OIL EXPORTS, NON-OIL EXPORTS AND ECONOMIC GROWTH: TIME SERIES
ANALYSIS FOR KUWAIT (1970-2004)

by

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AN ABSTRACT OF A DISSERTATION

Submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Economics
College of Arts and Sciences

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Manhattan, Kansas

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ABSTRACT

Kuwait is an oil-based economy that adopts an export promotion policy as the fundamental strategy for economic growth. The country has experienced remarkable economic growth and high per capita GDP for the last four decades. The export-led growth (ELG) hypothesis has been commonly used to examine the impact of exports on economic growth. Numerous studies support this hypothesis and found evidence that exports have a significant positive relationship with economic growth. However, it is not yet known how effective the ELG hypothesis is in small oil producing country like Kuwait. The central question addressed is whether the ELG hypothesis is valid in the case of Kuwait.

This empirical research investigates the relationship of two components of exports (oil exports and non-oil exports) with economic growth by examining the ELG hypothesis using annual time series data for the Kuwaiti economy over the period 1970-2004. The study applies a number of econometric techniques: unit root test, cointegration test, error correction model (ECM), impulse responds function (IRF), and Granger causality test.

The results of this dissertation show that all the variables are stationary in the first difference. Moreover, the cointegration test confirms the existence of the long run relationship among the three variables. The Granger test shows bidirectional causality between oil exports and economic growth, and a unidirectional causality from non-oil exports to economic growth. However, the causality results are consistent with the results reported by the ECM.

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Chapter One

INTRODUCTION

The importance of increasing exports as an engine for economic growth has long been the subject of considerable debate in the economic development and growth literature. However, economic growth is one of the requirements for raising the standard of living and increasing the per capita GDP in a country. There are different strategies and policies that enable an economy to grow, such as export promotion and import substitution.

Export promotion is a characteristic of an economy that allocates substantial resources to increase the production of goods that the country exports. However, export promotion policy exposes domestic firms to foreign competition. Theoretically, domestic industry achieves better production technology and a higher quality of output. In addition, it should reduce its costs and increase its efficiency and credibility in the international market. Conversely, import substitution policy is a characteristic of an economy that allocates substantial resources to produce goods that the country currently imports. Import substitution policy is frequently implemented in the form of tariffs and other import barrier mechanisms to protect a domestic industry.

Numerous studies have discussed both export promotion (or export-oriented) policy and import substitution (or import-oriented) policy. However, there remains a debate among economists about the correct policy instrument for developing countries. Thus, each country must decide which policies and strategies to adopt. The decision might depend on improving an industry's competition in the international market or protecting a local industry.

Exports are one of the factors in promoting economic growth. This view suggests that an increase in productivity provides more efficient use of resources, increases specialization of export products, increases the level of skills in the export sector, and improves overall efficiency.

In addition, increased productivity reallocates the economic resources from less productive sectors to more productive ones based on comparative advantage and increases the sales of export products in domestic and foreign markets. This approach should generate technological improvements in response to competition in international markets (Balassa, 1978; Feder, 1982; Ram, 1985, 1987; Darrat, 1987; Moschos, 1989; Riezman, 1996; Xu, 1996; Giles and Williams, 2000; Abu-Qarn, 2004; AlKhuzaim, 2005)

Empirically, the Export-Led Growth Hypothesis (ELG) has been supported by many countries, such as Newly Industrialized Countries (NIC), which have doubled their standard of living in the last three decades. There are many countries that are good examples of ELG that will be discussed in detail in the literature review chapter. Numerous studies have found a significant positive relationship between exports and economic growth and concluded that exports are highly correlated with economic growth (e.g., Emery, 1967; Michalopoulos and Jay, 1973; Michaely, 1977; Balassa, 1978 and 1985; Bhagwati, 1978, Heller and Porter, 1978; Fajana, 1979; Tyler, 1981; Feder, 1982; Kavoussi, 1984, Krueger, 1985, Moschos, 1989; Grossman and Helpman, 1991; Giles and Williams, 2000, Abu-Qarn 2004).

There are many countries, including Kuwait, that have adopted the export policy as a major instrument for economic growth. According to the theory of comparative advantage, these countries should benefit from specialization of the export sector and selling their export goods in the international market. Kuwait is an oil-based economy that adopted the export policy as the fundamental strategy for economic growth. Kuwait exports most of its oil production, which is around 5% of the global oil production. Kuwait uses the revenues generated to cover expenditures and to import goods from all over the world (Al-Yousif 1997). Its ELG policy is divided into oil exports and non-oil exports in international markets. ELG policy promotes the

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use of more advanced technology among export-oriented sectors with the aim of enhancing capacity utilization, economies of scale, efficiency, higher productivity, and better allocation of the economy's resources.

Oil is the major source of income in Kuwait. Oil exports include petroleum and natural gas. These two byproducts are the only productive natural resources in the country. Kuwait experienced remarkable economic growth for the last three decades. Despite several international financial crises and despite the severe economic impact of Gulf Wars I and II, Kuwait is maintaining healthy economic growth and high per capita GDP.

The government of Kuwait increased its spending in the oil sector by using more advanced technologies and highly skilled labor. This strategy has more than doubled oil production in the last three decades. As a result, there is rapid economic growth in all sectors of the economy. Moreover, the economic growth in Kuwait has had a positive impact on the population and labor force. The population in Kuwait has tripled in the last three decades. In 1970, the population was 0.74 million and increased to 2.23 million in 2000. The population change increased the demand for goods and services in the economy. The higher demand for labor attracted many immigrants from Southeast Asian countries to Kuwait. As a result of the increase in immigrant workers, there is an imbalance in the distribution pyramid of the Kuwaiti versus non-Kuwaiti population.

Although, ELG theories have been empirically examined in many developing countries, it is not yet known how effective ELG theory is in small, oil-producing countries like Kuwait. The purpose of this research is to examine the impact of ELG instruments on Kuwait's long-term and short-term economic development. The remaining chapters of this dissertation are arranged as follows. Chapter 2 will provide a background of the Kuwaiti economy. In chapter 3, previous

empirical findings on Export-Led Growth (ELG) Hypothesis will be discussed. The methodology to examine the ELG instruments and data will be examined in chapter 4. The results are presented in chapter 5, and chapter 6 will discuss the conclusion and policy implications of this research.

Chapter Two

ECONOMIC BACKGROUND FOR KUWAIT

2.1 Introduction

Kuwait is a small country located on the northeast Arabian Peninsula, on the northern shore of the Arabian Gulf. Kuwait shares a northern border with Iraq, a southern border with Saudi Arabia, and has a total area of 17,820 sq km. Based on the 2006 census, the population of Kuwait is approximately 3 million. About 30% of the population is Kuwaiti and 70% is non-Kuwaiti. The official language is Arabic, yet English is widely spoken.

Kuwait was established in the middle of the eighteenth century. The word Kuwait originally came from the word "Kut" which means a "small fort". The history of Kuwait dates back to the 18th century when a group of tribes and families emigrated from the middle of the Arabian Peninsula to the northeast. Al-Sabah, who belonged to the Al-Anazi tribe, was one of these families. Al-Sabah was elected by peers to be the Royal family of Kuwait. The first ruler of Kuwait was Sabah I, who ruled the country from 1756 to 1762.

Between 1899 and 1961, Kuwait had a binding agreement with the British Empire. In this agreement, the United Kingdom guaranteed security and protection for Kuwait and pledged not to interfere in Kuwait's domestic affairs. At the end of this agreement, the state of Kuwait gained its independence on February 25, 1961.

Life in Kuwait in the 18th and 19th centuries was very simple. People mainly engaged in livestock trading, fishing, pearl diving, and long distance trade with Basra, India, and East Africa. However, India was considered Kuwait's major trade partner. Kuwaiti people used to travel to India to sell pearls and buy food, cloth, wood, and other goods. After oil was discovered, the per capita GDP in Kuwait was considered among the highest in the world. Oil

changed the country into a modern state where Kuwaiti enjoys the benefits of economic development.

In this chapter, I will discuss the oil sector in Kuwait and how it changed the economy. I will look at the GDP, per capita GDP, and the oil and non-oil exports in Kuwait. I will also discuss some characteristics of the population and labor market in Kuwait and explore how massive growth in Kuwait in the last decades has prompted expatriates to enter the country.

2.2 Oil

The discovery of oil in the Gulf region started at the turn of the 20th century. Iran was the first country in the region to discover oil in 1911. Anglo-Persian Oil Company (APOC), a British Company, signed a contract with the Iranian government to search for oil. During that time, Britain and USA were competing with one another to sign multiple agreements with the Gulf region countries to search for oil, develop and manage oil reserves, build pipelines to carry the oil to the sea, and build refineries (Library of Congress, 1994). In 1927, oil was discovered in Iraq and in Bahrain in 1932. Oil was discovered in Kuwait and Saudi Arabia in 1938. It was discovered in Qatar in 1939 and in the UAE and Oman in 1958 and 1964, respectively.

Kuwait signed an agreement with Britain that established the Kuwait Oil Company (KOC) in 1934. Although the discovery of oil in Kuwait dates back to 1938, oil exports were delayed due to WWII. In 1946, oil exports began and Kuwait started to experience dramatic growth. KOC was completely nationalized in 1975, and by that time, Kuwaiti oil was wholly owned by the government. Oil export is considered the major source of income in Kuwait. On average, it accounts for approximately 90% of total exports and 80% of the government's income. Kuwait is one of the members of Organization of Petroleum Exporting Countries

(OPEC). This organization plays an important role in determining production quotas for its members (Library of Congress, 1994).

2.3 Social Welfare

The discovery of oil in Kuwait changed the entire life of its people, and Kuwait has experienced remarkable economic growth for the last three decades. As a result, the Kuwaiti government adopted a social welfare policy aimed at redistributing social wealth among the citizens. The government also allocated a huge budget for education, public health, employment, and housing. There is no income or sales tax in Kuwait.

The Kuwaiti government provides citizens with basic education; schooling from kindergarten to high school is completely free. Therefore, the level of education among the citizens is very high. In addition, the government provides financial support for health services and housing for Kuwaiti citizens. The government also encourages large families among the citizens through subsidies based on the family size (up to five children). The goal of this policy is to increase the number of Kuwaiti citizens.

2.4 GDP and Per Capita GDP

Kuwait experienced massive growth in terms of the GDP. In 1970, the total GDP was estimated at $2.87 billion and rose to $55.66 billion in 2004. The oil embargo imposed by OPEC in 1973, as well as the rapid increase in the world demand for oil, caused a large increase in world oil prices and allowed oil exporting countries to make substantial windfall profits. Meanwhile, the per capita GDP for Kuwait increased from $3,882 in 1970 to $21,327 in 2004, with an annual growth rate of approximately 5%. Figures 1 and 2 show the significant increase in the GDP and the level of per capita GDP from 1970 to 2004.

Figure 1: GDP for Kuwait in Billion US$
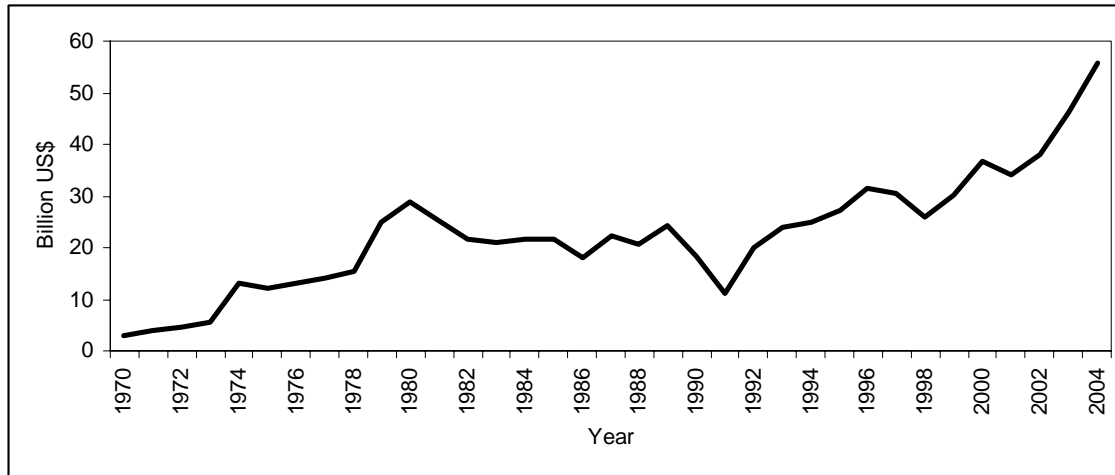
Source: International Monetary Fund (IMF), 2006.

Figure 2: Per Capita GDP for Kuwait in Thousand US$
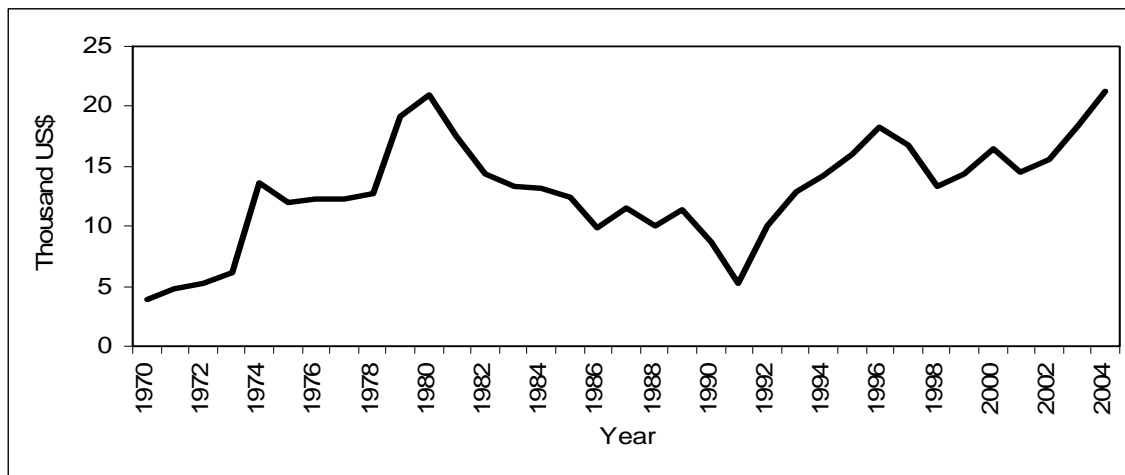
Source: International Monetary Fund (IMF), 2006.

Figure1 indicates growth rates for the GDP of 765%, -15%, 64%, and 51% over the periods 1970-1979, 1980-1989, 1990-1999, and 2000-2004, respectively. Figure 2 shows growth rates in per capita GDP of 392%, -46%, 67%, and 29% for the same periods.

During the 1980s, the Kuwait economy experienced a significant decrease in their GDP due to a continuous decrease in oil prices during that period. The decline in oil prices was due to multiple reasons. These reasons include the decreased demand for oil, the First Gulf War (Iran-

Iraq War) over the period 1980-1988, and the fact that non-OPEC oil production increased to 20 million barrel per day (b/d) in 1981. In addition, OPEC output declined to 17.5 and 13.7 million b/d in 1983 and 1984, respectively. However, in 1985 OPEC output increased significantly and reached 18 million b/d, which also contributed to the sharp decline in oil prices in the mid 1980s.

2.5 Exports:

Kuwaiti exports played an important role in developing the country to transform it into a modern one. Exports in Kuwait may be broadly classified into two categories: oil exports and non-oil exports. Oil exports include oil and natural gas, while non-oil exports include exports of national origin and re-exported goods.

Oil exports and non-oil exports have experienced massive growth over the decades. In 1970, oil exports totaled $1.62 billion. This figure rose to $26.65 billion in 2004. Non-oil exports increased from $0.074 billion to $1.95 billion from 1970 to 2004. The ratio of oil exports to total exports averaged roughly 90% during that time frame. Figure 3 shows the changes oil and non-oil exports over the period 1970-2004.

