

AMERICAN UNIVERSITY OF BEIRUT

DUTCH DISEASE: THE SAUDI ARABIA CASE STUDY

by
NOUR NIZAM NIZAM

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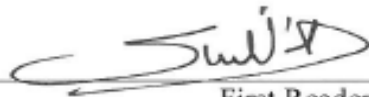
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by
NOUR NIZAM NIZAM


Approved by:

Dr. Simon Neaime, Professor
Economics



First Reader

Dr. Samir Makdisi, Professor Emeritus
Economics



Second Reader

Date of project presentation: April 21, 2015

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AN ABSTRACT OF THE PROJECT OF

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Following the extensive Dutch Disease literature and research on the paradox of natural resources and how they can become a curse when in fact they are supposed to be a blessing, this project attempts to explore this hypothesis for the case of the Kingdom of Saudi Arabia. Despite the abundance of oil and gas resources, social risks in the Kingdom of Saudi Arabia remain a major concern.

After a general introduction and formulation of theoretical framework in chapter I, chapter II reviews the literature of the Dutch Disease. Chapter III covers the main macroeconomic fundamentals and social development in the Kingdom of Saudi Arabia. Macro fundamentals include a thorough overview on the economy of the country in hand followed by a study of the oil dependence and major oil price movements i.e. boom and bust stages. Non-oil sectors: manufacturing and agricultural sector shares of GDP are also discussed followed by a discussion of real exchange rate system, labor force, inflation, monetary and fiscal policies employed in the country, and finally social risks prevailing. Chapter IV includes an empirical testing of the Dutch Disease hypothesis using an OLS time series econometric analysis approach. It will also examine the short-run and long-run relationship between real exchange rate and oil revenues, non-oil traded sector, and non-traded sector. Finally, chapter V summarizes the outcomes and includes policy recommendations and diversification challenge for Dutch Disease management in KSA.

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CHAPTER I

INTRODUCTION AND THEORETICAL FRAMEWORK

Following the extensive literature and research on the paradox of natural resources, major international economies have been concerned with the structural effects and policy implications of a resource boom. A natural resource wealth has been the reason behind different political and economic ailments including stagnation, eradication of democracy, colonialism, corruption, civil wars, economic slowdown, etc. This is when the abundance of natural resources starts to act a curse rather than a blessing. It is considered a blessing when its discovery or an increase in the world market price of a domestic resource leads to an increase in income and consumption possibilities and is considered a curse when the boom is accompanied with severe economic effects and acts as an obstacle to the development of the country (Rodriguez, 2006). Starting the period of mid-1970s, major resource abundant countries have witnessed a volatile wave of episodes including boom and bust such as the oil price decrease in 1980s; where most oil-dependent countries suffered from the collapse of consumption and investment, and the oil price increase in 1970s which led to economic downturn and stagnation; thereby causing inflation a recession. This volatile characteristic of resources; mainly oil, creates skepticism among major producing and exporting countries. Therefore, modern economic studies have stressed on the fact that countries without abundant natural resources; mainly minerals and fossil fuels, tend to outperform those who are rich with such resources. This curse has been empirically

highlighted and analyzed in many studies. Sachs and Warner (1995) explain in their paper that this mechanism of the natural resource curse is evident in a sample of 97 developing countries where they study each country's annual growth rate in relation to the country's natural resource based exports. Another famous study was conducted by Michael Ross¹ (2012) in his book *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*, where he identifies that it is not a coincidence that major oil-producing countries have less democracy, fewer jobs for women, more frequent civil wars, and more volatile economic growth than the rest of the world. In addition, Ross believes that countries with a lot of oil have more repressive governments with a stress on Arab countries such as Algeria, Libya, and the Gulf countries. One might ask why it is oil that many studies stress on. Joanne Myers² (2013) explains that even though oil is not unique with diamonds and other minerals producing similar problems; however, oil is the most sought-after commodity with a more pronounced and widespread impact.

In addition to the controversial literature about the natural resources curse, a more frequent and increasingly studied phenomenon is the relationship between natural resources boom and non-resource economic activity. This economic phenomenon is referred to as "Dutch Disease". Corden and Neary (1982) described the Dutch Disease as the coexisting relationship within the traded goods sector of progressing and declining, or booming and lagging sub-sectors. In their model three sectors are considered the main players including: (1) booming traded goods sector (energy or

¹ Michael Ross: Professor of Political Science with major concern in Political Economy, Natural Resources, Conflict, Resource Curse, and Democratization

² Joanne Myers is the director of Public Affairs Programs in Carnegie Council. The council invited Michael Ross as a guest speaker to discuss his book *Oil Curse* in 2013

natural resource in general), (2) non-booming traded sector or lagging sector; representing manufacturing sector, and (3) non-traded sector; which constitute mainly of services, local products, retail trade, and construction. The main concern behind their paper was to study the effects of the exploitation of the booming energy sector on the size and profitability of the manufacturing sector through crowding out and thereby, causing appreciation of real exchange rate. Many economists tried to approach this study and add to its value including Neary and Wijnbergen (1985), Benjamin, Devarajan, and Weiner (1987), Fardmanesh (1991), Sachs and Warner (1995), Rudd (1996), and many others. Thus, definitions of the Dutch Disease theory slightly differed among the authors with some referring to it as the inflow or injection of foreign currency while others defining it as the deindustrialization of a nation's economy and even some referred to it as "resource curse". Moreover, some authors studied the effect of the inflow of remittances³ in the host country by individuals working outside their home country.

The term Dutch Disease was coined by The Economist magazine in 1977 to reflect the economic disturbance that the Netherlands was facing after the discovery of large wells of natural gas reserves in the North Sea in 1959. The country witnessed vast increase in wealth and revenues after it became a net exporter of this natural resource. This rapid exploitation of the natural resource without monitored extraction and export mechanism caused adverse repercussions illustrated by the influx of foreign currency

³ Remittances represent the inflow of foreign currency which is also correlated with foreign assistance and Foreign Direct Investments (FDIs)

into the Netherlands making the guilder⁴ stronger. This led to the increase in prices of non-oil exports making them expensive for foreign countries to buy which in turn caused Netherlands to lose its competitive power in the region. The non-oil exports represented the manufacturing traded sector in Corden and Neary's model. Therefore, this sector contracted and lost its competitiveness in international markets. Moreover, the purchasing power of the Dutch exponentially increased leading to inflation. The negative effects were also present in different sides of the economy. Kiev (2014) explains in his article in *The Economist* that from 1970 to 1977 unemployment increased from 1.1% to 5.1%, corporate investment was tumbling, gas extraction generated few jobs, and investment rushed out of the country which caused the crimping of future economic potential in the Netherlands. Other articles mention that the booming industry increases the demand for factors of production; thereby, increasing their prices and making other industries less profitable which in turn make these industries face high labor costs. Ebrahimzadeh (2012) explains in her article "Dutch Disease: Wealth Managed Unwisely" the process of the disease in which when a country discovers oil, the country's oil exports initially raises the incomes in accordance with the inflow of foreign currency and if the increased foreign exchange were spent entirely on imports there would be direct impact on the money supply or demand for domestically produced goods; however, if the foreign currency is converted into local currency and is spent on domestic non-traded goods, what would occur depends if the exchange rate is fixed or flexible. The author explains: if the exchange rate is fixed, the foreign currency inflows are converted into the domestic currency causing an increase

⁴ Guilder was the monetary unit of the Netherlands before adopting the euro in 2002

in money supply and an increase in the demand. This rise in demand causes domestic price to increase due to the demand-supply forces. The final result is an appreciation of the real exchange rate. On the other hand, if the exchange rate is flexible, the foreign currency inflows would increase the value of the domestic currency causing an appreciation as well but not due to domestic price increases. In both cases, the country would lose competitiveness. This drives us to the extension of the core model of Corden and Neary in 1982 with two classical effects of the boom: Spending Effect and Resource-Movement Effect.

To explain the Spending Effect⁵, one assumption must be taken into consideration which is the positive income elasticity of demand. From its title, one can comprehend that this effect has to deal with income and increased spending. "...the increase in disposable income leads to increased spending and demand for both tradable and non-tradable goods. The increased demand for non-tradables gives rise to an increase in prices since the country's resources limit the supply of these goods and the boom has not increased these specific resources" (Rodriguez, p. 6, 2006). This price increase as explained before leads to an appreciation of the real exchange rate thus making tradables less competitive in international markets. Moreover, the increase in the relative price of non-traded goods increases the relative profitability of this sector and contracts that of traded goods sector⁶. Additional effect of the increase in prices include increase in wages of the labor in this non-tradable sector so the country would

⁵ "The Spending Effect was first examined by McKinnon (1976), using a static model of a small country producing traded and non-traded goods" (Benjamin, Devarajan, and Weiner, p. 73, 1987)

⁶ Fardmanesh (1991)

witness a shift in labor from the tradables sector (not including booming energy sector i.e. manufacturing sector) to the non-tradable one. Another simple definition refers to the use of increased revenues which alone is sufficient to produce Dutch Disease-type effects (Benjamin, Devarajan, and Weiner, 1987).

The resource movement effect, in general, refers to the movement of mobile resource factors from the lagging sector to the energy booming sector. However, it is divided into two divisions⁷. The first division is the direct resource movement effect. Rodriguez (2006) defines the direct effect as increasing marginal productivity of labor and wages in the booming energy sector which tends to attract labor from the lagging sector. The direct resource movement effect is also called the direct de-industrialization⁸. Rodriguez believes that the indirect resource movement is similar to the previously mentioned spending effect which results from the reduced production in the non-tradable sector which yields excess demand. Referring to the demand and supply forces again, excess demand leads to an increase in prices and thereby wages. This mechanism causes further shift of labor from the lagging manufacturing sector to the non-tradable sector. Rudd (1996) explains that the resource movement effect occurs when the booming sector shares domestic factors of production with other sectors of the economy which triggers the price of factors to go up which in turn squeezes the traded goods sector further because producers in that sector will not be able to pay these increased prices. Another definition given by Rudd is that it is theoretically possible that the resource movement effect results from government's increasing use of physical

⁷ Check Corden (1984)

⁸ Corden and Neary (1982)

capital resources in the oil industry. In short, capital and labor resources would shift to the non-traded domestic goods sector and to the booming resource sector; with both transfers causing a contraction in the production of the lagging manufacturing sector.

After discussing the Dutch Disease theory and its effects, it is crucial to reflect some of its symptoms. Mardaneh (2012) identifies several symptoms for diagnosing the disease which include: (1) rise in the price of oil and appreciation of real exchange rate, (2) slowdown in the manufacturing sector, (3) increase in investment in the oil sector, (4) increase in the nominal wage of the labor in the booming tradable sector, (5) higher growth rate for services non-tradable sector compared to the lagging manufacturing sector, and (6) rise in government expenditures which results in domestic inflationary pressures. Moreover, he believes that it is not necessary that all these symptoms must hold for a country suffering from the disease.

“Nearly every country that finds oil, natural gas, or a valuable amount of a tradable natural resource should concern itself with the possibility of “Dutch Disease” and the impact that extraction of oil will have on their economy” (Hilaire, p.1, 2004). Having different countries suffering from this disease shall support Hilaire’s opinion. Therefore, it is essential to review the literature and present some case studies.

CHAPTER II

LITERATURE REVIEW

After examining the theoretical framework of the Dutch Disease, it can be concluded that this disease can originate from two sources. The first one is the discovery of large, easy to exploit source of oil that can induce rapid exploitation of the resource and the second is a sudden increase in the price of oil, similar to what happened in the mid-1970s when OPEC restricted supply of oil causing pricing to increase, which can induce countries to exploit existing oil reserves; both of which can trigger the onset of Dutch Disease⁹. This phenomenon has been the concern of many authors since the 1980s and economists have approached the theoretical framework by far than the empirical literature with some validating the theorem while others refuting it. Wijnbergen (1984) investigated the effect of the decline of manufactured goods on inflation and employment in oil producing countries in Latin American and he proved the theorem that the oil boom undermined the nonoil traded sector accompanied with an expansion of non-tradable goods sector. Black et al (2005) found that oil booms increased the manufacturing sector in the oil-rich American states and Gelb (1988) did not find any evidence that the increasing oil revenues harm the manufacturing sector. However, Harding and Venables (2013) find a negative relationship between price movements and manufacturing exports in oil-exporting countries, Kamas (1986) deduced that in Colombia the relative price of services increased and the real exchange

⁹ Rudd (1996)

rate appreciated due to a rise in foreign exchange earnings from coffee, Egert and Leonard (2008) realized that the real exchange rate appreciated as well in the manufacturing traded sector in Kazakhstan, and Hilaire (2004) also confirmed detrimental effects in the Mexican and Venezuelan economy after the discovery of large oil reserves causing an increase in revenues with a mismanagement of those revenues from the side of the government. Moreover, the core model developed by Corden and Neary (1982) show that the manufacturing sector would definitely suffer from the Dutch Disease with a fall in manufacturing output and employment, a worsening of the balance of trade in manufacturing, and a fall in the real return to factors specific to the manufacturing sector accompanied by a real appreciation assuming only labor was mobile between sectors.

Other studies reveal that the agricultural sector is also affected by the disease. This theory was supported by Benjamin, Devaragan, and Weiner (1987) when they investigated the possibility of a Dutch Disease in a developing country while taking Cameroon as a case study. They concluded that it is the agricultural sector that is mostly hurt rather than the manufacturing sector in a developing country. Mardaneh (2012) also verified this approach by presenting an example from the Iranian economy with the agricultural sector facing the major decline in response to increase in oil prices rather than the manufacturing sector. This conclusion was also supported by Fardmanesh (1991) as he integrated the Dutch Disease model of an oil boom into a reduced form three-sector model while taking five developing oil-exporting countries with significant agricultural and manufacturing sectors. Countries used were Algeria, Ecuador, Indonesia, Nigeria, and Venezuela. His model revealed that there was an expansion in

their manufacturing sector and a contraction in the agricultural sector. Moreover, following the oil boom in 1970s, the manufacturing sector expanded with a reduction in the agricultural sector in most developing oil-exporting countries (World Bank, 1984).

Another set of studies are those who study the effect of Dutch Disease on the economic growth rather than the effect on tradable and non-tradable sectors. Mardaneh (2012) mentions in her paper different scholars who investigated this approach including Gelb (1988) who found that resource abundance lowers growth in addition to Karl (1997) and Auty (1999). Wijnbergen (1984) and Krugman (1987) found that there is a negative relationship between natural resources exploitation and productivity growth¹⁰.

