# How Should Libya Diversify its Economy

**Karim Zahreddin Ben Alashher**

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Approval of the Institute of Graduate Studies and Research

Prof. Dr. Ali Hakan Ulusoy
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Business Administration.

Prof. Dr. Melek Şule Aker
Chair, Department of Business Administration

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Business Administration.

Prof. Dr. Melek Şule Aker
Supervisor

Examining Committee

1. Prof. Dr. Melek Şule Aker

2. Prof. Dr. Ahmet Aker

3. Asst. Prof. Dr. Mehmet İslamoğlu

# ABSTRACT

This research looks at the crude oil export dependent Libyan economy and investigates which other industries are suitable for Libya to diversify its economy into so as to enable more sustainable economic growth in the long-term. This study applies a theoretical model developed by MIT researchers on short-term and long-term economic diversification and applies it to the context of Libya over the last two decades. In this study specific attention will be devoted to providing suggestions for sectors to invest in and strengthen the Libyan economy for continued sustainable growth. The author is aware that the diversification process requires careful financial planning as well as large investments over time, and that these investments would be provided through local sources although outside assistance may be sought from international organizations and private sources.

Accordingly, this study conducts a trend analysis, using SPSS, on the Libyan exports and imports between 2000 and 2019, observes the short-term and long-term growth potential of various sectors in order to provide a roadmap for diversifying Libya's income sources in the coming years. Results are in line with the theoretical MIT model which proposes that short-term diversification must be around a cluster of products and services that are closely related to the primary-income source of the country. The author is aware that a model which fits a large economy may not be suitable for a small economy.

When this study applied this model to Libya, results show that the short-term sectors that provide the highest return in that country's context are petroleum product sectors

such as petroleum coke, refined petroleum, coal tar oil, asphalt and asphalt mixtures. It was also proposed that the sectors necessary for long-term growth and sustainable development are tourism and agriculture.

**Keywords:** Economic diversification, Libyan economy, sustainability, oil export dependence

# ÖZ

Bu araştırma ham petrol ihracatına bağlı Libya ekonomisini inceleyerek, hangi diğer sektörlere yatırım yapıldığı takdirde, uzun vadede daha sürdürülebilir bir büyüme sağlanacağını incelemektedir. Bu çalışma, MIT araştımacılarınca geliştirilen ve kısa dönem ve uzun dönemde ekonomik çeşitlendirmenin teorik bir modelini, son yirmi yılda yer alan veriler ışığında Libya ekonomisine uygulamıştır.

Buna göre, 2000-2019 döneminde Libya ihracat-ithalat verilerinde, SPSS kullanılarak eğilim analizleri belirlenerek, çeşitli sektörlerin kısa ve uzun vadedeki büyüme potansiyelleri gözlemlenmiş ve gelecek yıllarda Libya'nın gelir kaynaklarının çeşitlendirilmesi için bir yol haritası önerilmiştir. Bir ülkenin ana gelir kaynağına yakın ürün ve hizmetlerin kısa dönemde çeşitlendirmenin odağı olmasını öneren teorik MIT modelini bu araştırmanın bulguları birebir desteklemektedir.

Bu araştırma bu modeli Libya'ya uyguladığında elde edilen sonuçlar göstermektedir ki kısa vadede bu ülkeye en yüksek getiriyi sağlayanlar petrol ile ilişkili sektörler olan rafine petrol, petrol kok (endüstriyel yakıt olarak), kömür katran yağı, ve asfalt ve asfalt türevi ürünlerdir. Uzun dönemde sürdürebilinir büyümeye katkı sağlayacak sektörler ise turizm ve tarım olarak gözlemlenmiştir.

**Anahtar Kelimeler:** Ekonomik çeşitlendirme, Libya ekonomisi, sürdürülebilirlik, petrol ihracatı bağımlılığı

***To my Parents, Brothers, Uncles and Aunts.***

***Without them I couldn't have made it this far.***

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# INTRODUCTION

## 1.1 Background of the Study

Economic diversification has historically helped countries grow and maintain stable economies through creating multiple sources of income. Economic diversification. generally helps countries maximize economic growth in the long-run and lowering the risk of depending on a single income source (UNFCCC, 2018).

A stable macroeconomic environment is created by the introduction of policies that strengthen the private sector and the social programs that provide a higher quality of life for the citizens (Callen et al., 2014). To this it must be added that the government of the country in question should be ready to undertake the necessary infrastructural investment and also have the necessary funds to do so.

An optimal and efficient strategy in order to implement diversification is one that will evolve over a long period of time, the first stage being investing in related activities due to the low-risk nature that these activities have and they are much less likely to fail compared to riskier activities (Ramcharan, 2005).

The main benefit of diversifying an economy is creating a structure that has room to grow as well as being flexible in times of shocks, when these shocks can lead to a dip in the countries' growth rate (Li, 2003).

The main obstacle and challenge that countries face when attempting economic diversification are costs due to building a strong infrastructure for different sectors and industries (Mansour, 2013).

Existing cases of countries implementing economic diversification strategies or beginning the process can be seen in Saudi Arabia, Kuwait and Qatar. These nations historically have been heavily reliant on their oil sector. However, as time has passed, they made great efforts to diversify their economy away from the dependence on crude oil exports ("Vision 2030 of the Kingdom of Saudi Arabia," 2016). Furthermore, it is important to note that these countries are on the path to diversifying their economies, and are not yet fully diversified.

Libya gained independence in the 1950's and during that period the country was relatively considered to be economically poor. In the 1960's oil was discovered and the country's fate changed drastically and it had experienced an economic boom from its crude oil exports. The main problem with the Libyan economy is its heavy dependence on the export of crude oil. 69% of Libya's earnings come from exporting oil and gas and the same sector accumulates 60% of Libya's GDP, (OPEC : Libya, n.d.).

Fossil fuels are created over a long period of time from the remains of various living creatures and organisms, fuels such as gas, oil and coal are examples of natural fuels.

The Libyan economy has recently suffered from the ongoing civil war. There are fluctuations in the economic growth at the present and it is far from reaching a stable point.

Tourism, transport and agriculture are sectors which the Libyan government may choose to invest in as the nation has a rich history, culture and attractions such as the Mediterranean coastline which can be used for its touristic value. Moreover, agriculture will be a very beneficial sector to invest in due to the fact that only 25% of the countries food requirement is produced locally (Zurqani et al., 2019), strengthening this sector could lower the Libyan governments food expanses that could be used then on other sectors. Additionally, transport services could prove to be a very beneficial sector to grow considering Libya's unique position between Europe and Africa, as well as connecting the Arab Maghreb countries to Egypt and the Middle Eastern countries.

## 1.2 Problem statement

Academics have discovered that economic diversification can have a very high implementation cost, especially if not done correctly. Moreover, the dependence of exporting oil as the main income source is a major problem due to the oil reserves running out in the future (Ritchie & Roser, 2020). So, it is truly imperative that Libya develops alternative economic activities as soon as possible.

The civil war that occurred in Libya had a lot of collateral damage. Unemployment is one of the main problems that the country is facing, and strengthening the different sectors in the country and building a stable economy will help reduce unemployment (Statista, 2021). Liquidity is also suffering as a result of the war, monetary and financial liquidity is lacking due to the decrease in production and large increase in imports to satisfy local requirements (Mohammad et al., 2020).

## 1.3 Aims and Objectives

The main aim of this study is to show that the Libyan economy is far too dependent on crude oil exports as an income source to fuel the economy, as well as providing reasons

as to why the economy should be diversified to create a more sustainable future for the country.

The objective of the study is to create a roadmap for diversifying the Libyan economy, and providing a clear set of steps to follow in both the short-term and long-term, to pave the way for a sustainable economy in the near future.

## 1.4 Study Question

1. Is the Libyan economy too dependent on crude oil exports?
2. What sectors have the potential to expand as Libya adopts economic diversification policies?
3. Are petroleum products viable income sources in the short-term?
4. Will focusing on non-oil sectors provide a sustainable economy in the long-term?

# Chapter 2

# LITERATURE REVIEW

## 2.1 Economic Diversification

According to The United Nations “Economic diversification is the process of shifting an economy away from a single income source toward multiple sources from a growing range of sectors and markets.” (UNFCCC, 2018).

This is an economic strategy undertaken by countries to maximize growth over the long term, which is especially efficient for underdeveloped or developing resource rich countries that are dependent on a single resource, due to the untapped potential of their economy.

A study conducted by Gelb (2010) found that the main reason as to why the countries should diversify their economies, especially in the case of oil dependent countries is that diversifying local production and exports is heavily associated with higher long-run growth, as well as a more stable economy that is more protected against future threats and market shifts in certain sectors.

When a country has a high GDP, high income and is rich in resources, then it has more options when it comes to diversifying their economy, giving them a wide variety of sectors to invest in, as well as the option to invest in sectors that become profitable over long periods of time or requires a high initial investment.

Furthermore, Gelb (2010) also found that developing countries in general have been successful when it comes to economic diversification. Although different methods were used, the main one in most cases has been the focus on industry. It can be observed historically, that when countries move from exporting primary products to exporting industrial products, the shift comes with major growth of the country's economy, there are many examples of this shift in the past century such as: China, South Korea and India.

Research conducted by Callen et al. (2014) discovered that due to the volatility and uncertainties associated with the oil market for the oil dependent economies, economic diversification could prove very useful in reducing these fluctuations. This is also true to other countries dependent on single export primary goods. Moreover, this is likely to reduce unemployment rates overtime by creating job opportunities in the public and private sectors. In addition, according to recent studies, due to the finite nature of oil, and its depletion in the foreseeable future, oil dependent economies must diversify before oil becomes a non-viable income source. Finally diversifying the economy will allow for sustainable growth over time and raising production levels.

## 2.2 Policies of Economic Diversification

Introducing policies that create a more stable macroeconomic environment and bolsters the private sector as well as investments in education and infrastructure or specifically targeting certain sectors to aid their growth should be the main aim of the policymakers (Callen et al., 2014). These types of policies, assist in creating a fertile ground for a future diversified economy. Additionally, these policies should be based on research on policies from countries that successfully diversified their economies such as South Korea and China.

Historically, we can see that countries that increase spending on infrastructure and education achieve high levels of growth with little inflation. This aids in creating a healthier macroeconomic environment. In addition, reforming laws and regulations regarding private businesses creates a better environment for investors and entrepreneurs to cultivate industries and sectors with the beneficial side effect of lowering unemployment and increasing general income and standard of living.

## 2.3 Strategies of Economic Diversification

Alshamsi et al. (2018) have found that the strategy to diversify an economy that has low levels of industrial diversity, the optimal strategy is one that evolves over time, starting with investing in related activities as they found that these are low risk endeavors since riskier endeavors are more likely to fail at early stages of diversification. This will serve to slowly build the economy's capacity over time, eventually reaching a stage with more diverse industries although mostly related. At that point the focus should be shifted towards more connected activities, this might seem to slow down the diversification, but it is necessary for future growth and will serve to create a better framework for future industrial development beyond that stage the focus can be widened to encompass more complex or more advanced forms of industry. This will be the recommended strategy and the one we will be focusing on in this study.

Researchers at the Massachusetts Institute of Technology (MIT) have developed a model to predict the optimal behavior of economies in the process of diversification and have found that the real life behavior of economies in that process is close to the optimal behavior predicted by the model with one of the glaring differences being that countries undergoing this process take too many risks or too big a risk in the early

stages of the process while taking very little or no risk in the later stages. While the optimal behavior predicted by the model suggests that the opposite should be optimal behavior, that being taking risks later in the process and being more risk averse in the earlier stages (Alshamsi et al., 2018). This model is targeted at single income source dependent economies, and is a perfect model for the Libyan economy. The model is based in 2 steps:

The first step: In the short-term which in the case of developing an economy ranges from 5 to 10 years or more depending on the economic environment and the state of the sector in question, the country should find and focus on products related to the main income source of the country, improve their production and turn them into reliable sources of income in their own right. This is considered a low-risk investment due to the sector already having sufficiently developed infrastructure to support it lowering the risk further if there exists a demand for these products in the local markets or the ability to export them to foreign trade partners. In Libya's case this would be petroleum products.

The second step: In the long-term, the country should identify possible sectors that could provide sustainable long-term growth which in the case of developing new or underdeveloped sectors refers to a period of 10 years or more after the access to the funds to grow them becomes available and also depending on the level of development of the sectors in question, investing in their infrastructure and in their development. This is considered a high-risk investment due to these sectors being underdeveloped and thereby incurring high costs to reach a profitable and sustainable level adding to the risk of entering new and possibly very competitive markets, as these sectors are usually extremely underdeveloped and require large investments; in Libya's case this

would be tourism, transport and agriculture, subject to the proviso that the necessary funds for the structural investments of all of these sectors are forthcoming. It is also important to note that at the present moment with widespread infections of Covid-19 all over the world tourism is not doing too well. And that the uncertainties arising from the epidemic does not make the tourism sector too attractive at the present time.

## 2.4 Benefits of a Diversified Economy

The main benefit of a diversified economy is also the main reason an economy should be diversified; it is to create an economic structure for the country that remains flexible and capable of growth in spite of shocks and external negative effects to certain sectors or industries. In a single income source dependent economy, economic shocks could cause a massive drop in growth or even negative growth depending on the size of the shock in that market. The main aim of diversifying an economy is to create an environment that lowers risk and has more growth potential.

Ramcharan (2005) has found that economies that are focused on one income source as opposed to diversified economies, suffer more from shocks due to exogenous sources such as natural disasters. Furthermore, the effects of these shocks hit harder if the shock is related to the main income source.

Additionally, researchers at Yale University have shown that the emerging market economies, by implementing economic diversification, increase the expected returns and lower the general risk of investment and allow investors to have a more diversified portfolio and increase their likelihood of investing more, allowing for further growth opportunities from direct investments (Li, 2003).

## 2.5 Challenges of Economic Diversification

There are some challenges to diversifying an economy as well as some obstacles to be overcome on the way. Starting with cost, the efforts to diversify an economy will incur relatively high costs in bolstering and building industries and sectors that may have been left underdeveloped for years. Of special importance is the cost of building infrastructures necessary for the nascent sectors. Furthermore, following the correct diversifying methods and implementing as well as adhering to proper policies is crucial. Especially in the early stages, to create the proper framework for the diversification of the economy, and therein building that framework lies as the main challenge. Beyond that, proper advertisement and the providing good investment opportunities will allow the markets to evolve on their own (Mansour, 2013).