Figure 3: Ratio of Oil and Non-Oil Exports to Total Exports
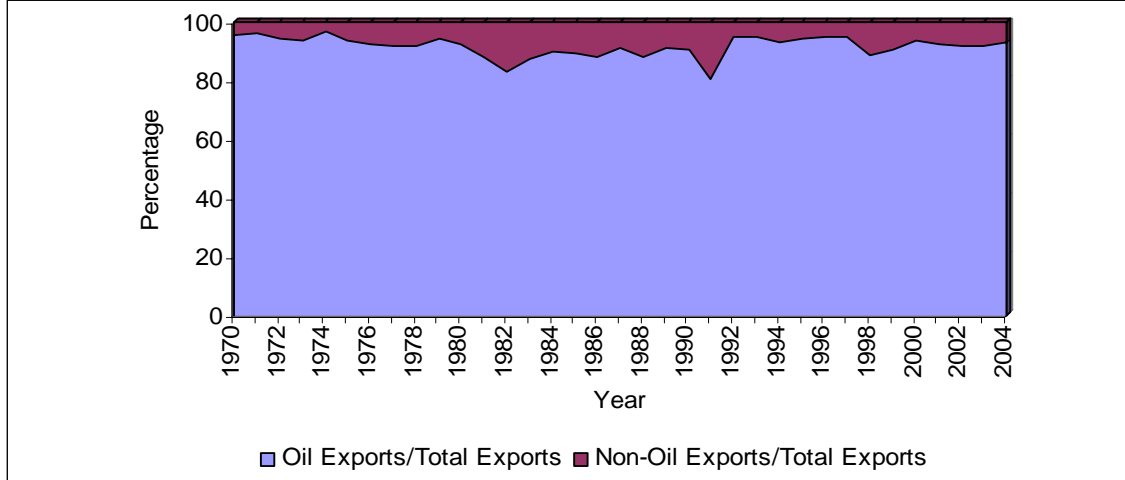
Source: International Monetary Fund (IMF), 2006

2.5.1 Oil Exports:

Kuwait experienced growth rates in oil exports of 968 %, -43%, 73%, and 46% for the periods 1970-1979, 1980-1989, 1990-1999, and 2000-2004, respectively. The oil sector is solely owned by the government and this sector is the main source of national income in Kuwait. The ratio of oil revenues to the total revenues for the government were 91%, 88.5%, 88.5%, 85%, and 91% for the years 2001, 2002, 2003, 2004, 2005, respectively (Central Bank of Kuwait, 2005).

The continuous economic growth in Kuwait led the government to undertake development programs in many sectors, particularly the oil sector. Today, Kuwait produces approximately 2.67 million barrels of oil per day. Current production contrasts sharply with the approximate production of 1.25 million barrels per day in 1980. This shows a significant increase in oil production over a period of 27 years. Despite this exponential growth, the government plans to expand oil production by involving foreign oil companies, such as Chevron, Exxon, and Shell, to increase the production in the northern part of Kuwait.

Figure 4: Oil Export for Kuwait in Billion US$
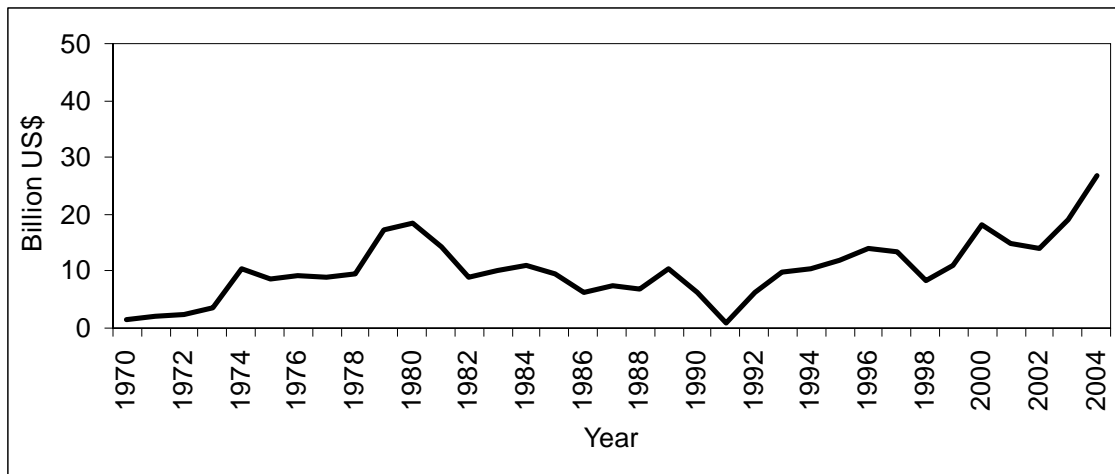
Source: International Monetary Fund (IMF), 2006

Figure 5: The Ratio of Oil Export/ GDP for Kuwait (%)
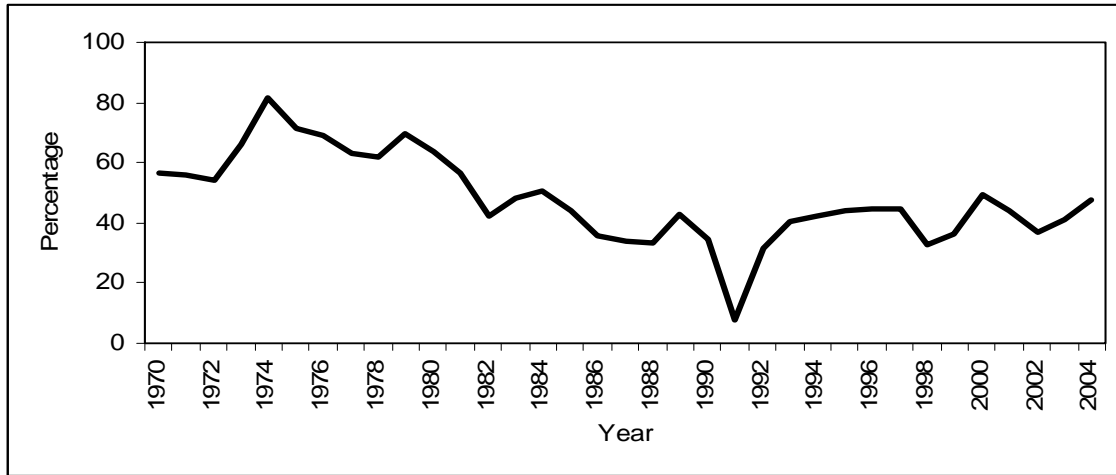
Source: International Monetary Fund (IMF), 2006

2.5.2 Non-Oil Exports

Kuwait experienced a growth rate in non-oil exports equal to 1405%, -29%, 73%, and 55% for the periods 1970-1979, 1980-1989, 1990-1999, and 2000-2004, respectively. Non-Oil Exports may be classified into:

1. Exports of national origin: these include all goods that have been produced or manufactured domestically, or the goods that have been subjected to manufacturing changes domestically that led to a change in the structure of goods and their values.

2. Re-exported goods: these include all imported good cleared through customs without making any real changes to their structure (Annual Statistical Abstract Edition 42 Ministry of Planning-2005).

Figure 6: Non-Oil Export for Kuwait in Billion US$
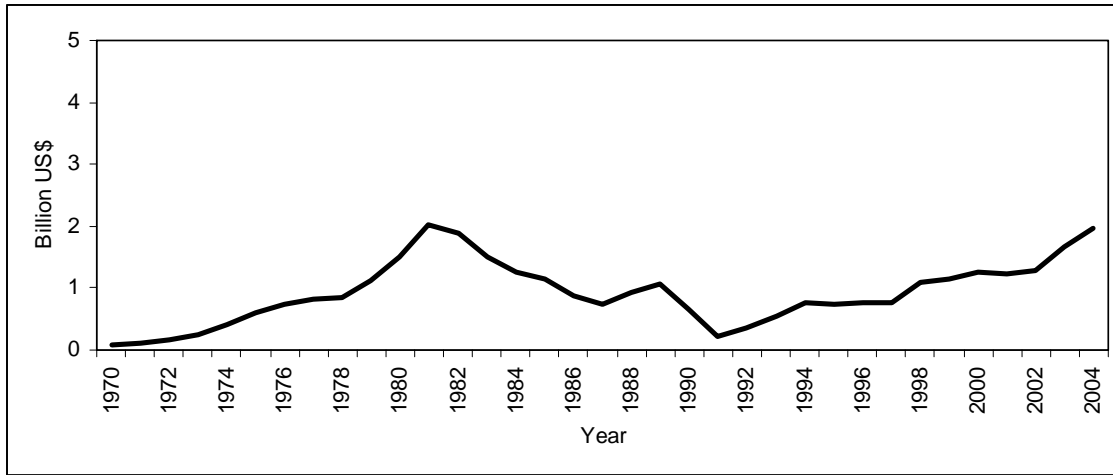
Figure 7: The Ratio of Non-Oil Export/ GDP for Kuwait (%)
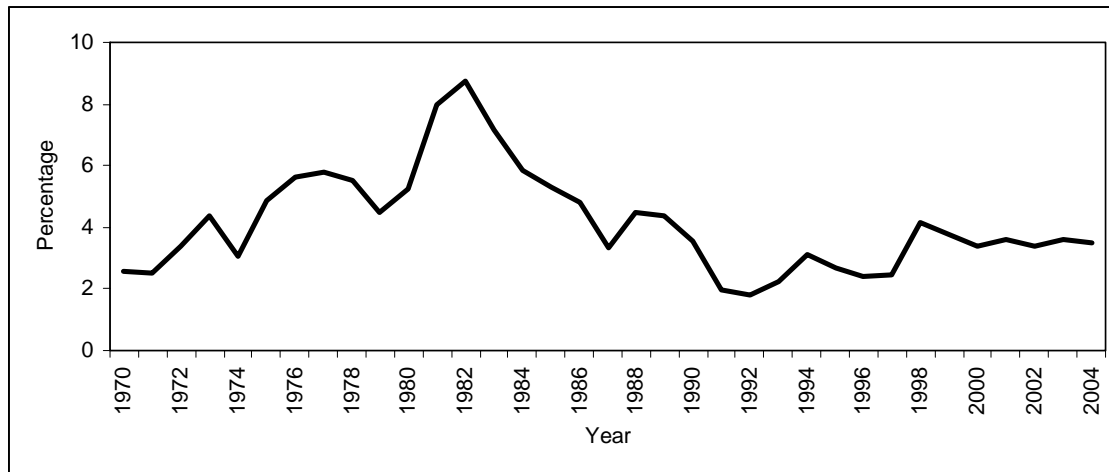
2.6 The Labor Market in Kuwait

The nature of the labor market in Kuwait is different than those of other developing countries. In Kuwait, the issue is a structural and distributional one, i.e. a problem that relates to the imbalance in the structure of the population. However, the government continues its dependence on oil as the main source of revenue, encourages the spread of luxury consumption habits, and increases its role in economic activities.

Due to the massive growth in Kuwait, there are a huge number of work opportunities and high demand for domestic and foreign laborers. The population in Kuwait is growing rapidly. In the last three decades, the Kuwaiti population has increased from 0.74 million in 1970 to 2.61 million in 2004, an increase of about 3.5 times. Most of this growth is due to an increase in the number of Non-Kuwaiti or foreign expatriates. They move from their home countries to work in Kuwait with a working visa, and they stay as long as they have jobs. The majority of the non-Kuwaiti laborers came from low income countries, such as Bangladesh, India, Pakistan, Philippines, Sri Lanka, and Arab countries like Egypt, Lebanon, Jordan, Palestine, and Syria.

According to the 2005 Annual Statistical Abstract for Ministry of Planning in Kuwait, the total population was 2,866,888 (male and female), where 973,286 (34%) are Kuwaiti and 1,893,602 (66%) are non-Kuwaiti. The Kuwaiti population was comprised of 477,216 (49%) males and 496,070 (51%) females. The non-Kuwaiti population was comprised of 1,314,181 (70%) males and 579,421 (30%) females.

Figure 8: The Population in Kuwait

Source: International Monetary Fund (IMF), 2006.

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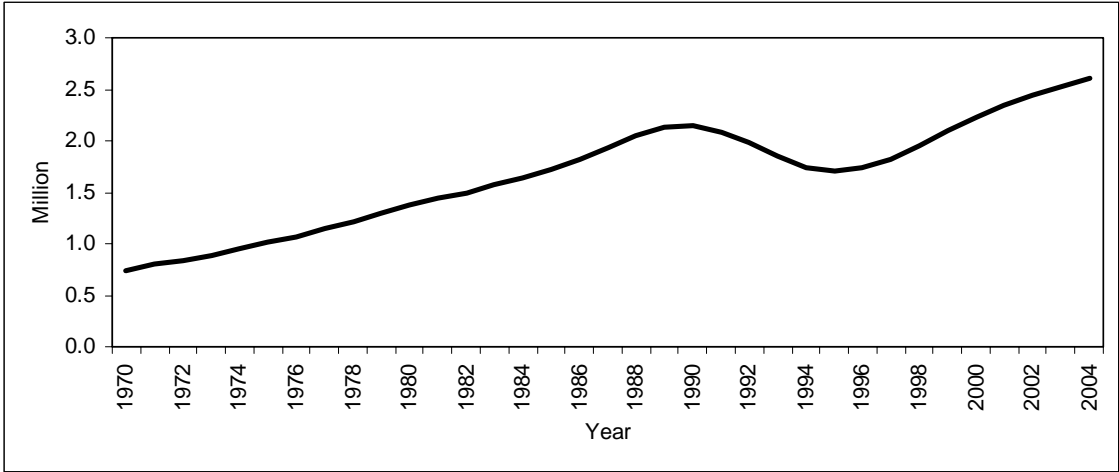
2.6.1 The Wage Policy:

The goal of any employment policy is to achieve the optimal allocation of available labor force among different sectors in order to maximize the GDP. The employment policy adopted by the government did not traditionally focus on the distribution of the labor force among different sectors. Instead policy focused on providing the tools for economic and social development during the sharp growth of oil revenue that Kuwait experienced in the last three decades. The policy was designed to redistribute the oil revenue among the citizens regardless of the efficiency of the use of the national labor force.

Based on the goal of the employment policy in the public sector, the distribution of wealth, the level of the salaries and wages in this sector is largely influenced by social and political factors as well as economic ones. As a result of non-economic forces, the relationship between income and productivity became distorted and lead to a decrease in the productivity of much of the Kuwaiti labor force.

In fact, the wages and salaries in the public sector exceeded the labor productivity. The wages and salaries for the public sector employees are higher than those of workers in the private sector with comparable education and technical levels. Private sector wages largely reflect the labor productivity of workers because of economic factors rather than non-economic factors (Al-Kaisi, 1993).

As a result of this wage/productivity discrepancy, there is a concentration of Kuwaiti, especially those with the poor skills, employed in the public sector. Around 88% of Kuwaiti worked in the public sector. These employees are not in the production sector because of their inability to compete in the labor market. This situation led to a shortage of skilled workers in the

private and production sectors. Therefore, Kuwaiti economic productivity is highly dependent on the productivity of non-Kuwaiti labor.

The Kuwaiti labor market may be divided into private and public sectors. It might also be partitioned based on nationality into Kuwaiti and non- Kuwaiti. This partition is clear in the wages differentials between Kuwaiti and non- Kuwaiti and wage differences among the Kuwaiti themselves between the private sector and public sector. Moreover, there is a mismatch between the education system output and the labor market needs, which is a common problem in many Gulf States. The mismatch is exceptional in Kuwait because of the expansion of the education system to its highest level. There are an increased percentage of females participating in the labor force, yet the university curriculum remains focused toward social and education studies (Altony, 1998).