A third set of studies of the Dutch Disease corresponds to those not related to oil or gas exporting boom. Indeed, there are other environments that faced this disease. Examples reviewed in the literature include: (1) the export boom of Swiss bonds in 1970s caused the appreciation of the Swiss franc with devastating effects on agricultural sector, (2) influx of gold into Spain¹¹ in the 16th century which caused disturbance in the Spanish industry, (3) gold discoveries in 1850s in Australia, and (4) technological advancement boom in Japan in the 1960s which had adverse effects on the less dynamic tradable sectors especially agricultural one (Corden, 1982). Oil discovery boom include those in Norway and North Sea¹² in 1970s. On the other hand, there are other studies that refute this phenomenon even if the country is rich with a certain commodity. For

¹⁰ Mardaneh (2012)

¹¹ Some refer to it as the flow of American treasures (Ebrahimzadeh, 2012)

¹² Caused adverse effect on British manufacturing sector accompanied with real appreciation of the pound

example, Brazil is a major oil and gas producer while ranking the second in ethanol fuel production in the world¹³. At the same time, it was able to outperform other countries in the agricultural sector. “Brazil is now the world’s biggest exporter not only of coffee, sugar, orange juice and tobacco but also of ethanol, beef and chicken, and the second-biggest source of soya products”¹⁴. Therefore, there is no valid evidence that Brazil suffers from Dutch Disease with its resources and commodities being translated into wealth rather than a curse. Another example is that of United Arab Emirates (UAE) who ranked among the top 10 in the world’s oil and gas producing countries. However, it did not suffer from the Dutch Disease due to its well-managed and diversified economy.

Many scholars might believe that the Dutch Disease is a passing transitional phase that is eradicated with the adjustment of the economy; however, it seems that developing countries could suffer lengthy consequences (Hilaire, 2004). This is proven especially in countries that depend solely on the booming sector with no other alternatives being conducted from this commodity. To analyze this, an Arab developing country shall be chosen to shed light on the probability of it facing Dutch Disease.

¹³ Brazil is the 8th largest total energy consumer and 10th largest producer (U.S. Energy Information Administration)

¹⁴ The Economist (2010)

CHAPTER III

MACRO FUNDAMENTALS

The mid-20th century illustrated a transitional phase in the MENA region after it experienced the lowest possible levels of socio-economic development which started to recover after the discovery of oil. The utilization of oil reserves resulted in rapid transformation in the social, economic, and political sectors not only in the oil-rich countries but also in the whole region. This transformation resulted in economic modernization but caused political stagnation as well according to different authors¹⁵. On the economic side, the Arab states were very limited to agriculture, pastoral economies, and a small but locally important caravan trade (Gause, 1994). Oil extraction represented a source of revenue to the Arab states rich with oil such as Kuwait, Qatar, Saudi Arabia, Bahrain, United Arab Emirates, etc. Therefore, such economies have transformed from agricultural to rentier economies.

The economic modernization era started when the oil-rich countries began to experience growth in the oil revenue and in turn GDP. Starting the 1960s, a wave of alterations started to prevail which included different social indicators such as education, infrastructure, manufacturing, public and private investment, health, enterprises, etc. By the late 1980s, there was massive expansion in public sector employment with low levels of open unemployment, migration opportunities abroad, reduction in infant mortality, increase in life expectancy, increase in school enrollment,

¹⁵ Check Schwarz (2008) and Malachova (2012)

improvement in literacy levels, and promotion in the living standards of the public¹⁶. Despite its vast reserves of oil and improvement in the economic and social sectors, the Middle East is still considered as a Third World region due to its high reliance on oil revenues and weak production sector of the economy in addition to some political factors such as lack of democracy, corruption, reluctance to the reforms, and other issues (Malachova, 2012). Similarly, on the political side, the Middle East witnessed a political development after the oil discovery. However, there is some controversy in this matter in which many scholars believe that this discovery caused political stagnation. According to Malachova, political stagnation is referred to the lack of democracy, prevalence of authoritarian regimes in the Middle East, and reluctance to the political reforms. The lack of government accountability is also another factor driving towards stagnation in terms of tax exemption for citizens in return for no demand for representation and for accountability. Governments provide its citizens with a wide range of genuine public goods and services: defense, national security, education, health, employment, social security, network of infrastructure, etc. with adequate and sometimes excellent level and quality¹⁷. In return for these public goods and services, citizens become politically passive and do not comment on any policies adopted by the government even if they are not satisfied with its unaccountability. In other words, they would not rebel against the government as long as they are satisfied with the services provided. The author continues and says that the lack of political development, i.e. the political backwardness in the Middle East is not only due to “rentierism” but also due to

¹⁶ T M. Youssef (2004)

¹⁷ Beblawi (1990)

the intrinsic political culture which is derived from the personal relations and ties in addition to the Islamic norms¹⁸ and political traditions prevailing.

After analyzing the economic and political effects of the discovery of oil which returns us back to the curse of natural resources, one should shed light on the effects of the dependence on oil as a single raw material. Oil is a finite, nonrenewable resource with unlimited demand. "At recent rates of utilization oil in the GCC (Gulf Co-operation Council) region will run out in the lifetime of the present generation (Bahrain, Qatar, and Oman), its children (UAE), or its grandchildren (Kuwait and Saudi Arabia)" (Kubursi, p. 1, 1984). Therefore, dependency on raw materials in general and on oil in particular is accompanied with different pitfalls which include: (1) price volatility, (2) world supply and demand volatility where new reserves or oil wells might be discovered in a certain area or demand changes from one commodity to another with both forces changing the economy of a country, (3) changes in the terms of trade (such as trade barriers), (4) corrosive effect of commodity production on political institutions¹⁹ where corruption is followed after the government tries to capture rents, (5) market uncertainty causing a resource-dependent state's decisions often based on political means rather than on economic profit only, and finally (6) Dutch Disease which we presented in the beginning of this paper.

Therefore, in this paper we attempt to study the theory of Dutch Disease in an Arab developing resource-dependent country which we have mentioned earlier that it

¹⁸ "The political system based on patronage and kin ties is not a surprise as it is stipulated by the religion – Islam..." (Malachova, p. 5, 2012)

¹⁹ The Economist (2010)

may suffer lengthy consequences²⁰. However, Stevens (1986) notes that Arab Gulf economies may not experience the classical problems associated with a booming energy sector because such countries did not have immense productive activities before oil discovery, and therefore there is "little to be damaged". Such an incident may apply to the case of Saudi Arabia. Workers, which are one of the main inputs of industrial production in Saudi Arabia, are mainly foreigners which also apply to other tradable sectors making it impossible to depict any concrete conclusion whether Dutch Disease has been an obstacle to the development of the manufacturing sector in this country (Looney, 2011). In a previous paper in 1990, Looney states that Saudi Arabia presents an interesting case study because while the Riyal showed a considerable appreciation after 1975, its manufacturing sector was able to expand almost the same pace as was experienced by non-traded sectors. Given this controversy among authors, in this paper we attempt to study the applicability of this disease in Saudi Arabia. However, it is essential to illustrate some macro fundamentals about the kingdom first and based on results obtained, several policy recommendations shall be discussed.

A. Overview on the Saudi Arabian Economy (table01) :

The economy of Saudi Arabia is considered the largest economy of the emerging regional bloc; the GCC formed by Bahrain, Kuwait, Qatar, Oman, the United Arab Emirates, and the Kingdom of Saudi Arabia with the kingdom contributing to 49% of total GDP and 67% of total population in this economic bloc (Chauvin, n.d.). The

²⁰ Check Hilaire (2004)

economic activity of the country is highly dependent on oil, its sale of petroleum, and its by-products. These features have made the kingdom's economy the largest and strongest economy in the Middle East.

"Before the discovery of oil in the Arabian Peninsula, it would be difficult to speak of a unified entity such as the Saudi Arabian Economy. Before the 1930s, the region that would later come under the control of the Saudi state was composed of several regions that lived off specific resources and differentiated human activities" (United States Library of Congress - online). For example, Hijaz Western province depended chiefly on subsistence agricultural and Eastern province was known for its plantation economy that grew dates and other cash crops. Therefore, there was no one unified economy across all areas. However, three major events occurred causing a restructuring of the country's economy. The three events included the establishment of the Kingdom of Saudi Arabia in 1932 which unified a number of diverse areas under one ruler, the discovery of oil in Eastern province in 1938, and the rebuilding of Europe after World War II and its need for cheap and reliable source of energy which enhanced the status of the newly formed oil industry in the kingdom and all these three events formed the basis for the current Saudi economy (FRD²¹, Library of Congress, online, 1993). Oil income was the major trigger behind the development of the country with the expansion of different industries. At the same time, massive oil revenues brought with it different complications in terms of foreign affairs, global impact, and domestic policies in Saudi Arabia. It has been diversifying its industrial output and spending on human capital in education and training and has experimented technologically with agriculture

²¹ Federal Research Division

(Sherifa, 2011). In addition, the kingdom has put a five-year plan on five different phases starting in 1970. But the planning agency was established in 1958 in response to suggestions by International Monetary Fund and the first 5-year developmental plan did not start before 1970 due to financial constraints and limited funds which concentrated on human resources, infrastructure, and transportation. In 1965 planning was formalized in the Central Planning Organization which was later reorganized in 1975 and became the Ministry of Planning (FRD, 1993). Therefore, the Saudi Arabian government's attention was centered on industrial development, mainly in the downstream of activities of the petroleum sector accompanied with joint ventures with foreign partners in order to import technology to utilize oil and gas for refining and petrochemical operations which were completed by the end of 1985²². In this manner, six types of industries were prevalent in the country which include the following: (1) chemicals, drugs and medicine, rubber and plastic products, (2) iron, aluminum, steel, structural and fabricated metal products, (3) cement and clay, (4) clothing, textiles, glass, footwear, and paper products, (5) consumer appliances, machinery, vehicles, furniture, and equipment, and finally (6) food and beverages, carbonated products, and warehousing. The Saudi Arabian industrialization was subject to major changes in terms of innovation, employment, and investment which enhanced the economic status of the country.

Therefore, Saudi Arabia is a kingdom that has gained the title of a major global player in the world due to the windfalls of oil revenue.

²² Looney (2011)

B. Oil Dependence and Oil Price Movements:

What defines the Saudi Arabian economy is its oil wealth that was discovered in 1938 which brought with it widespread of economic change. While the country was considered relatively poor until the 1970s when oil prices soared causing a substantial increase in oil revenues. Revenues increased from 3.9 billion in 1973 to 319.3 billion in 1980 (figure01). "The oil revenues financed the development of bureaucracy that worked to unify an economically diverse country. The developing of the oil sector was crucial to domestic policy stability and a guarantee of foreign protection during the several regional conflicts" (Chauvin, p. 46, n.d.).

Saudi Arabia possesses more than 16% of the world's oil reserves and has the largest capacity for crude oil production in the world, estimated in 2009 at about 8.2 million barrels/day (SAMA, Annual Report) and actual crude output exceeded OPEC's set quota in 2010 due to high domestic demand for crude oil with an average of 8.4 million barrels/day²³. Even though Venezuela occupies 18% of the global reserves, its reserves are not considered easily accessible and they cost more to extract than Saudi reserves. "Saudi Arabia has the largest Gulf endowment of proved oil reserves of 265.9 billion barrels, and the second largest in the world (behind Venezuela, although Saudi crude quality is superior)... [It] is likely to be able to sustain production for another 65-100 years depending on the pace of extraction"²⁴. However, even though Saudi Arabia has the largest proven reserves in the Arab world, its per capita reserves are the lowest in the region (figure02). Moreover, the kingdom ranks the fifth among the world's

²³ Bloomberg (2011)

²⁴ Credit Agricole: Private Banking, 2012

natural gas reserves with about 4% possession. With respect to consumption, Saudi Arabia ranks first in energy consumption; both oil and gas, in the Arab world and the sixth in the world with respect to oil consumption and seventh with respect to natural gas consumption (figure03). The oil consumption reached about 2.86 million barrel/day in 2011. As for cumulative production in the period between 1990 and 2012, it produced over 78 billion barrels of oil (12.7% of global supply), thereby exceeding Russia and United States (table02). Finally, Saudi Arabia has the ability to substantially increase its supply to the global oil market with a spare production capacity of over 2 million barrels per day (mbd) since it accounts for over 50% of global spare production capacity and it can raise global oil production by over 2% within 30 days (IMF,2013). The report continues and states that Saudi Arabia keeps large quantities of oil in storage facilities in the Mediterranean, northern Europe, and Asia to meet customer demand in order to ensure smooth delivery of crude exports in case of transportation disruptions or any other market disturbances.

Over the past four decades, the kingdom's oil production and exporting patterns have reflected emerging policy objectives in addition to global demand and supply trends.

Between 1970 and 1980, the country increased oil production from almost 3.8 million barrel per day (mbd) in 1970 to almost 10 mbd in 1980. This massive increase in oil production coincided with: (1) rising oil prices, (2) return to public ownership of the oil industry, and (3) large investments to boost capacity²⁵. After the first oil boom in 1973, which greatly affected the country, OPEC asserted more constraints and control

²⁵ IMF (2013)

over the production and price of oil whose rises and contractions impacted economic planning, employment, and development and have also fostered expansion (Sherifa, 2011). Moreover, in this period oil exports increased and royalty payments and taxes on foreign oil companies increased considerably causing dramatic change in the economic situation with an increase of revenues per barrel of oil from \$0.22 billion in 1948 to \$0.89 billion in 1970 (Rodriguez, 2006). In 1974, a plan was set for moderate use and extraction pace of oil to ensure international economic stability taking into consideration it is the world's most important producer and thus has a strong profound influence on the world's oil demand and supply. In this period Saudi Arabia was allocating its oil revenues to invest them in different industries especially in infrastructure in order to spur its economic growth. By 1982, prices per barrel increased reaching a value above \$30 and as mentioned earlier oil revenues increased from 3.9 billion in 1973 to 319.3 billion in 1980. In this period, the government engaged in many subsidies in order to encourage non-oil development, distribute income, and meet social goals which supported the Saudi population but they became increasingly difficult to maintain and costs were greater than the overall benefits (Hilaire, 2004). The author continues and states that when the oil prices started to fall in 1982, the kingdom was forced to change its focus from managing budget surplus to dealing with budget deficit and balance of payment shortfalls. OPEC interfered and invited Saudi Arabia to stick with the production quota. Therefore, it faced two main challenges: (1) limitation of production and (2) oil price decline. Saudi Arabia cut back its production by more than 65% between 1980 and 1985. However, in the end of 1985, the country increased its oil production again which led to the second price crash in 1986 but the country managed

to survive this change by using its previously collected oil revenues. The reason behind the fall in oil prices was due to the severe recession in the early 1980s in the United States and Europe with a downfall in global energy demand which had put downward pressure on oil prices. Due to this incident, OPEC assigned certain production quotas. Aleisa and Dibooglu (2004) state in their paper that the sharp increase in oil prices have been blamed on collusive behavior of OPEC cartel and the sharp price declines are associated with the weakening of OPEC.