## 2.6 Existing Cases of Diversifying Economies

In this section we will be looking at three existing cases of Saudi Arabia, Qatar and Kuwait, for their economic diversification experience and we will be seeing what methods these countries used in order to diversify their economy in order to help build a sustainable future.

### 2.6.1 Saudi Arabia

Starting with Saudi Arabia as an example, in the 1970's and 1980's they experienced a boom in their economy due to oil export revenues, and have since decided to grow the sectors outside the oil sector using this capital, before then they had a tribal economy based in agriculture and animal herding. They have since set an economic diversification plan starting in 1970-1975 that spans over many decades with many steps along the way to create a diverse economic structure (Ministry of Economy and Planning, 2017). In the most recently concluded development plan: in the Ninth Development Plan (2015-2019), the focus is on the continued efforts to consolidate

their economic diversity, adopting a set of key macroeconomic objectives such as: diversifying the structure of the national economy and achieving balanced development across the country, while also aiming to improve social issues such as: unemployment and improving living standards, as well as economic initiatives to increase the contributions of the private sector to the development process. As well as setting goals that can be measured in increasing their real GDP and improving the contribution of the non-oil sectors to the GDP and they met these goals.

The results varied over the years in Saudi Arabia, as for example in the Eighth Development Plan (2004-2009), they set targets of lowering country-wide unemployment as well as increasing the percentage of nationals employed in both the public and private sectors, but have unfortunately fell short of the set goals, this however served to re-evaluate their goals and targets and the following plans hoped to adjust to avoid similar shortcomings (John Sfakianakis, n.d.).

Furthermore, it is important to mention that regardless of the direct effect of the diversification efforts on the petroleum industry and GDP, many other benefits have been incurred over the years. Due to these efforts to make Saudi Arabia a better country in general in terms of healthcare, education and industrial growth, the initial steps carried out in the first few development plans and the subsequent plans have modernized infrastructure, created a safe investment environment, improved social programs like education and health, as well as improving the overall quality of life in the country. In that process they funded growth in two fishing cities: Yanbu and Al-Jubail, turning them into industrialized port cities that create many jobs and opportunities and they are still growing.

Currently, Saudi Arabia is working on a new project set out to create a better future for the country, and set to make a measurable improvement in many sectors of the country, from quality of life, to employment, and to further efforts towards diversifying the economy, specifically in the housing, healthcare, financial development and private sectors ("Vision 2030 of the Kingdom of Saudi Arabia," 2016). The project titled "Saudi Vision 2030" is ongoing and seems to be a functional replacement for the periodic development plans, albeit being executed over a 10 year period as opposed to the 5 year length of the previous plans. In the case of Libya financing similar projects, it would require a more focused approach than large spending across many sectors as it would be difficult to finance as Libya's crude oil income is the fifth of Saudi Arabia's, how to approach this development is the main focus of this study.

As for their economy's dependency on oil, their oil as a percentage of GDP currently is at 42% while the other 58% is mainly divided between other industries such as plastics and chemical products as well as services with the minor contribution of agriculture at 2.6%, with the efforts over the years trying to improve the effect of other sectors on their GDP (Forbes, 2018).

### 2.6.2 Qatar

Morakabati et al. (2014) states that Qatar tackled their dependence on oil by diversifying their exports, building a framework for tourism and overall development in order to build a future which the country will no longer depend on oil and gas as their main source of income, Qatar plans to diversify its economy first through tourism and plans to later create a more in-depth roadmap for its other sectors. An advantage

Qatar has is that they have an abundance of capital although they are lacking non-energy resources.

Qatar is improving their tourism sector by implementing a strong image as a tourism destination as well as taking steps to sponsor and host international sports events such as the world cup. In addition, they are assuring the safety of tourists and residents, the political stability of the nation and the personal freedoms of its citizens and guests. Furthermore, they are making sure that they maintain their cultural and religious values and traditions. Furthermore, since the inception of the diversification plan Qatar has planned mega projects that will all be finished in time for their hosting of the 2022 FIFA world cup, costing an estimated total of 190 billion USD, Qatar hopes to generate the expected revenues from these projects as well as using the infrastructure for future economic undertakings to provide long-term use and value from them in the form of the Doha metro and improvements to expressways, as well as creating more opportunities for foreign direct investments in the future.

As for their economy's dependence on oil, it currently accounts for 40% of their GDP, and is 63% on government revenue (*Qatar Overview of Economy, Information about Overview of Economy in Qatar*, n.d.)

### 2.6.3 Kuwait

Al-Kawaz (2008) states that Kuwait has begun its economic diversification process by creating "vision 2035", where the economy will be dominated by the private sector, the country will be attractive to investors and the nation will be a dominant force in the region and internationally by becoming a center for trade and a financial powerhouse. The project includes labor market and human capital reforms as well as creating a favorable business environment for foreign investors. The government

hopes to achieve all these via the process of economic diversification and investing in and reforming social programs to help move their citizens over the entitlement barrier and become skilled workers and entrepreneurs instead of passive investors. The nation is already under the process as 83% of all businesses in Kuwait are now in the non-oil industries. Although Kuwait's focus on tourism has been lower compared to other gulf countries, they still are taking measures to turn Kuwait a touristic destination once the pandemic is over and growing the hospitality industry is one of their long-term plans.

As for their economy's dependence on oil, it currently accounts for 40% of its GDP and is 92% of their export revenues (*OPEC : Kuwait*, n.d.).

## 2.7 History of the Libyan Economy

The modern history of Libya starts in the 1950's after it gained its independence from Italy and was reunited into one single nation. During these times the country was poor until the eventual discovery of oil in 1962. Before then, it was extremely underdeveloped and poor due to lack of natural resources, harsh weather conditions, lack of land fit for agriculture and an inexperienced workforce. However, after the discovery of oil, the economy of Libya experienced a boom due to the influx of revenue from crude oil exports (Masoud, 2013). The United Nations economic experts have stated before that the Libyan economy prior to extracting and exporting oil was a backward economy, meaning that it showed no indication of any positive economic growth (Mabro, 1972). In the 1970's, the Libyan Government issued plans in order to expand the agricultural sector, which resulted in its rise to about 9.2% of the GDP, the following development plans would focus on industry and by the mid 1980's would grow 23%. However, between 1973 and 1997 as the GDP of the country grew and the labor force moved to the services industry and most of the industrial sectors declined

due to the increasing dependence on crude oil, and the contribution of the industrial sectors to GDP would decline from 77.4% to 24.9% over these 3 decades, research as to why this happened concluded that it was due to the decrease of the oil prices and has found that a 10% increase or decrease in international oil prices would cause an increase or decrease of 3% in the GDP (United Nations Development Programmes, 1999). Between 1996 and 2000 the country implemented a social and economic program, targeting the production and service sectors providing them with the goods and services required in order to lower the import requirements for these markets, the markets in question are in the industrial, agricultural and staple goods sectors, planning large investments over the years to these sectors but have since been abandoned and remain a small part of the GDP (Masoud, 2013).

## 2.8 Issues with the Current Libyan Economy

According to (OPEC : Libya, n.d.) the major issue of the Libyan economy is its historical and current dependence on the export of crude of oil. Exporting oil and gas accumulate up to 69% of Libya's earnings from exports, and 60% of Libya's GDP comes from the gas and oil sector.


Figure 1. Libya GDP Annual Growth Rate (% compared to previous year) 2000-2019 (World Bank Group, 2021)

After the Libyan revolution in 2011 and the ensuing civil war, the economy initially suffered decline. However, since then the country's economy has been experiencing fluctuations in economic growth and the economy has struggled to reach a stable and sustainable state (Khan & Mezran, 2013). This is shown in Figure 1, as you can see the annual fluctuations in GDP compared to the previous year, the increase in 2012 was due to the start of oil production and exports again after the revolution. However, soon after the civil war, many hurdles in production and export were observed, they caused these fluctuations in the following years.

## 2.9 The Dependence of the Libyan Economy on Oil

The concerns over the future of oil as a main income source are shared by many scientists and researchers around the world, and Libya's biggest source of income is from its crude oil exports, as can be shown in Figure 2:

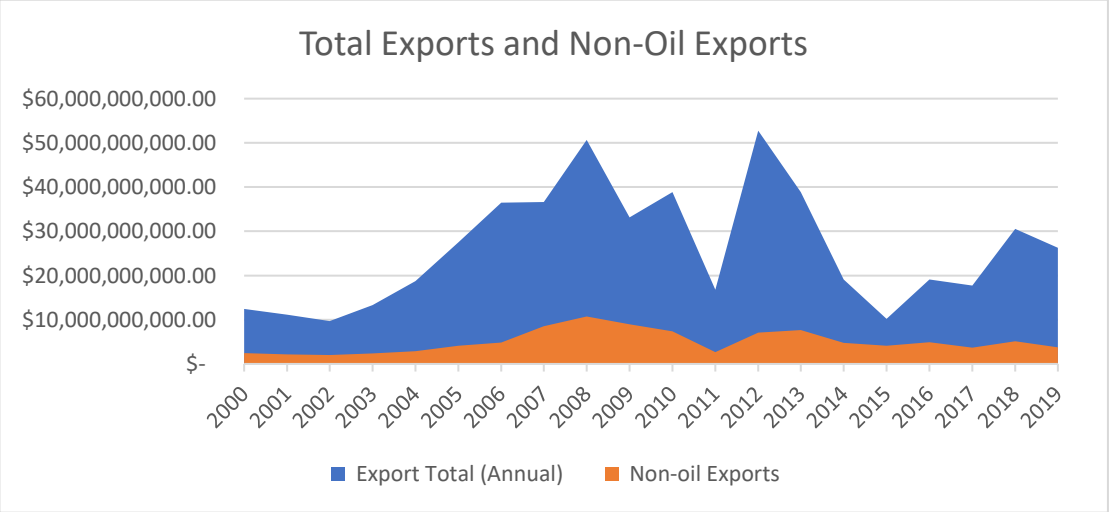


Figure 2. Area graph showing total exports and non-oil exports (in USD) 2000-2019 (World Bank Group, 2021)

Here we can see that not only is oil the biggest part of the export revenue (averaging just barely under 80% of total exports between 2000 and 2019), without it the economy would probably not survive. This is a worrying sign due to the unbalanced rate at which

fossil fuels are formed and the rapid rate at which they are consumed. Furthermore, we can see from Figure 2 that the total exports and the non-oil exports mirror each other in most peaks and troughs.

Shafiee & Topal (2009) conducted a study on when fossil fuels will run out by developing a model based on a modified version of the Klass model that econometrically that displays the relationship between multiple variables, including fossil fuel reserves, in order to estimate the longevity of natural resources such as oil, gas and coal and have found that theoretically based on their formula oil will last another 21 years which means by 2042 oil will not be a reliable income source.

Research conducted by Ritchie & Roser (2020), using the reserves to production ratios found that we have about 50 years of oil remaining. Although it is important to mention that this is a static measure based on figures from 2015 and the actual values might vary, though the idea remains the same, that is depending on oil as the sole income source is not a secure economic policy for the economy in the long-term, especially for a country whose economy dependent on crude oil exports such as Libya.

## 2.10 Future Fossil Fuel Shortage

The main problems with fossil fuels are that they take a very long time to form naturally and since that process takes far longer than the rate at which they are exploited by current human consumption. Thereby, we cannot depend on the current gas and oil deposits to sustain any oil dependent economy in the long-run (Mann et al., 2003).

According to Shafiee & Topal (2009), from what we know the worlds' fossil fuels reserves are being depleted at the current consumption rate, the researchers found that

the oil, gas and coal reserves will be depleted in 35, 37 and 107 years respectively. This shows us that by 2042 at the current estimate, oil depended economies will struggle to maintain or achieve positive growth and will suffer economically due to these circumstances.

## 2.11 Potentially Important Sectors to Invest in

Economic diversification will help to create a sustainable economy in Libya. In order to diversify the economy, the Libyan government has to invest in different sectors to create an economy that can stay strong even when one of its main sources of income is threatened, such as if oil prices go down internationally or if oil production drops for some reason. We suggest that tourism, transport and agricultural are potential sectors to invest in due to the the future prospects of these sectors as previously mentioned.

According to Zurqani et al. (2019), the agriculture sector could be a sector to be invested in. Currently Libya's entire agriculture sector only provides 25% of Libya's food requirements, while the rest of the country's requirements are imported. Additionally, Libya has access to water from the Great Man Made River pipe network projects to supply the water demands for the expansion of the agricultural sector, it provides billions of liters of water to cities in Libya every day from the Nubian Sandstone Aquifier System, which is an underground natural water aquifer system that contains an estimated 150,000 $km^3$ of goundwater. Benefits of investing in agriculture is that Libya will become more independent for their food supply as well as creating more jobs in sectors outside of the oil and gas industry, allowing for a more skilled and capable labor force.

Tourism and transport are sectors with a lot of potential. In the case of tourism; due to Libya's rich culture, history, archeology and most importantly their vast 1,770 km long Mediterranean coastline. Due to the fact that Libya has been so oil reliant there were no major investments in this sector. A good indicator that tourism will be a successful sector to invest in is the success of their neighbors, Egypt and Tunisia, these two nations have utilized tourism and are major attractions in North Africa (Danis, 2006), in the case of Tunisia: they spend around 71 million USD every year on their tourism sector, while the initial costs were covered by international investments by large hotel companies. There also exists many sites worth visiting in Libya for their historical significance such as Leptis Magna's Carthaginian and Roman ruins as well as many destinations in the desert that show the rocky terrain and sand dunes of the Sahara Desert. In the case of transport; Libya has a unique location between Europe and Africa, as well as connecting the Arab Maghreb countries (Tunisia, Algeria, Morocco and Mauritania) to Egypt and the Middle Eastern countries, both in transport of goods and people there lies potential for growth in the transport sector, as well as the tourism sector's travel services.