Metwalli (1998) shows that the general difference in wages between Kuwaiti and foreigners can be partially explained by the difference in the education level between the two groups. The Kuwaiti labor force, with high and mid-level education, has much higher wages than non-Kuwaiti. The author also shows that the difference in wages in the production sectors can be partially explained by the concentration of the Kuwaiti labor force in high capitally intensive sectors that require a high level of education and training. Wage differences in career levels are due to the social benefits system that is used in Kuwait to encourage the increase in Kuwaiti population relative to the immigrant population. The social benefits are used to overcome the population imbalance.

Ramadan and Altony (1998) analyze the demand for labor in the social services in Kuwait based on an economic model that included the major activities that demand labor in Kuwait. Their research uses annual cross-sectional data for labor force, level of economic

activity, and wages. They look at the labor market for Kuwaiti and foreigners to find the demand elasticity for each group. Their results show that the real wage was statistically significant in determining the demand for foreign labor and the demand for labor as a whole. However, real wage was not statistically significant in determining the demand for Kuwaiti labor.

2.6.2 Employment:

The massive economic growth in Kuwait in the last decade has attracted a significant influx of expatriates to Kuwait. The labor force in Kuwait increased from 745,701 in 1995 to 1,700,906 in 2005, an increase of 128% during the 10 year period.

From 2003 to 2005, as the world witnessed a high oil price, Kuwait experienced high economic growth rate, which led the government to increase spending on development programs and projects. In addition, the private sector in Kuwait also increased its spending on new projects. As a result, this expansion created many jobs in Kuwait that attracted many expatriates to move to Kuwait. Thus, the total labor force increased by 21% in the three years from 2003 to 2005.

The percentage of labor force to the total population increased from 47% in 1995 to 56% in 2003 and from 57% in 2004 to 59% in 2005. For the same period, the Kuwaiti labor force was the minority, averaging around 18% of the total labor force. Seventy-one percent of the Kuwaiti labor force was male and 29% was female. The increased education level among Kuwaiti females and the societal change in Kuwait indicate that female participation in the labor force is increasing over time. The percentage of Kuwaiti females in the labor force has increased from 29% in 1995 to 37% in 2003 and from 38% in 2004 to 40% in 2005.

On the other hand, the percentage of the non-Kuwaiti females in the labor force decreased from 24% in 1995 to 22% in 2003 and from 21% in 2004 to 20% in 2005. Table 1 and

figure 9 show the labor force in Kuwait by gender and nationality. The data indicate a small increase in Kuwaiti participation and a big increase in non-Kuwaiti participation in the labor force.

Table 1: The Labor Force in Kuwait by Gender and Nationality

	1995		2003		2004		2005	
	Kuwaiti	Non-Kuwaiti	Kuwaiti	Non-Kuwaiti	Kuwaiti	Non-Kuwaiti	Kuwaiti	Non-Kuwaiti
Male	100,788	458,063	164,137	883,775	170,441	977,179	179,199	1,113,258
Female	41,416	145,434	98,596	254,235	105,960	271,843	119,553	288,896
Total	142,204	603,497	262,733	1,138,010	276,401	1,249,022	298,752	1,402,154
Total Labor Force	745,701		1,400,743		1,525,423		1,700,906	
Total Population by Nationality	653,616	921,954	913,500	1,570,834	942,892	1,701,885	973,286	1,893,602
Total Population	1,575,570		2,484,334		2,644,777		2,866,888	
% of the Labor Force to Total Population	47%		56%		57%		59%	

Source: Annual Statistical Abstract Edition 42, Ministry of Planning, Kuwait, 2005.

Figure 9: Population, Manpower & Labor Force by Employment Status, Gender, & Nationality
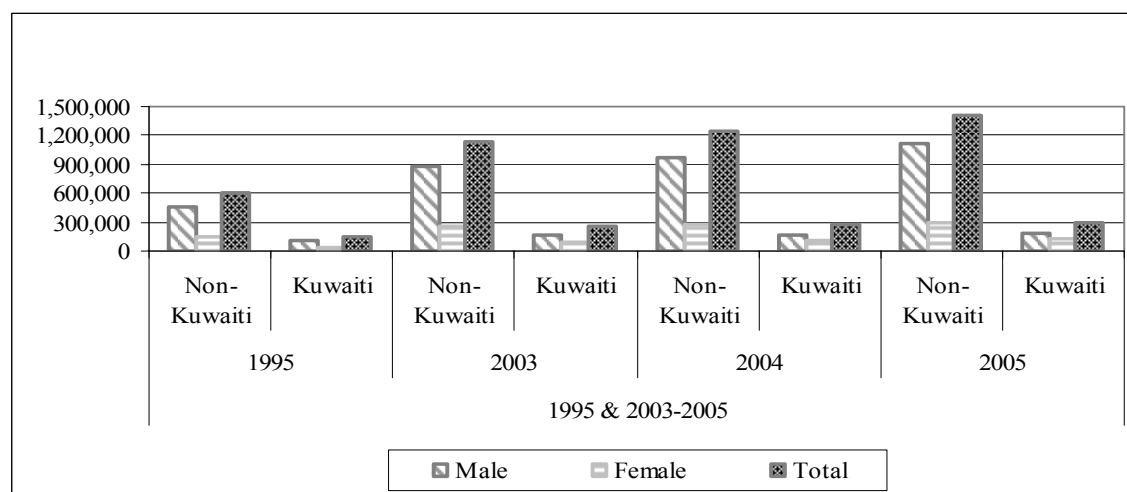
Source: Annual Statistical Abstract Edition 42, Ministry of Planning, Kuwait, 2005.

2.6.3 Unemployment:

The rate of unemployment in Kuwait is low compared to the rest of the world. In 2005, the unemployment rate was 4.4% and 0.84% for Kuwaiti and non-Kuwaiti, respectively. Meanwhile, Kuwaiti unemployment is estimated to be 13,815 people; 6,153 (44.5%) are male, and 7,662 (55.5%) are female. Non-Kuwaiti unemployment is 11,883 people; 6,683 (56.3%) are male and 5,200 (43.7%) are female. Figure 10 shows the ratio of the unemployment based on citizenship and gender (Ministry of Planning in Kuwait, 2005).

Since the unemployment rate for non-Kuwaiti is always smaller than that of the Kuwaiti, the probability for a non-Kuwaiti to find a job in Kuwait is relatively high. This provides more incentive for new foreigners to come to Kuwait. Therefore, the population of non-Kuwaiti will continue to rise in Kuwait.

Figure 10: Ratio of Unemployment to Labor Force
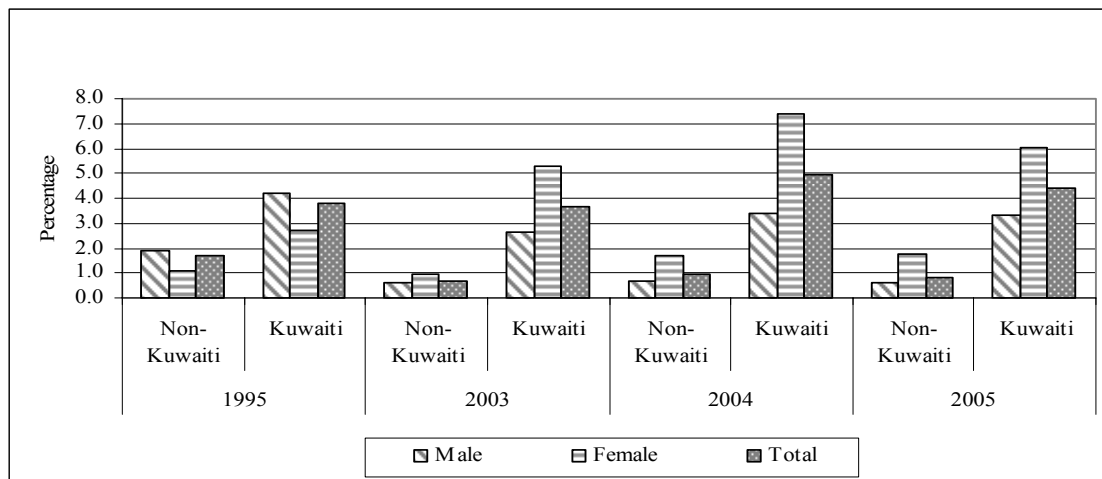
Source: Annual Statistical Abstract Edition 42, Ministry of Planning, Kuwait, 2005.

The Kuwaiti economy is characterized by heavy dependence on oil revenues, and governmental policies have led to the dangerous imbalance in the population composition and the labor force. The policies resulted in a surge in the number of expatriate workers, making the Kuwaiti population the minority. Even though the policies were intended to distribute the "oil"

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wealth among the citizens, the government employment and wages policies have led to a dangerous imbalance between productivity and wages, resulting in the concentration of the domestic labor force in the public sector. Government spending became the driving force of economic activities in the nation, also contributing to an imbalance in the population and the structure of the labor force.

2.7 Currency:

The Kuwaiti Dinar (KD) is the official currency in Kuwait. The average exchange rate of US dollar to Kuwaiti Dinar in 2006 is approximately $1 US = 0.290 KD.

Central Bank of Kuwait (CBK) is the official authority responsible for the implementation of the monetary policy in Kuwait. The CBK long ago adopted a weighted currency basket peg system that pegged the Kuwaiti Dinar to major world currencies. In effect, this exchange rate policy has enhanced and maintained a stable exchange rate against the major world currencies, especially the US dollar. The implementation of this policy, however, came to an end in 2002 when Kuwait joined a monetary integration with other Gulf Cooperation Council (GCC) countries. In this system, a single currency is planned for 2010. In January 2003, the CBK adopted a pegged exchange rate to the US dollar with some margins around a parity rate equal to +/- 3.5% such that $1 US "shall not exceed" 0.310 KD and "shall not fall below" 0.289 KD (Economic Report, CBK, 2005).

2.8 Kuwait and the GCC:

Kuwait is a member of the GCC for the Arab States of the Gulf: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). The GCC was established in 1981 after the first Gulf War (Iran-Iraq War). The goal of this organization is to promote political and

social cooperation. It aims also to promote a common market and monetary union to achieve economic integration by 2010.

Chapter Three

LITERATURE REVIEW

This chapter reviews the previous research on the relationship between export and economic growth for many countries around the world. Multiple empirical studies have been done using cross section and time series data. The goal of those studies is to test the export-led growth hypothesis. Numerous studies support this hypothesis where exports have a strong positive impact on economic growth. However, few studies suggest that exports do not cause economic growth. The chapter focused on empirical studies from 1967 to 2007. Most of the studies have used data for Industrialized Countries (IC), Newly Industrializing Countries (NIC), Developing Countries (DC), and Less Developed Countries (LDC). This categorization is based on the World Bank classification. In the end of this chapter, table three presents a summary of 31 empirical studies that were conducted between 1967 and 2007, which includes data set and time period, methodology, variables, technique, and results of the study.

The early studies include Emery (1967), Maizels (1968), Voivodas (1973), Michaely (1977), Balassa (1987), Williamson (1978), Fajana (1979), Tyler (1981), Feder (1982), Kavoussi (1984), Ram (1985, 1987). Most of these studies used simple correlation tests such as ordinary least square (OLS) estimation method. In those studies the correlation coefficient between exports and economic growth was tested, and found that export and growth are highly correlated. Their results support the export-led growth hypothesis. However, the empirical results of the early studies derived from traditional econometrics, which have been highly criticized for being spurious. Thus, most of early studies were misleading in that they advocated export growth in an arbitrary way.

The theoretical benchmark of the early studies is based on bivariate and ad hoc production functions. Some of these studies include labor growth and capital growth (or investment growth) in order to measure the externality and productivity gains generated by this sector which stimulated the domestic economy. This is one of the weaknesses of the previous studies. Another weakness is that they ignored the issue of causality and only relayed on positive correlation between exports and economic growth as an evidence of causality. They assumed that the causality runs from exports to GDP, but they did not test that empirically. Another weakness of the early studies is that they used cross-sectional analysis to a single-equation production function, which assumes that all countries have identical production function, but this is not true in reality.

The recent studies include Chow (1987), Hsiao (1987), Kunst and Marin (1989), Chan and et al. (1990), Ahmad and Kwan (1991), Bahmani-Oskooee and et al. (1991), Sharma et al. (1991), Al-Yousif (1997), Panas and Vamvoukas (2002), Abual-Foul (2004), Abu-Qarn and Abu-Bader (2004), Hossain and Karunaratne (2004), Love and Chandra (2004), Al-Mamun and Nath (2005), Awokuse (2005, 2006), Reppas and Christopoulos (2005), Siliverstovs and Herzer (2006, 2007). These recent studies used different techniques than the previous ones. They used the cointegration test, vector autoregression (VAR), and Granger test. These techniques are important to determine the links between exports and economic growth and to verify the direction of causality. Moreover, most of recent studies did not use cross-sectional data. Instead, they used time series data for each country, which casts doubts on the long-run positive impact of export expansion on economic growth. Therefore, recent studies are not as conclusive as they were previously.

Furthermore, some of the recent studies have found no long-run relationship between exports and economic growth, and they suggested that it arises only from a positive short-term relationship between exports growth and economic growth. In addition, the size of the export sector in the country is very small and it has a weak linkage with other sectors in the economy. Therefore, it is unlikely that exports expansion could boost the economic growth. On the other hand, there are other studies that confirmed that export expansion leads to economic growth.

Most importantly, since this research focuses on the export-led growth hypothesis in Kuwait, the previous studies did not provide an insight into concluding about Kuwait. Moreover, there is only one published study, in 1997 by Al-Yousif, which includes Kuwait. His finding indicates that there is no long-run relationship between exports and economic growth. In comparison, this study uses the most recent time series technique to explore the link between exports (oil and non-oil exports) and GDP in Kuwait.

Emery (1967) examines the relationship between exports and economic growth for 48 developed and developing countries. He conducts a time series analysis using annual data for the period 1953-1963 employing a regression equation using GNP as the dependent variable and total exports as the independent variable. The results indicate that there is a significant positive relationship between exports growth and economic growth. Further, his results suggest that in order to increase the economic growth, countries should follow the stimulated export policy and should not follow the import substitution policy.

Maizels (1968) conducts a study to test the relationship between the rate of change in exports and the rate of change in the GDP for nine developing countries for the period between 1951 and 1962. He finds that there is a significant relationship between export growth rate and GDP growth rate.

Voivodas (1973) investigates the relationship between exports, foreign capital inflow, and the domestic growth rate. He uses a time series and cross sectional data for 22 less developed countries (LDC) over the period of 1956 -1967. In this study, Voivodas (1973) uses two models: the Harrod-Domar model and the two-gap model. Voivodas finds that there is a significant relationship between the growth of exports and the growth of domestic product, and there is insignificant relationship between foreign capital inflow and the growth of GDP. The results suggest that exports cause growth in GDP.

Michaely (1977) conducts a study of 41 less developed countries over the period 1950-1973. The purpose of the study is to test the hypothesis that the rate of export growth and the rate of economic growth are positively correlated. He uses the proportion of exports as a measure of export growth, and he uses the rate of change of per capita GDP as a measure of economic growth. The results of this study indicate that there is a significant positive relationship between the rate of export growth and the rate of economic growth for the countries under the study.

Balassa (1978) examines the relationship between exports and economic growth using a data set of 11 industrial developing countries for the period 1960 to 1973. This study is different from previous studies, as it uses three different measures including export growth versus output growth, export growth versus the growth of output in net exports, and the average ratio of exports to output versus the growth of output. In this study, Balassa finds that there is a positive relationship between exports and economic growth, and he points out that export oriented policies lead to a better growth performance than import substitution policies.