In the 1990s, there was high energy demand from developing Asia countries and the kingdom increased its oil exports for these countries to reach more than 55% after it accounted for almost 30% in the 1970s. In the contrary, Saudi Arabia decreased its oil exportation to Europe from almost 44% in 1970s to 15% in 1990s (table03). The status of Saudi Arabia increased even further after the first Gulf war in late 1990 making it the only country with an excess capacity of crude oil which had to fill the demand gaps. Iraq and Kuwait's fall in oil production caused a loss of global oil supply by almost 6.5% (figure04). Saudi Arabia stepped in and increased its production to fill this supply gap by almost two thirds of the loss caused by Kuwait's and Iraq's shortage in supply. Despite all attempts, the oil price increased. Another two episodes drove Saudi Arabia to increase its production in response to supply disturbances which were the Venezuelan Strike and the second Gulf war between 2002 and 2003. These two episodes caused a reduction in global supply of oil by almost 1.6% 2.3% respectively. Saudi Arabia increased its oil production by almost 1.1 mbd to offset the gap during Venezuelan strike in addition to other increase in production by other producers (figure05). Whereas the gap during second Gulf war was offset by: (1) recovery of

Venezuelan production, (2) increase in Saudi oil production, and (3) substantial decline in global demand (IMF, 2013). The final and most recent episode was the Libyan unrest in 2011 which caused a reduction in global oil supply by almost 1.8% which at the same time hardly hit European refineries. Saudi Arabia's crucial role was not only increasing oil production but also introducing a new oil blend tailored to European refineries (IMF, 2013). Oil price increase also accompanied this episode (figure 06).

C. Non-Oil Sectors (table04):

Since the oil and gas energy resources in are finite, limited, and non-renewable, Saudi Arabia faces a major challenge which is developing non-oil industry sectors. Diversification and investment in the non-oil productive sectors is of critical importance. Kubursi (1984) believes that for the Arab Gulf States, high shares of investment in non-oil GDP require minimal sacrifice of present consumption and savings can be derived from the oil sector. But the author continues and states that negative consequences accompany this relationship in which the relationship between growth of oil revenues and the growth of non-oil GDP has been rather tenuous²⁶ in which other sector of the economy would not grow on their own without continuous flow of oil. “Oil has not yet succeeded in promoting a state of sustained growth in the non-oil sectors, which are still heavily dependent on oil developments” (Kubursi, p. 71, 1984). This weak structure is basically due to two main factors: (1) oil boom and (2) restricted productive investment in the non-oil sectors. Kubursi explains two basic

²⁶ Kubursi (1984) found that the growth rate of non-oil GDP drops if the variable of oil revenues is taken out of the equation; $\text{Ln}(\text{NOGDP})_t = 5.62 + 0.203*t + 0.247*\text{Ln}(\text{OGDP})_t$ with a t-stat of 2.22, $R^2 = 0.98$, and D.W. = 1.04

features of the economic policy in the oil rich Arab Gulf states which might explain the relative lack of auto-dynamism in the non-oil sectors which are heavy investment in infrastructure which is divorced from productive investment and negative effects of oil on agriculture. What Kubursi might be saying is that the development in infrastructure is not hindering the investment in industry or agricultural sectors but rather being predominant.

If we restrict our analysis to the case of Saudi Arabia, the country did not witness any type of non-oil economic activity²⁷ before the 1970s until it witnessed influx of oil revenues. This increase is reflected in the increasing share of non-oil sectors in total GDP gradually reaching its highest transformation between 1980s and 2000s (figure07). These sectors witnessed an accelerated growth after the year 2000 averaging over 6.3% compared to less than 2.7% in the 1990s. “Steadier than overall GDP, non-oil GDP growth has been gradually rising over the past two decades, going from an average rate of 2.7 percent a year in the 1990s to 4.3 percent during 2000–11. As a result, the oil sector’s share in total real GDP has declined from almost 40 percent in 1991 to less than 30 percent in 2011” (IMF, p. 5, 2012). Therefore, the non-oil sectors are playing an important role in driving economic growth in the kingdom over the past years (figure08). Even though non-oil activity has been contributing to the overall GDP, but Saudi Arabia remains an oil-dependent economy. Indeed, in nominal terms, the oil sector’s contribution to GDP at current prices surged from about 30% in

²⁷ It is worth mentioning that the non-oil sectors refer to the public (government services and public services) and private sectors (any other economic activity)

the late 1990s to currently close to 60%²⁸. Between the period of 2005 and 2008 there was a balance between percentage of oil and non-oil sectors to GDP. In addition, the total GDP share of non-oil turning out to be higher than oil sector between the periods of 1982 until 2004 on a row. In the secular trend, non-oil sector GDP is found to be increasing, while oil sector GDP has been declining (Al Sahlawi and Choudhury). The increase in the role of the non-oil sector is a sound indicator of a manufacturing and industrial development focus of the Saudi economy within its on-going program of privatization²⁹.

Again we restrict our analysis to the agricultural and manufacturing non-oil sectors.

1. Agricultural Sector:

In general, the Gulf region is neither a well-equipped and suitable area for agricultural economic activities nor a fertile land for productive agricultural investments and cultivation. This sector is subject to different challenges which include the fertility of the land and the climate change. Kubursi (1984) presents a table in his book that indicates the land base of six countries³⁰ in terms of total area and agricultural land of different types. His findings reflect a scarcity of agricultural land in the region with only 0.47% of total land is suitable for crops and 35.37% is suitable for permanent pasture.

²⁸ IMF (2012)

²⁹ Al-Sahlawi and Choudhury (2000)

³⁰ Countries include: Saudi Arabia, Qatar, Oman, Kuwait, Bahrain, and UAE

Moreover, he found that Saudi Arabia dominates agricultural production in the region followed by Oman and United Arab Emirates to a lesser extent.

Agricultural sector experienced massive transformation in 1970s and 1980s with a decrease in the percentage share of GDP from almost 5% in 1968 to 0.84% in 1974 i.e. a reduction by 83% and with an increase from 0.98% in 1980 to almost 6.3% in 1989 i.e. more than a quadrupled value. Agricultural sector reached its peak in 1989 with a percentage of more than 6.3% of GDP between the period of 1968 and 2013. However, this percentage recorded only 1.84% in 2013 (figure09).

On the other hand, the total agricultural production measured in thousands of tons did not decline substantially as did the percentage of GDP. The previously mentioned increase in the percentage of GDP in the 1980s was accompanied by a more than doubled agricultural production in early 1980s (mainly 1981-1982) from 2052 to 4648 thousand tons (figure10 a). Saudi Arabia's agricultural production is highly concentrated between grain, vegetables, and green fodder with fruit production being the lowest (figure10 b).

In traditional agriculture, farmers in Saudi Arabia used to harvest dates, figs, watermelons, wheat, onions, squash, etc. However, the kingdom managed to adopt modern techniques that replaced human labor by machinery and workers that remained in land were mostly foreigners. Cultivation included roses which were used for both cooking and fragrance. Starting the 1970s and 1980s, Saudi Arabia under-took restructuring of this sector aiming at enhancing food security through self-sufficiency and rural incomes (FRD, 1993). The kingdom introduced modern agricultural techniques in order to increase its output. However, the agricultural program did not

meet its intended goals in the sense that even though the kingdom produced a surplus of output, it still imported fertilizers, labor, and equipment from abroad; thereby making it dependent on foreign inputs to produce food products for the Saudi locals. Besides, traditional agricultural regions did not benefit from this developmental program because the program led to the establishment of large scale agricultural production units which were managed by foreign firms, large businesses, and wealthy individuals³¹.

If we want to related this sector to the Dutch Disease which is our main concern, one could hypothesize that there would be a decline in the agricultural sector as human capital would transfer from the this traded sector to the booming sector which is the oil sector in this case. "Ministry of Planning estimated the total labor force in 1979 to 2.9 million and agriculture accounted for 15.8% of the total work force. By 1989 the total labor force had risen to 5.8 million but agriculture's share had declined to 9.9%" (Rodriguez, p. 22, 2006). As mentioned earlier, the agricultural production increased especially in the period between 1980 and 1994 even though the labor force in this sector declined. This increase was the result of government intervention through increasing the agricultural techniques and providing subsidies.

2. *Manufacturing Sector:*

Unlike the agricultural sector, the manufacturing sector did not witness substantial changes over the period 1968-2013. The highest percentage change during this period was 28.3% in 1983 when the manufacturing sector increased from 4.93% in 1982 to 6.32% in 1983 measured as a percentage of GDP (figure11).

³¹ FRD, Library of Congress, online (1993)

Kubursi (1984) believes that when we want to analyze or talk about the manufacturing sector, one must talk not only in terms of market size but also in terms of resource pools and human skills. The author mentions in his book that the non-oil manufacturing sectors of the Arab Gulf countries refer to different sub-sectors which include: (1) resource-based industrialization illustrated in processing natural resources to capture the high value-added component of such activities and to diversify production and exports which include iron and steel, aluminum, cement, and copper, (2) food and agricultural processing, and (3) capital goods and high-technology products which include telecommunications equipment, electric power equipment, telephone and power cables, and machinery and equipment for the chemical and petrochemical. This diversification in the manufacturing sector evolved after the government has played an active role through establishing industrial plants especially in big manufacturing enterprises such as petrochemical and steel. Funding for these changes in the manufacturing sector came mainly from industrial subsidies, direct loans, offset programs, tariffs, and etc.³². The plan for these modifications in the economy started in the 1970s when the government collected revenues from the oil industry. Part of the accumulated revenue was used for investment in the manufacturing sector through building manufacturing plants. The 1980s witnessed the first episode of changes in the construction sub-sector which declined in the mid-1980s when the investments were re-directed to food processing and other consumer goods.

³² FRD, Library of Congress, online (1993)

The progress that has been made in the manufacturing sector is centered basically on mining and energy sub-sectors with investments being plowed into increasing oil production capacity as well as those of gas, solar thermal, and other sustainable electricity generation methods and with large endowment of hydrocarbons used in industries producing cement, petrochemicals, metals, and fertilizers³³. Until now, Saudi Arabia is exerting its efforts on heavy industries exemplified by petrochemicals, aluminum complexes, and copper refinery.

Finally, relating this sector to the Dutch Disease, one cannot find a supporting proof that coincides with the theory because as proposed by the theory, the manufacturing sector should be declining with an increase in the booming oil sector. The expansion of the manufacturing sector was part of the massive development efforts and 5-year plan which were funded by the oil revenues and imposed by the Saudi government starting the 1970s in order to develop the country and the economy in various ways (Rodriguez, 2006).

D. Labor Force:

When discussing the theory of Dutch Disease, it is important to investigate the movement of mobile factors or human capital from one sector to another. The spending and resource movement effects reflect this movement. Labor will move from the lagging and non-tradable sector to the booming energy sector. If the industry requires

³³ Credit Agricole: Private Banking, 2012

excessive demand for labor, then the country would import foreign labor. This case fits that of Saudi Arabia perfectly.

The Arab world in general is known for its relatively rapid population growth (figure 12) which still exceeds the world's average, even though it slowed down in recent years, and is characterized by its young population structure³⁴ (El-Katiri and Fattouh, 2012). In addition, the participation of women in the workforce added further pressure in the labor market. The Arab countries expanded their enterprises and public sectors to attract new labor starting the 1950s. "In the GCC, governments have also been nationalizing employment in the public sector by replacing foreign employees with nationals. However, past strategies of expanding government employment and nationalizing jobs in ministries, the bureaucracy, and the public sector have reached their limits in recent years, even in resource-rich economies"³⁵. This phenomenon reflected a downturn in the public sector productivity. The discovery of oil has brought with it the emergence of national oil companies who might provide locals with employment opportunities. Therefore, the oil boom in 1973 was associated with the largest wave of inter-regional migration and the large inflow of revenues following the price hike in 1973 allowed resource-rich economies to embark on a very ambitious program of building modern infrastructure and developing key sectors of their economies especially in public services sector³⁶. However, the oil industry such as that in Saudi Arabia is capital intensive and has limitations for attracting employees.

³⁴ About 50% of the Saudi locals are below 25 years old

³⁵ El-Katiri and Fattouh, p. 36, 2012

³⁶ El-Katiri and Fattouh (2012)

According to the 2012 UNDP report by El-Katiri and Fattouh, Saudi Arabia, which is considered the largest oil and gas sector country in the Arab world, employs only 74,212 people in 2010 in the mining, oil, gas, and quarrying sector which represent only 1% of the total labor force in the private sector. The most tremendous change occurred in the end of the 20th century after the end of the traditional era and the rise of modern economics. Many Saudi locals moved from traditional working areas to government services accompanied with the welcoming of foreigners in the workplace by the private sector as well. "Estimates varied, but a reliable Western source indicated that total employment grew from more than 1.7 million in 1975 to 2.2 million in 1980. The domestic work force numbered 1 million (58% of total employment) in 1975. By 1980 employment of foreigners had risen from 723,000 in 1975 to more than 1 million (or 46% of total employment) in 1980" (FRD, Library of Congress, online, section 1, 1993). Employment across sectors differed as well between the year 1979 and 1989. In 1979, the total workforce was 2.9 million divided as 1.3 million in the producing sector and 1.6 million in services sector. Agriculture accounted for 15.8%, construction 20.4%, 10.6% trade, government and social services 34.2% of total labor force. However, in 1989, total labor force increased to 5.8 million with agricultural sector share dropping to 9.9%, construction down to 16.4% with an increase in trade and social services sectors to 15.6% and 42.4% respectively³⁷ (figure14). Kubursi (1984) addresses two concerns in the labor of the agricultural sector. First is how to reduce employment in the

³⁷ FRD, Library of Congress, online (1993)

agricultural sector to man the emerging activities in other sectors. Second is how to improve the skills and productivity of those remaining.