# Chapter 3

# HYPOTHESIS

## 3.1 Petroleum Products as Potential Income Sources

According to MIT researchers, the first step to diversify the economy is focusing on related products to oil (the main income source of Libya) as income sources, as it is less risky and has the most infrastructure, which will aid in creating a portfolio of exports (Alshamsi et al., 2018). In the case of Libya, focusing on petroleum products is the logical step, as it has been producing petroleum products but in low quantities while relying on exports to meet the varying demand. We can see in Figure 3 and Figure 4 for example, the large disparity between the imports of asphalt and the exports respectively:

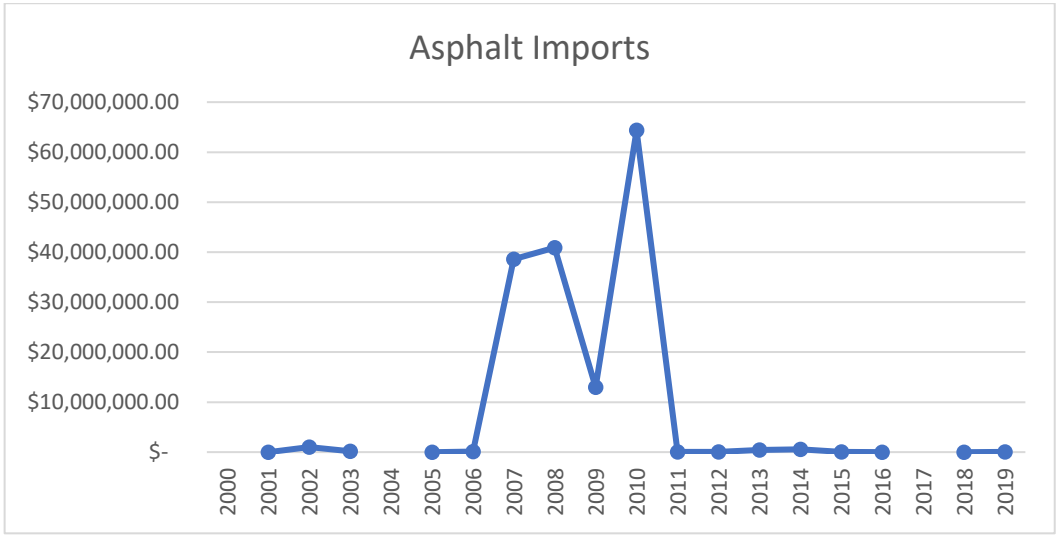


Figure 3. Line graph showing Libya's asphalt imports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

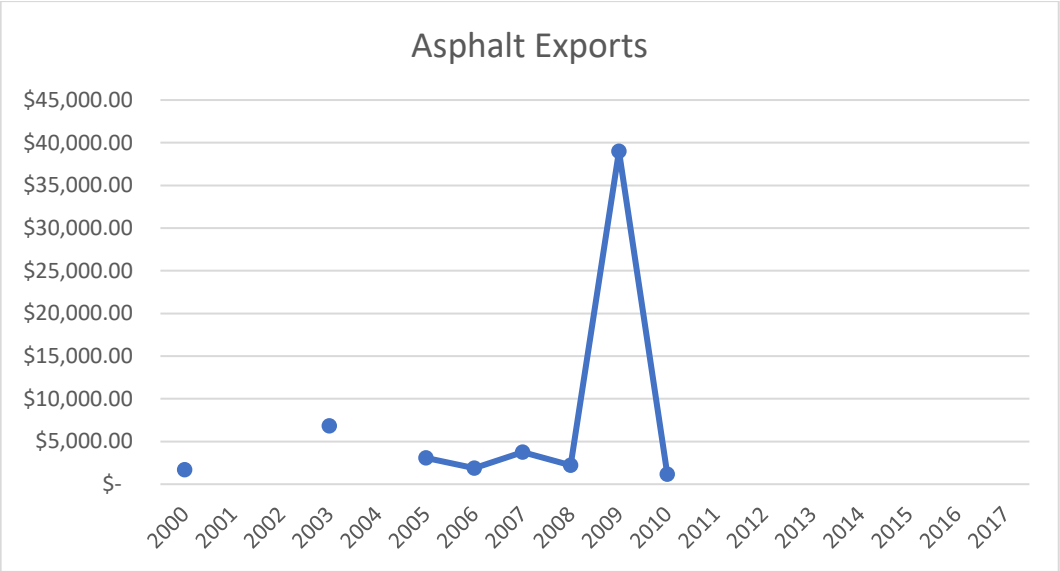

Figure 4. Line graph showing Libya's asphalt exports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

Figures 3 and 4 show that producing these products would help meet the local demand instead of importing the product while also generating revenue through exports, we can see that most years there are no exports of asphalt while almost every year it is imported, the year that showed the most exports also showed a significant decrease in imports compared to the few years before and after it. This is also the case for other petroleum products that will be shown later in the analysis chapter. Thus, we take H1 as follows:

*H1: Manufacturing petroleum products will help in creating multiple income sources, decrease imports and decrease the dependence on oil in the short term by reducing the imports and utilizing the revenue from the exports*

## 3.2 The Long-term Focus on Developing Non-Oil Sectors

Following the conclusion of the MIT researchers, the next step after strengthening related products to the main income source, the country can focus on the underdeveloped and much riskier unrelated products (Alshamsi et al., 2018). In this case, Libya can focus on agriculture, transport services and tourism services that have

been left underdeveloped since the oil has been fulfilling its role as a reliable income source, and has left other sectors in a weak state. Using the revenues from the oil related products as well the capital not spent on imports for these products, Libya can start investing in and growing their other sectors.

Libya's services sector including transport and travel as two major actors, has been a growing sector for a long-time, the services sector as a whole, accounts for 34% of Libya's GDP as well as 59% of labor force occupation, and yet it remains underdeveloped and not meeting its potential. Libya has invested around than 15% of government expenditure in the services sector in 2020 which is higher than previous years, this includes healthcare and education as well as travel and transport services, and only to maintain the current state of these services, with special note to the very small effort of the government to help its citizens throughout the covid-19 pandemic. These services sectors could provide far more for the Libyan economy, as previously mentioned: the tourism sector could exploit the Mediterranean coastline and the historical sites for touristic value, and the transportation sector could utilize Libya's unique position to transports goods and people between Europe and Africa as well as connecting the Arab Maghreb countries to Egypt and Middle Eastern countries.

As for the agricultural sector, as mentioned preciously Libya produces only 25% of its food requirement, relying on imports for the rest. Therefore, strengthening this sector could prove useful in decreasing spending on food stuffs, and possibly achieving complete self-reliance in this regard. Agriculture remains a small part of the Libyan economy even though the country has access to billions of liters of water every day from the Great Man-Made River, that has not even utilized its full capacity to withdraw

water as only 378 of the possible 1300 wells are actively being used. Thus, we take H2 as follows:

*H2: Focusing on sectors unrelated to oil after the related sectors are strengthened will create a more sustainable economy in the long-run*

# Chapter 4

# METHODOLOGY

## 4.1 Data

The data used for this study comes mostly from the World Bank Group as they provide economic data repositories for all countries, specifically the data collection on Libya's economic activity from 1960 to 2019 (World Bank Group, 2021). As well as The Observatory of Economic Complexity, from which the detailed annual export and annual import data was collected for the years between and including 2000-2019 (OEC - The Observatory of Economic Complexity, 2020). This study will focus on the data from 2000 to 2019, as the most recent data is more appropriate to estimate Libya's potential output for the upcoming years.

Other sources include other economic and statistic data series sites such as Statista and the Federal Reserve Economic Data (FRED) databases, that helped obtain miscellaneous data and graphs that show implicit information from the previous sources.

## 4.2 Trend Analysis Using Linear Regression

In this analysis we will be using linear regression to test the data for possible trends (Kivikunnas, 1998). For the purposes of this study the year 2000 will be considered year 1 and from then we will arrive to the equations that will predict the future values of the production, this works by fitting the data into a model with the following equation:

$$Y_{it} = c_{it} + B_{it} X_{it} + e_{it} \quad (1)$$

i is the product

t is time

$Y_{it}$ is the production volume of i in time t

$c_{it}$ is the constant of the equation

$B_{it}$ is the coefficient of the independent variable at time t

$X_{it}$ is the independent variable being time from year 1 of the study onwards

$e_{it}$ is the error term of the equation

## 4.3 Variables to be Tested

In this research, and in accordance with our hypotheses, we will be testing three different groups of data:

First of all, data related to Libya's oil dependence, where we expect to find no trends due to the fluctuating nature of oil prices, but also high annual values that sustain the Libyan economy in its current state. These variables are: crude oil exports, oil real GDP growth, non-oil real GDP growth, and total exports.

Second, data related to the oil sector, where we expect to find no trends in the exports and a positive trend or no trend for imports, as we assume that aside from the extraction and exporting of crude oil, the sector is stagnant and underutilized, and these variables are: imports and exports of asphalt, imports and exports of asphalt mixtures, imports and exports of refined petroleum, imports and exports of coal tar oil, and imports and exports of petroleum coke.

Finally, data related to the underdeveloped sectors that either provided value in the past or is important for future sustainable growth, in these variables we expect to see

no trends currently, especially for exports, and any positive trend would be either for imports or in the past due to the ongoing civil war interrupting these sectors, these variables are: imports and exports of agricultural raw materials, imports and exports of travel services, and imports and exports of transport services.

# Chapter 5

# DATA ANALYSIS

## 5.1 Trend Analysis

A trend analysis test was conducted on all the products mentioned in this study, and all existing trends will be explained here as well as displayed on the figures later in this chapter to distinguish them and illustrate the trends.

The test found that the only significant and strong positive trend in exports to be exports of travel services with p-value = 0.002 as shown in Table 2 and Pearson correlation value of 0.657 showing a relatively strong positive correlation as shown in Table 1, although these services grew due to the Libyan revolution limiting access to foreign travel services in and out of Libya. Regardless, the Libyan government must still ensure a suitable environment and strong infrastructure for them to continue to grow into the future.

Table 1. Correlation analysis of travel services exports and time

| | | Correlation | |
|---|---|---|---|
| Pearson Correlation | Travel Services_Exports | 1.000 | 0.657 |
| | Time | 0.657 | 1.000 |
| Sig. (1-tailed) | Travel Services_Exports | | 0.001*** |
| | Time | 0.001*** | |
| N | Travel Services_Exports | 19 | 19 |
| | time | 19 | 19 |

Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 2. Regression analysis of travel services exports and time

| Model | ANOVA[a] | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 4.301E+18 | 1 | 4.301+18 | 12.920 | .002[b]** |
| Residual | 5.659E+18 | 17 | 3.329E+17 | | |
| Total | 9.960E+18 | 18 | | | |

a. Dependent Variable: Travel Services_Exports
b. Predictors: (Constant), Time
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 3. Coefficients of trend formula for travel services exports and time

| Model | Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | Unstandardized coefficients | | Standardized coefficients | t | Sig. | 95% Confidence interval bounds for B | |
| | B | Std. error | Beta | | | Lower | Upper |
| (Constant) | 387036842.105 | 275546594.665 | | 1.405 | 0.178 | -194315655.738 | 968389339.949 |
| Time | 86865789.474 | 24167035.054 | 0.657 | 3.594 | 0.002** | 35877802.446 | 137853776.501 |

a. Dependent Variable: Travel Services_Exports
Note: * = p < .05, ** = p < .01, *** = p < .001.

Additionally, the formula for the trend can be expressed as follows based on the findings from Table 3, using the unstandardized coefficient of time, while the constant of the equation was found to be not significant and therefore not used:

$$Y_{TAE\,t} = 86865789.474 * X_{TAE\,t} + 24167035.054 \quad (2)$$

Using that Equation (2), we can predict the next 10 years of travel services exports if it continues to grow at this rate to see the potential revenue it could generate, would as follows in Table 4 and shown in Figure 5:

Table 4. Prediction for the 10 years between 2019 and 2028 for travel services exports

| Year | Value (in USD) |
|---|---|
| 2019 | 1,066,556,508.744 |
| 2020 | 1,153,422,298.214 |
| 2021 | 1,240,288,087.694 |
| 2022 | 1,327,153,877.164 |
| 2023 | 1,414,019,666.634 |
| 2024 | 1,500,885,456.114 |
| 2025 | 1,587,751,245.584 |
| 2026 | 1,674,617,035.064 |
| 2027 | 1,761,482,824.534 |
| 2028 | 1,848,348,614.004 |

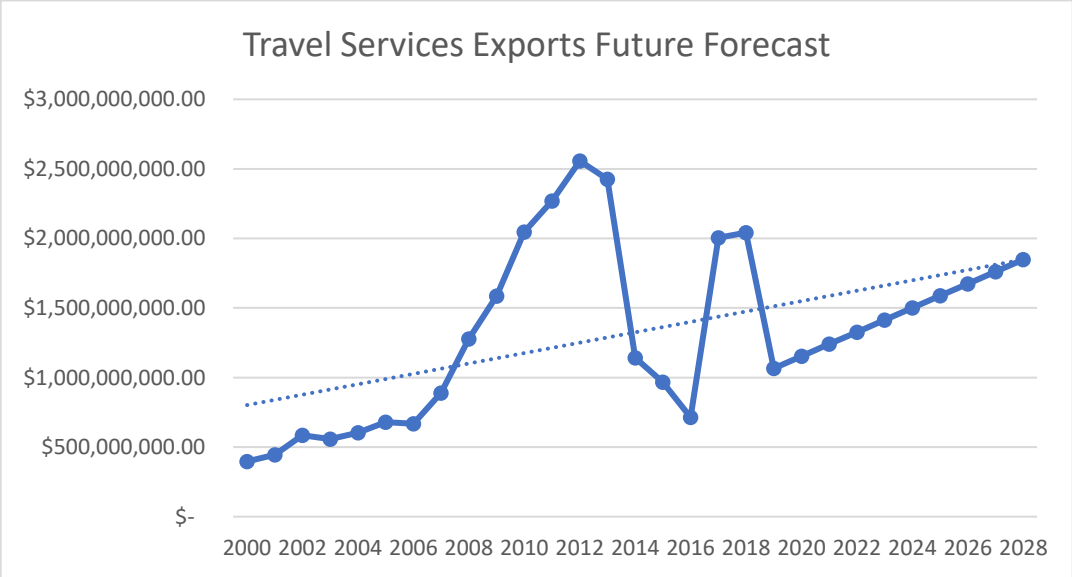


Figure 5. Line graph showing travel services exports historical data (2000-2018) and forecast data (2019-2028) (World Bank Group, 2021)

Furthermore, from the product imports, we find that both refined petroleum imports and transport services imports both show a significant and strong positive trend with

p-value = 0.001 and p-value = 0.019, that can be found in Table 6 and Table 9 respectively and Pearson correlation values of 0.680 showing a relatively strong positive correlation and 0.531 showing a moderate positive correlation, that can be found in Table 5 and Table 8 respectively, showing that in the coming years the imports of these products and thereby their annual costs are increasing while their exports are showing no signs of growth. The Libyan government should increase refined petroleum production to offset this trend by lowering their dependence on imports for refined petroleum, and using the freed funds to invest in other sectors.