Williamson (1978) studies the effect of exports, foreign capital, and investment on economic growth in 22 Latin American countries over the period of 1960-1974 using time series and cross sectional data. The results show that exports, foreign capital, and investment have a

positive impact on economic growth. However, his findings indicate that in order for the country to expand the economic growth, one or more of the explanatory variables under consideration should expand.

Fajana (1979) examines the effect of exports and foreign capital on economic growth in Nigeria using a time series data. The study covers the period from 1957-64 and 1965-74. The separation of the time period into two subperiods is based on the impact of agricultural exports and oil exports. He indicates that exports affect economic growth positively. Furthermore, the results show that the relationship between exports and economic growth in the latter period is significantly stronger when oil was the primary export. However, the oil exports have a greater impact on economic growth than agricultural exports in Nigeria.

Tyler (1981) investigates the relationship between export expansion and economic growth for 55 middle income developing countries for the period 1960 to 1977. He extends the work of Balassa (1978) by using a bivariate model to test the correlation between GDP growth and other economic variables, including the growth of manufacturing output, manufacturing export, total export, and investment. Tyler's results illustrate that a higher growth rate of exports is associated with a higher growth rate of GDP. Further, he concludes that countries with the fastest economic growth also had the fastest manufacturing exports growth.

Feder (1982) examines the effect of both the export sector and the non-export sector on economic growth for a sample of 31 semi-industrialized countries over the period of 1964-1973. He divides the whole economy into two main sectors and the resource allocation is divided between them. The first sector produces export goods for international market, while the second sector produces non-export goods for domestic market. Feder uses a simple production function model to test the marginal factor productivities in both export and non-export sectors. He finds

that the marginal factor productivity in the export sector is higher than in the non-export sector due to international competition and foreign investment. Therefore, shifts the economic resources from the less productive to the more productive sector leads to higher economic growth.

Kavoussi (1984) extends Tyler's work by including low income countries in the sample. He investigates the relationship between export expansion and economic growth for 73 developing countries over the period of 1960-1978. He uses a simple production function model, which includes manufacturing exports and total exports. The results indicate that there is a significant positive relationship between exports and economic growth for both the low and middle income countries. He also concludes that export expansion raises the productivity level, which causes the positive correlation between the exports growth rates and GNP in developing countries.

Ram (1985) conducts a study of 73 LDCs to measure the contribution of exports to economic growth using the production function model and considers the exports as the productive input. He divides the whole sample into two levels of income, low income and middle income countries, for two periods, 1960 -1970 and 1970-1977. Also, he examined the single equation model and tested the heteroskedasticity assumption. In this study, Ram finds that there is positive relationship between exports and economic growth. The impact of exports on economic growth for the middle income LDCs is significantly higher than the low-income LDCs over the period 1960 -1970, but in the second period 1970-1977 the impact differential almost disappears.

Chow (1987) perform Sims causality test to investigate the causality between export growth and industrial development in eight Newly Industrializing Countries (NICs): Argentina,

Brazil, Hong Kong, Israel, Korea, Mexico, Singapore and Taiwan. The time period of the study is from 1960 to 1980. The results indicate that there was no causality between export growth and industrial development for Argentina, while in Mexico there is a unidirectional causality going from manufactured goods exports to manufactured output. Moreover, there is bidirectional causality between the growth of exports and industrial development in Brazil, Hong Kong, Israel, Korea, Singapore, and Taiwan.

Hsiao (1987) applies Sims and Granger causality tests to examine the direction of causality between export growth and GDP growth for four Asian NICs: Hong Kong, Korea, Singapore, and Taiwan over the period of 1960-1984. This study indicates that the two tests do not lead to the same causality results for each country. For instance, Sims test shows a causality going from GDP to exports in Hong Kong, while it shows bidirectional causality for Korea, Singapore, and Taiwan. Granger test shows a causality going from GDP to exports in Hong Kong while it shows no causality relationship exists for the other three countries. Further, the export-led growth hypothesis was supported only in the case of Hong Kong. Hsioa also concluded that the economic growth can be achieved by both export promotion and import substitution policies for the countries under the study.

Ram (1987) conducts a study to test the relationship between exports and economic growth for 88 LDC using both time series and cross-sectional data for two different time periods 1962-1972 and 1973-1982. In this study, Ram finds that there is a significant positive relationship between export performance and economic growth for most countries under the study. His results also indicate that government expenditure has a positive impact on economic growth.

Kunst and Marin (1989) investigate the causal relationship between export growth and productivity growth for the Austria manufacturing sector over the period of 1965-1985. The finding indicates that there is a unilateral causality going from the manufactured output per worker to manufactured exports.

Chan and et al. (1990) perform the Granger causality test to investigate the causality between real exports and real GDP in Taiwan for the period 1952-1987. The result indicates that there is a unidirectional causality going from the growth of GDP to the growth of exports.

Ahmad and Kwan (1991) perform the Granger causality test to investigate the relationship between exports and national income for 47 African developing countries during the period 1981 to 1987. The study uses both pooled time series and cross sectional data. Their finding suggests that there is no evidence of causality for all countries, but the authors indicate that there is weak support for causality going from economic growth to exports in some subsets of sample countries.

Bahmani-Oskooee, et al. (1991) apply the Granger causality test to examine the direction of causality between export growth and economic growth for developing countries using annual data over the period 1951-1987. They determine the optimal number of lags based on Akaike's Final Prediction Error (FPE) Criteria. The results for causal links from export growth to output growth are as follow: unidirectional positive causality for Dominican Republic and Taiwan; El Salvador, Paraguay and Peru exhibit unidirectional negative causality; Korea and Thailand exhibit positive causality in both directions; South Africa observes internally generated exports; Indonesia exhibits positive causality from export growth to economic growth and negative causality from economic growth to export growth; and finally the study indicates no causality

exist for Brazil, Ecuador, Greece, Guyana, Honduras, Jamaica, Morocco, Philippines, Sri Lanka, and Tunisia.

Sharma et al. (1991) investigate the causal relationship among growth, exports and factor inputs (capital and labor). The sample consists of five industrialized countries (Germany, Italy, Japan, United Kingdom, and United States) with quarterly data from 1960 -1987. They estimate the four variables for each country by using the VAR model. The results show that exports cause economic growth in the case of Germany and Japan, while in UK and U.S. the causality is the opposite (economic growth causes export growth), and no causality is found for Italy. Furthermore, the study supports export-led growth hypothesis for only Germany and Japan. However, in the case of UK and U.S., the results are consistent with the fact that the domestic demand conditions have a significant impact on economic growth, which supports the demand-led growth hypothesis.

Al-Yousif (1997) provide results of the unit root and cointegration tests using annual data for exports and GDP from 1973 to 1993 for four countries, Saudi Arabia, Kuwait, UAE, and Oman. He finds that there is statistical evidence that suggests that exports have a positive impact on economic growth in the four countries, but the cointegration results suggest that there is no long-run relationship between exports and economic growth in the four countries.

Panas and Vamvoukas (2002) perform the co-integration procedure, error-correction model, and multivariate Granger causality test to investigate the relationship between exports and output growth for Greece. The authors use annual time series data over the period 1948 - 1997. The result of this study indicated that the causality runs from output growth to export growth in the case of Greece.

Abual-Foul (2004) examines the export-led growth hypothesis in Jordan for the period from 1976 to 1997, using ECM, VAR, and Granger causality methodologies. The results show that exports have a positive impact on economic growth. He suggests that the government should attract the foreign investors to invest in Jordan, which will increase the exports and lead to faster growth. He also found unidirectional causality runs from exports to GDP in Jordan.

Abu-Qarn and Abu-Bader (2004) investigate empirically the relationship between export growth and economic growth for nine Middle East and North Africa (MENA) countries using time series techniques. They used the following time periods: 1963-1999 for Algeria, Egypt, Israel, and Morocco; 1976-1999 for Iran; 1976-1998 for Jordan; 1960-1991 for Sudan; 1963-1998 for Tunisia; and 1966-1996 for Turkey. When they consider total exports, the unidirectional causality runs from exports to GDP only in the case of Iran. Yet when they consider manufactured exports, the results support the ELG hypothesis. The results show that not all exports contribute equally to the GDP. However, the results also support the importance of promoting manufactured exports to boost economic growth in the MENA countries.

Hossain and Karunaratne (2004) conduct a study to test the export-led growth hypothesis in Bangladesh using a quarterly time series data for the period 1974 -1999. The results indicate that both total exports and manufacturing exports are significantly and positively related to economic growth and there is a long run relationship between exports and economic growth in the case of Bangladesh. The finding confirms that Granger causality runs from exports to GDP.

Love and Chandra (2004) investigated the relationship between exports and economic growth over the periods 1950-1998, 1970-2000 and 1965-1997 for India, Pakistan, and Sri Lanka, respectively. They use Johansen's multivariate co-integration framework for testing the causality. Their findings conclude that export growth effects economic growth positively in the

case of India and Pakistan, and there is bidirectional causality between exports and growth in the case of India. However, there is no evidence for either direction of causality in the case of Sri Lanka, because the terms of trade coefficient has a negative sign, indicating that any increase in exports and income will effect the terms of trade negatively.

Al-Mamun and Nath (2005) conduct a study to test the export-led growth hypothesis in Bangladesh using a time series analysis. In this study, they use quarterly data on an industrial index, exports of goods and services, and exports of goods for the period from 1976 to 2003. The result of Engle-Granger co-integration test indicates that there is a positive long-run relationship between exports and industrial production. The result of the error-correction model (ECM) of industrial production and export suggest that there is a long-run unidirectional causality from exports to growth. Also, the study confirms that there is no evidence of a short-run causal relationship between exports and industrial production, but the authors indicate that the long-run causality runs from export to industrial production.

Awokuse (2005) examines the export-led growth hypothesis in Korea for the period from 1963 to 2001 using the VECM, VAR, and Granger causality methodologies. The findings indicate that there is a bi-directional causality between exports and output growth, which indicates that the exports Granger cause growth (ELG) and growth Granger cause exports (GLE). However, changes in capital levels and terms of trade have a strong impact on economic growth in Korea, while exports growth is influence by GDP, capital and foreign output shock.

Reppas and Christopoulos (2005) conduct a study of 22 LDCs from Asia and Africa using the co-integration and OLS techniques to test the relationship between exports and economic growth for the period from 1969 to1999. Their finding suggests that there is a positive long run relationship between export growth and economic growth for the majority of the

countries under the study. However, the co-integration results indicate that the causality runs from economic growth to export growth.

Awokuse (2006) performs the causality test to examine the relationship between exports and economic growth for Japan using a quarterly time series data over the period of 1960-1991. The results indicate that there is a bi-directional causality (ELG and GLE) between exports and output in Japan, using productivity as a measure of output. In addition, he points out that both capital and foreign output have a positive impact on output. Capital has a positive and significant effect on productivity; which is consistent with the neoclassical theory where aggregate productivity is a function of capital.

Siliverstovs and Herzer (2006) investigate empirically the relationship between export growth and economic growth using annual time series data over the period 1960 -2001. They separate the exports into two categories, primary exports and manufactured exports. The findings indicate that both primary exports and manufactured exports are significantly and positively related to economic growth in Chile, which supports ELG hypothesis in Chile. Further, The Granger causality runs from manufactured exports to economic growth, while the primary exports do not cause economic growth.

Siliverstovs and Herzer (2007) examine the export-led growth hypothesis in Chile for the period 1963 to 2001 using the neoclassical production function. In this study the productivity is measured as a function of manufactured and mining exports. The findings support ELG for manufactured exports and the Granger Causality run from manufactured exports to output, and there is bidirectional causality between mining exports and non-export GDP. The results also indicate that there is a long run relationship between non-export GDP and other variables

including capital stock, a labor variable representing the number of employment every year, real

imports of capital goods, manufactured exports, and mining exports.

Table 2: Empirical Studies on the Export-Led Growth (ELG) Hypothesis						
Study	Data Set	Methodology				
		Economic Growth	Export Growth	Technique	Other Variables	Result
Emery (1967)	Cross-Section: 50 countries (1953-1963)	GNP Growth	Export Growth	OLS	Current account	Support ELG
Maizels (1968)	Time Series: 9 countries (1950 -1962)	GDP	Exports	OLS	-	Support ELG
Voivodas (1973)	Cross-Section: 22 countries, Time Series:12 countries (1956-1967)	Real GDP Growth	Real Export Growth	OLS	Country Dummy Variables.	Support ELG
Michaely (1977)	Cross-Section: 41 countries (1950-1973)	Per Capita GNP Growth	Growth in Export Share	Rank Correlation	-	Support ELG
Balassa (1978)	Cross-Section: 10 countries (1956-1967 and 1967-1973)	GNP Growth	Export Growth	OLS, Production Function	Labor Force Growth, Investment	Support ELG
Williamson (1978)	Cross-Section: 22 countries (1960-1974)	Change in GDP	Lagged Exports	OLS	Direct Investment, Foreign Capital, Country Dummies.	Support ELG
Fajana (1979)	Time Series: Nigeria (1954-1974):	GDP growth	Export Shares	OLS	Trade Balance, Current Account	Support ELG

Study	Data Set	Methodology				
		Economic Growth	Export Growth	Technique	Other Variables	Result
Tyler (1981)	Cross-Section: 55 countries (1960-1977)	GDP growth	Export Growth	OLS, production function	Labor Force Growth, Investment Growth	Support ELG
Feder (1982)	Cross-section: 31 countries (1964-1973)	GDP Growth	Export Growth	OLS	Labor Force Growth, Investment	Support ELG
Kavoussi (1984)	Cross-Section: 73 countries (1960-1978)	GDP Growth	Export Growth	OLS, Production Function	Labor Growth, Capital Growth	Support ELG
Ram (1985)	73-country, Cross-Section: 73 countries (1960-1970 and 1970-1977)	Real GDP Growth	Real Export Growth	OLS, Tests for Heteroskedasticity and Specification Bias (Hausman Test)	Labor Force Growth and Real Investment Growth	Support ELG
Chow (1987)	Time Series: 8 countries (1960-1984)	Real Manufactured Output	Real Manufactured Exports	Sim's Test	-	Support ELG
Hsiao (1987)	Time Series: 4 countries (1960-1982)	Real GDP	Real Exports	Granger Test, Sim's Test.	-	One country Support ELG
Ram (1987)	Cross-Section and Time Series: 88 countries (1960-1982)	Real GDP	Real Export	OLS	Real Investment, Population Growth	Support ELG

Table 2: Empirical Studies on the Export-Led Growth (ELG) Hypothesis (continued)

Table 2: Empirical Studies on the Export-Led Growth (ELG) Hypothesis (continued)

Study	Data Set	Methodology				
		Economic Growth	Export Growth	Technique	Other Variables	Result
Kunst and Marin (1989)	Time Series: Austria (1965-1985)	Labor productivity on manufactured.	Real Exports of Manufactured	Granger Test	Terms of trade, Real OECD GDP, seasonal Dummy Variables.	Not Support ELG
Chan and et al. (1990)	Time Series: Taiwan (1952-1987)	Real GDP	Real Exports	Granger Test	-	Not Support ELG
Ahmad and Kwan (1991)	Time Series: 47 countries (1981-1987)	Real GDP, Real GDP Per Capita	Total Real exports, Real Manufactured exports, Share of Manufactured Exports to Total Exports	Granger Test	-	Not support ELG
Bahmani-Oskooee et al. (1991)	Time Series: 20 countries (1951-1987)	Real GDP	Real exports	Granger Test	-	Little Support ELG
Sharma et al. (1991)	Time Series: 5 countries (1960-1987)	Real GNP	Real Exports	Granger Test	Real Capital Formation, Labor	Little Support ELG

Table 2: Empirical Studies on the Export-Led Growth (ELG) Hypothesis (continued)