As for foreigners, they make up almost a third of total population while holding more than 80% of the work force. About 80% of the public sector jobs are held by Saudi nationals while more than 80% of the private sector jobs are held by foreigners³⁸ (figures 13 a & b). Reasons behind this high participation of foreigners in the Saudi workplace might be due to the less legal protection foreigners need in firms than Saudi people need in addition to demanding fewer wage. As mentioned earlier, the oil sector in Saudi Arabia does not demand high intensity for labor and Saudis would not be attracted to jobs that non-Saudis work in. However, the basic and initial reason for the migration of non-Saudis into the kingdom is the limited size of their national labor force so it had to rely on foreign labor especially after the oil booms and the beginning of modernization. The import of foreign workers to Saudi Arabia might have had positive consequences such as releasing the stress of fear of the Dutch Disease accompanied with the movement of labor from lagging and non-traded sectors to oil booming sector. Foreigners acted in a way such that they filled the gap in the labor transmission from one sector to another and removed any capacity constraints for production in such sectors. “Without the imported labor the prices of the non-tradable sector would have risen further, due to shortages of non-tradable goods as a result of increased demand, and would hence lead to an even greater appreciation of the real exchange rate” (Rodriguez, p. 23, 2006). Thus, the competitive power of the non-oil sector could remain intact. Moreover, foreigners; mainly Asians, were more skilled than Arab

³⁸ Gulf Cooperation Council (2010)

workers especially in technical specialties. At the beginning of the 1970s, the percentage of Arab workers in the GCC was 72%, by 1985, this percentage has fallen to 56%, and further again to 31% in 1996 with the latest available data suggest that the percentage stands at around 25%³⁹. The Saudi labor force grew at a rate of 3.7% annually compared to a growth rate of 21% for non-Saudis causing a decline in the share of Saudis in the total labor force from 49.4% in 1980 to 40.2% in 1985 (Looney, 2011).

With respect to unemployment, its overall rate is 5.8% and has remained broadly stable since mid-2009 as declared by the IMF report (2013). According to the same report, among Saudis, unemployment rates increased from 10.5% at the end of 2009 to 12.1% at the end of 2012 especially for women and youth unemployment. Besides, Saudi employment growth was only 4.6% between 2010 and 2012 and the fraction of Saudi employment to total employment has declined since the end of 2009.

This structure of the labor market is due to four main reasons⁴⁰:

- i. Strong growth in sectors that typically rely on foreign labor such as wholesale and retail trade, construction, transportation, and personal services which have not contributed to the employment of Saudi locals
- ii. Private sector wage differentials with Saudi workers earning higher than non-Saudis for the same education level in the private sector

³⁹ International Organization for Migration (2010)

⁴⁰ IMF (2013)

- iii. Public sector employment and wage policies with generous compensation packages to low-skilled Saudis employed in the public sector which is higher than the wage of qualified non-Saudis employed in the private sector
- iv. Cultural factors that depress female labor force participation with an increase in their participation rate in the total labor force from 12% in 2006 to 16% in 2012; yet, remaining very low compared to similar emerging markets with a majority of Muslim population

Therefore, the focus is now how to provide or come up with forward linkages to generate employment and more jobs for Saudi locals including women. However, the plight of women and other aspects of the religious conservatives are holding the society back from delivering growth at its full potential and the government has to work on reducing the mismatch of skills to job openings that prevail in the country (Credit Agricole, 2012). One of the main challenges to the kingdom would be human resource development such as construction of schools and universities with new curriculum to fill the gap of youth unemployment and solving the issue of the mismatch⁴¹.

E. Real Exchange Rate System:

The major consequence of Dutch Disease as previously discussed is the real exchange rate appreciation in the country. Therefore, it is important to study the movement and the characteristics of this factor when analyzing the theory of Dutch Disease.

⁴¹ Chauvin (n.d.)

A stable real exchange rate plays a central role in economic stability, development, and growth especially in developing countries since it impacts capital inflows, foreign direct investment, and trade⁴². Increase in the level of uncertainty about real exchange rate is reflected negatively in export performance and in FDIs in addition to macroeconomic disequilibrium. The analysis of the Saudi Arabian real exchange rate is of great interest to many scholars because the country is one of the major players in the global oil market and any disturbance that affects this exchange rate shall have an influence on oil production and hence the world economy.

The currency used in Saudi Arabia is the Saudi Riyal (SR) and the intervention currency was the U.S. Dollar (USD). The Riyal against USD was determined by the Saudi Arabian Monetary Agency (SAMA) and SAMA in collaboration with Ministry of Finance manages the foreign exchange control. Reviewing the history of the exchange rate we can stop at different episodes starting with the year of 1960 when the Riyal was devaluated to 16.7% in terms of gold, therefore changing the official rate from 3.75 SR to 4.5 per 1 USD. Between 1960 and 1975 there were several attempts to change the official rate to maintain the gold value. For example, in 1971 there was a floating of the USD causing a devaluation of the Saudi Riyal because Saudi officials declared that they do not want to change the official rate. At the end of 1971, the official rate was changed to 4.14475 per one USD based on the unchanged gold content of the Saudi currency. However, in 1973 there was realignment of the official rate to 3.73 SR per one USD after a devaluation of the US dollar. In August 1973, the Saudi Riyal was up-valued by 5.078% in terms of gold thereby establishing a new official rate of 3.55 per one USD.

⁴² Aleisa and Dibooglu (2002)

Therefore, SAMA preferred to maintain a “constant” and predictable Saudi Riyal exchange rate. Following this mechanism shall foster economic development and growth, keep prices stable, and promote international trade (Aleisa and Dibooglu, 2002). The Saudi officials adopted a fixed exchange rate regime in an attempt to achieve these goals; however, the collapse of the Bretton Woods System⁴³ and the instability of the US dollar had made it difficult to stabilize the Saudi Riyal as well. The Saudi Arabian Monetary Agency switched to the IMF’s Special Drawing Rights (SDR) unit in 1975 at an exchange rate of 4.28255 SR per SDR with a margin of 2.25 to 7.25 (Looney, 1990). In 1981, SAMA abolished the pegging regime of Saudi Riyal to SDR. Instead, the USD became the pegging currency. Banks were allowed to charge 0.25% above and below the agency’s buying and selling rates i.e. a range of 3.74 and 3.75 SR per dollar. From 1981 to 1985, SAMA changed the exchange rate until it reached SR 3.75 / 1 USD in June 1986 and has been the same ever since.

The following table summarizes the exchange rate policy in the Kingdom of Saudi Arabia since 1950:

⁴³ It is a monetary management agreement with stated rules for commercial and financial relations among world’s major industrial states with an obligation for each country to adopt a monetary policy that maintained the exchange rate by tying the domestic currency of each country to gold and then the US dollar. This agreement was then abolished in 1971 when the US dollar became a reserve currency and it led to many countries converting their fixed currencies to floating ones

Exchange Rate Policy in Saudi Arabia

Year	Regime	Exchange Rate
1950 - 70	Fixed Exchange Rate against the U.S. dollar	4.5
1970 - 72		4.15
1973 - 75		3.56
1975 - 81	Fixed Exchange Rate against SDR	3.4
1981 - present	Fixed Exchange Rate against the U.S. dollar	3.75

Table 05: Exchange Rate Regime in Saudi Arabia

Source: Aleisa, E. and Dibooglu, S. (2002). Sources of real exchange rate movements in Saudi Arabia. *Journal of Economics and Finance*, Vol. 26, No. 1, Spring 2002

Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. The real effective exchange rate (REER) of Saudi Arabia ranged between a minimum of 93.63 in 2008 and a maximum of 245.4 in 1982 measured during the period of 1980–2013 with 2010 as a base year.

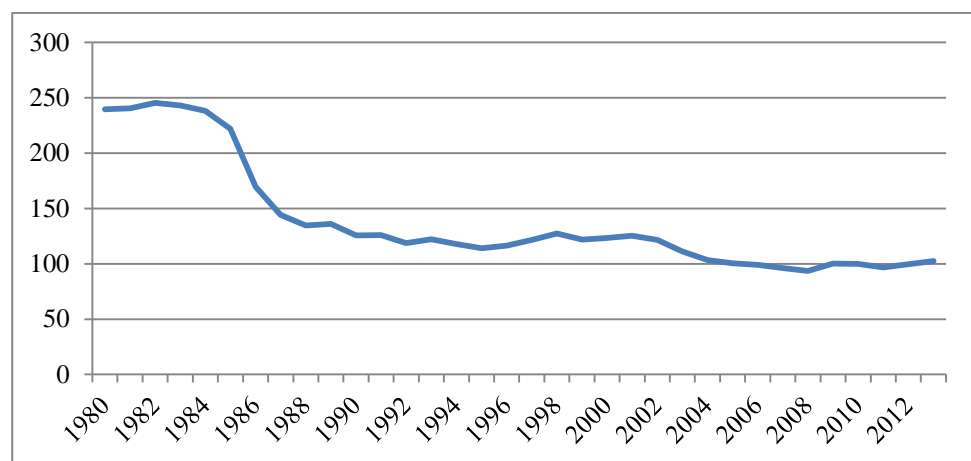


Figure 15: Real Effective Exchange Rate Index (2010 = 100)
Source: World Bank Development Indicators

From the graph we can realize a clear depreciation of the real effective exchange rate but this was followed after an appreciation between 1973 and 1976⁴⁴. This depreciation allows Saudi Arabia to gain competitiveness in the world market by making its exports cheaper to foreign imports of Saudi products. At the same time, devaluation is accompanied with increased costs of imports to the country which adds inflationary pressures on the economy. “Thus, the appropriate measure of an exchange rate policy is one that incorporates changes in domestic and foreign prices into nominal exchange rate changes. The resulting measure is called the real exchange rate. Thus, only devaluation or depreciation of real exchange rate can increase a country’s international competitiveness” (Bahmani-Oskooee, p 103, 2002). In addition, monetary policy makers suggested that the use of fixed exchange rate regime might eliminate foreign exchange risk from the exchange rate volatility and is therefore conducive to foreigner investment in the country⁴⁵.

On the other hand, the advantages of the fixed exchange rate regime are accompanied by some disadvantages. For example, the recent supply shock to most GCC countries caused by the increases in oil prices was asymmetric while the demand shock was symmetric which causes national and international price changes in oil⁴⁶. Besides, the exchange rate being pegged to the U.S. dollar creates a low interest rate environment and the country is “flushed” with liquidity patterns causing low loan-to-deposit ratios (Credit Agricole Private Banking, 2012). Therefore, low interest rates,

⁴⁴ Figures before 1980 were calculated by Bahmani-Oskooee (2001)

⁴⁵ Check (Ramady, 2005)

⁴⁶ Fakieh (2013)

ample liquidity, and high fiscal spending pose clear inflationary risks. In a manner of speaking, it is important to reflect the characteristics of inflation figures in the kingdom.

F. Inflation:

In the past four decades or even more, inflation has been the concern of many scholars and economists due to its tremendous effects both socially and economically. Al-Bassam (1999) proposes different external factors behind the rise of inflation in Saudi Arabia during different periods of time which include the U.S. dollar short-term market interest rate, changes of the Saudi Riyal exchange rate against the U.S. dollar, and imported inflation. The author intends in his paper to study the sources behind inflation in the kingdom using a monetarist single-equation model with nominal money supply, real income (real GDP), and a lagged variable as explanatory variables in addition to the previously mentioned external variables for the dependent variable inflation. Different empirical research has been conducted to explain the reasons behind the emergence of inflation. However, Al-Bassam (1999) concludes that there has been no single theory or model that can be used to explain fully the changes in rate of inflation in every economy and there are different variables than those mentioned earlier that might affect inflation such as the stage of economic development, economic and institutional setting, and economic policies especially monetary and fiscal policies.

Inflation control is of high interest for Saudi officials in order to stabilize the economy considering it one of the basis of oil suppliers in the world, can greatly affect OPEC policy decisions regarding supply and production quota of oil, and is an open economy with negligible restrictions on movement of money and goods which make it

subject to external causes of inflation movements. The recent financial crisis in 2008 caused disturbance in inflation rates worldwide. In Saudi Arabia, inflation rates⁴⁷ scored 2.2% in 2006 and soared up to 4.16% in 2007 and further to 9.86% in 2008. Throwing back to the 1970s and 1980s, inflation rate reached its highest level and recorded 34.57% in 1975 and reached its lowest in 1986 with a negative value of -3.2% (figure16). This substantial rise in inflation in the kingdom was mainly due to substantial increase in oil prices i.e. oil revenues and thus liquidity.

Moreover, the government adopted monetary expansion after increase in government expenditures and pushed up salaries in the mid-1970s causing the high level of inflation. The government tried to curb this increase through following different measures. Measures included abolishing a number of taxes and customs duties (such as: road tax and tax on domestic petroleum products), providing import subsidies on milk products and medicine, reducing the cost of electricity, reducing government expenditures⁴⁸, and conducting an evaluation of Saudi Riyal against U.S. dollar (Al-Bassam, 1999). As a result of these measures, inflation dropped from 34.57% in 1975 to 1.08% in 1979 and back to 4.17% in 1980. Nevertheless, three periods of deflation prevailed: 1978, 1992-1993, and 1998-2002, intimately linked with the evolution of the price of oil⁴⁹. Recent inflation figures depict an increase in 2008 to 9.86% after it ranged between 1% and 4% from 2003 till 2007. However, it decreased back to 5.43% in 2010

⁴⁷ Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly (World Bank definition)

⁴⁸ Government expenditures (capital and current expenditures) increased by 132% in 1975 and decreased by 25.32% in 1986

⁴⁹ Credit Agricole: Private Banking, 2012

and recently it scored 3.5% in 2013. Credit Agricole Private Banking (2012) discuss in their report few factors for the inflationary environment of the Saudi Arabian economy which include the inherently inflationary cheap Riyal since it is linked to the cheap U.S. dollar making non-U.S. imports relatively expensive for Saudi Arabia, almost 85% of imports are outside from the United States which affects domestic prices, and food prices are considered an important driver of Saudi inflation. Besides, the report mentions that the goal behind running a fixed exchange system means that interest rates act as policy instruments dedicated to keep the exchange rate fixed and not to fight inflation. Therefore, Saudi officials and SAMA in particular need to find an alternative way other than the central bank to fight inflation as it is considered a persistent shock to the Saudi economy.