Table 5. Correlation analysis of refined petroleum imports and time

| **Correlation** | | | |
|---|---|---|---|
| Pearson Correlation | Refined Petorleum_Imports | 1.000 | 0.680 |
| | Year | 0.680 | 1.000 |
| Sig. (1-tailed) | Refined Petorleum_Imports | | 0.000*** |
| | Year | 0.000*** | |
| N | Refined Petorleum_Imports | 20 | 20 |
| | Year | 20 | 20 |

Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 6. Regression analysis of refined petroleum imports and time

| **ANOVA[a]** | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 7.128E+18 | 1 | 7.12E+18 | 15.486 | .001***[b] |
| Residual | 8.285E+15 | 18 | 5.603E+17 | | |
| Total | 1.541E+19 | 19 | | | |

a. Dependent Variable: Refined Petorleum_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 7. Coefficients of trend formula for refined petroleum imports and time

| Model | Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | Unstandardized coefficients | | Standardized coefficients | t | Sig. | 95% Confidence interval bounds for B | |
| | B | Std. error | Beta | | | Lower | Upper |
| (Constant) | 254500385.384 | 315160994.638 | | 0.808 | 0.430 | -407628294.474 | 916629065.243 |
| Year | 103531249.259 | 26309131.513 | 0.680 | 3.935 | 0.001*** | 48257815.003 | 158804683.514 |

a. Dependent Variable: Refined Petorleum_Imports
Note: * = p < .05, ** = p < .01, *** = p < .001.

Based on the data from Table 7, the equation for refined petroleum imports using the unstandardized coefficient of time, while the constant of the equation was found to be not significant and therefore not used, would be:

$$Y_{RFI\,t} = 103531249.259 * X_{RFI\,t} + 26309131.513 \quad (3)$$

Using that Equation (3), we can predict the next 5 years of refined petroleum imports would be in the short-run as follows in Table 8 and shown in Figure 6:

Table 8. Prediction for the 5 years between 2020 and 2024 for refined petroleum imports

| Year | Value (in USD) |
|---|---|
| 2020 | 2,200,465,365.953 |
| 2021 | 2,303,996,615.213 |
| 2022 | 2,407,527,864.473 |
| 2023 | 2,511,059,113.733 |
| 2024 | 2,614,590,362.993 |

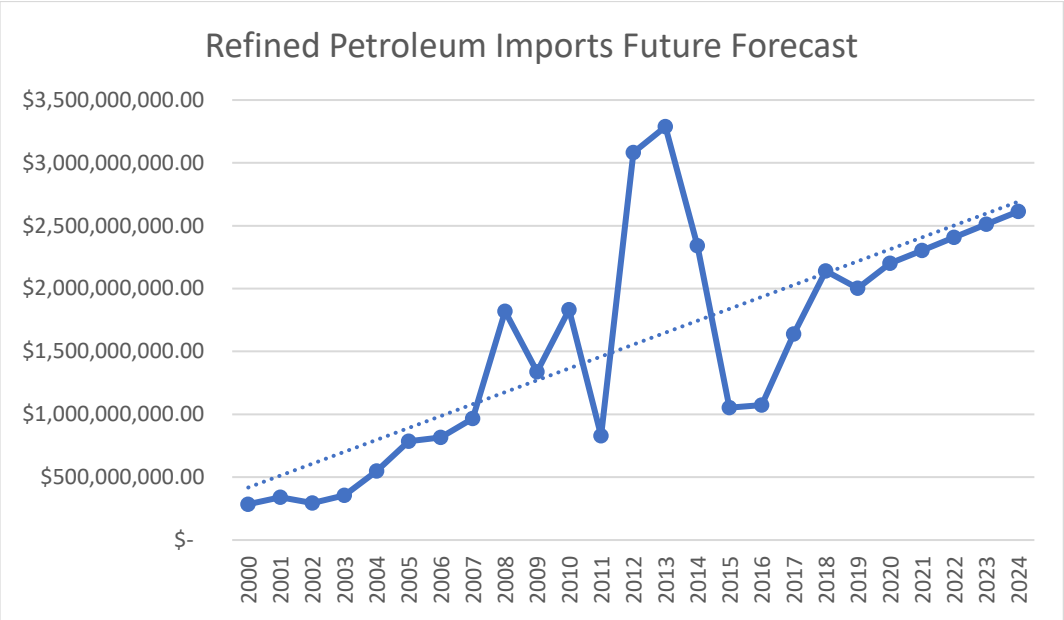

Figure 6. Line graph showing refined petroleum imports historical data (2000-2019) and forecast data (2020-2024) (World Bank Group, 2021)

Table 9. Correlation analysis of transport services imports and time

| Correlation | | | |
|---|---|---|---|
| Pearson Correlation | Transport Services_Imports | 1.000 | 0.531 |
| | Year | 0.531 | 1.000 |
| Sig. (1-tailed) | Transport Services_Imports | | 0.010** |
| | Year | 0.010** | |
| N | Transport Services_Imports | 19 | 19 |
| | Year | 19 | 19 |

Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 10. Regression analysis of transport services imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 3.706E+18 | 1 | 3.706E+18 | 6.669 | .019*[b] |
| Residual | 9.445E+18 | 17 | 5.556E+17 | | |
| Total | 1.315E+19 | 18 | | | |

a. Dependent Variable: Transport Services_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 11. Coefficients of trend formula for transport services imports and time

| Model | Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | Unstandardized coefficients | | Standardized coefficients | t | Sig. | 95% Confidence interval bounds for B | |
| | B | Std. error | Beta | | | Lower | Upper |
| (Constant) | 598549122.807 | 355976696.576 | | 1.681 | 0.111 | -152496056.975 | 1349594302.589 |
| Year | 80629298.246 | 31221221.642 | 0.531 | 2.583 | 0.019 * | 14758278.467 | 146500318.025 |

a. Dependent Variable: Travel Services_Exports
Note: * = p < .05, ** = p < .01, *** = p < .001.

Additionally, based on the data from Table 11, the equation for transport services imports using the unstandardized coefficient of time, while the constant of the equation was found to be not significant and therefore not used, would be:

$$Y_{TRE\,t} = 80629298.246 * X_{TRI\,t} + 31221221.642 \quad (4)$$

Using that Equation (4), we can predict the next 10 years of transport services imports using the unstandardized coefficient of time, while the constant of the equation was found to be not significant and therefore not used would be as follows in Table 12 and shown in Figure 7:

Table 12. Prediction for the 10 years between 2019 and 2028 for transport services imports

| Year | Value (in USD) |
|---|---|
| 2019 | 1,643,807,186.642 |
| 2020 | 1,724,436,484.642 |
| 2021 | 1,805,065,782.642 |
| 2022 | 1,885,695,081.642 |
| 2023 | 1,966,324,379.642 |
| 2024 | 2,046,953,677.642 |
| 2025 | 2,127,582,975.642 |
| 2026 | 2,208,212,274.642 |
| 2027 | 2,288,841,572.642 |
| 2028 | 2,369,470,870.642 |

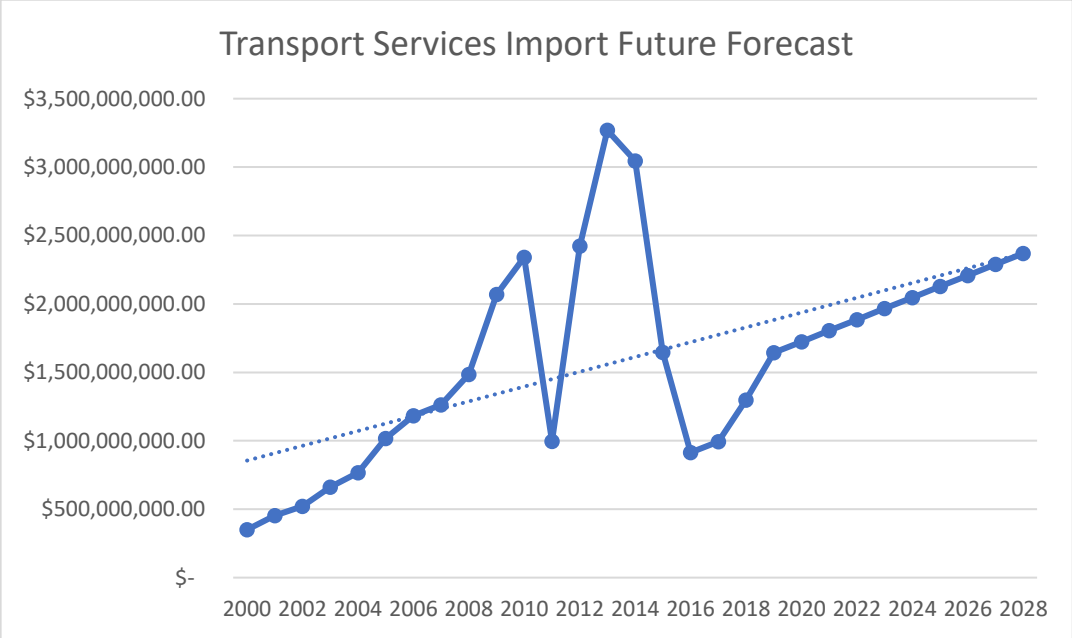


Figure 7. Line graph showing transport services imports historical data (2000-2018) and forecast data (2019-2028) (World Bank Group, 2021)

As shown in Figure 7, there will be an increase in demand for transport services in Libya. Thus, investing in transport services and developing the country's transport services would reduce import of these services and increase GDP of Libya by generating revenue, income and employment. This production will also contribute to

the diversification of the Libyan economy and allow it to utilize its unique geographical location between many cultural hubs.

The analysis of other products also tells us that all other products in exports and imports are stagnant with no significant trend, positive or negative. Even though as will be shown later in this chapter: they are higher in imports than exports, meaning they cost the Libyan government in import costs annually more than they provide income as exports, and that needs to change if they are to become reliable sources of income, and provide the funds needed for the Libyan government to grow its other sectors. We can see the regression results for those products in the following tables:

Table 13. Regression analysis of total exports and time

**ANOVA[a]**

| Model | Sum of Squares | df | Mean Squares | F | Sig. |
|---|---|---|---|---|---|
| Regression | 145361594366268000000.000 | 1 | 145361594366268000000.000 | 0.820 | .377[b] |
| Residual | 3189137273918360000000.000 | 18 | 177174292995465000000.000 | | |
| Total | 3334498868284630000000.000 | 19 | | | |

a. Dependent Variable: Total Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 14. Regression analysis of crude petroleum exports and time

**ANOVA[a]**

| Model | Sum of Squares | df | Mean Squares | F | Sig. |
|---|---|---|---|---|---|
| Regression | 8682336374023260000.000 | 1 | 8682336374023260000.000 | 0.687 | .418[b] |
| Residual | 2276029228482550000000.000 | 18 | 126446068249031000000.000 | | |
| Total | 2362852592222780000000.000 | 19 | | | |

a. Dependent Variable: Crude Petroleum_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 15. Regression analysis of asphalt exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 121144450.118 | 1 | 121144450.118 | 0.700 | .435[b] |
| Residual | 1038442085.382 | 6 | 173073680.897 | | |
| Total | 1159586535.500 | 7 | | | |

a. Dependent Variable: Asphalt_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 16. Regression analysis of coal tar oil exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 4131330857164150.000 | 1 | 4131330857164150.000 | 2.236 | .156[b] |
| Residual | 27710088854515200.000 | 15 | 1847339256967680.000 | | |
| Total | 31841419711679300.000 | 16 | | | |

a. Dependent Variable: Coal Tar Oil_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 17. Regression analysis of petroleum coke exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 7685653824.686 | 1 | 7685653824.686 | 0.476 | .528[b] |
| Residual | 64619819733.314 | 4 | 16154954933.329 | | |
| Total | 72305473558.000 | 5 | | | |

a. Dependent Variable: Petroleum Coke_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 18. Regression analysis of refined petroleum exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 3095265968373820000.000 | 1 | 3095265968373820000.000 | 1.207 | .286[b] |
| Residual | 46142230806793200000.000 | 18 | 2563457267044060000.000 | | |
| Total | 49237496775167000000.000 | 19 | | | |

a. Dependent Variable: Refined Petorleum_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 19. Regression analysis of asphalt mixtures exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 9819027286.961 | 1 | 9819027286.961 | 0.155 | .714[b] |
| Residual | 253292594252.373 | 4 | 63323148563.093 | | |
| Total | 263111621539.333 | 5 | | | |

a. Dependent Variable: Asphalt Mixtures_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 20. Regression analysis of asphalt imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 88208726164801.000 | 1 | 88208726164801.000 | 0.225 | .642[b] |
| Residual | 5891553301228590.000 | 15 | 392770220081906.000 | | |
| Total | 5979762027393390.000 | 16 | | | |

a. Dependent Variable: Asphalt_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 21. Regression analysis of asphalt mixtures imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 95976470197.309 | 1 | 95976470197.309 | 0.109 | .745[b] |
| Residual | 15837599718625.600 | 18 | 879866651034.758 | | |
| Total | 15933576188823.000 | 19 | | | |

a. Dependent Variable: Asphalt Mixtures_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 22. Regression analysis of coal tar oil imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 6831790703730.270 | 1 | 6831790703730.270 | 3.416 | .081[b] |
| Residual | 36002904186801.900 | 18 | 2000161343711.220 | | |
| Total | 42834694890532.200 | 19 | | | |

a. Dependent Variable: Coal Tar Oil_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 23. Regression analysis of petroleum coke imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 171406474374597.000 | 1 | 171406474374597.000 | 0.625 | .440[b] |
| Residual | 4664013151917920.000 | 17 | 274353714818701.000 | | |
| Total | 4835419626292510.000 | 18 | | | |

a. Dependent Variable: Petroleum Coke_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 24. Regression analysis of transport services exports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 169904280701744.000 | 1 | 169904280701744.000 | 0.029 | .867[b] |
| Residual | 99336523087719300.000 | 17 | 5843324887512900.000 | | |
| Total | 99506427368421000.000 | 18 | | | |

a. Dependent Variable: Transport Services_Exports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 25. Regression analysis of travel services imports and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 5774627272727270.000 | 1 | 5774627272727270.000 | 1.011 | .341[b] |
| Residual | 51393001818181800.000 | 9 | 5710333535353530.000 | | |
| Total | 57167629090909100.000 | 10 | | | |

a. Dependent Variable: Travel Services_Imports
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 26. Regression analysis of oil real GDP growth and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 99.573 | 1 | 99.573 | 0.027 | .870[b] |
| Residual | 65523.057 | 18 | 3640.170 | | |
| Total | 65622.630 | 19 | | | |

a. Dependent Variable: OilRealGDPGrowth
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

Table 28. Regression analysis of non-oil real GDP growth and time

| ANOVA[a] | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Squares | F | Sig. |
| Regression | 171406474374597.000 | 1 | 171406474374597.000 | 0.625 | .440[b] |
| Residual | 4664013151917920.000 | 17 | 274353714818701.000 | | |
| Total | 4835419626292510.000 | 18 | | | |

a. Dependent Variable: OilRealGDPGrowth
b. Predictors: (Constant), Year
Note: * = p < .05, ** = p < .01, *** = p < .001.