Study	Data Set	Methodology				
		Economic Growth	Export Growth	Technique	Other Variables	Result
Al-Yousif (1997)	Time Series: 4 countries (1973-1993)	Real GDP	Real Exports	OLS, Cointegration Test, White Test	Investment as a percentage of GDP, Growth of Labor Force, Growth of government expenditure, Growth terms of trade	Little Support ELG
Panas and Vamvoukas (2002)	Time Series: Greek (1948-1997)	Real GNP	Exports	Cointegration Test, ECM, Granger Test	nominal effective exchange rate index, Consumer Price index	Not support ELG
Abual-Foul (2004)	Time Series: Jordan (1976 to 1997)	Real GDP	Real Exports	ECM, VAR, Granger Test	-	Support ELG
Abu-Qarn and Abu-Bader (2004)	Time Series: 9 countries (1960-1999)	Real GDP	Real Total Exports, Real Manufactured Exports	Cointegration, VAR, ECM, Granger Test	Real Imports	Not support ELG for Total Exports, but Support ELG for Manufactured Export
Hossain and Karunaratne (2004)	Time Series: Bangladesh (1974-1999)	GDP	Total exports, Manufacturing Exports	Cointegration, ECM, Granger Test	Capital Formation	Support ELG

Table 2: Empirical Studies on the Export-Led Growth (ELG) Hypothesis (continued)

Study	Data Set	Methodology				Result
		Economic Growth	Export Growth	Technique	Other Variables	
Love and Chandra (2004)	Time Series: 3 countries (1950-2000)	Real GDP	Real Exports	Cointegration, VAR, Granger Test	Terms of Trade	Little Support for ELG
Al-Mamun and Nath (2005)	Time Series: Bangladesh (1976 - 2003)	Industrial Production Index	Exports	Cointegration, ECM, Granger Test	Used Industrial Production Index instead of GDP	Support ELG
Awokuse (2005)	Time Series: Korea (1963-2001)	Real GDP	Real Exports	ECM, VAR, Granger Test	Terms of Trade, Gross Capital Formation, Industrial Production	Support ELG and GLX
Reppas and Christopoulos (2005)	Time Series: 22 countries (1969-1999)	Real GDP	Real Exports	Cointegration, OLS, Causality Test	Share of investment in GDP, Employment	Support GLX
Awokuse (2006)	Time Series: Japan (1960-1991)	Productivity	Real Exports	VAR, DAG, Granger Test,	Real Term of Trade, Gross capital formation, industrial production	Support ELG and GLE
Siliverstovs and Herzer (2006)	Time Series: Chile (1960-2001)	Productivity	real manufactured exports, and real primary exports	VAR, Granger Test	real capital stock, labor, real Imports	Support ELG
Siliverstovs and Herzer (2007)	Time Series: Chile (1960-2001)	Productivity	Manufactured Exports, Mining Exports	Johansen Cointegration, ECM, VAR, ARCH, Granger Test	Non-Export output, Capital Stock, Labor, Real Imports of Capital Good	Manufactured Exports Support ELG, but Mining Exports supports ELG and GLE.

Chapter Four

DATA AND METHODOLOGY

4.1 Data

In this study, we use the annual time series data for Kuwait for the period from 1970 to 2004, collected from the International Financial Statistics published by the International Monetary Funds (IMF). The data comprise Real Gross Domestic Product (RGDP), Oil Exports (OILX), and Non-oil exports (NONOILX). All values will be in real terms. In addition, they will be expressed in the logarithmic form. To obtain the real GDP, the GDP deflator will be used to deflate nominal GDP. To get the oil exports in real prices, nominal oil exports will be deflated using an index for oil prices. Finally, to obtain the non-oil exports in real prices, unfortunately, there is no special price deflator for that sector. Indeed, we cannot use the export prices as is because they will be biased toward oil exports prices. Therefore, the convenient method to get non oil exports in real values is deflating them using the GDP deflator.

Table 3 shows the descriptive statistics (summary statistics) for the data (in natural logarithm) for real gross domestic products (RGDP), real oil exports (OILX), and real non-oil exports (NONOILX).

Table 3: Statistics RGDP, OILX and NONOILX

	Mean	Standard Deviation	Minimum	Maximum
RGDP	4.401	0.103	4.005	4.586
OILX	3.995	0.259	2.947	4.436
NONOILX	2.986	0.206	2.293	3.254

Source: IMF data

4.2 Methodology

In order to analyze the issue of export-led growth in Kuwait, this study will investigate the relationship between the real gross domestic product (RGDP) and exports. The study divides exports into two categories: oil exports (OILX) and non-oil exports (NONOILX). Oil exports, as it is known for Kuwait, make up the majority of total exports. Still, it is important to know how these two components will affect the RGDP, or how the RGDP will affect them, the causality issue. In addition, we will determine the causality between oil exports and non-oil exports.

This research applies the following five tests: Unit Root test, Cointegration test, Error Correction Model, Impulse Response Function, and Causality test. In brief, the importance of these tests is described in the next section:

The unit root test is important to ensure that all variables included in the model are stationary. That is to ensure that any variable has a constant mean and constant variance. This makes prediction of future values sensible. If variables are non-stationary, as expected for most macroeconomic variables, the normal way to investigate the relationship among variables, for example the OLS technique, makes no sense. When variables are non-stationary, we still can investigate the relationship among them using the cointegration test. The idea is to test if we can build a long run relationship among variables that are non stationary.

The error correction model (ECM) and impulse response function are other ways to investigate the relationship among variables. For example, ECM combines the short run and the long run relationships of the variables in one equation. It confirms the existence of the long-run relationship among the variables. The second test, the impulse response function, identifies shocks to any variable and measures the responses of each variable in the model to those shocks.

Finally, the causality test helps testing if a causal relationship exists between two variables. If one variable is causing the other variable, then the first variable contains some useful information about the latter that enables us to predict its future values efficiently. All these tests are discussed separately in details in the following sections.

4.2.1 Unit Root Test

4.2.1.1 Approach

Most of the time series data are non-stationary, meaning that the mean and variance are not constant over time. For example, the GDP of Kuwait over the period 1970-2004 was not stationary. We determined this by dividing the GDP data into four subperiods: 1970-1979, 1980-1989, 1990-1999, and 2000-2004. The mean values of the GDP for these four subperiods are not the same. Also, the variances of the GDP for these four subperiods are not the same.

Basically consider a variable Y that has a time series represented by a first-order autoregressive AR (1):

$$Y_t = \alpha Y_{t-1} + \varepsilon_t$$

where Y_t is the GDP at time t, ε_t is the disturbance term that is generated from a white noise process and assumed to be independently and identically distributed with zero mean and constant variance and ε's are uncorrelated across time.

If α is less than one in absolute value ($|\alpha|<1$), then the time path is stationary, and the time path of Y_t will fluctuate around a constant mean value and therefore will not have an upward or downward trend. On the other hand, if α is greater than one in absolute value ($|\alpha|>1$), the series will be explosive and the time path is non-stationary. However, if α is equal to one in absolute value (($|\alpha|=1$), the time path of Y_t is non-stationary, and the unit root exists.

4.2.1.2 How to make it stationary

Most of the time series data are non-stationary, that is, different periods give new information about the mean, the variance, and covariance, and these have to be finite and bounded. However, if the variance and the covariance are not finite, they will not be bounded, and thus, the time series data in this case will not be stationary.

A time series variable Y_t, for example, has a covariance stationarity (or weak stationarity) if its mean, variance, and autocovariances are finite and do not depend on time; that is, its mean $E(Y_t) = \mu$, variance $Var(Y_t) = \sigma^2$, and covariance (or autocovariance) $Cov(Y_t\ Y_{t+j}) = \gamma_j$ at lag j. However, if a variable is not stationary, it can be made stationary by removing the trend in the series by taking the first difference; that is, $\Delta Y_t = Y_t - Y_{t-1}$

In most time series data the first difference is stationary. If that is the case, the variable is said to be integrated of order 1, written I (1). However, if the variable is not stationary in the first difference, which is rare, then we need to difference it twice to make it stationary. In this case, Y_t and ΔY_t are non-stationary, but $\Delta^2 Y_t$ (the second difference) is stationary, and it said to be integrated of order 2, written I (2).

Broadly speaking, a stochastic process is said to be integrated of order p, denoted I (p), if the stationarity is achieved after differencing the variables p times. However, the Augmented Dickey-Fuller (ADF) (1979) test is the general method to perform a formal test for series stationarity.

4.2.1.3 ADF Test

The ADF test develops a procedure for a formal test on nonstationary time series. This technique considers the following three different regression equations to be used to test for the presence of unit root:

$$\Delta Y_t = \alpha_1 Y_{t-1} + \text{lags of } \Delta Y_t + \varepsilon_t \tag{4.2.1}$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \text{lags of } \Delta Y_t + \varepsilon_t \tag{4.2.2}$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 t + \text{lags of } \Delta Y_t + \varepsilon_t \tag{4.2.3}$$

Equation (4.2.1) is a random walk; equation (4.2.2) is a random walk with intercept only; equation (4.2.3) is a random walk with intercept and time trend. In these three equations we have $\varepsilon_t \sim ii(0,\sigma^2)$ for t = 1, 2, ….

From the above three equations, we look at the critical value for rejecting the null hypotheses of α_1. However, in equations (4.2.1), (4.2.2), and (4.2.3) the first difference of Y_t is regressed against a constant term, a time trend ($t = 1, 2…, T$), the first lag of Y_t, and lags of ΔY_t. It is important to include sufficient lags of ΔY_t to ensure no autocorrelation in the error term. Sometimes, one lag or no lags are suitable. To test for the suitable number of lags, we will use the Schwarz Information Criterion (SIC) to confirm whether autocorrelation is present or not.

The ADF test is based on the value of t-statistics for the coefficient of the lagged dependent variable compared with special calculated critical values. If the calculated value is greater than the critical value, then we reject the null hypothesis of a unit root; the unit root does not exist, and our variable is stationary (Enders 1995; Maddala 1998; Greene 2003; Gujarati 2003).

4.2.2 Cointegration Test

4.2.2.1 Approach

This test is useful for estimating a long-run relationship between time series macroeconomic variables, given that most macroeconomic variable, such as GDP and exports, are nonstationary in their levels, trend over time, and seem to follow random walk. It is important to test for stationarity before we perform the cointegration test. This may require

differencing the variables to make them stationary. Further, the cointegration technique is an important condition to confirm whether we have a stable long run relationship between two variables. In addition, it suggests that the time series cannot move far away from one another, which implies that there is a stationary long run relationship between the cointegrated variables.

In chapter 2, I showed the GDP, oil exports, and non-oil exports over the period 1970-2004. These variables share a common trend and move together over the long run. Therefore, there might be a relationship between them. For example, there may be a linear combination of GDP and oil exports. If that holds, we conclude that GDP and oil exports are cointegrated and a linear combination of these variables will be stationary.

The cointegration test, between two variables y_t and x_t, denotes a linear combination of nonstationary variables. This test requires the two variables to be integrated of the same order, say p, and a linear combination of the variables should be integrated of order lower than p, say p-q, where q>0. However, if the nonstationary time series variables y_t and x_t are integrated of different orders, they are not cointegrated and they tend to drift apart in the long run, and will obtain a spurious relationship.

Suppose y_t and x_t are nonstationary time series variables and they are integrated with the same order, say integrated of order 1, that is, $y_t \sim I(1)$ and $x_t \sim I(1)$. This indicates that y_t and x_t are CI (1,1). Then, y_t and x_t are said to be cointegrated if there exists a constant β such that $u_t \sim I(0)$ where $u_t = y_t - \beta x_t$, and the residual series are stationary.

4.2.2.2 How to Perform the Cointegration Test:

Consider the following cointegrating regression:

$$Y_t = \beta_0 + \beta_1 X_t + u_t \qquad\qquad (4.2.2.1)$$

where

$$u_t = Y_t - (\beta_0 + \beta_1 X_t).$$

If the error term (u_t) is trending over time, then the variables are not related, meaning that they are not cointegrated. However, if the error term (u_t) is constant over time, which means it is stationary, then there is a long run linear relationship between the variables Y_t and X_t, and thus they are cointegrated. In other words, Y_t and X_t are I(1) variables and u_t is I(0), which implies that Y_t and X_t are cointegrated and β_1 is the cointegrating parameter.

Consider the following cointegrating regression equation, where it includes three variables Y_t, X_t, and Z_t, and three cointegrating vectors β_0, β_1, and β_2:

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 Z_t + u_t \qquad\qquad (4.2.2.2)$$

Suppose we want to estimate the above equation to test whether any long run equilibrium relationship would exist among the three variables, we follow these steps:

Step 1. Estimate equation (4.2.2.2) by using OLS, and then save the residuals. Assume that all three variables Y_t, X_t, and Z_t become stationary after differencing once, which means they are integrated of order 1, I(1).

Step 2. Perform the ADF test on the residuals. If we reject the null hypothesis (H_0: the residuals are not stationary), the residuals are stationary and all variables (Y_t, X_t, and Z_t) are cointegrated.

The residuals equation has the following form (regress Δu_t on u_{t-1} and the lags of Δu_t):

$$\Delta u_t = \alpha_1 u_{t-1} + \alpha_2 \Delta u_{t-1} + \alpha_3 \Delta u_{t-2} + \ldots + \alpha_{j+1} \Delta u_{t-j} + \varepsilon_t \qquad (4.2.2.3)$$

Where,

u_{t-1}: the first lag of the residual; Δu_{t-1}, Δu_{t-2}, $\Delta u_{t-3}\ldots$, $\alpha_t \Delta u_{t-i}$: the lags of Δu_t (to ensure no correlation in error terms).

In equation (4.2.2.3) we compare the t-statistic for the coefficient (α_1) in absolute value. If the calculated t-statistic is greater than the critical value, we reject the null hypothesis (H_0: u_{t-1} has a unit root or the variables are not cointegrated), and we conclude that the variables are cointegrated. However, if the calculated t-statistic is lower than the critical value, we cannot reject the null hypothesis, and we conclude that the variables are not cointegrated.

4.2.3 Error Correction Model (ECM)

4.2.3.1 Approach

We apply this test after we confirm the existence of the long-run relationship among the variables. The importance of the ECM is that it combines the short run relationship between the first differences of the variables and the long run relationship for the variables at the level. Moreover, the ECM allows a gradual adjustment of the dependent variable toward its long run value, and it also allows the short run dynamic. Worth noting is that the ECM ensures all variables in the estimated equation to be stationary.

Once cointegration is detected, the long run equilibrium tends to be re-established after a disequilibrium shock, and any deviation from equilibrium in a period will be partially corrected in the following period. However, the error term, u_t from cointegrating equation (4.2.2.1), corresponds to the deviation from the long run equilibrium relationship and can be used as the error correction terms in describing the short run dynamic specification.

4.2.3.2 How to Perform the ECM

Consider the following model:

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_t - \beta_2 \left[y_{t-1} - \gamma_1 - \gamma_2 x_{t-1} \right] + u_t \qquad (4.2.3.1)$$

where β_0 is a constant term. β_1 is the short run elasticity, and it measures the impact of the changes in X_t on Y_t. It also corresponds to how fast deviation from the long-run equilibrium is estimated to follow the change in each variable. In other words, $\beta_1 \Delta X_t$ is the first difference term of the ECM that shows the effect of the short run disturbances on the explanatory variables. If $\beta_1 = 0$, then Y_t is not responding to a deviation from the long run equilibrium in the previous period. β_2 is the fraction of disequilibrium errors in previous periods. It is also called the ECM coefficient and demonstrates the short run adjustment of the variables toward the long run equilibrium. $\left[y_{t-1} - \gamma_1 - \gamma_2 x_{t-1} \right]$ is the disequilibrium error in the previous period, and it shows the adjustment toward the long run equilibrium. It also equals to the disequilibrium residuals of a cointegrating equation. The error term in time t is represented by u_t.