Finally, high inflation is a common feature in countries affected by the Dutch Disease according to Rodriguez (2006). One of the main reasons not mentioned earlier and is common in Dutch Disease suffered economies is the capital inflows. However, in the case of Saudi Arabia, the main reason was the injection of oil revenues resulting in excess liquidity patterns especially after the first oil shock in early 1970s. Therefore, monetary policy system in the Saudi Arabian economy has to sharpen its potentials in order to fight any sort of disturbance.

G. Monetary and Fiscal Policy:

As mentioned earlier, the kingdom pegged its exchange rate to the U.S. dollar at a rate of 3.75 Riyals per each U.S. dollar. This mechanism restricts the policy instruments available for the Saudi Arabian government as far as the employment of

fiscal and monetary policies are concerned⁵⁰. These two instruments are considered the triggers in the economy.

Starting with monetary policy, it is monitored by SAMA: Saudi Arabian Monetary Agency, the central bank of the kingdom that was established in 1952⁵¹ and is vested with the conduct of monetary policy and has instrument and operational independence in pursuing its policy objectives (Al-Hamidy, n.d.). SAMA's main functions include issuing the Saudi national currency (Saudi Riyal), supervising domestic commercial banks and regulating exchange dealers, managing foreign exchange reserves, acting as a banker to the government, conducting monetary policy for promoting price and exchange rate stability, and promoting growth and ensuring the soundness of the financial system aiming at ensuring price stability internally and externally, balance of payments consideration, and confidence in the economy.

Recent literature has been focusing on the relationship between an open economy with a pegged exchange rate and money supply. “Under the monetary approach to the balance of payments (MABP) with free capital mobility and fixed exchange rate, the monetary authority cannot control the size of the money supply. Any attempt to increase the money supply by the central bank will give rise to an offsetting capital outflow of the same magnitude, leaving money supply unchanged” (Akikina and Al-Hoshan, 2003). Moreover, authorities cannot sterilize these capital outflows and

⁵⁰ Aleisa and Dibooglu (2002)

⁵¹ The year 1928 saw the birth of a unified currency in the kingdom and paper money coming into circulation after the creation of SAMA and started to issue Pilgrim's Receipts in 1953 (Credit Agricole: Private Banking, 2012)

reduce their effects on money supply⁵². In turn, this has implications on inflation as mentioned before due to increase in uncontrolled money supply especially in least developed countries (LDCs). The mechanism causes the monetary policy to be impotent and weak. Applying this to the case of Saudi Arabia, the country is an open economy in terms of its current and capital account, has no control over capital flows, lacks well-developed financial markets, has international earnings that do not affect money supply directly, and its interest rate is not officially recognized in the country. All these features enable us to include Saudi Arabia among the LDC with uncontrolled money supply making it a country with limited availability of monetary tools and targets (Akikina and Al-Hoshan, 2003). The authors explain three main factors affecting the growth in money supply (figure17) which include: (1) change in government's net domestic expenditures, (2) private sector balance of payments deficit, and (3) change in commercial bank's net credits to private sector.

Going back to the exchange rate, it is considered the country's main policy choice because first Saudi Arabia is a resource-based economy with foreign exchange receipts and payments predominantly in U.S. dollars, secondly exchange rate stability is important to trigger investment in the country in order to diversify the economy and state budget planning, and finally changes in exchange rate (US/SAR) do not contribute highly to Saudi Arabia's terms of trade because the export sector is dominated by oil and petrochemicals⁵³.

⁵² Bhalla (1982) has documented that unsterilized capital inflows were the main source of the increase in money supply in 28 developing countries during the era of fixed exchange rates, 1965–1975

⁵³ Al-Hamidy (n.d.)

Therefore, the monetary policy in Saudi Arabia was conducted by SAMA aiming at achieving price stability, supporting the various economic sectors in line with domestic and international economic developments, and supporting domestic banks to perform their financing role in the domestic economy through maintaining repo rate constant at 2% and reverse repo at rate at 0.25%, maintaining cash reserve ratio for demand deposits at 7% and time and saving deposits at 4%, encouraging domestic banks to increase lending, and stabilizing the three-month Saudi interbank offered rate at 0.946%⁵⁴.

As for fiscal policy, it is highly dependent on the oil price in Saudi Arabia. Economies that highly dependent on the energy sector are highly susceptible to oil price shocks and the macroeconomic management would be complicated by the failure of most economies to use counter-cyclical policy in response to oil prices, instead fiscal policy tends to be highly pro-cyclical with respect to commodity prices (Elbadawi and Soto, 2011). This means that during upturns in oil prices due to oil boom fiscal balances tend to worsen rather than improve. In the 1980s, oil prices dropped down which drove Saudi Arabia into a deep budget deficit for about 20 years (figure18). Moreover, debt to GDP ratios increased above 100%. Nevertheless, Saudi Arabia had improved its fiscal stance ahead of the Great Recession and public debt was cut from almost 104% of GDP in 1999 to 13% in 2008⁵⁵ (Credit Agricole, 2012). Public debt is on continuous decrease and recorded 2.7% of GDP in 2013 after it reached 37.3% in 2005. According to SAMA annual report statistics, there was no need to issue any debt instruments in 2012 owing to

⁵⁴ SAMA, Online Report Statistics, 2014

⁵⁵ According to SAMA calculations debt recorded 12.1% of GDP

strong financial position in recent years. The report of Credit Agricole in 2012 continues and states that net foreign assets rose from 23% to 92% of GDP during the same period and the kingdom provided support to the global economy in 2011 by increasing its oil production as mentioned earlier and committed additional resources to the IMF. Other fiscal measures include large packages in February and March 2011 combining to 19% of GDP directed towards increasing public sector wages, expanding public employment, paying unemployment benefits, and improving access to housing.

Linking the fiscal policy to oil sector and oil revenues volatility specifically, fiscal policy constitutes the main driving force behind non-oil growth with government spending amounting to over 80% of non-oil GDP⁵⁶. According to the IMF report in 2012, the main task of the fiscal policy in Saudi Arabia has been to balance development goals, such as investing in social and economic infrastructure and promoting economic diversification, with macroeconomic stability while witnessing volatile oil prices. In order to assess whether the Saudi economy has been adopting counter-cyclical fiscal policy or not; that Elbadawi and Soto mentioned in their paper, one has to figure out whether the government has been using spending smoothing mechanism while facing oil price volatility. Table 06 summarizes the volatility in the past three decades in growth rates of oil revenues, spending (fiscal spending), and correlation coefficients between the two variables. From this table we can realize that the oil revenue volatility decreased from 1980s to 1990s; however, it increased in 2000s but with a value less than that in the 1980s. On the other hand, spending growth volatility has been declining gradually since the 1980s and the correlation between the

⁵⁶ IMF (2012)

two variables fell significantly from 0.9 in 1980s to 0.2 in 2000s. The volatility in growth of oil revenues can be attributed to the oil price swings with the 1980s witnessing a decline and an increase in 2000s. Therefore, one can conclude that the Saudi government has been adopting spending smoothing despite the volatility in oil revenues growth. However, according to Credit Agricole 2012 report, the massive fiscal drive has increased the kingdom's vulnerability to a dip in the oil price and introduced long-term fiscal sustainability concerns. Non-oil deficit has increased over 70% of GDP in 2010 after it recorded about 40% in 2004. As this deficit increases, the break-even oil price increases as well rendering the country more vulnerable to a drop in the price of oil. Another issue Saudi officials worry about is the distributed government budget by sectors with the defense sector accumulating the largest percentage (about 10% of GDP). Another weakness is reflected in the devotion of about 40% of the budget to paying wages in order to diminish public sector employment and encourage the private sector. Employees in the public sector have many benefits including high wages, and good pensions accompanied with free health care, generous social services, and free education to all citizens. The report indicates that the country can benefit from creating sovereign wealth funds from broadening the tax base and from liberalizing subsidized prices⁵⁷. Finally, in a manner of speaking, Saudi Arabia takes a long-term view over the cycles in the oil market while both fiscal and monetary policies are used to reduce the

⁵⁷ Saudi locals are not subject to income tax and only non-residents pay personal income tax at a rate of 20%. However, Saudi individuals and nationals of GCC states who conduct business in the kingdom pay an Islamic tax called "Zakat" which is a flat rate of 2.5% levied on property and business income. Moreover, adjusting domestic price level of commodities other than oil such as wheat, flour, gas, electricity, pharmaceuticals would promote economic diversification, stimulate job creation, and contribute to a more efficient allocation of resources (Credit Agricole: Private Banking, 2012)

effect of oil price volatility on domestic economic development in the sense of adjusting the level of foreign exchange reserves and retiring domestic debt in good times which should help the Saudi economy to be protected from oil price swings⁵⁸. For an oil-dependent economy susceptible to different versions of volatility, a fixed exchange rate regime with a counter-cyclical fiscal policy seem to be the appropriate route to absorb any form of a shock.

Like any other country, Saudi Arabia is subject to social risks in addition to the economic ones that's why addressing them is crucial to study the social development of the country. Socio-economic development comes in one hand to achieve prosperous results.

H. Social Risks:

Even though Saudi Arabia is an open economy; however, it is a closed social and political system which must be addressed wisely. The kingdom faces different socio-economic challenges that have been driving the country to follow a developmental plan with deep efforts to eradicate or even minimize the spill-over effects of these challenges in a just manner by the ruling group of the kingdom. Issues include unemployment, poor academic standards, limited social freedom and women's rights, lack of renewable water resources, lack of public transportation, political and economic reforms, limited access or participation of foreigners in the stock market and others that all come under the umbrella of social, economic, religious, and political factors.

⁵⁸ Al-Hamidy (n.d.)

Unlike other Arab countries, the kingdom seems to be immune from the Arab Spring wave that hit the region in recent years and changed a number of societies dramatically (Hunter and Sallam, 2013). However, it has to address different challenges or risks because if not dealt with, they shall have severe consequences on the country. Recalling the unemployment rates, high percentage of foreign workers (more than 80% of total labor force), and high population growth rate which is driven by both immigration and fertility rate forces, government welfare and employment programs have failed to keep on track with population growth causing chronic rise in the incidence of poverty which is estimated about 25% of total population⁵⁹. Moreover, the government tried to launch programs to promote hiring of locals but it had minimal aggregate effect of Saudi locals thereby worsening the problem. This contradicts with the middle class that live in moderate wealth, spend lavishly, and employ maids, cooks, and drivers. Despite the government efforts through different social welfare programs, poverty and corruption still exist in the country. As for the corruption perceptions index, in 2014 the kingdom ranked 55 out of 175 countries with a score of 49/100 and a percentile rank of 62% in 2014 among all countries in the world⁶⁰. However, it ranks the third in the MENA region with UAE and Qatar heading over. This index measures the perceived levels of public sector corruption in 175 countries and territories. When referring to country analysis, the MENA region is referred to as a region in “turmoil” or chaos. Perhaps, it the emergence of ISIS in the region and the Arab Spring waves that hit some countries badly causing the upheaval of corruption and social unrest in those

⁵⁹ Sullivan (2012). *The Washington Post*

⁶⁰ Check "Transparency International: the global coalition against corruption" website

countries. Some countries, after the uprising, were subject to the rise of civil wars with many lives being lost every day. The best two examples that could be given would be Libya and Iraq. “Iraq and Libya tell a story of a region in turmoil plagued with geopolitical insecurity, rampant corruption and governments unwilling or unable to seriously make a clean break with their cronyism” (Zughayar, p. 1, 2014). This allows us to analyze the security and political concerns encountering the region and whether Saudi Arabia has been affected or not. Hunter and Sallam (2013) believe that the concentration of political power could be a recipe for self-destruction in Saudi Arabia. The characteristics of the kingdom classified as being an absolute monarchy with the king having absolute executive power. Ministers, senior military officers, ambassadors, and governors are selected by the king. This creates a competition for power among the second generation of the ruling family thereby creating more divisions within the Al Saud family.

Another issue highly apparent in the kingdom is the role of women. The west believes that this issue is very serious reflecting high inequality between men and women. The woman is not allowed to move freely; however, all her actions are restricted and limited in terms of going out, driving, access to education, freedom of dress code, mixed gender environment, employment opportunities, and others. The year 2009 marked the first transition in liberating women with the opening of co-educational university (The King Abdullah University of Science and Technology) with permitted unveiled dress on campus, appointment of the country’s first woman deputy minister in the same year, representation of females by women lawyers in courts in 2010, allocation of 30 seats in the consultative assembly for women in 2013, right to vote and run for

public office in local government elections in 2015, more accessibility for education mainly in secondary schools, increase in employment opportunities after the conjecture that females were raised to get married, raise children, and do household work, and the development of mixed gender workplace especially in areas of banking, finance, and medicine⁶¹. Nevertheless, many critics still believe that those actions and reforms are rather figurative instead of true actions being made. Even if those reforms were truly made, Saudi Arabia still lags behind almost all Muslim countries in terms of women employment in the work force (Figure 19). Besides, Saudi Arabia is a still conservative country with main concern is keeping the traditional gender role in the society with continuous restrictions on women's movement and those traditional values have hampered almost all attempts to liberate the women in the kingdom. Many Saudi officials believe that changing the role of women in the society and offering her freedom is seen as a threat to the country. Finally, Saudi Arabia must have been adopting reforms, even though very slowly, maybe as a precaution from a rebellious movement.

Poverty is a key term when discussing the social risks encountering the country. The kingdom does not report all data regarding poverty; however, different sources calculate poverty between 15% and 25% of total population. Another social risk prevailing is the lack of sustainable drinking water source. Saudi Arabia is faced with a major threat of water insecurity due to the scarcity of water taking into consideration it is a desert. The government drilled tens of thousands of tube wells in the 1970s, it operates 27 desalination facilities that produce drinking water, and is investing in water-

⁶¹ Check Hunter and Sallam (2013)

recycling technologies with recycling plants mainly in Jeddah, Riyadh, and other industrial cities (Howells, 2014). Despite all these measures, the effect of insufficient drinking water is felt in major cities such as Jeddah. Literacy rates are relatively high in Saudi Arabia with a percentage of 99.22% of youth total between the age of 15 and 24 years old. Based on gender, 99.13% are female literates out of female literates and 99.3% are male literates out of total male youth⁶². Despite this high record, job opportunities are minimal and those for women as discussed before are of impossible mission.