The full results are displayed again in appendix A.

## 5.2 Libya's Oil Dependence

In order to show Libya's dependence on oil as a sole income source we can refer to Figure 2 again in chapter 3, that shows how crude petroleum exports between the years 2000 and 2019 have on average accounted for almost 80% of the country's exports, and how small the contributions of all other exports are to the export revenue of the country. Next, Figure 8 and Figure 9 display Libya's real GDP growth, with and without oil respectively, between 2000 and 2019:

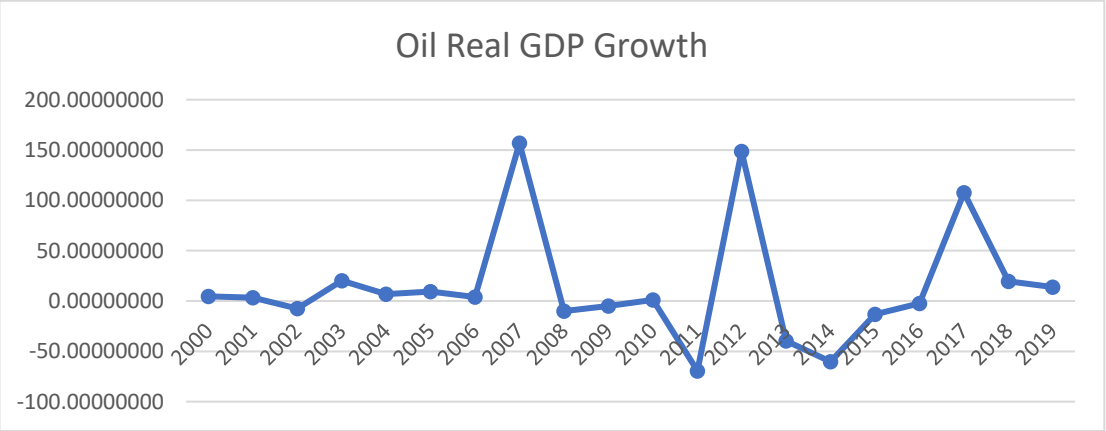


Figure 8. Line graph showing oil real GDP growth for Libya (in annual % change) 2000-2019 (Federal Reserve Economic Data, 2021b)

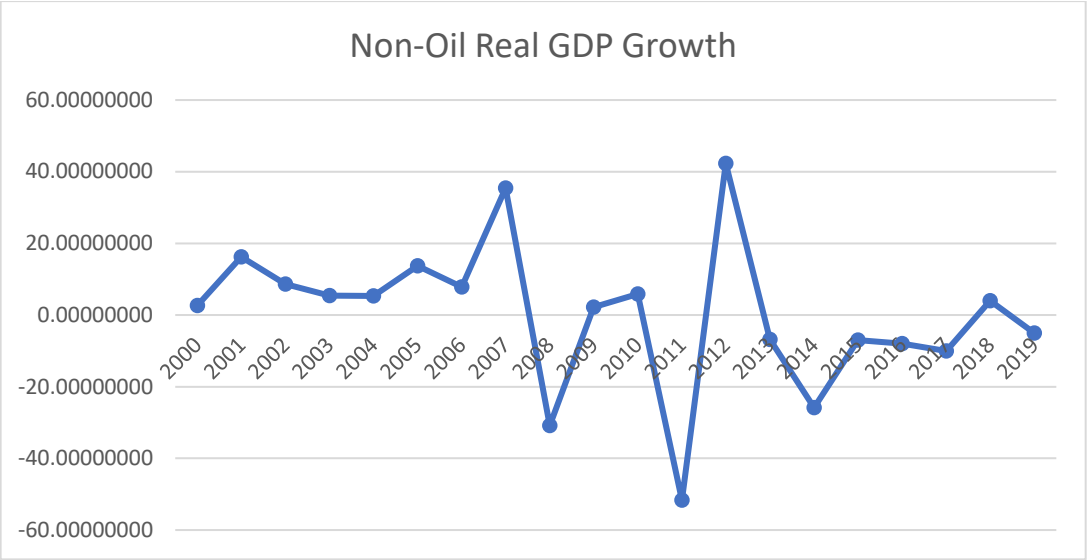


Figure 9. Line graph showing non-oil real GDP growth for Libya (in annual % change) 2000-2019 (Federal Reserve Economic Data, 2021a)

We can see in Figure 8 and Figure 9 that the real growth of the GDP changes dramatically when factoring in oil. Furthermore, the effects aren't always positive, showing the volatile nature of depending on a single income source, years such as 2002, 2009 and 2010 had slight positive growth when we are not factoring oil, as opposed to the years 2017 and 2019 that show negative growth without oil, but with oil 2017 shows 107% growth from the previous year.

The aim of pointing out these graphs is to show the large effects oil has on the exports and GDP of Libya, further illustrating Libya's dependence on crude oil exports.

## 5.3 Petroleum Related Products

We can examine the potential in the short term for the petroleum related products as income sources by looking at Figure 3 and Figure 4 from the previous chapter, as well as the following figures:

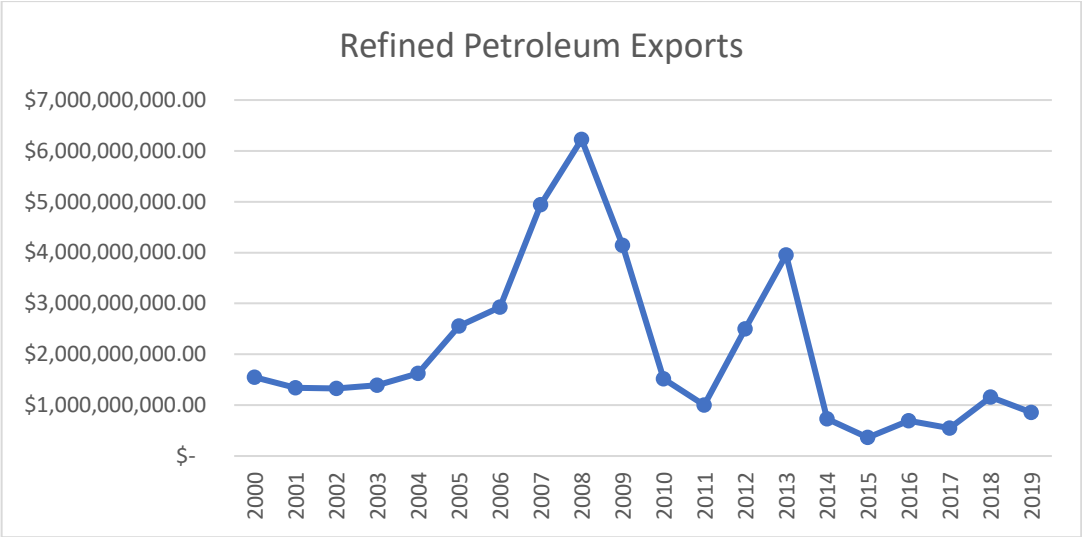


Figure 10. Line graph showing Libya's refined petroleum exports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

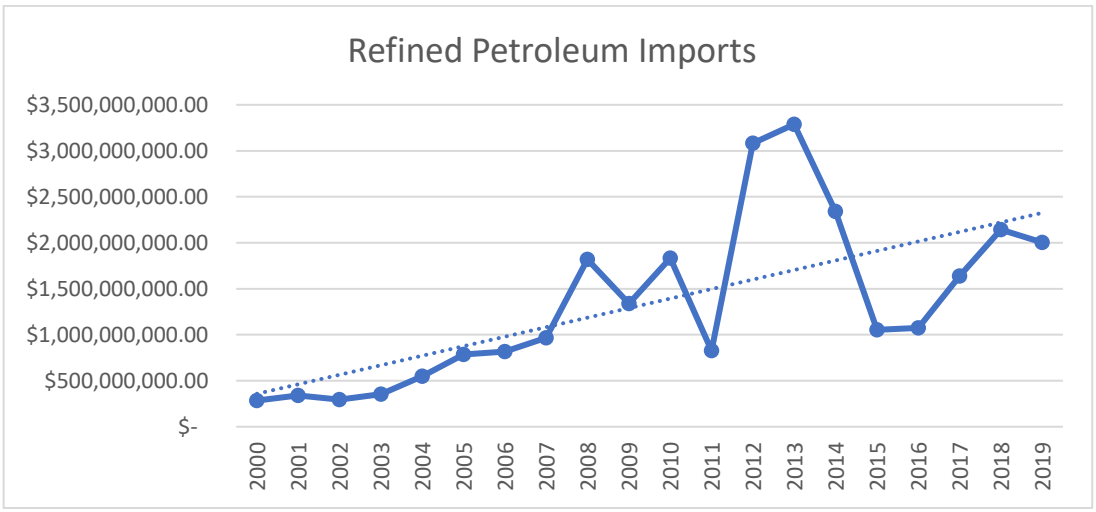


Figure 11. Line graph showing Libya's refined petroleum imports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

In Figure 10 and Figure 11, we can see that as Libya's refined petroleum exports decreased in the last 6 years, their imports increase. Therefore, if they develop and maintain their refined petroleum production, it may continue to be a good source of income as well as lowering their import need for it. It is also important to mention that refined petroleum is Libya's single largest import at an average of about 17% of total imports annually, which is not ideal for a country that produces mainly crude petroleum, as developing their oil processing sector could prove very beneficial, and

in the coming years refined petroleum might be the chief source of funds for growing Libya's other sectors as it shows the largest volume of production in the oil sector aside from crude petroleum, with no indication of re-exports historically and recently due to international sanctions on the re-exporting of petroleum products from Libya.

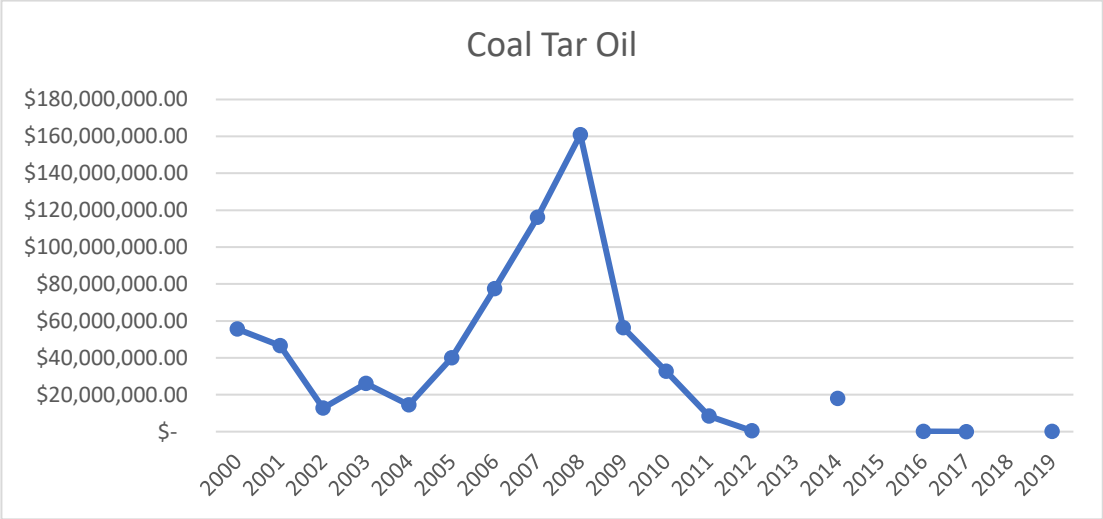


Figure 12. Line graph showing Libya's coal tar oil exports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

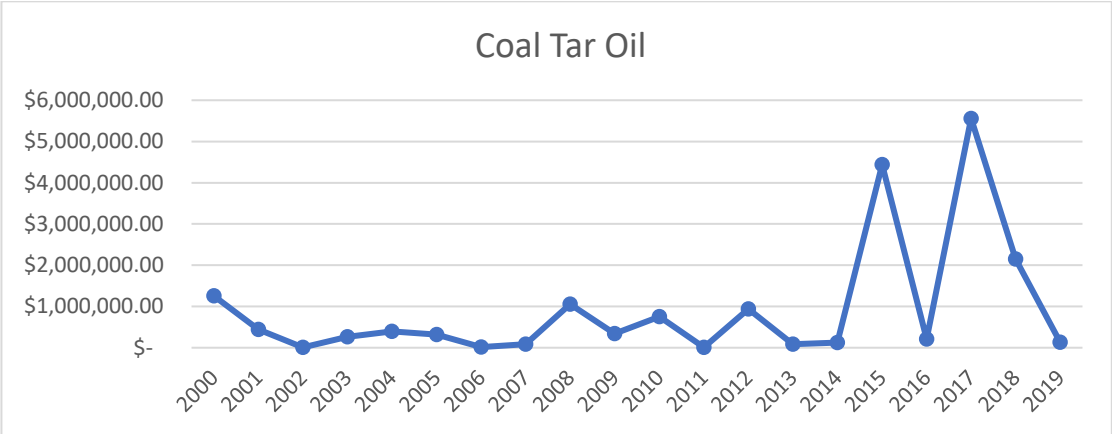


Figure 13. Line graph showing Libya's coal tar oil imports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

In Figure 12 and Figure 13, we see Libya's coal tar oil exports and imports respectively. It has shown in the past, that it has potential to export more than import, but as the revolution continued and the war started, the production has slowed and

even halted in some years, relying instead on imports to satisfy the local requirement. Nevertheless, there is potential in here, as shown in the past and this part of the sector can certainly be reinforced to become a more reliable pillar of the annual revenue.