4.2.4 Vector Autoregression (VAR):

4.2.4.1 Approach

The VAR model was developed by Sims (1980). The model is used to estimate the relationship among variables included in the model and to measure the evolution and the interdependencies among multiple time series. The advocates of VAR emphasize its virtues, such as that the variables are treated symmetrically by including lags of the variable itself and lags of other variables in the model.

The word VAR includes vector and autoregressive. The term vector implies that we are dealing with a vector of variables (two or more). The term autoregressive implies that the lagged values of the dependent variable appear on the right hand side.

The VAR model treats the variables in the model on an equal footing, and there is no a priori distinction between endogenous and exogenous variables. Therefore, the researchers should not worry about determining whether the variables are endogenous or exogenous because all the variables have been treated as endogenous variables (Gujarati, 2003). Furthermore, it is very important to determine the lag length in the VAR model. Should we include many lags or few lags? The information criteria like Akaike Information Criterion (AIC) or Schwarz Information Criterion (SIC) can be used to choose the appropriate lag length for the VAR model.

4.2.4.2 How to Estimate the VAR Model

Suppose we have a three variable VAR model with X, Y and Z. Suppose we decided to include two lags for each variable in each equation. Then, the VAR model will contain six lagged parameters in each equation plus the constant term, making a total of seven parameters. For example, the model for X_t would be

$$X_t = \alpha_{10} + \beta_{11}X_{t-1} + \beta_{12}X_{t-2} + \gamma_{11}Y_{t-1} + \gamma_{12}Y_{t-2} + \lambda_{11}Z_{t-1} + \lambda_{12}Z_{t-2} + \varepsilon_{1t} \qquad (4.2.4.1)$$

In practice, we can extend the sets of variables when we have k numbers of endogenous variables and p numbers of lags. Then, the resulting VAR model in matrix notation is

$$y_t = \alpha + \Phi_1\, y_{t-1} + \ldots + \Phi_p\, y_{t-p} + \varepsilon_t \qquad (4.2.4.2)$$

where y_t and its lagged values are vectors of endogenous variables; ε_t is a vector of non-autocorrelated disturbances; $\varepsilon_t \sim$ i.i.d. N $(0, \Omega)$, meaning ε_t is a k x 1 vectors with 0 mean and Ω is the contemporaneous covariance matrix. $\Phi_1, \ldots, \Phi_p$ are k x k matrices of coefficients to be estimated.

4.2.4.3 Impulse Response Function (IRF):

The IRF is the centerpiece of the VAR model. It has been used to measure the effect of various shocks on the behavior of the endogenous series in the system. It defines the response of the dependent variable in the VAR model to shocks in the error terms. In other words, the IRF detects the impact of a one time shock to one of the innovations on current and future values of the endogenous variables. The plot of the IRF shows the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. This study includes three variables RGDP, oil-exports and non-oil exports. This analysis will explain how these variables interact with each another. The general form for the IRF would be

$$y_t = \alpha + \varepsilon_t + \Theta_1 \varepsilon_{t-1} + \Theta_2 \varepsilon_{t-2} + \ldots + \Theta_i \varepsilon_{t-i} \tag{4.2.4.3}$$

where y_t is a vector of the dependent variables under consideration; α is a vector of the constants; ε_i is a vector of innovations for all variables that has been included in the VAR model; and Θ_j is a vector of parameters that measure the reaction of the dependent variable to innovations in all variables included in the VAR model.

However, in the case of two variables ($y_{y,t}$ and $y_{x,t}$), the general form for the IRF would be

$$y_{y,t} = \alpha_1 + \varepsilon_{y,t} + \eta_1 \varepsilon_{y,t-1} + \eta_2 \varepsilon_{y,t-2} + \ldots + \eta_i \varepsilon_{y,t-i} \tag{4.2.4.4}$$

$$y_{x,t} = \alpha_2 + \varepsilon_{x,t} + \varphi_1 \varepsilon_{x,t-1} + \varphi_2 \varepsilon_{x,t-2} + \ldots + \varphi_i \varepsilon_{x,t-i} \tag{4.2.4.5}$$

Equation (4.2.4.4) tells us how the dependent variable, $y_{y,t}$ (for example RGDP), responds to previous innovations that happened for that variable. Similarly, equation (4.2.4.5) tells us how the dependent variable, $y_{x,t}$, responds to previous innovations in the other endogenous variables that are included in the VAR model.

4.2.5 Causality Test

4.2.5.1 Approach

If a relationship between two variables X and Y exists, whether positive or negative, it is not necessary to denote that X is causing Y, or Y is causing X, or X and Y are causing one another. However, if X is causing Y, then X contains some useful information about Y that enables us to predict the value of Y efficiently.

The idea behind the Causality technique (Granger, 1969) is not to find the relationship between the variables, but to test the causality between them. For example, if exports (X) are positively related to the real GDP (RGDP), then we use the Granger causality test to figure out the direction of the causality between them. This test determines whether the causality runs from X to RGDP (X→RGDP), the causality runs from RGDP to X (RGDP→X), X and RGDP are causing each other (X↔RGDP), or the causality between X and RGDP does not exist. Some economists use the Sims test (Sims, 1972) to examine the direction of causality. This test is similar to the Granger test, except that Sims uses a slightly different filter in order to separate the trends in the data.

We ask the question: is RGDP causing X, or X causing RGDP? A variable X is Granger-caused by RGDP if it can be predicted efficiently by using the past and present values of RGDP and all other relevant information.

4.2.5.2 How to Perform the Granger Causality Test

The Granger-Causality test involves estimating the following two regressions to test, for example, the causality between RGDP and X:

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$$RGDP_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j=1}^{n} \beta_j RGDP_{t-j} + u_{1t} \qquad\qquad (4.2.5.1)$$

$$X_t = \sum_{i=1}^{n} \lambda_i X_{t-1} + \sum_{j=1}^{n} \delta_j RGDP_{t-j} + u_{2t} \qquad\qquad (4.2.5.2)$$

where RGDP is real gross domestic product. X is exports; u_{1t} and u_{2t} are the disturbance terms that are not correlated with one another; and α_i, β_j, λ_i, δ_j are the variable coefficients.

Equations (4.2.5.1) and (4.2.5.2) contain past information for the values of X and RGDP. For example, the first equation shows that RGDP at time t is related to the past values of X (X_{t-1}, X_{t-2}, …, X_{t-i}) and the past values of RGDP ($RGDP_{t-1}$, $RGDP_{t-2}$,…, $RGDP_{t-i}$). Similarly, the second equation shows that X at time t is related to the past values of X (X_{t-1}, X_{t-2},..., X_{t-i}) and the past values of RGDP ($RGDP_{t-1}$, $RGDP_{t-2}$,…, $RGDP_{t-i}$). After testing both equations, there are four possible scenarios that are listed below.

1) ***Unidirectional Causality:*** If the set of estimated coefficients on the lagged X in equation (4.2.5.1) is statistically different from zero ($\sum_{i=1}^{n} \alpha_i \neq 0$ for i=1, 2,…, n) and the estimated coefficients of the lagged RGDP in equation (4.2.5.2) is not statistically different from zero ($\sum_{j=1}^{n} \delta_j = 0$ for j=1, 2,…, n), then we have Granger causality running from X to RGDP (X→RGDP).

2) ***Conversely Unidirectional Causality:*** If the set of estimated coefficients on the lagged X in equation (4.2.5.1) is not statistically different from zero ($\sum_{i=1}^{n} \alpha_i = 0$ for i=1, 2,…, n) and the estimated coefficients of the lagged RGDP in equation (4.2.5.2) is statistically

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different from zero ($\sum\limits_{j=1}^{n} \delta_j \neq 0$ for j=1, 2,…, n), then we have Granger causality running from RGDP to X (RGDP→X).

3) ***Bilateral Causality:*** If the sets of lagged X and RGDP coefficients are statistically different from zero in regressions (4.2.5.1) and (4.2.5.2), ($\sum\limits_{i=1}^{n} \alpha_i \neq 0$ for i=1, 2,..., n) and ($\sum\limits_{j=1}^{n} \delta_j \neq 0$ for j=1, 2,…, n), then X causes RGDP and RGDP causes X (X↔RGDP).

4) ***Independence:*** If the sets of lagged X and RGDP coefficients are not statistically different from zero in regressions (4.2.5.1) and (4.2.5.2), ($\sum\limits_{i=1}^{n} \alpha_i = 0$ for i=1, 2…, n) and ($\sum\limits_{j=1}^{n} \delta_j = 0$ for j=1, 2,…, n), then both X and RGDP are independent.

Chapter Five

EMPIRICAL RESULTS

5.1 Unit Root Test

This test helps to identify which variables have a unit root. In other words, it determines the non-stationary variables. It defines the variables that have a definite positive or negative trend over time. To do this, the Augmented Dickey-Fuller (ADF) will be used to test the variables under investigation, real GDP (RGDP), oil exports (OILX), and non-oil exports (NONOILX). The results of the test are shown in the Table 4 and Table 5 below.

Table 4: Unit Root Test Results (with intercept)

Variables	ADF (in natural logarithms)		ADF (first difference- Rates of growth)		
RGDP	-2.745	[0]	-5.632	[1]	*
OILX	-2.686	[0]	-5.582	[1]	*
NONOILX	-2.263	[0]	-5.448	[1]	*

Table 5: Unit Root Test Results (with intercept and time trend)

Variables	ADF (in natural logarithms)		ADF (first difference- Rates of growth)		
RGDP	-2.745	[0]	-5.612	[1]	*
OILX	-2.696	[0]	-5.559	[1]	*
NONOILX	-2.420	[0]	-5.335	[1]	*

1) The results of Table (3) are based on assuming the existence of a constant in the regressions, while the results of Table (4) are based on assuming the existence of a constant and a time trend in the regressions.
2) The * indicates rejection the null hypothesis of unit root at 1% significant level.
3) The lag length of the ADF regression is specified in brackets [ ].
4) The lag length of the ADF regression is based on the Schwarz Information Criterion (SIC) for appropriate lag length.

The results for the ADF test, as appear in Table 4 and Table 5, show that all three variables, RGDP, OILX, and NONOILX, are non stationary on the logarithmic level whether we include an intercept or both an intercept and a time trend in the regression. The appropriate lag

length for the ADF regression appears in brackets; it was chosen based on the Schwarz Information criterion (SIC).

These results urge us to investigate the unit root hypothesis for the same variables, but after taking the first difference. These results appear in column 3 in the same tables (4 and 5). These results support the stationarity of all three variables at the first difference, and the null hypothesis for unit root was rejected for all variables at the 1% level. Since all variables are stationary in the first level, this supports performing the cointegration test.

5.2 Cointegration Test

This test is used to see if a long-run relationship exists among a set of variables that are non-stationary at their levels but stationary after first differencing. In our case, the variables (RGDP, OILX, and NONOILX) are found to be non-stationary at their levels but stationary after first differencing, that is, RGDP~I(1), OILX~I(1), and NONOILX~(1). Accordingly, the Engle-Granger Cointegration technique (the two-step technique) was used to estimate that relationship. We start this test by examining an equation of the form:

$$RGDP_t = \alpha + \beta_1 \, OILX_t + \beta_2 \, NONOILX_t + e_t \qquad\qquad (5.2.1)$$

Where α is a constant, and β_1 and β_2 are coefficient to be estimated.

The second step is to save the residuals and to perform the ADF test on the residuals. If we reject the null hypothesis (H_0: the residuals are not stationary), the residuals are stationary and the variables RGDP, OILX, NONOILX are cointegrated. The result for the first step appears in the following equation, where the t-statistics are shown in parentheses:

$$RGDP_t = 6.508 + 0.310 \, OILX_t + 0.113 \, NONOILX_t \qquad\qquad (5.2.2)$$
$$\quad (21.197) \ (9.267) \qquad (2.683)$$

Then, we saved the fitted residual, and after applying the ADF test on that series, the null hypothesis for non-stationary series was rejected at the 10% significant level.

To confirm this result, this research would apply another methodology to confirm the existence of a long run relationship among RGDP, OILX, and NONOILX. Johansen's approach is performed in order to explore the cointegration relationship. This test allows estimating the cointegration relationships among the non-stationary variables using Trace and Maximum Eigenvalue tests to examine the rank r, where r stands for the number of cointegrating relations (or cointegrating vectors).

If r=1, for example, then there is only one linear combination or only one single cointegrating vector. If r=2, then there are two linear combinations or two cointegrating vectors. When detecting the long-run relationship between two variables, and whether we find r=1 or r=2, means the long-run relationship exists. On the other hand, if r=0, then the series are not cointegrated, and there is no long-run relationship among the variables. The information about the existence of the long-run relationship among real GDP, oil exports, and non-oil exports is shown in table 6.

Table 6: Johansen Cointegration Test Results

Number of Cointegration Vectors		Likelihood Ratio Statistics	95% Critical Value
Trace Test			
Null	Alternative		
r = 0	r >= 1	29.925 **	29.797
r <= 1	r = 2	6.574	15.495
r <= 2	r = 3	0.468	3.841
Maximum Eigenvalue test			
Null	Alternative		
r = 0	r = 1	23.351 **	21.132
r = 1	r = 2	6.106	14.265
r = 2	r = 3	0.468	3.841

The *, **, and *** indicate rejection of likelihood ratio tests at 10%, 5%, and 1% significance levels, respectively.

Table 6 shows both Trace and Maximum Eigenvalue tests. Trace test has the null hypotheses of: r is less than or equal to 0, less than or equal to 1, and less than or equal to 2, and the alternative hypotheses of: r is greater than or equal to 1, equal to 2, and equal to 3, respectively. The Maximum Eigenvalue test has the null hypotheses of: r is equal to 0, equal to 1, and equal to 2, and the alternative hypotheses of: r is equal to 1, equal to 2, and equal to 3, respectively. The results from table 6 indicate that the null hypothesis of no cointegrating vector is rejected by both the Trace and Maximum Eigenvalue tests, that is H0: r=0 is rejected at the 5% significance level. However, the null hypothesis of only one or less cointegrating vector cannot be rejected by either test, that is H0: r <=1 and r<=2 are not rejected. Thus, RGDP, OILX, and NONOILX are cointegrated, and there is a long-run relationship among them.

5.3 Error Correction Model (ECM)

The general form of the ECM with two variables is as follows:

$$\Delta y_t = \beta_0 + \beta_1 \, \Delta x_t - \beta_2 \, [y_{t-1} - \gamma_1 - \gamma_2 \, x_{t-1}] + u_t$$

The coefficient β_2 is assumed, theoretically, to have a negative sign and to have a value between zero and one. Once cointegration among the variables (RGDP, OILX, and NONOILX) has been identified, the ECM is performed in order to detect the gradual adjustment of the dependent variable toward its long run value. We applied the ECM for the three variables RGDP, OILX, and NONOILX. The result appears in equation (5.3.1), where the t-statistics are shown in parentheses:

$$\Delta RGDP_t = 0.0097 + 0.281 \, \Delta OILX_t + 0.142 \, \Delta NONOILX_t - 0.061 \, e_{t-1} \qquad (5.3.1)$$
$$ (0.852) \quad (10.253) \qquad (3.377) \qquad\qquad (-0.443)$$

The optimal lag structure for OILX and NONOILX in the ECM is determined according to Akaike Information Criterion (AIC). $\Delta OILX_t$ and $\Delta NONOILX_t$ are the manipulated variables, and e_{t-1} is mutually uncorrelated white noise residual.