Credit Agricole report in 2012 states that growing inequalities are considered a further risk to the society which seem to be widening the gap in living standards between immigrants and Saudi citizens on one hand and among Saudis on another hand. The report continues and mentions housing as another social friction with strong demand versus limited supply and low access to mortgage finance in addition to restrictions for foreigners to participate in the stock market. Even the lack of public transportation channel is considered an issue because it puts more pressure on the consumption of fuel especially in this vast geographical area. “The near-term economic outlook is broadly favorable and the main risks to the economy are the geopolitical risks and the evolution of oil prices” (Credit Agricole, p. 6. 2012).

Therefore, the main challenge that summarizes all these social and economic risks is achieving modernity and liberating and strengthening its institutions while preserving its heritage, culture, values, and faith. Saudi Arabia has recognized its need

⁶² Figure are for the year of 2013

for economic, social, and political reforms to promote a vibrant economy, a civil society, and broader political participation by Saudi Citizens.

In short, the Saudi economy has been developing and expanding in a very short period through different developmental efforts that were previously discussed through establishing a planning agency in 1958 which later became the Ministry of Planning. Despite this fact, it exhibits several features of under-development such as limited absorptive capacity, the existence of unorganized financial markets, and the dependence on the export of one primary commodity particularly oil (Al-Bassam, 1999). Moreover, the budget of the developmental plan relies heavily on oil revenues and the growth of all non-oil sectors is tied to that of the oil sector. In other words, the whole economy is dependent on this resource and its expansion might be on the expense of other sectors. After discussing the macro fundamentals of the Saudi economy, it is pivotal to empirically test the applicability of Dutch Disease theory in the kingdom.

CHAPTER IV

EMPIRICAL TESTING

The literature is divided between those supporting the theory of Dutch Disease in Saudi Arabia and those who refute it. Rodriguez (2006) stand in line with those who oppose the presence of Dutch Disease while Looney (2011) seems to be supporting the theory. In this section we aim at empirically testing the applicability of the theory in Saudi Arabia even if the core theoretical model suggests a unique outcome. Therefore, only the empirical model shall provide us with concrete results in addition to being less developed in this matter than the theoretical framework which adds a challenge to examining the Dutch Disease.

Recalling the arms of the Dutch Disease, resource movement effect and spending effect, which result from a booming sector (oil discovery in the case of Saudi Arabia), the paper will be reflecting the occurrence of each in the country and their effect on the other sectors in the economy. Therefore, a preview of the major oil boom and bust episodes is necessary to reflect the spill-over effects on the different sides of the economy and those related to the Dutch Disease in particular. Mehrara and Oskoui (2006) argue that the reason behind boom and bust cycles is the unpredictable nature of oil price fluctuations in which it has been difficult to separate out temporary fluctuations from trends and shocks will remain poorly foreseen that's why oil producing countries will be always vulnerable to boom-bust cycles. The boom period was classified as the

period between 1974 and 1980 whereas the bust period was between 1981 and 1988⁶³. After 1988, prices were still volatile but at a steadier pace than the preceding years (figure 20)

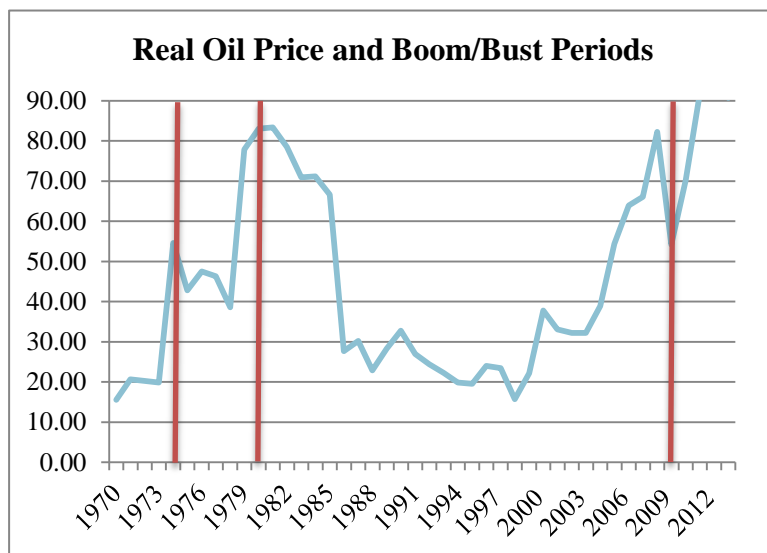


Figure 20: Real Oil Price during Boom and Bust Periods
 Source: SAMA, Annual Report

Therefore, these price mechanisms represent a "price-driven shock" and its effect on the non-resource sectors such as manufacturing and agriculture shall be studied. Smith (n.d.) argues that if the effects were positive during the boom years and negative during the bust ones, this could be an evidence of positive spillovers of the booming resource sector and the opposite is true for the negative spillovers. However, he continues and says that if effects were positive and negative during both boom and bust this reveals a spurious or no effect of price change in the booming sector⁶⁴.

⁶³ Check Smith in OxCarre Research Paper 133 (n.d.)

⁶⁴ If the effects were either positive or negative during only one of the boom or bust but not the other, this would reveal asymmetric price effects.

Nevertheless, our aim in this paper would be more relevant to the first case with a booming sector adversely affecting the non-resource sectors in the economy.

The increase in the price of oil worldwide causes an increase in the relative price of manufacturing sector in two ways: first it increases the oil imports cost and in turn the production cost of manufacturing in the developed manufacturing-exporting countries⁶⁵ and second it increases the national income of oil-exporting countries and hence the world demand for manufactured goods; reflecting higher income elasticity for manufactured goods relative to agricultural products (Fardmanesh, 1991). However, Fardmanesh continues and states that this differs between developed and developing countries; in developing oil-exporting countries, the increase in global price of manufacturing causes an expansion of this sector on the expense of agricultural sector which is explained by the resource-movement effect. Moreover, developing oil-dependent economies such as that of Saudi Arabia lacks an oil-intensive manufacturing sector with low capital-intensive manufacturing technology. Another feature that falls into the case of Saudi Arabia is the decline in the country's non-oil terms of trade since the kingdom is considered almost a net importer of manufactured goods relative to the magnitude of oil exports. Following this literature, Benjamin, Devarajan, and Weiner (1987) explain three main reasons behind the different effect of an oil boom in a developing economy: (1) agriculture rather than manufacturing is the sector that will most likely to be hurt with implications on rural-urban terms of trade and rural-urban migration, (2) even if this country is a producer of manufactured goods, they would be imperfect substitutes for manufactured products sold in the world market so consumer

⁶⁵ Check Marquez (1985)

demand may not shift totally into the foreign good as domestic price increase, and (3) the oil sector in a developing country is an "enclave" with respect to the rest of the economy since it usually employs imported capital and labor. Therefore, the oil boom would be due to expenditure and employment of oil revenues rather than a result of demand for materials, capital, and labor from the oil sector. "One should perhaps emphasize that the oil industry is much like a small enclave in terms of the almost negligible direct reliance on domestic labor and capital in OPEC" (McKinnon, 1976, p. 162). The oil sector in the Saudi economy is foreign capital intensive and the number of locals employed in this sector represents a small proportion of total labor force. The following figure shows the distribution of labor by nationalities (Saudi and non-Saudi) in the industrial sector whose main component is the oil sector.

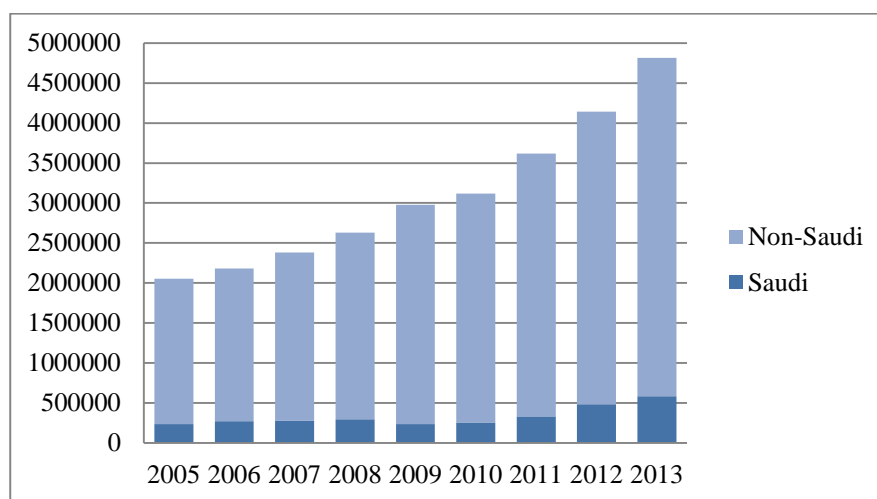


Figure 21: Labor Force by Nationality in Industrial Sector
Source: SAMA, Annual Report

The figure clearly shows a wide difference between Saudi locals and non-Saudi. The biggest portion of labor force in this sector goes to foreigners. Another issue

that the oil sector faces in the Arab Gulf oil-exporting countries in general and Saudi Arabia in particular is that the skill of labor employed in the oil sector is highly “sector-specific” reflecting a difficulty of transfer of labor force from non-oil sectors to the oil one i.e. minimal or null impact of resource movement effect.

To validate the theory, we test the hypothesis of Dutch Disease in Saudi Arabia using an OLS time series model with two main players in the economy: non-oil traded goods sector which aggregate the agricultural and manufacturing sectors and non-traded goods sector which aggregate the industry and services⁶⁶ sectors together. As for the oil sector, it is disregarded due to the previously discussed null effect of the resource movement effect. Therefore, the traded non-oil and non-traded sectors are taken as a function of non-oil GDP.

A. Data and Methodology:

Yearly data for the two sectors under study was extracted from the World Bank Database starting from the year 1970 till 2013: i.e. 44 observations. The data was compared to the annual statistics bulletin in the Saudi Arabia Monetary Agency (SAMA) and there was a match thereby validating the data. Besides, the variables used are dominated in million Riyals and in real terms using 2010 as a base year. The question in hand was the theory of the Dutch Disease (DD) which was measured as the Real Exchange Rate (RER)⁶⁷ as the dependent variable and independent DD variables

⁶⁶ Industry sector is composed of mining, construction, electricity, water, and gas (excluding manufacturing) and services sector includes wholesale and retail trade, real estate, transportation, education, healthcare, and other financial and government services

⁶⁷ Real Exchange Rate = Nominal Exchange Rate * (CPI_{USA} / CPI_{KSA})⁶⁷

used were non-oil traded goods sector (NO), non-traded goods sector (NT), and oil revenues (R). The estimated equation is as follows:

$$\text{Real Exchange Rate (RER)} = \beta_0 + \beta_1(\text{NO}) + \beta_2(\text{NT}) + \beta_3(\text{R}) + \varepsilon$$

The null and alternative hypotheses are as follows:

- H_0 : No Dutch Disease - Oil revenues does not induce real exchange rate appreciation
- H_1 : Dutch Disease Exists - Oil revenues cause real exchange rate appreciation

We are concerned in the effect of oil revenues on the real exchange rate on one hand (i.e. magnitude and sign of β_3) and the causality between the two sectors and the real exchange rate on another hand. Therefore, a simple OLS regression was performed to see the effect of the independent variables on the real exchange rate using unrestricted vector auto-regression model (VAR) in addition to pair-wise granger causality. Moreover, vector error correction model (VECM) was employed to study the long-run relationship. However, we shall start first with unit-root testing as the basis for any regression.

B. Unit-root Testing:

Testing for unit root is crucial for testing the stochastic nature of the variables and whether they have a specific trend or revert to a certain mean. The null hypothesis is that the variable examined has a unit root and follows a random walk i.e. non-stationary. Both the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests

were employed to check the stationary status of each variable. First results show that all variables were I(2); integrated at level two which derived us to take the logarithmic functional form of each variables and re-test the significance of unit-root. The second results show that even the logarithmic form⁶⁸ of each variable reveal that they are non-stationary and have a unit-root. Therefore, aiming at making them stationary in order to perform the regression, the difference of logs was taken for each variable and both ADF and PP unit-root tests reveal a rejection of the null hypothesis and that they possess a stationary status. The following table summarizes the t-stat and p-value results for each variable using ADF and PP tests showing that all p-values are less than 5% therefore, they are stationary.

	Augmented Dickey Fuller		Phillips-Perron	
	t-stat	p-value*	t-stat	p-value*
Real Exchange Rate**	-2.031613	0.0417	-2.261827	0.0245
Non-oil traded goods sector	-4.874119	0.0016	-4.85061	0.0017
Non-traded goods sector	-5.815718	0.0001	-5.819528	0.0001
Oil Revenues	-5.527433	0.0002	-5.489542	0.0003

*MacKinnon (1996) one-sided p-values

** using none option ; neither trend nor intercept

Table 07: Unit Root Results

Source: Author's calculations from World Bank Database

The non-stationary variables results allow us to construct co-integration tests to check for a long-run relationship between the variables.

⁶⁸ The logarithmic form of the variables in now considered the level variables so all upcoming empirical tests shall be applied to the logged variables except for the regressed equation function and granger causality

C. Co-integration Tests:

To test for co-integration, the Johansen co-integration test was conducted for the non-stationary level variables i.e. variables that are in logarithmic form: ln (real exchange rate), ln (non-oil traded goods sector), ln (traded goods sector), and ln (oil revenues). It is applied to check whether they are confined to a specific linear combination and move together or not. The following table depicts the results showing three co-integrating equations at the 5% significance level ($r=3$) with the p-values below 0.05 and the trace and max-Eigen values being greater than the 5% critical values; thereby, rejecting the null hypothesis of no co-integration and that they are highly co-integrated. This co-integration allows us to perform a long-run analysis using VECM.