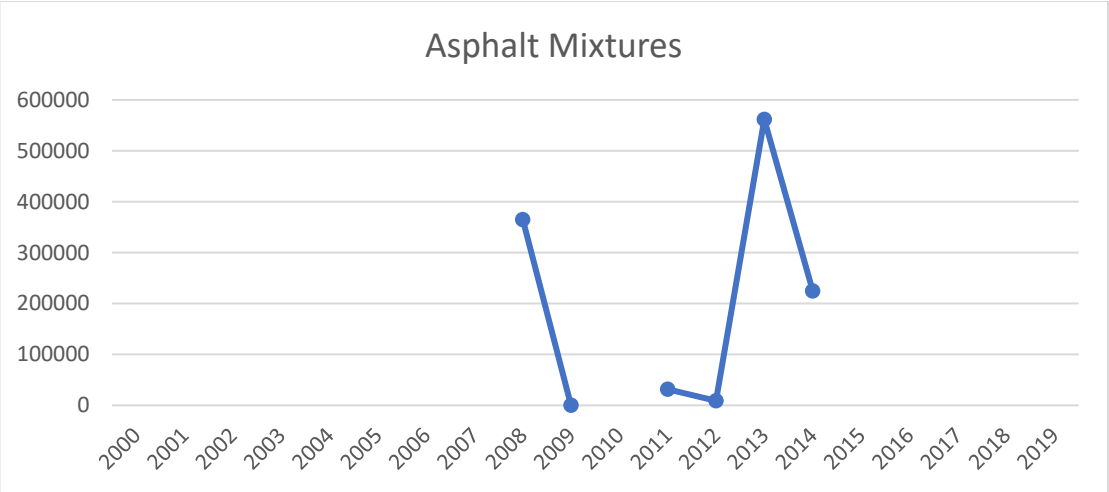


Figure 14. Line graph showing Libya's asphalt mixtures exports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

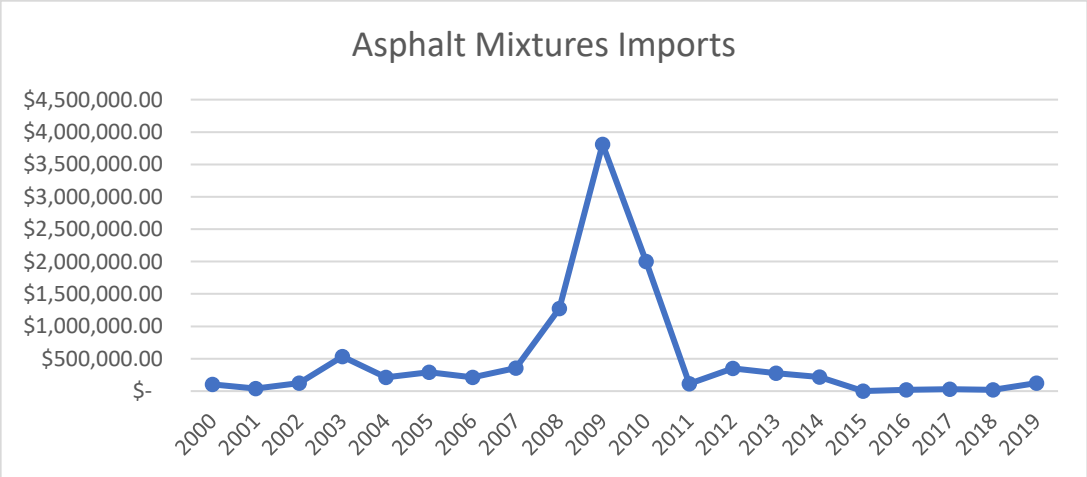


Figure 15. Line graph showing Libya's asphalt mixtures imports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

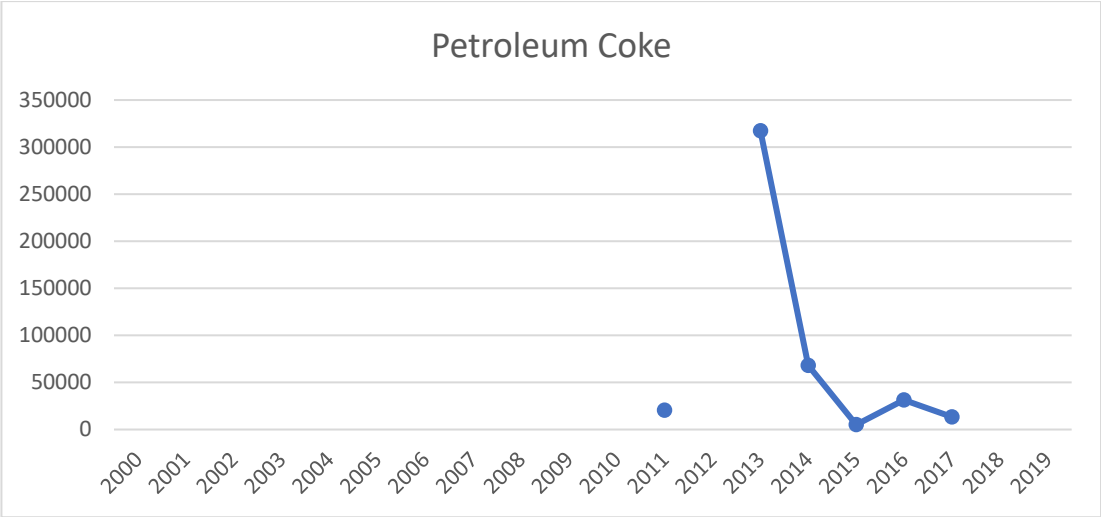


Figure 16. Line graph showing Libya's petroleum coke exports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

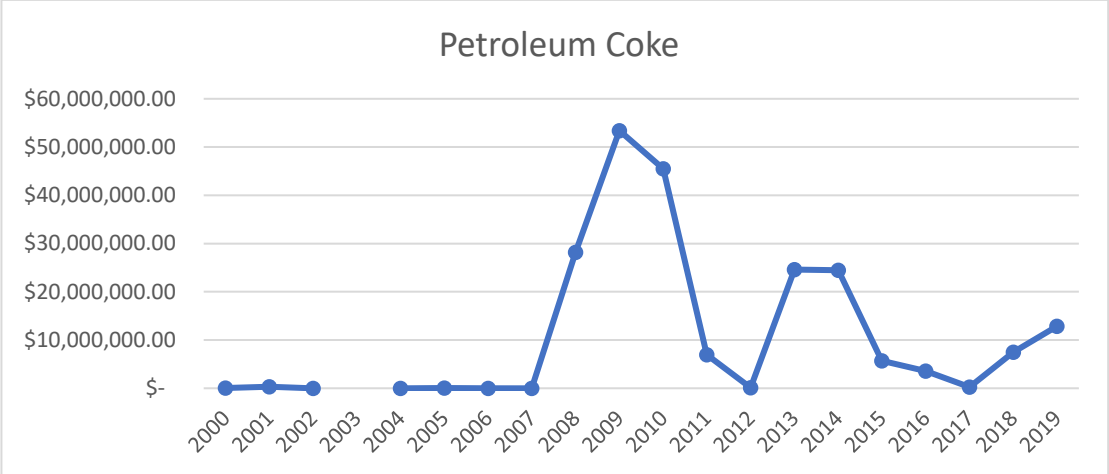


Figure 17. Line graph showing Libya's petroleum coke imports (in USD) 2000-2019 (OEC - The Observatory of Economic Complexity, 2020)

In the figures 12 through 17, we see the same issues we saw in Figure 5 and Figure 6 in the previous chapter showing asphalt exports and imports, here we look at asphalt mixtures and petroleum coke, two petroleum products that can be used to strengthen this industry beyond the dependence on crude oil exports.

The answer to H1 is illustrated by these figures, and how they show us that the petroleum sector could provide more for the Libyan economy than crude oil exports,

and how many of these products had years of good export values as well as years without production where they needed to import them, this information implies that if we focus on growing these sectors that already have the infrastructure and the level of development required to produce and provide value to the economy, then we should focus on growing them more while we are still producing the base material for their production, allowing the Libyan economy to have more products to offer and require less from imports in the short-term, thereby diversifying their income sources (albeit in the same sector, at least in the short term), and giving the resources and time required to diversify other sectors in the long-run.

## 5.4 Non-Oil Sectors

To analyze the possibility of growing Libya's other sectors to a point where they can fulfil a role as a reliable income source, we can find that there is no data pertaining to Libya's agricultural output in the relevant years aside from raw material output which is scarce and employment in the agricultural sector, from this information as well as the mentioned production levels, we conclude that Libya's agriculture sector is severely underdeveloped, yet we still suggest it is an important sector to develop as it has the potential to provide employment and revenue to Libya, especially since it has the water supply to support it.

We will then look at the following figures that show the current state of the tourism services and transport services sectors, as they do have activity in the relevant years:

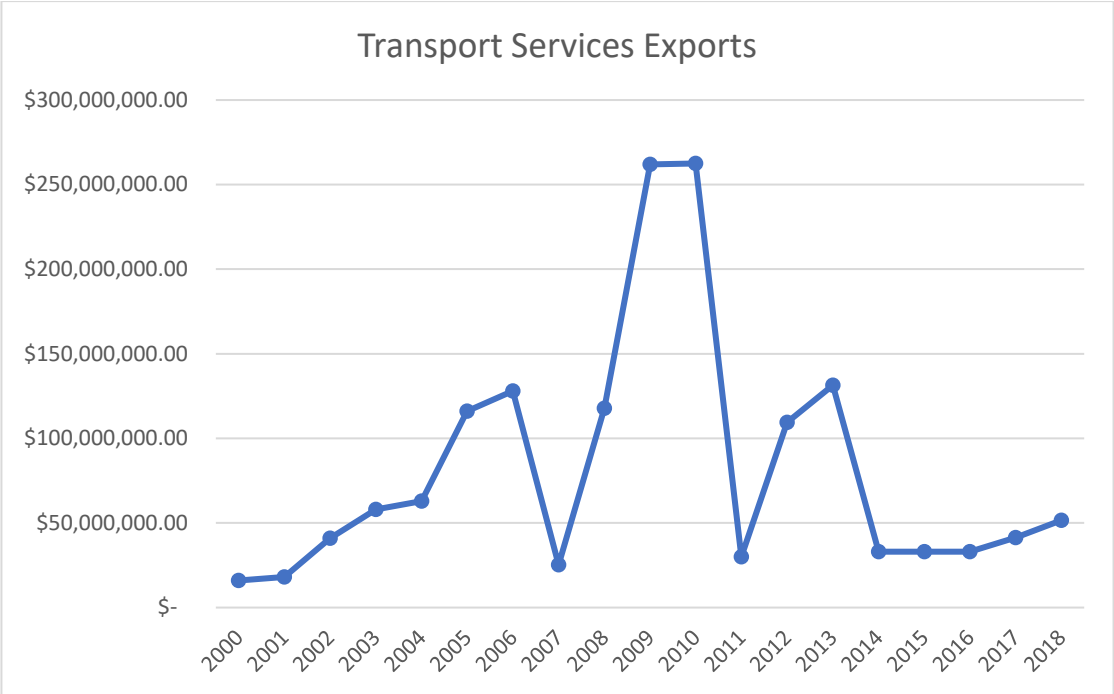


Figure 18. Line graph showing Libya's transport services exports (in USD) 2000-2019 (World Bank Group, 2021)

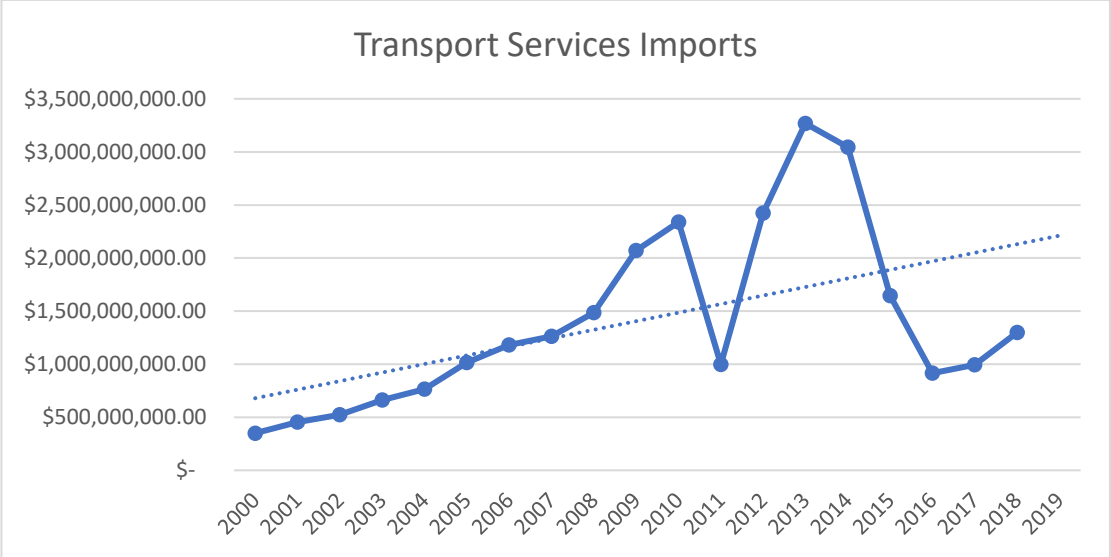


Figure 19. Line graph showing Libya's transport services imports (in USD) 2000-2019 (World Bank Group, 2021)

In Figure 18 and Figure 19 showing Libya's transport services exports and imports respectively, we can see how the transport services of Libya have been more reliant on imports than have provided export being almost an entire order of magnitude lower in

value, which displays the degree to which the geographical opportunities of Libya have been underutilized in the transport of goods and people.