Equation (5.3.1) relates the RGDP to OILX and NONOILX. It shows that the short-term changes in OILX and NONOILX affect changes in RGDP positively, and these effects are significant at the 1% level. These results reveal positive effects of oil and non-oil exports on output, which support the ELG theory. In addition, equation (5.3.1) shows that 0.061 of the short-run adjustment coefficient of the deviation of the actual RGDP from its long-run equilibrium level is corrected each year. Even though the short-run adjustment coefficient was insignificant, it gave the "correct sign" and the true expected range that it should be within. The correct sign means, theoretically, we expect the sign of coefficient of the error term in previous year (ε_{t-1}) to be negative. This ensures that the error term in period t-1 to be corrected this year to its equilibrium level. So, when we got -0.061, this means we have the corrected sign (the negative one). In other words, the meaning of the "-0.061" is that, it is the speed of adjustment in the dependent variable toward its long run equilibrium. That is any disequilibrium in the error term for the dependent variable in time t-1, will be adjusted the next year in the amount (speed of adjustment) of 0.061.

5.4 VAR Specifications

As a final approach to the question of whether oil exports and non-oil exports influence economic growth, this study estimates a VAR model that includes all three variables under consideration: RGDP, OILX, and NONOILX.

The VAR model is estimated with two lags of each variable plus a constant term in each equation. To summarize the VAR results, Equations (5.4.1, 5.4.2, and 5.4.3) show the results for the VAR specification with the t-statistics shown in brackets below the corresponding variable.

$$RGDP_t = 5.369 + 1.852\ RGDP_{t-1} - 1.381\ RGDP_{t-2} - 0.336\ OILX_{t-1}$$
$$[1.844]\quad [3.882]\qquad\quad [-2.367]\qquad\quad [-2.155]$$

$$+ 0.422 \text{ OILX}_{t-2} - 0.143 \text{ NONOILX}_{t-1} - 0.025 \text{ NONOILX}_{t-2} \qquad (5.4.1)$$
$$[2.311] \qquad [-0.991] \qquad [-0.171]$$

$$\text{OILX}_t = 13.573 + 2.935 \text{ RGDP}_{t-1} - 4.169 \text{ RGDP}_{t-2} - 0.218 \text{ OILX}_{t-1}$$
$$[1.805] \quad [2.382] \qquad [-2.768] \qquad [-0.542]$$

$$+ 1.324 \text{ OILX}_{t-2} - 0.458 \text{ NONOILX}_{t-1} + 0.152 \text{ NONOILX}_{t-2} \qquad (5.4.2)$$
$$[2.806] \qquad [-1.228] \qquad [0.397]$$

$$\text{NONOILX}_t = 2.099 - 0.218 \text{ RGDP}_{t-1} + 0.120 \text{ RGDP}_{t-2} + 0.222 \text{ OILX}_{t-1}$$
$$[0.355] \quad [-0.225] \qquad [0.101] \qquad [0.701]$$

$$- 0.073 \text{ OILX}_{t-2} + 0.748 \text{ NONOILX}_{t-1} - 0.105 \text{ NONOILX}_{t-2} \qquad (5.4.3)$$
$$[-0.198] \qquad [2.551] \qquad [-0.348]$$

What is important in a VAR model is to construct the Impulse Response Function (IRF) to get the responses of each variable to a shock in all other variables including the variable under consideration. Note that the Cholesky decomposition is used for ordering the variables when estimating the IRF.

Figure 11, row 1, shows the responses of real GDP to shocks to real GDP, oil exports, and non oil exports. The real GDP responds positively to a shock in oil exports but this happened in the medium run and not in the short run, after 3-4 lags. However, non-oil exports have little effect on real GDP.

Row 2 in the same figure shows the responses of oil exports to shocks to real GDP, oil exports, and non-oil exports. Oil exports respond positively to a shock in real GDP. The reason for that is because an increase in the real GDP of the country, an increase in its income, encourages the country to spend more on the oil sector, which will increase its ability to export more. At the same time, non-oil exports have a minimal effect on oil exports.

Row 3 in figure 11 shows the responses of non-oil exports to shocks to real GDP, oil exports, and non-oil exports. The non-oil exports respond positively to a shock in real GDP. The

same interpretation of why oil exports respond positively to real GDP shocks applies here. Higher income encourages spending more to enhance the production ability of other sectors including the non-oil sector, which works to support variation in exports. However, the effects of oil exports shocks on non-oil exports are minimal. Specifically, there is a small, but constant effect on non oil exports.

Figure 11: The Impulse Response Function Results

Response to Cholesky One S.D. Innovations ± 2 S.E.
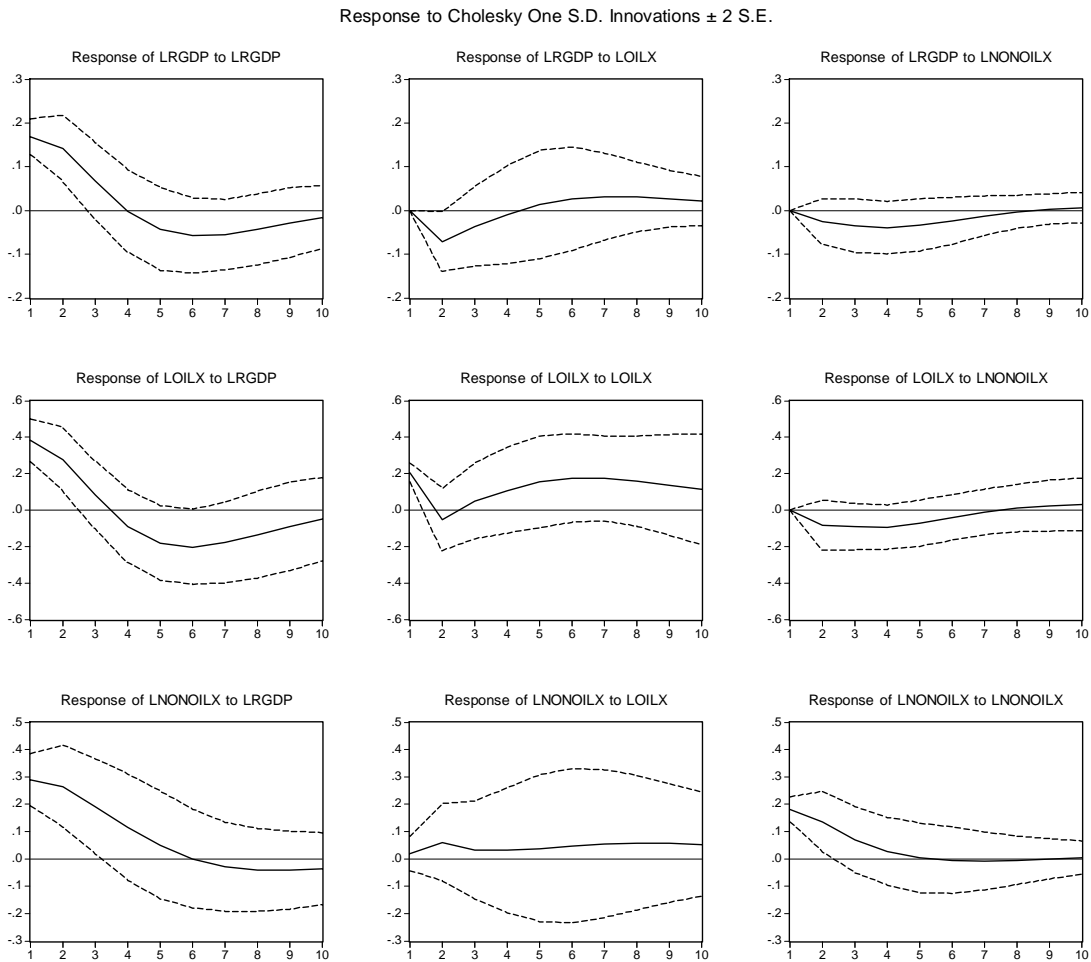
5.5 Granger Causality Test

This study uses Granger Causality technique to investigate the direction of the causality for the following variables:

1. RGDP and OILX

2. RGDP and NONOILX

3. OILX and NONOILX

Tables 7 and 8 summarize the results of causality among the variables under investigation.

Table 7: The Granger Causality Results among RGDP, Oil Exports and Non-Oil Exports

The null hypothesis	The p-value for level of significance (F-test)	The results
OILX does not Granger Cause RGDP	7%	rejected
RGDP does not Granger Cause OILX	1%	rejected
NONOILX does not Granger Cause RGDP	10%	rejected
RGDP does not Granger Cause NONOILX	22%	cannot be rejected
NONOILX does not Granger Cause OILX	9%	rejected
OILX does not Granger Cause NONOILX	10%	rejected

Table 8: The Granger Causality Results among RGDP, Oil Exports and Non-Oil Exports

RGDP	⟷	OILX
RGDP	⟵	NONOILX
OILX	⟷	NONOILX

*: Arrows indicate the direction of Granger causality between the variables.

The results generally are consistent with the results reported by the ECM models, and most importantly with the economic theory. There is a bilateral causality relationship between real GDP and oil exports. Oil exports affect real GDP positively, and real GDP affects oil exports positively too. This result is normal since increasing oil exports will create extra income that will increase consumption, investment, and government purchases, "the three main components of the Gross Domestic Product (GDP)."

How can RGDP affect OILX positively? It is clear that increasing spending on the oil sector, developing that sector by using more advanced technologies, and increasing the level of workers' skills, will lead to an increase in the level of efficiency and raise the oil exports. These results are consistent with reality because production of oil in Kuwait was 1.25 million barrels per day during the 1980s, and it has increased to over 2.60 million barrels today. Thus, the economy of Kuwait considers the oil sector as a top priority in development projects. Moreover, Kuwait is planning to develop some oil fields in the northern part of the country. This project involves cooperating with some foreign oil companies who will play an important role in expanding the oil exports.

The second causality relationship is between real GDP and non-oil exports. The causality between these two variables goes only from NONOILX to RGDP, but it does not go the other way. This result supports the export-led growth hypothesis. This outcome means that even though the portion of the non-oil exports to total exports is small, they are still affecting real GDP positively. However, this is consistent with the Kuwaiti government's plans to diversify sources of income and to decrease dependence on the oil sector.

The third causality relationship is between the two components of exports in Kuwait. The finding indicates that there is bidirectional causality between oil exports and non-oil exports. Obviously, the oil exports are dominant and have a huge effect on income and employment in Kuwait. This will have an impact on many sectors in the economy, including the non-oil sector. Moreover, the nature of non-oil exported products could explain the bilateral causality relationship between oil exports and non-oil exports. When the oil is produced, it has two components: the first part, crude oil, is shipped overseas as oil exports; the second component goes to the refineries in Kuwait. There are three large refineries in Kuwait: Mina Abdulla, Mina

Ahmadi, and Shuaiba. These refineries produce many products such as kerosene, gasoline, diesel, petrochemicals, and other products. However, most of the non-oil exported goods are from the petrochemical products such as ethylene and manufactured fertilizer. Ethylene comprises around 50% of the total non-oil exports. Thus, as the oil production increases, the ethylene production will increase as well, meaning oil exports cause non-oil exports. On the other hand, the machines that produce the oil use non-oil exported products to maintain the production. Therefore, in short, there is a circular relationship between oil exported goods and non-oil exported goods, and each one affects the other.

Chapter Six

CONCLUSION AND POLICY IMPLICATIONS

The objective of this study is to identify whether the export-led growth (ELG) hypothesis is valid for Kuwait. A number of studies support the ELG theory and indicate that exports have a significant positive impact on economic growth. However, the effectiveness and validity of the ELG theory for small oil producing county like Kuwait is not yet known.

The Kuwait economy has grown rapidly over the last three decades. Its per capita GDP has increased at an average annual rate of five percent between 1970 and 2004. This study examines the Export-Led Growth (ELG) Hypothesis to explore the relationship between exports (oil exports and non-oil exports) and economic growth for Kuwait using time series data from 1970 to 2004. All the data used in this study were from the International Monetary Fund annual publications.

The specific focus of this dissertation is to investigate the stationarity properties of the data (oil exports, non-oil exports and real GDP) for the presence of unit roots using the Augmented Dickey-Fuller (ADF). The findings indicate that all three variables, oil-exports, non-oil exports, and real GDP, are non-stationary in their level. However, they became stationary in the first difference, and they are integrated of order one (1). The results of the study also suggest that there is a long run equilibrium relationship among oil-exports, non-oil exports, and real GDP.

The results from the cointegration tests confirm the existence of a long-run relationship among these three variables. The error correction model (ECM) is used to demonstrate the short run adjustment of the variables toward the long run equilibrium. The results show a significant, positive effect on economic growth from the two types of exports.

The Granger Causality test was used to determine whether export expansion promotes economic growth or economic growth promotes export growth. The results of the causality analysis suggest that there is a bilateral causality between oil exports and economic growth, indicating that oil exports promote economic growth and growth supports oil exports for Kuwait. The findings also indicate that there is a unidirectional causality from non-oil exports to economic growth. This result tends to favor the effectiveness and validity of the ELG theory for Kuwait.

Kuwait is an oil-based economy that exports most of its oil production. The oil sector is the backbone of the economy, and it influences all other sectors across Kuwait. Oil exports have been the major source of capital for government-sponsored infrastructure and development projects. However, the findings of this research highlight the importance of the non-oil export sector and indicate that this sector needs to be promoted to enhance further economic growth. The non-oil sector has a significant positive impact on economic growth. The government of Kuwait would benefit from changing the composition of their export sector. The government should further diversify the export sector to reduce the dependence on the oil sector and to increase reliance on non-oil exports. This change may require the policy makers to develop and implement a comprehensive long term economic plan for diversification of the export sector.

Unfortunately, very few bundles of commodities are found in the export sector, and their export share is insignificant compared to oil exports. While potentially difficult, diversification of production and more focus on non-oil exports products may help the economy to benefit from comparative advantage.

Oil price fluctuation could have a larger impact on the growth of oil based economies. For example, if oil prices decrease, causing a decline in oil revenues, economies like Kuwait that

rely heavily on oil export may face revenue shortfalls (budget deficit) unless those economies have other export revenues from exports to supplement the loss of oil export revenues. In fact, this scenario happened during the 1980s as oil prices continued to decline, which harmed many oil exporting countries around the world. As such, the diversification of non-oil exports could reduce the adverse effects of oil price fluctuations and help to keep the economy healthy. Therefore, one of the policy implications is that the policymakers should take into consideration the non-oil export sector and continue to support this sector.

Externality is one way of supporting the non-oil exports. The government should sustain the non-oil sector using revenues from the oil-sector. This positive externality could lead to faster economic growth. Moreover, there are other externalities that could lead to expansion of the non-oil export sector: improving production techniques and support for innovations; improving the human capital stock by providing high quality training to domestic laborers; and to increasing the efficiency of competitive management (Feder 1982).

At less than 10% of total exports, the non-oil export sector is small compared to oil exports, yet it has started to generate the capital needed to achieve economic growth. Still, it is necessary to provide some support to the "infant industries" until they become mature and able to compete in international markets. It is essential that countries that are highly dependent on oil develop their non-oil export sector. Myint (1977) argues that in order to have strong external trade, the economies need "to underplay the fact that a country may not be able to take full advantage of its external economic opportunities unless its internal domestic economic organization is strengthened and improved."

In addition, supporting the non-oil exported goods might encourage people to invest more in this sector and could motivate people to be innovative. Better market performance may lead to

some innovation, which might improve the non-oil exported products. A practical example of these supports is the government of Nigeria. This government provides a variety of incentives for the non-oil export sector: a) labor intensive mode of production; b) local value added; c) export-oriented industries; and d) investment in economically disadvantaged areas (Nigerian Investment Promotions Commission, 2007).