Hypothesized: No. of CE(s)	Null	Trace	0.05 C.V.	p- value**	Max- Eigen	0.05 C.V.	p- value**
None*	$r = 0$	95.1231	47.85613	0.0000	43.99061	27.58434	0.0002
At most 1*	$r \leq 1$	51.13248	29.79707	0.0001	30.89624	21.13162	0.0016
At most 2*	$r \leq 2$	20.23624	15.49471	0.0089	17.24246	14.2646	0.0164
At most 3	$r \leq 3$	2.993778	3.841466	0.0836	2.993778	3.841466	0.0836

Trace and Max-Eigen tests indicates 3 co-integrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

Table 08: Co-integration Results

Source: Author's Calculation from World BankDatabase

D. Estimated Equation: VAR Model

After ensuring that all variables are stationary by using the difference of logarithmic functional forms, OLS unrestricted VAR model was conducted and the following equation was obtained:

$$\mathbf{RER} = \mathbf{0.01} + \mathbf{0.117(NO)} - \mathbf{0.256(NT)} - \mathbf{0.076(R)} + \boldsymbol{\varepsilon}$$

(1.88) (0.97) (-3.72) (-3.62)

The numbers between parentheses correspond to the t-statistics of each independent variable. Results reveal that all coefficients are highly significant except for non-oil traded goods with an R-squared of 0.434 and F-stat of 9.97. The F-stat is greater than the critical F-value revealing a rejection of the null hypothesis and the three coefficients are jointly significant. In addition, the regressed equation reveals a negative relationship between non-traded goods and oil revenues with the real exchange rate opposed to a positive relationship between non-oil traded goods and real exchange rate. The following results confirm our hypothesis tested and the applicability of the Dutch Disease theory in Saudi Arabia with an increase in oil revenues causing an appreciation in the real exchange rate. We can deduce that at more than 95% confidence interval the null hypothesis of no Dutch Disease can be rejected. An increase of a unit in percentage in oil revenues reflects a 0.076 unit decrease in percentage in the real exchange rate keeping all other coefficients constant. Similar results were calculated by Saud Al-Mabrouk (1991) who verified the Dutch Disease in his paper and he attributed the small responsiveness of the real exchange rate to the oil revenues to the fact that part of the oil revenues has been utilized to subsidize the non-oil traded goods on one hand and to import labor and capital on another hand.

In addition, higher oil revenues trigger excess spending and in turn demand for tradable and non-tradable goods which results in higher imports to meet this excess in demand. This increase in the level of imports causes real exchange rate appreciation accompanied with higher foreign consumer production index and the country would lose its competitiveness power. In other terms, an oil boom causes an increase in oil revenues which causes real exchange rate appreciation.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.010391	0.005507	1.886788	0.0666
NO	0.117511	0.120103	0.978418	0.3339
NT	-0.256888	0.068924	-3.727109	0.0006
R	-0.076407	0.0211	-3.621216	0.0008

Table 09: Regression Results

Source: Author's calculations from World Bank Database

To better understand the Dutch Disease mechanism, we shall look at the granger causality between all variables in general and the causality of independent variables on real exchange rate in particular. But, VECM model shall be employed first.

E. VECM Long-Run Equation:

If we were to estimate the long-run relationship between the variables, a Vector Error Correction Model (VECM) could be adopted using the level variables which are the log of real exchange rate, non-oil traded goods, traded goods, and oil revenues.

The following table summarizes this relationship showing similar results as the estimated VAR equation. The relationship of oil revenues and real exchange rate is still

inversely related showing an increase oil revenues is accompanied with an appreciation of real exchange rate but with a larger effect ($0.216 > 0.07$).

VECM Long-Run Equation Co-integrating Equation	
Ln Real Exchange Rate(-1)	1
Ln non-oil traded goods(-1)	-1.136 (0.238) [-4.76357]
Ln traded goods(-1)	0.787 (0.291) [2.70309]
Ln oil revenues(-1)	0.216 (0.065) [3.30342]
c	-0.489

Table 10: VECM Equation / (standard error) / [t-stat]

Source: Author's calculation based on World Bank Database

$$\text{Long-run Equation: } RER = 0.489422 + 1.136(NO) - 0.787(NT) - 0.216(R)$$

F. Granger Causality:

The granger causality test is employed to check for a bilateral, unilateral, or even no relationship between the variables. The pair-wise granger causality is tested using the VAR model on the differenced logged variables and regressed using two lags. The null hypothesis depicts no granger causality which is rejected by a probability less than 5% and with an F-statistic less than the F-critical values. The following table summarizes the results showing all three kinds of relationships.

Results show a bi-directional relationship between each of non-oil traded goods and non-traded goods with real exchange rate in addition to a uni-directional

relationship between non-oil traded and non-traded; with non-oil granger causing non-traded, between non-oil traded goods and oil revenues; with those revenues granger causing the first party, and between non-traded goods and oil revenues; with those revenues granger causing the non-traded goods as well. Finally, there exists no granger causality between oil revenues and real exchange rate. However, we are interested in the causality between oil revenues and non-oil traded goods as well. This relationship is uni-directional with oil revenues granger causing those traded goods in the short-run; thus, oil revenues can help in predicting the values of those goods in the future. Such results are supported by the co-integration test that reveals a strong co-integration among the variables. Moreover, they provide us with an understanding of the second concern which is the relationship between the two sectors and the real exchange rate with both having a predictive power over the other in the time-series analysis. Therefore, all variables are interrelated and dependent on each other in one way or another.

Null Hypothesis	Obs	F-Statistic	Prob.
NO does not Granger Cause RER	41	7.92121	0.0014
RER does not Granger Cause NO		4.25421	0.022
NT does not Granger Cause RER	41	10.8897	0.0002
RER does not Granger Cause NT		9.83062	0.0004
R does not Granger Cause RER	41	1.94779	0.1573
RER does not Granger Cause R		1.44975	0.248
NT does not Granger Cause NO	41	0.42013	0.6601
NO does not Granger Cause NT		3.35097	0.0463
R does not Granger Cause NO	41	4.98111	0.0123
NO does not Granger Cause R		0.28279	0.7553
R does not Granger Cause NT	41	6.19147	0.0049
NT does not Granger Cause R		0.33021	0.7209

Table 11: Pair-wise Granger Causality Test

Source: Author's calculations from World Bank Database

G. Variance Decomposition:

By definition, a variance decomposition (VD) or forecast error variance decomposition (FEVD) is used to aid in the interpretation of a vector auto-regression (VAR) model once it has been fitted. The variance decomposition indicates the amount of information each variable contributes to the other variables in the auto-regression and it determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. The following table illustrates the variance decomposition results of all variables with the log of non-oil traded goods highly explaining that of real exchange rate with a progressive increasing percentage over 10 lags; whereas, the log of non-traded goods experience progressively decreasing

percentages over time. On the other hand, logged oil revenues explain slightly the log of real exchange rate with a percentage around 0.01%. Thus, more than 34% and 1.7% of the variability in logged real exchange rate forecast error variance is attributed to the variance of log of non-oil goods and non-traded goods sectors respectively in the 10th period.

These results were supported by the granger causality test which depicts no causal relationship between oil revenues and real exchange rate opposite to a bi-directional relationship between real exchange rate and the two goods sectors.

Period	S.E.	Ln(RER)	Ln(NO)	Ln(NT)	Ln(R)
1	0.013775	100	0	0	0
2	0.027379	97.9869	0.650819	1.359596	0.002685
3	0.043703	87.6408	8.786266	3.555629	0.017304
4	0.063409	80.80027	15.94553	3.243302	0.010901
5	0.082339	75.65741	21.57342	2.752502	0.01667
6	0.099721	70.97332	26.54496	2.467059	0.014661
7	0.114911	67.85737	29.95625	2.175287	0.011095
8	0.127321	65.71704	32.31732	1.955616	0.010031
9	0.137434	64.24502	33.93205	1.812194	0.010742
10	0.145755	63.38959	34.8868	1.710371	0.013235

Table 12: Variance Decomposition

Source: Author's calculations from World Bank Database

H. Impulse Response Functions:

"Impulse Response Function (IRF) of a dynamic system is its output when presented with a brief input signal, called an impulse. More generally, an impulse response refers to the reaction of any variable in response to some external change". In both cases, it describes either the reaction of one variable as a function of time or as a

function of other independent variable. Thus, it is important to shed light on the IRF dynamics.

We shall examine the dynamics and response of log real exchange rate⁶⁹ when subject to a shock from each of the three independent variables. The following graphs represent the impulse response functions (cholesky one standard deviation innovations) when a shock is applied to the dependent variable immediately and on the following periods after.

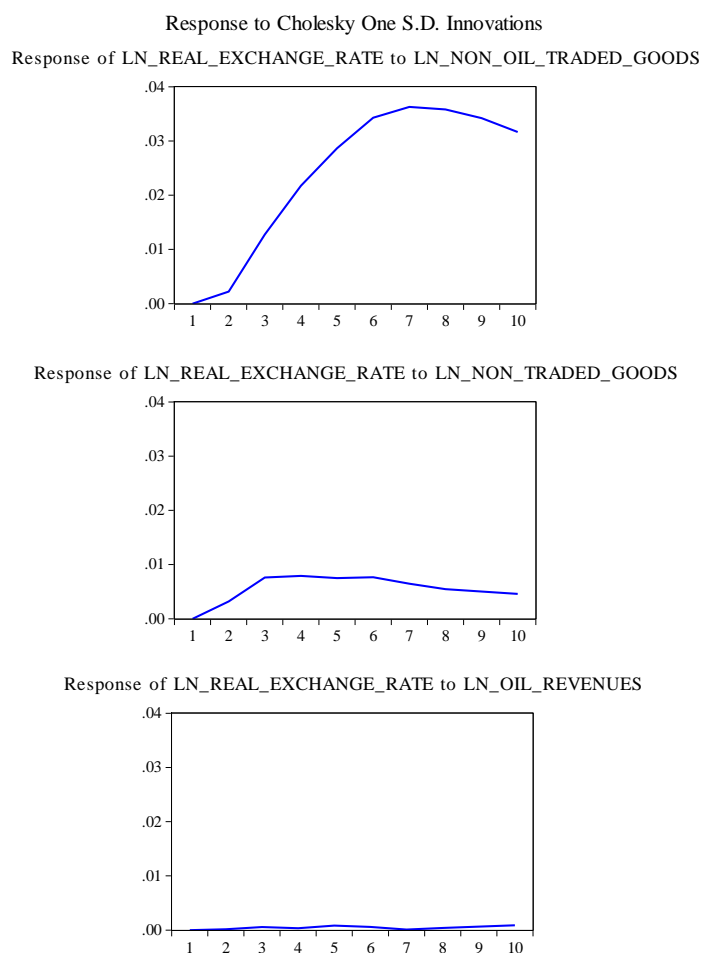


Figure 22: Impulse Response Functions

Source: Author's calculated from World Bank Database

⁶⁹ The log of variables is used since the level variables are I(2) so I(1) variables are chosen

From the first graph we can realize that a shock in the non-oil traded goods sector is clearly transmitted positively to the real exchange rate immediately i.e. on the same day of the shock and lasts for almost 8 periods after which it starts to converge to its mean and it dies down in the long-run. Similarly, a shock in the non-traded goods sector is transmitted positively to the real exchange rate immediately during the first period and progresses until the third period after which it starts to converge to its mean. Moreover, it is considered is moderate response. As for the shock in oil revenues, it is not reflected by a change in real exchange rate; neither positively nor negatively. The responses were almost negligible. These results are supported as well by the granger causality outcomes with no granger relationship between oil revenues and real exchange rate.

I. Recap

The empirical testing allowed us to derive concrete results to prove the theory of Dutch Disease in the Kingdom of Saudi Arabia with an oil boom causing appreciation of the real exchange rate causing the country to lose its competitiveness power of the traded goods market in the world trade market. As previously discussed, the human capital resources in the oil sector are highly sector-specific with constraints on its mobility to other sectors thereby eliminating the resource movement effect and dealing only with the spending effect. As a result, an oil boom causes an increase in oil revenues and in the demand for both tradable and non-tradable goods in turn. Saudi Arabia is a small open economy; therefore, the prices of traded goods are pegged to the

world's prices. The excess in demand for traded goods is met with an increase in imports; whereas, the demand for non-tradable goods is satisfied with increased local production and prices. Indirectly, the expansion in non-traded goods sector is accomplished at the expense of non-oil traded goods sector. Results also reveal that the subsidies to the agricultural and manufacturing sectors from the oil revenues pocket has lessened the adverse effects of an oil boom on the real exchange rate. The expansion in both tradable sectors was already reflected in the previous discussion of each sector⁷⁰. Another factor that contracted the effect of oil revenues on real exchange rate appreciation is that part of the oil revenues has been invested abroad which could provide income when oil prices decline and in turn prevent any further appreciation (Al-Mabrouk, 1991). A third factor could be attributed to the excess of foreign labor who meet any deficiency in any of the economy's sectors and in turn trigger remittances which reduce both resource movement and spending effects and by substitution the appreciation of real exchange rate. The oil sector is capital intensive so any import of foreign workers shall be transferred to the other traded labor-intensive sectors especially the agricultural and manufacturing sectors. This mechanism induces an expansion of those tradable sectors rather than de-industrialize them. Al-Mabrouk (1991) suggests another factor which is the import of capital, equipment, and machines from abroad. This moderates the resource-movement effect if it shall occur and reduces the spending effect through paying for these capital resources.

⁷⁰ Check macro fundamentals chapter

Despite all these factors, Saudi Arabia still suffers from Dutch Disease. However, its diversification pattern in its economy has allowed it to escape severe repercussions on the real exchange rate due to any oil shock whether boom or bust.