Figure 20. Line graph showing Libya's travel services exports (in USD) 2000-2019 (World Bank Group, 2021)

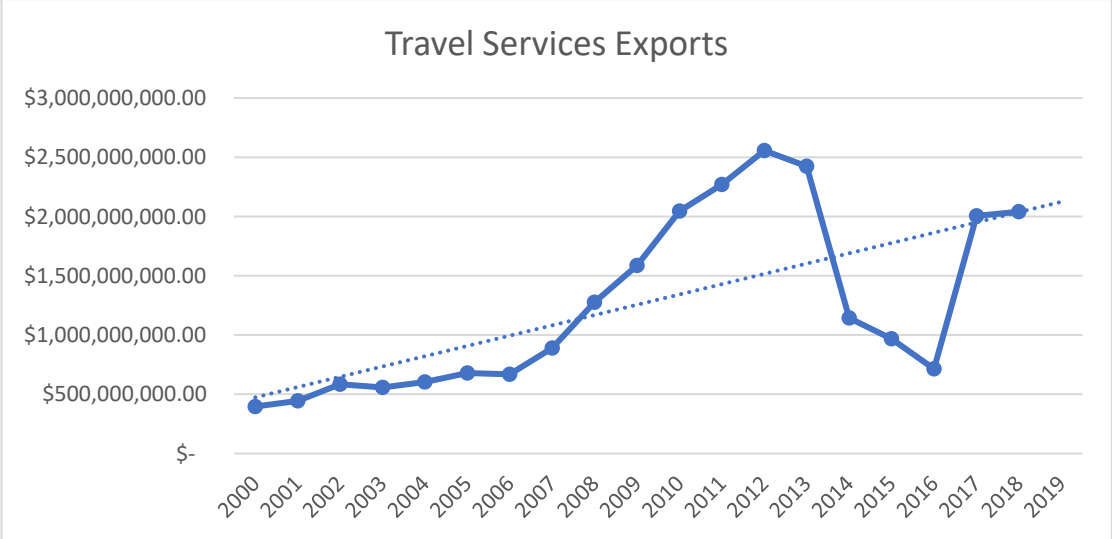


Figure 21. Line graph showing Libya's travel services imports (in USD) 2000-2019 (World Bank Group, 2021)

In Figure 20 and Figure 21, we see Libya's travel services imports and exports respectively, though in these graphs we can clearly notice how the imports of the travel

services stopped in 2011, due to the revolution in the country, this has allowed the exports of these services to grow, as the demand for these services remained, although the war starting in 2014 has stunted this growth slightly, it is still in an upward trend. This growth must be maintained and continued, and special care must be placed on it, especially after the war ends to help foster these growing services.

The answer to H2 is shown in how strengthening the transport services and travel services sectors as well as the agricultural sector and building an infrastructure to support them in the long-run will require large amounts of investments over time to lower the risk of investment for the Libyan government while growing these industries, and the best way to provide these investments is through the capital provided by the petroleum products that will be produced for local use and provide capital through exports in the short-term. Furthermore, growing these sectors will provide additional sources of income utilizing Libya's current resources and geographical opportunities to increase employment, generate revenue, and create a more diverse economic environment in the long-term.

# Chapter 6

# CONCLUSION

## 6.1 Conclusion and Policy Implications

The study showed through conducting a trend analysis, that for the majority of the products discussed there is no growth. Finding the only positive growth trends in the imports of a key petroleum product in refined petroleum and transport services, showing unencouragingly that Libya's costs in importing refined petroleum will keep increasing until a change is made, as for the transport services, we can conclude that Libya has neglected to utilize its strategic position between Europe and Africa, as well as between the Arab Maghreb countries and Egypt and the Middle Eastern countries, by not taking advantage of its advantageous location in the transportation of goods and people between these regions. Furthermore, the only export showing positive growth is in the tourism sector and that being the export of travel services, this is due to the inaccessibility of foreign travel services since the start of the revolution, which has allowed this sector to grow, even though the war has slowed this growth, the upward trend remains. This should encourage Libya to create a suitable environment for this growth to continue especially after the war ends.

This study has focused on applying the previously mentioned MIT researcher's economic diversification model to Libya's economy. Following that model, the short-term related products were analyzed. Petroleum products were the primary focus of this section as the country already produces these products in low quantities and if

these products are invested in then local demand will be met, lowering or even eliminating the need for imports, as well as providing other reliable income sources for the country. Moreover, we found that these products showed no significant growth in the relevant time period. Increasing the production of these products to decrease their imports and provide revenue to grow other sectors of the Libyan economy is imperative in growing and diversifying the economy and will support the country in providing the funds required to cover the costs of growing the other sectors that will be the focus of the second step of the diversification plan.

In the next step, the long-term focus on developing non-oil sectors comes after the oil sector is established as a multi-income source sector, the main focus of this section is investing in riskier unrelated products and underdeveloped industries. Libya may choose to invest in agriculture as it has the need for it as well as the water supply needed to support its growth, as well as the transport sector to take advantage of Libya's strategic location, and also the tourism services industry to maintain the growth it has found in recent years. It is important to note that such undertakings would prove very expensive and would take many years to become fully functioning and self-reliant sectors. Therefore, the short-term sectors with available infrastructure should remain the first focus of the diversification efforts, these are the mistakes most commonly made by diversifying nations; to focus on the high-risk investments before the low-risk investments, and policy makers should pay very close attention to this.

It is also important to note that increasing the production of petroleum products with the aim of exporting them to international markets and growing sectors that could possibly compete with neighboring countries in the case of tourism and transport, both

are faced with the threat of larger economies and corporations that are already competing in these markets. In the case of petroleum products specifically Libya will be competing with nearby multinational companies like ENI an Italian oil and gas company and one of the seven supermajor oil companies in the world, this is a very real threat and must be approached with caution as Libya already deals very closely with ENI. However, Libya has two advantages in this scenario: the first being Libya's existing customers and markets it exports its petroleum products chiefly crude petroleum to Italy, China, Spain and France among others which can afford it some negotiating power, and the second is ENI is mostly a processing company for oil and produces petroleum products, the crude oil for which is mainly provided by Libya giving it more negotiating power. In the case of the tourism and transport sectors, after the development of these sectors, Libya will be competing with neighboring countries like Tunisia, Morocco and Egypt, that are already well-established touristic locations and have more established and developed transport services.

## 6.2 Limitations and Recommendations

As with every study there are limitations. For our study the main limitation is the lack of data on many years for exports and imports, the current state of the nation due to the civil war, the lack of studies on the Libyan economy specifically and on similar economies in general and the difficulty in assessing and quantifying the diversification of an economy, as well as the difficulty in assessing the future values and costs of products and development plans to be undertaken, this study focused on creating a semi-rigid framework that may be used to develop a roadmap for diversifying the Libyan economy.

This study focused on the available data between the years 2000 and 2019, future researchers should focus on the period after the war. A similar study can be conducted after the war ends in order to work with more stable data and have a more immediate impact on the sustainability of the economy. Furthermore, a similar study can be conducted with close cooperation with the Libyan government in order to work with more recent and accurate data as well as affecting the policy makers in a more direct way leading to possible change in the near future.

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# APPENDIX

# Trend Analysis

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Export Total (Annual) | 25994549625.00 | 13247639051.395 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Export Total (Annual) | time |
|---|---|---|---|
| Pearson Correlation | Export Total (Annual) | 1.000 | .209 |
| | time | .209 | 1.000 |
| Sig. (1-tailed) | Export Total (Annual) | . | .189 |
| | time | .189 | . |
| N | Export Total (Annual) | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .209[a] | .044 | -.010 | 13310683415.793 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 14536159436626828000.000 | 1 | 14536159436626828000.000 | .820 | .377[b] |
| | Residual | 3189137273918362500000.000 | 18 | 1771742929954646000000.000 | | |
| | Total | 3334498868284631000000.000 | 19 | | | |

a. Dependent Variable: Export Total (Annual)

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 21085433388.458 | 6183231148.507 | | 3.410 | .003 | 8094946788.656 | 34075919988.260 |
| | time | 467534879.671 | 516166163.424 | .209 | .906 | .377 | -616889989.493 | 1551959748.835 |

a. Dependent Variable: Export Total (Annual)

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Crude Petroleum_Exports | 20990910890.00 | 11151711202.706 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Crude Petroleum_Exports | time |
|---|---|---|---|
| Pearson Correlation | Crude Petroleum_Exports | 1.000 | .192 |
| | time | .192 | 1.000 |
| Sig. (1-tailed) | Crude Petroleum_Exports | . | .209 |
| | time | .209 | . |
| N | Crude Petroleum_Exports | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .192[a] | .037 | -.017 | 11244824064.832 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 8682336374023258000.000 | 1 | 8682336374023258000.000 | .687 | .418[b] |
| | Residual | 2276029228482551600000.000 | 18 | 1264460682490306400000.000 | | |
| | Total | 2362852592222784000000.000 | 19 | | | |

a. Dependent Variable: Crude Petroleum_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 17196915663.595 | 5223574496.156 | | 3.292 | .004 | 6222592875.779 | 28171238451.410 |
| | time | 361332878.705 | 436055573.904 | .192 | .829 | .418 | -554785887.279 | 1277451644.689 |

a. Dependent Variable: Crude Petroleum_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Asphalt_Exports | 7457.249999999980 | 12870.71168805916700 | 8 |
| time | 9.0000 | 3.29502 | 8 |

**Correlations**

| | | Asphalt_Exports | time |
|---|---|---|---|
| Pearson Correlation | Asphalt_Exports | 1.000 | .323 |
| | time | .323 | 1.000 |
| Sig. (1-tailed) | Asphalt_Exports | . | .217 |
| | time | .217 | . |
| N | Asphalt_Exports | 8 | 8 |
| | time | 8 | 8 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .323[a] | .104 | -.045 | 13155.74706722996400 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 121144450.118 | 1 | 121144450.118 | .700 | .435[b] |
| | Residual | 1038442085.382 | 6 | 173073680.897 | | |
| | Total | 1159586535.500 | 7 | | | |

a. Dependent Variable: Asphalt_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | -3905.605 | 14355.985 | | -.272 | .795 | -39033.436 | 31222.226 |
| | time | 1262.539 | 1509.068 | .323 | .837 | .435 | -2430.016 | 4955.095 |

a. Dependent Variable: Asphalt_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Coal Tar Oil_Exports | 39176887.82 | 44610410.578 | 17 |
| time | 9.4706 | 5.76756 | 17 |

**Correlations**

| | | Coal Tar Oil_Exports | time |
|---|---|---|---|
| Pearson Correlation | Coal Tar Oil_Exports | 1.000 | -.360 |
| | time | -.360 | 1.000 |
| Sig. (1-tailed) | Coal Tar Oil_Exports | . | .078 |
| | time | .078 | . |
| N | Coal Tar Oil_Exports | 17 | 17 |
| | time | 17 | 17 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .360[a] | .130 | .072 | 42980684.696 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 41313308571 64156.000 | 1 | 41313308571 64156.000 | 2.236 | .156[b] |
| | Residual | 27710088854 515192.000 | 15 | 18473392569 67679.500 | | |
| | Total | 31841419711 679348.000 | 16 | | | |

a. Dependent Variable: Coal Tar Oil_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. | Lower Bound | Upper Bound |
| 1 | (Constant) | 65562678.197 | 20493407.675 | | 3.199 | .006 | 21882013.721 | 109243342.672 |
| | time | -2786077.244 | 1863037.061 | -.360 | -1.495 | .156 | -6757046.742 | 1184892.253 |

a. Dependent Variable: Coal Tar Oil_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Petroleum Coke_Exports | 75974.00 | 120254.292 | 6 |
| time | 15.3333 | 2.16025 | 6 |

**Correlations**

| | | Petroleum Coke_Exports | time |
|---|---|---|---|
| Pearson Correlation | Petroleum Coke_Exports | 1.000 | -.326 |
| | time | -.326 | 1.000 |
| Sig. (1-tailed) | Petroleum Coke_Exports | . | .264 |
| | time | .264 | . |
| N | Petroleum Coke_Exports | 6 | 6 |
| | time | 6 | 6 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .326[a] | .106 | -.117 | 127102.144 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7685653824.686 | 1 | 7685653824.686 | .476 | .528[b] |
| | Residual | 64619819733.314 | 4 | 16154954933.329 | | |
| | Total | 72305473558.000 | 5 | | | |

a. Dependent Variable: Petroleum Coke_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 354258.229 | 406783.598 | | .871 | .433 | -775154.101 | 1483670.558 |
| | time | -18148.971 | 26312.644 | -.326 | -.690 | .528 | -91204.582 | 54906.639 |

a. Dependent Variable: Petroleum Coke_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Refined Petroleum_Exports | 2066636426.90 | 1609797253.909 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Refined Petroleum_Exports | time |
|---|---|---|---|
| Pearson Correlation | Refined Petroleum_Exports | 1.000 | -.251 |
| | time | -.251 | 1.000 |
| Sig. (1-tailed) | Refined Petroleum_Exports | . | .143 |
| | time | .143 | . |
| N | Refined Petroleum_Exports | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .251[a] | .063 | .011 | 1601080031.430 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 3095265968373817300.000 | 1 | 3095265968373817300.000 | 1.207 | .286[b] |
| | Residual | 4614223080679317000.000 | 18 | 2563457267044064800.000 | | |
| | Total | 4923749677516698400.000 | 19 | | | |

a. Dependent Variable: Refined Petroleum_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 2782990051.732 | 74375203 8.295 | | 3.742 | .001 | 1220425002.004 | 4345555101.459 |
| | time | -68224154.746 | 62087220.569 | -.251 | -1.099 | .286 | -198664564.856 | 62216255.364 |

a. Dependent Variable: Refined Petroleum_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Asphalt Mixtures_Exports | 198568.67 | 229395.563 | 6 |
| time | 12.1667 | 2.31661 | 6 |

**Correlations**

| | | Asphalt Mixtures_Exports | time |
|---|---|---|---|
| Pearson Correlation | Asphalt Mixtures_Exports | 1.000 | .193 |
| | time | .193 | 1.000 |
| Sig. (1-tailed) | Asphalt Mixtures_Exports | . | .357 |
| | time | .357 | . |
| N | Asphalt Mixtures_Exports | 6 | 6 |
| | time | 6 | 6 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .193[a] | .037 | -.203 | 251640.912 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 9819027286.961 | 1 | 9819027286.961 | .155 | .714[b] |
| | Residual | 253292594252.373 | 4 | 63323148563.093 | | |
| | Total | 263111621539.333 | 5 | | | |

a. Dependent Variable: Asphalt Mixtures_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | -34169.994 | 599899.997 | | -.057 | .957 | -1699759.403 | 1631419.415 |
| | time | 19129.205 | 48578.482 | .193 | .394 | .714 | -115746.283 | 154004.693 |

a. Dependent Variable: Asphalt Mixtures_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Asphalt_Imports | 9223.372036854777000 | 19332230.25706260700000 | 17 |
| time | 10.9412 | 5.50534 | 17 |