There are many products that are considered non-oil exports, including manufactured fertilizers, ethylene, mineral fuels and lubricants and related materials, and chemicals. However, some of these products, such as ethylene, are produced domestically. Ethylene is one type of petrochemical, and it is an oil-derived product, meaning that it originates from crude oil. The petrochemical industry is still new in Kuwait, but it is growing fast. For example, ethylene products have increased by more than 50% in the last five years. Kuwait has a comparative advantage in oil, and the costs of producing the oil-diverted products are low. Therefore, the country should focus on the production of the oil-derived products by increasing the level of skills and improving overall efficiency, leading to better production technology and higher quality output.

Furthermore, increasing the efficiency and credibility of the non-oil exported products will improve the industry's ability to compete in the international market. Increased efficient and credibility also might attract the attention of petrochemicals firms around the world and encourage them to consider Kuwait as a regional base for operations.

However, the Kuwaiti government has to encourage domestic and foreign investors to produce the non-oil exported goods in Kuwait. Investment from foreign firms will help to transfer the technology to Kuwait, to improve production efficiency through learning by doing,

and to create more value added products. As a result, this will lead to higher economic growth in Kuwait and enable the country to maintain a healthy economy.

The rapid economic growth in many countries like China and India has created a tremendous demand for oil that has led to a boost in oil prices in the international market. The oil price has increased by more than 100% in the last five years. Thus, oil-based economies have observed high economic growth for the same period, but there is no guarantee that higher oil prices will persist in the market. Therefore, Kuwait should consider this is a golden opportunity to use the additional revenues to improve the non-oil export sector and make it more productive and efficient. Moreover, the non-oil export sector should also focus on having competitive advantages rather than relying on price competitiveness.

This research has uncovered some areas for further research. Further research in the following areas may help to derive some impotent policy recommendations.

Future research:

1. Is there a relationship between exports and productivity gain in Kuwait? Perform a causality test, Granger (1969) or Sims (1972), to investigate the causality between oil and non-oil exports and productivity in Kuwait.

2. What are industries in Kuwait that will have a comparative advantage in the international market? Measure the productivity indicators for each of the export industries in the non-oil sector to determine the most productive industry or industries. The government can prioritize its support for these industries, which will help to improve the efficiency of resource use and competitiveness.

3. Is there a trickledown effect from oil and non-oil exports to other sectors of the economy? Analyze how the oil and non-oil sectors could benefit other sectors in Kuwait economy.

4. What level of government support for export would result in the efficient use of national resources and competitiveness? Learn from the experience of other countries about the optimal externalities that are possible for oil-based economies like Kuwait. Learn from the experience of Newly Industrializing Countries (NICs) about how to improve the non-oil sector and be a major competitor internationally.

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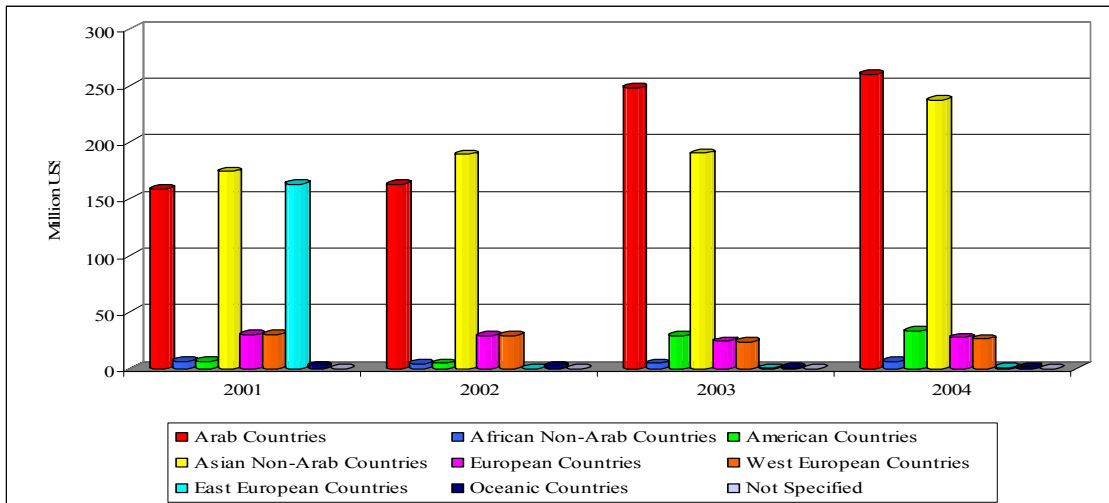
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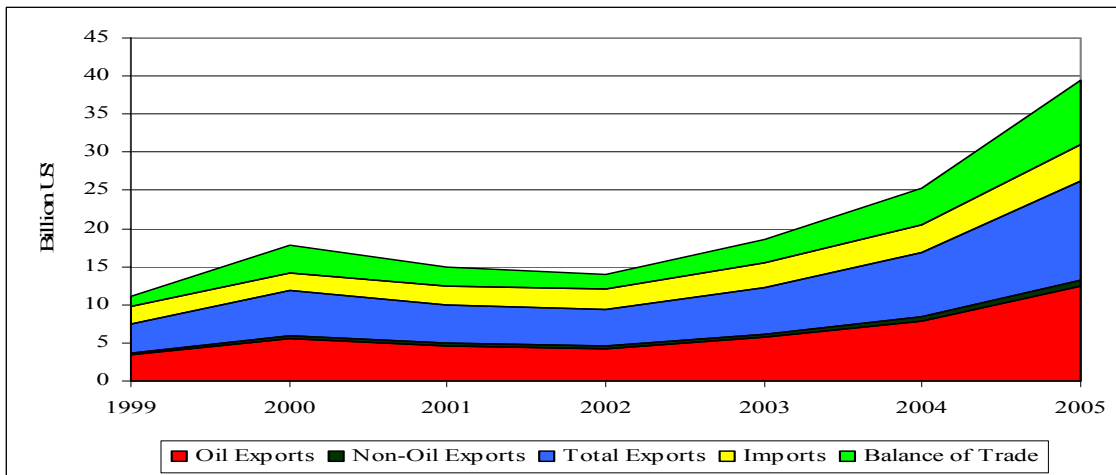
Figure 12: Non-Oil Exports According to Destination in Million US$
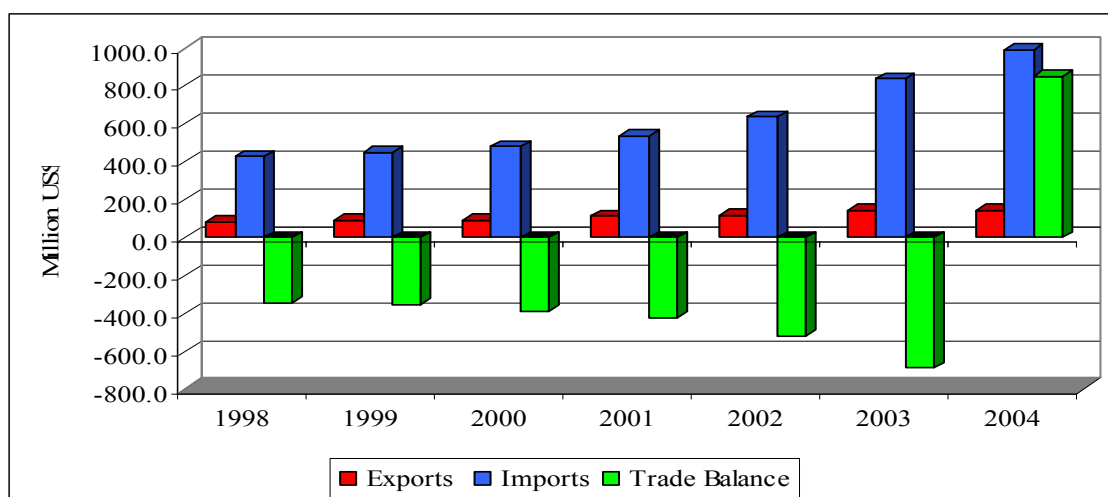

Central Bank of Kuwait, Kuwait, 2005

Figure 13: Summary of Foreign Trade in Billion US$

Central Bank of Kuwait, Kuwait, 2005

Figure 14: Kuwait's Foreign Trade with the GCC Countries in Million US$

Central Bank of Kuwait, Kuwait, 2005

Table 9: Non-Oil Exports in Million US$

Period	Manufactured Fertilizers	Ethylene Products	Other	Total	Re-Exports	Grand Total
1999	17.2	161.5	103.1	281.8	64.6	346.4
2000	19.5	196.3	104.5	320.4	64.0	384.4
2001	21.5	190.3	104.8	316.6	62.3	378.9
2002	15.5	191.0	121.2	327.7	65.7	393.4
2003	31.6	188.4	153.3	373.3	125.2	498.5
2004	41.1	229.0	156.9	427.0	140.0	567.0
2005	56.0	311.0	162.0	529.0	180.0	709.0

Central Bank of Kuwait, Kuwait, 2005

Table 10: Non-Oil Exports According to Destination in Million US$

Countries	2001	2002	2003	2004
Arab Countries	158.562	163.146	248.366	260.173
African Non-Arab Countries	6.752	4.108	4.789	6.619
American Countries	6.715	4.867	29.328	33.65
Asian Non-Arab Countries	174.047	189.352	190.418	237.114
European Countries	30.155	29.317	24.475	27.539
West European Countries	29.992	29.155	23.774	26.316
East European Countries	163	0.162	0.7	1.222
Oceanic Countries	2.681	2.593	1.117	1.892
Not Specified	0.007	-	0.04	0.01
Total	378.92	393.383	498.533	566.997

Central Bank of Kuwait, Kuwait, 2005

Table 11: Summary of Foreign Trade in Billion US$

Period	Oil Exports	Non-Oil Exports	Total Exports	Imports	Balance of Trade
1999	3.3564	0.3464	3.7028	2.3183	1.3845
2000	5.5783	0.3844	5.9627	2.1954	3.7673
2001	4.5908	0.3789	4.9697	2.4133	2.5565
2002	4.2728	0.3934	4.6662	2.7358	1.9305
2003	5.6635	0.4985	6.1621	3.2741	2.888
2004	7.8611	0.567	8.4281	3.7222	4.7058
2005	12.4343	0.709	13.1433	4.7523	8.391

Central Bank of Kuwait, Kuwait, 2005

Table 12: Re-Exports According to SITC Sections in Million US$

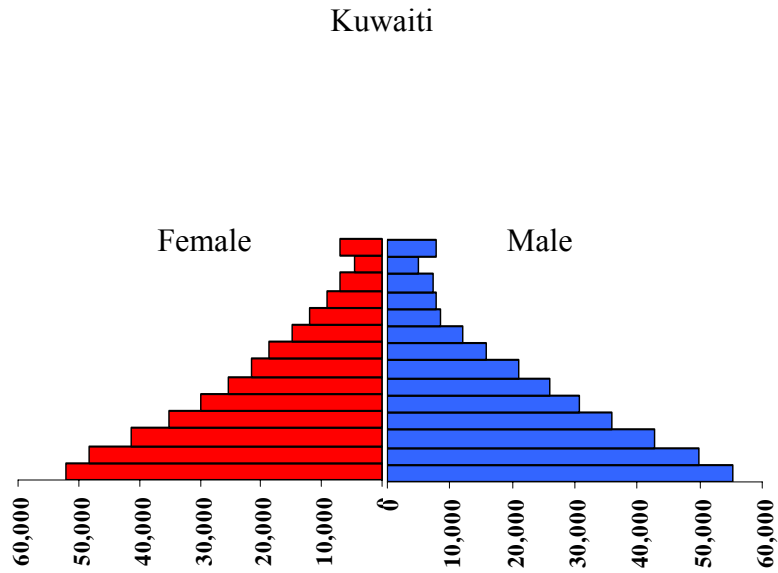| Period	Food & Live Animals	Beverages & Tobacco	Inedible Crude Material Except Fuels	Mineral Fuels, Lubricants & Related Materials	Animal and Vegetable Oils & Fats	Chemicals	Manufactured Goods Class'd by Material	Machinery and Transport Equipment	Miscellaneous Manufactured Articles	Commodities & Transac. Unclass'd According to Kind	Total
1998	2.1	0.1	0.3	-	0.3	2.4	8.9	44.3	9.2	1.3	68.8
1999	2.9	0.1	0.2	-	0.0	3.5	8.2	37.7	9.4	2.5	64.6
2000	3.0	0.2	0.2	0.1	0.1	2.8	12.7	38.1	6.7	0.1	64.0
2001	2.3	0.6	0.1	0.1	0.3	2.9	12.7	34.4	8.8	0.1	62.3
2002	6.6	1.1	0.1	0.1	0.1	3.3	12.1	33.0	9.0	0.4	65.7
2003	6.5	1.2	0.2	0.1	0.0	4.6	16.4	81.6	13.8	0.9	125.2
2004	6.5	1.8	0.4	0.1	0.1	5.8	20.8	80.7	23.9	-	140.0

Central Bank of Kuwait, Kuwait, 2005

Table 13: Non-Oil Exports of Kuwaiti Origin According to SITC Sections in Million US$

Period	Food & Live Animals	Beverages & Tobacco	Inedible Crude Material Except Fuels	Mineral Fuels, Lubricants & Related Materials	Animal and Vegetable Oils & Fats	Chemicals	Manufactured Goods Class'd by Material	Machinery and Transport Equipment	Miscellaneous Manufactured Articles	Commodities & Transac. Unclass'd According to Kind	Total
1998	9.15	1.9	11.78	16.12	1.43	177.86	25.43	11.3	6.01	0.05	261.01
1999	11.38	0.91	12.14	0.38	1.51	210.22	27.6	9.59	8.07	-	281.79
2000	11.65	0.73	13.2	2.92	1.06	252.14	26.11	7.83	4.75	-	320.37
2001	11.86	2.35	11.39	3.15	1.16	243.6	27.48	9.54	6.06	-	316.59
2002	12.87	2.06	13.92	2.91	1.12	244.95	28.69	12.28	8.93	-	327.72
2003	15.89	4.03	19.71	3.29	0.92	260.01	52.56	7.84	7.86	1.22	373.33
2004	15.66	5.48	21.11	3.91	0.8	315.41	49.53	10.15	4.92	-	426.95

Central Bank of Kuwait, Kuwait, 2005

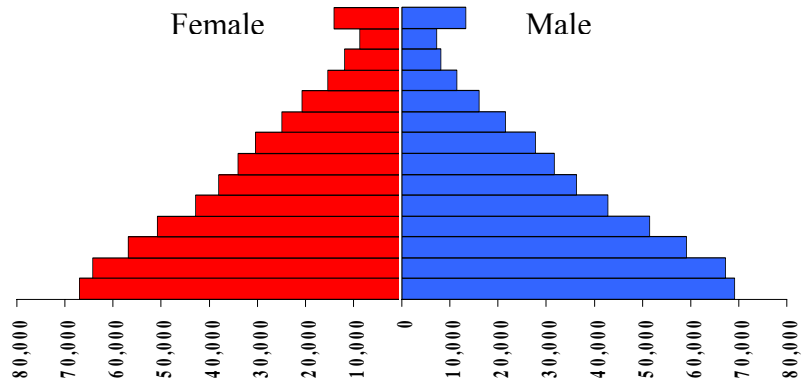Figure 15: Census Population Pyramid for 1995, 2004, 2005

1995

Kuwaiti

Non-Kuwaiti

Age Groups
+65
64-60
59-55
54-50
49-45
44-40
39-35
34-30
29-25
24-20
19-15
14-10
9-5
4-0

Female   Male

Female   Male

2004

Kuwaiti

Non-Kuwaiti

Age Groups
+65
64-60
59-55
54-50
49-45
44-40
39-35
34-30
29-25
24-20
19-15
14-10
9-5
4-0

Female   Male

Female   Male

2005

Kuwaiti

Non-Kuwaiti

Age Groups
+65
64-60
59-55
54-50
49-45
44-40
39-35
34-30
29-25
24-20
19-15
14-10
9-5
4-0

Female   Male

Female   Male

81