**Correlations**

| | | Asphalt_Imports | time |
|---|---|---|---|
| Pearson Correlation | Asphalt_Imports | 1.000 | -.121 |
| | time | -.121 | 1.000 |
| Sig. (1-tailed) | Asphalt_Imports | . | .321 |
| | time | .321 | . |
| N | Asphalt_Imports | 17 | 17 |
| | time | 17 | 17 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .121[a] | .015 | -.051 | 19818431.32243079300000 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 88208726164801.000 | 1 | 88208726164801.000 | .225 | .642[b] |
| | Residual | 5891553301228590.000 | 15 | 3927702200801906.000 | | |
| | Total | 5979762027393391.000 | 16 | | | |

a. Dependent Variable: Asphalt_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. | Lower Bound | Upper Bound |
| 1 | (Constant) | 14029369.698 | 10957224.373 | | 1.280 | .220 | -9325401.213 | 37384140.609 |
| | time | -426492.349 | 899963.187 | -.121 | -.474 | .642 | -2344718.476 | 1491733.778 |

a. Dependent Variable: Asphalt_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Asphalt Mixtures_Imports | 506107.55 | 915756.121 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Asphalt Mixtures_Imports | time |
|---|---|---|---|
| Pearson Correlation | Asphalt Mixtures_Imports | 1.000 | -.078 |
| | time | -.078 | 1.000 |
| Sig. (1-tailed) | Asphalt Mixtures_Imports | . | .373 |
| | time | .373 | . |
| N | Asphalt Mixtures_Imports | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .078[a] | .006 | -.049 | 938012.074 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 95976470197.309 | 1 | 95976470197.309 | .109 | .745[b] |
| | Residual | 1583759971862 5.645 | 18 | 8798666510 34.758 | | |
| | Total | 1593357618882 2.953 | 19 | | | |

a. Dependent Variable: Asphalt Mixtures_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 632249.884 | 435736.115 | | 1.451 | .164 | -283197.723 | 1547697.491 |
| | time | -12013.556 | 36374.548 | -.078 | -.330 | .745 | -88433.645 | 64406.534 |

a. Dependent Variable: Asphalt Mixtures_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Coal Tar Oil_Imports | 928740.30 | 1501485.140 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Coal Tar Oil_Imports | time |
|---|---|---|---|
| Pearson Correlation | Coal Tar Oil_Imports | 1.000 | .399 |
| | time | .399 | 1.000 |
| Sig. (1-tailed) | Coal Tar Oil_Imports | . | .041 |
| | time | .041 | . |
| N | Coal Tar Oil_Imports | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .399[a] | .159 | .113 | 1414270.605 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 6831790703730.266 | 1 | 6831790703730.266 | 3.416 | .081[b] |
| | Residual | 36002904186801.930 | 18 | 2000161343711.218 | | |
| | Total | 42834694890532.195 | 19 | | | |

a. Dependent Variable: Coal Tar Oil_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | -135514.832 | 656973.183 | | -.206 | .839 | -1515764.272 | 1244734.609 |
| | time | 101357.632 | 54843.062 | .399 | 1.848 | .081 | -13863.366 | 216578.629 |

a. Dependent Variable: Coal Tar Oil_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Petroleum Coke_Imports | 11235752.26 | 16390070.887 | 19 |
| time | 10.8421 | 5.87143 | 19 |

**Correlations**

| | | Petroleum Coke_Imports | time |
|---|---|---|---|
| Pearson Correlation | Petroleum Coke_Imports | 1.000 | .188 |
| | time | .188 | 1.000 |
| Sig. (1-tailed) | Petroleum Coke_Imports | . | .220 |
| | time | .220 | . |
| N | Petroleum Coke_Imports | 19 | 19 |
| | time | 19 | 19 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .188[a] | .035 | -.021 | 16563626.258 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 17140647437 4598.000 | 1 | 17140647437 4598.000 | .625 | .440[b] |
| | Residual | 46640131519 17916.000 | 17 | 27435371481 8700.940 | | |
| | Total | 48354196262 92514.000 | 18 | | | |

a. Dependent Variable: Petroleum Coke_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 5537428.403 | 8149397.549 | | .679 | .506 | -11656297.496 | 22731154.303 |
| | time | 525573.560 | 664929.070 | .188 | .790 | .440 | -877304.151 | 1928451.270 |

a. Dependent Variable: Petroleum Coke_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Refined Petroleum_Imports | 1341578502.599999400000000 | 900678931.5155628000000000 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | Refined Petroleum_Imports | time |
|---|---|---|---|
| Pearson Correlation | Refined Petroleum_Imports | 1.000 | .680 |
| | time | .680 | 1.000 |
| Sig. (1-tailed) | Refined Petroleum_Imports | . | .000 |
| | time | .000 | . |
| N | Refined Petroleum_Imports | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .680[a] | .462 | .433 | 678449199.7588679000000 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7127948516082233300.000 | 1 | 7127948516082233300.000 | 15.486 | .001[b] |
| | Residual | 8285279699762067500.000 | 18 | 460293316653448190.000 | | |
| | Total | 1541322821584430000000 | 19 | | | |

a. Dependent Variable: Refined Petroleum_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 254500385.384 | 315160994.638 | | .808 | .430 | -407628294.474 | 916629065.243 |
| | time | 103531249.259 | 26309131.513 | .680 | 3.935 | .001 | 48257815.003 | 158804683.514 |

a. Dependent Variable: Refined Petroleum_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Transport Services_Exports | 82647368.42 | 74351428.055 | 19 |
| time | 10.0000 | 5.62731 | 19 |

**Correlations**

| | | Transport Services_Exports | time |
|---|---|---|---|
| Pearson Correlation | Transport Services_Exports | 1.000 | .041 |
| | time | .041 | 1.000 |
| Sig. (1-tailed) | Transport Services_Exports | . | .433 |
| | time | .433 | . |
| N | Transport Services_Exports | 19 | 19 |
| | time | 19 | 19 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .041[a] | .002 | -.057 | 76441643.674 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 16990428070 1744.000 | 1 | 16990428070 1744.000 | .029 | .867[b] |
| | Residual | 99336523087 719280.000 | 17 | 58433248875 12899.000 | | |
| | Total | 99506427368 421024.000 | 18 | | | |

a. Dependent Variable: Transport Services_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 77187719.298 | 36506001.318 | | 2.114 | .050 | 166789.033 | 154208649.564 |
| | time | 545964.912 | 3201788.121 | .041 | .171 | .867 | -6209217.542 | 7301147.367 |

a. Dependent Variable: Transport Services_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Transport Services_Imports | 1404842105.26 | 854760768.556 | 19 |
| time | 10.0000 | 5.62731 | 19 |

**Correlations**

| | | Transport Services_Imports | time |
|---|---|---|---|
| Pearson Correlation | Transport Services_Imports | 1.000 | .531 |
| | time | .531 | 1.000 |
| Sig. (1-tailed) | Transport Services_Imports | . | .010 |
| | time | .010 | . |
| N | Transport Services_Imports | 19 | 19 |
| | time | 19 | 19 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .531[a] | .282 | .240 | 745396450.260 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 3705617729280702500.000 | 1 | 3705617729280702500.000 | 6.669 | .019[b] |
| | Residual | 9445469757035088000.000 | 17 | 555615868060887550.000 | | |
| | Total | 1315108748631579000000 | 18 | | | |

a. Dependent Variable: Transport Services_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 598549122.807 | 355976696.576 | | 1.681 | .111 | -152496056.975 | 1349594302.589 |
| | time | 80629298.246 | 31221221.642 | .531 | 2.583 | .019 | 14758278.467 | 146500318.025 |

a. Dependent Variable: Transport Services_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Travel Services_Imports | 132309090.91 | 75609277.930 | 11 |
| time | 6.0000 | 3.31662 | 11 |

**Correlations**

| | | Travel Services_Imports | time |
|---|---|---|---|
| Pearson Correlation | Travel Services_Imports | 1.000 | -.318 |
| | time | -.318 | 1.000 |
| Sig. (1-tailed) | Travel Services_Imports | . | .170 |
| | time | .170 | . |
| N | Travel Services_Imports | 11 | 11 |
| | time | 11 | 11 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .318[a] | .101 | .001 | 75566748.874 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 5774627272727272.000 | 1 | 5774627272727272.000 | 1.011 | .341[b] |
| | Residual | 5139300181818181816.000 | 9 | 5710333535353535.000 | | |
| | Total | 5716762909090909088.000 | 10 | | | |

a. Dependent Variable: Travel Services_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 175781818.182 | 48866733.677 | | 3.597 | .006 | 65237586.572 | 286326049.791 |
| | time | -7245454.545 | 7205006.804 | -.318 | -1.006 | .341 | -23544312.296 | 9053403.205 |

a. Dependent Variable: Travel Services_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Travel Services_Exports | 1255694736.84 | 743879880.143 | 19 |
| time | 10.0000 | 5.62731 | 19 |

**Correlations**

| | | Travel Services_Exports | time |
|---|---|---|---|
| Pearson Correlation | Travel Services_Exports | 1.000 | .657 |
| | time | .657 | 1.000 |
| Sig. (1-tailed) | Travel Services_Exports | . | .001 |
| | time | .001 | . |
| N | Travel Services_Exports | 19 | 19 |
| | time | 19 | 19 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .657[a] | .432 | .398 | 576980053.808 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4301029267105261600.000 | 1 | 4301029267105261600.000 | 12.920 | .002[b] |
| | Residual | 5659401702368423900.000 | 17 | 332905982492260220.000 | | |
| | Total | 9960430969473686000.000 | 18 | | | |

a. Dependent Variable: Travel Services_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 387036842.105 | 275546594.665 | | 1.405 | .178 | -194315655.738 | 968389339.949 |
| | time | 86865789.474 | 24167035.054 | .657 | 3.594 | .002 | 35877802.446 | 137853776.501 |

a. Dependent Variable: Travel Services_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Agricultural Raw Materials_Exports | 553208113.1450000000000 | 556197152.4004688000000 | 6 |
| time | 12.3333 | 4.54606 | 6 |

**Correlations**

| | | Agricultural Raw Materials_Exports | time |
|---|---|---|---|
| Pearson Correlation | Agricultural Raw Materials_Exports | 1.000 | .713 |
| | time | .713 | 1.000 |
| Sig. (1-tailed) | Agricultural Raw Materials_Exports | . | .056 |
| | time | .056 | . |
| N | Agricultural Raw Materials_Exports | 6 | 6 |
| | time | 6 | 6 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .713[a] | .508 | .385 | 436224377.3609150600000 00 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 78560953207 6279550.000 | 1 | 78560953207 6279550.000 | 4.128 | .112[b] |
| | Residual | 76116682961 5672060.000 | 4 | 19029170740 3918016.000 | | |
| | Total | 15467763616 91951620.000 | 5 | | | |

a. Dependent Variable: Agricultural Raw Materials_Exports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | -522176013 .981 | 558419969 .607 | | -.935 | .403 | -207259840 5.240 | 102824637 7.278 |
| | time | 87193307. 605 | 42913082. 531 | .713 | 2.032 | .112 | -31952510. 337 | 206339125 .546 |

a. Dependent Variable: Agricultural Raw Materials_Exports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Agricultural Raw Materials_Imports | 5796429975.613749500000000 | 4011913726.773459400000000 | 8 |
| time | 10.2500 | 5.06388 | 8 |

**Correlations**

| | | Agricultural Raw Materials_Imports | time |
|---|---|---|---|
| Pearson Correlation | Agricultural Raw Materials_Imports | 1.000 | .241 |
| | time | .241 | 1.000 |
| Sig. (1-tailed) | Agricultural Raw Materials_Imports | . | .283 |
| | time | .283 | . |
| N | Agricultural Raw Materials_Imports | 8 | 8 |
| | time | 8 | 8 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .241[a] | .058 | -.099 | 4205715283.324002000000000 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 6539915991202611200.000 | 1 | 6539915991202611200.000 | .370 | .565[b] |
| | Residual | 1061282462663105400000.000 | 6 | 1768804104438509000.000 | | |
| | Total | 1126681622575131500000.000 | 7 | | | |

a. Dependent Variable: Agricultural Raw Materials_Imports

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 3839939564.486 | 3544563284.177 | | 1.083 | .320 | -4833294342.700 | 12513173471.673 |
| | time | 190877113.281 | 31391180.721 | .241 | .608 | .565 | -577237392.117 | 958991618.678 |

a. Dependent Variable: Agricultural Raw Materials_Imports

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| OilRealGDPGrowth | 14.3835706855 | 58.7692319098 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | OilRealGDPGrowth | time |
|---|---|---|---|
| Pearson Correlation | OilRealGDPGrowth | 1.000 | .039 |
| | time | .039 | 1.000 |
| Sig. (1-tailed) | OilRealGDPGrowth | . | .435 |
| | time | .435 | . |
| N | OilRealGDPGrowth | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .039[a] | .002 | -.054 | 60.33382004194 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 99.573 | 1 | 99.573 | .027 | .870[b] |
| | Residual | 65523.057 | 18 | 3640.170 | | |
| | Total | 65622.630 | 19 | | | |

a. Dependent Variable: OilRealGDPGrowth

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 10.321 | 28.027 | | .368 | .717 | -48.562 | 69.203 |
| | time | .387 | 2.340 | .039 | .165 | .870 | -4.528 | 5.302 |

a. Dependent Variable: OilRealGDPGrowth

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| NonOilRealGDPGrowth | .2165258120 | 20.92976982939 | 20 |
| time | 10.5000 | 5.91608 | 20 |

**Correlations**

| | | NonOilRealGDPGrowth | time |
|---|---|---|---|
| Pearson Correlation | NonOilRealGDPGrowth | 1.000 | -.303 |
| | time | -.303 | 1.000 |
| Sig. (1-tailed) | NonOilRealGDPGrowth | . | .097 |
| | time | .097 | . |
| N | NonOilRealGDPGrowth | 20 | 20 |
| | time | 20 | 20 |

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .303[a] | .092 | .041 | 20.49500884377 |

a. Predictors: (Constant), time

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 762.233 | 1 | 762.233 | 1.815 | .195[b] |
| | Residual | 7560.817 | 18 | 420.045 | | |
| | Total | 8323.050 | 19 | | | |

a. Dependent Variable: NonOilRealGDPGrowth

b. Predictors: (Constant), time

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 11.458 | 9.521 | | 1.203 | .244 | -8.544 | 31.460 |
| | time | -1.071 | .795 | -.303 | -1.347 | .195 | -2.740 | .599 |

a. Dependent Variable: NonOilRealGDPGrowth