CHAPTER V

CONCLUSION AND POLICY RECOMMENDATIONS

Dutch Disease is a product of the natural resources curse hypothesis which was addressed in this paper in the context of structural effects of a booming energy sector; oil in this case, on the Saudi Arabian economy in terms of non-oil traded goods (agriculture and manufacturing), non-traded goods (industry and services), and real exchange rate. The booming sector is expected to cause appreciation of the real exchange rate and loss of competitiveness power of the tradable non-oil sectors. In addition, there are two routes for the Dutch Disease which are the resource-movement effect and the spending effect. The analysis of the macro fundamentals of the kingdom show basic symptoms for the applicability of Dutch Disease in the country which was supported by the empirical testing model showing a negative relationship between oil revenues and the real exchange rate of the country. Macro fundamentals allow us to derive the prerequisites for the disease that apply for the country starting with high dependency on the oil sector to being the largest producer of oil as well. Moreover, the oil boom episodes demanded a large number of foreign labor so the shortage in labor in other sectors was covered by Saudi residents thereby not affecting the movement of mobile factors i.e. labor from one sector to another. This phenomenon allowed us not to take into consideration the resource movement effect and stress on the spending effect because labor employed in the oil sector are sector-specific meaning that their skills cannot be applied in other sectors and vice-versa reflecting a difficulty in the movement

of labor. Empirical testing gave us concrete evidence that the kingdom suffers from Dutch Disease in terms of appreciation in the real exchange rate. However, the non-oil tradable sectors (agriculture and manufacturing) witnessed an expansion due to the investment of oil revenues in these sectors. This happened because before the oil discovery, the country did not have such sectors; instead, the economy was restricted and in small terms to the agricultural sector. As a result, Dutch Disease did occur earlier in the country and the non-oil tradable sectors did not witness a contraction. Another explanation could be attributed to two opposite movements in the non-oil tradable sectors. The first one is that real exchange rate appreciation causes a country to lose its competitive power in the world market and therefore the country would decrease its production. On the other hand, massive oil revenues were used to subsidize these sectors by increasing their production. This increase in production along with subsidies changed the cost structure and helped the economy to expand its non-oil tradable sectors. If the government did not interfere and did not subsidize these sectors, real exchange rate appreciation would have dominated and the manufacturing and agricultural sectors would shrink down. As a result, Dutch Disease theory would be in parallel with the addressed one in a general case.

The kingdom managed to minimize the drawbacks of Dutch Disease by adopting a steady pace of oil extraction and wise employment of oil revenues. Moreover, the kingdom decided to link government expenditures with the movement of oil prices. For example, when oil prices crashed, the Saudi Arabian government was able to cut its expenditures in order not fall in a deep deficit trap. However, no matter what the kingdom does to minimize the effects of Dutch Disease and restrict it to real

exchange rate appreciation, its non-oil tradable and non-tradable goods sectors are still tied to oil revenues which in turn dependent on the price of oil. Therefore, Saudi Arabia and commodity-rich countries in general should focus on diversifying their economies and expanding other non-resource sectors as a back-up; otherwise, Dutch Disease impact could be devastating on the economy.

Possible solutions for the Dutch Disease for a country with somehow permanent or long-lasting resource wealth could be: (1) boosting the productivity in the non-traded goods sector through restructuring and privatization, (2) diversifying exports other than the resource exports to minimize the heavy reliance on the booming sector in order to make them less vulnerable to exogenous shocks (such as drop in commodity prices) and to keep them competitive in the world market in the future, (3) investing rather than pure spending of the oil wealth, (4) making sure that the rest of the economy is isolated from the detrimental effects of a resource boom through different policies of investment abroad in order to stabilize the economy⁷¹, and (5) wise usage of accumulated resource wealth to promote industrial development and to sustain economic development especially when the resource or commodity depletes under good governance and governmental institutions.

Credit Agricole (2012) report suggests that the outlook for the Saudi Arabian economy is broadly positive and risks are concentrated with the social sphere which, if not addressed, could lead to heightened risk scenario in the political field. The report suggests that oil has produced a windfall of wealth and it is expected that it will continue to grow strongly and will improve the country's non-oil economy as well. As

⁷¹ Al-Mabrouk (1991)

for inflation, it is expected to stay under control not exceeding the 5%. The current downfall in oil prices and increase in imports shall put a downward pressure on current account balance. The surplus in budget is most likely to take a downward turn with continued decrease in oil prices and with increased fiscal spending on the non-oil sector and on the services sector (healthcare, education, job market, etc.) as a precaution from social disturbance in the Saudi streets.

Finally, the main challenge that the Saudi Arabian economy faces is how to manage the increasing influx of oil wealth and how to create long-lasting valued and profitable industries.

APPENDIX I

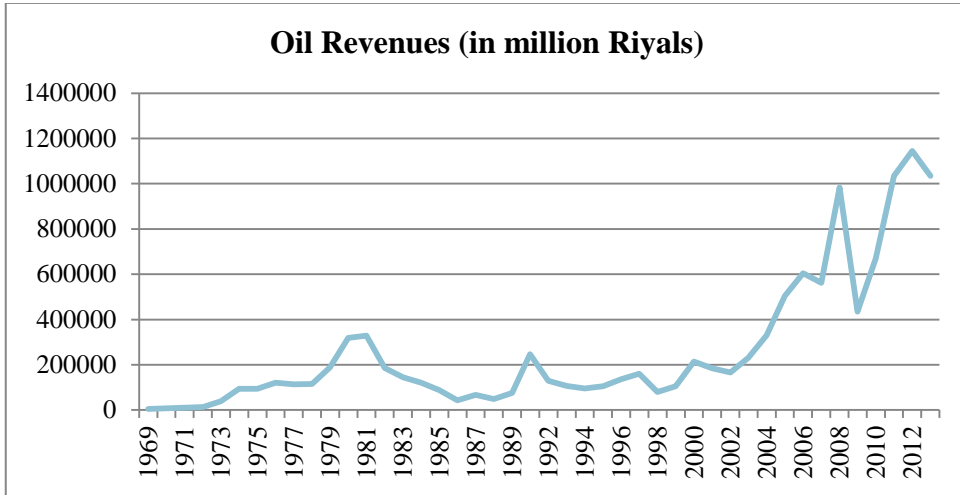


Figure 01: Oil Revenues in million Saudi Riyals
Source: SAMA, Annual Report

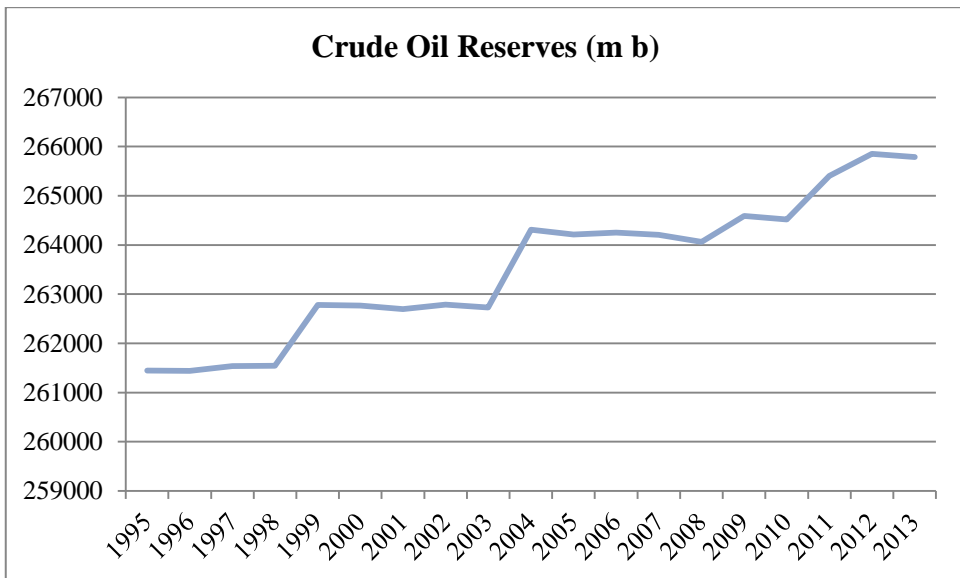


Figure 02: Crude Oil Reserves in billion barrels
Source: OPEC

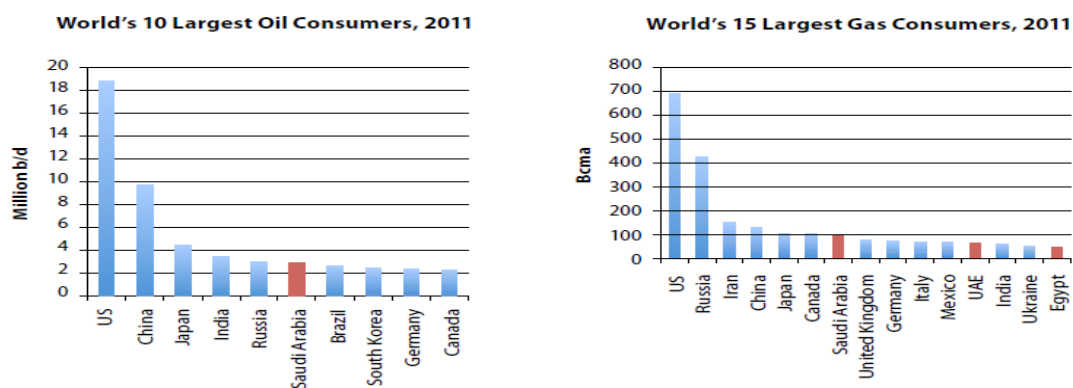


Figure 03: World's 10 Largest Oil and Gas Consumers
Source: UNDP, 2012

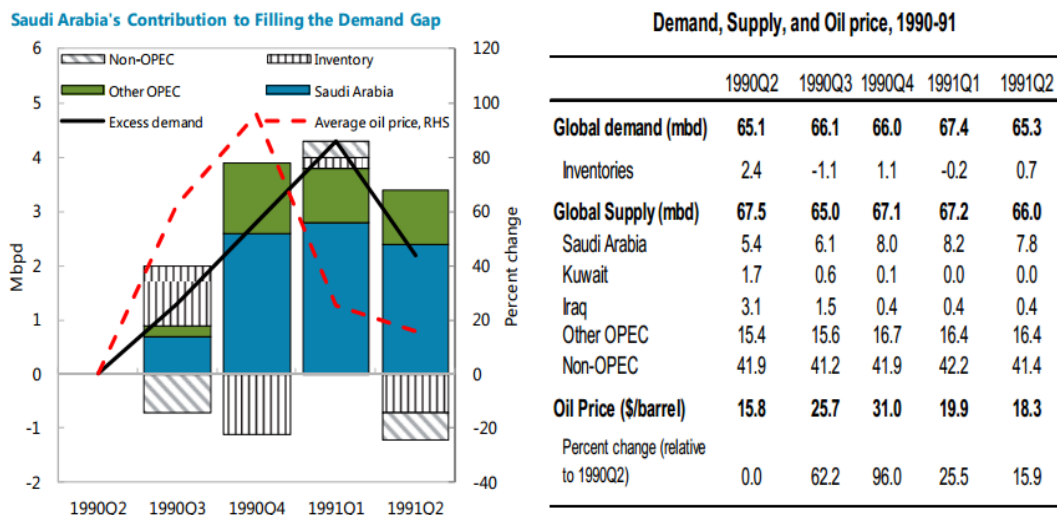
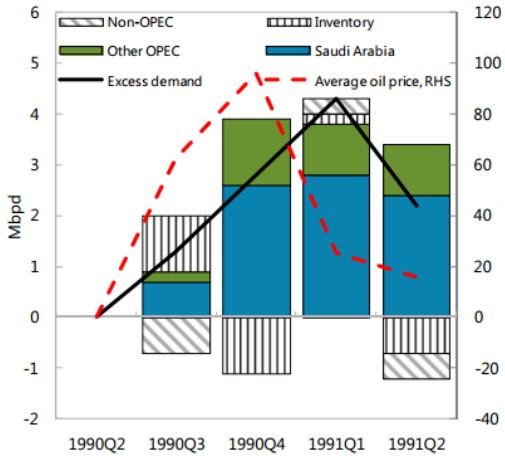


Figure 04: The Global Oil Market and the First Gulf War, 1990-91
Source: IEA; and IMF staff calculations 2013

Saudi Arabia's Contribution to Filling the Demand Gap

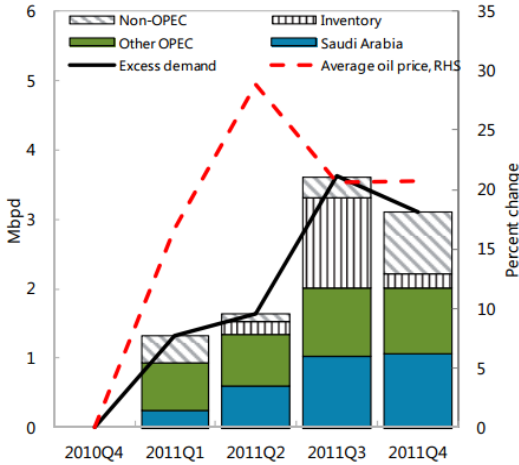


Demand, Supply, and Oil price, 1990-91

	1990Q2	1990Q3	1990Q4	1991Q1	1991Q2
Global demand (mbd)	65.1	66.1	66.0	67.4	65.3
Inventories	2.4	-1.1	1.1	-0.2	0.7
Global Supply (mbd)	67.5	65.0	67.1	67.2	66.0
Saudi Arabia	5.4	6.1	8.0	8.2	7.8
Kuwait	1.7	0.6	0.1	0.0	0.0
Iraq	3.1	1.5	0.4	0.4	0.4
Other OPEC	15.4	15.6	16.7	16.4	16.4
Non-OPEC	41.9	41.2	41.9	42.2	41.4
Oil Price (\$/barrel)	15.8	25.7	31.0	19.9	18.3
Percent change (relative to 1990Q2)	0.0	62.2	96.0	25.5	15.9

Figure 05: The Venezuelan General Strike and the Second Gulf War, 2002-03
 Source: IEA; and IMF staff calculations 2013

Saudi Arabia's Contribution to Filling the Demand Gap



Demand, Supply and Oil Price, 2010-11

	2010Q4	2011Q1	2011Q2	2011Q3	2011Q4
Global demand	89.8	88.4	87.7	89.6	89.6
Change in inventories	-2.3	0.0	-0.2	-1.3	-0.2
Global supply	87.5	88.4	87.5	88.3	89.4
Saudi Arabia	8.3	8.6	8.9	9.3	9.4
Libya	1.6	1.1	0.1	0.0	0.6
Other OPEC	25.3	26.0	26.1	26.3	26.3
Non-OPEC	52.3	52.7	52.4	52.6	53.2
Oil price (\$/barrel)	85.4	99.7	110.1	103.1	103.2
Percent change (relative to 2002Q3)	0.0	16.7	28.9	20.6	20.8

Figure 06: The Libyan Crisis, 2010-11
 Source: IEA; and IMF staff calculations 2013

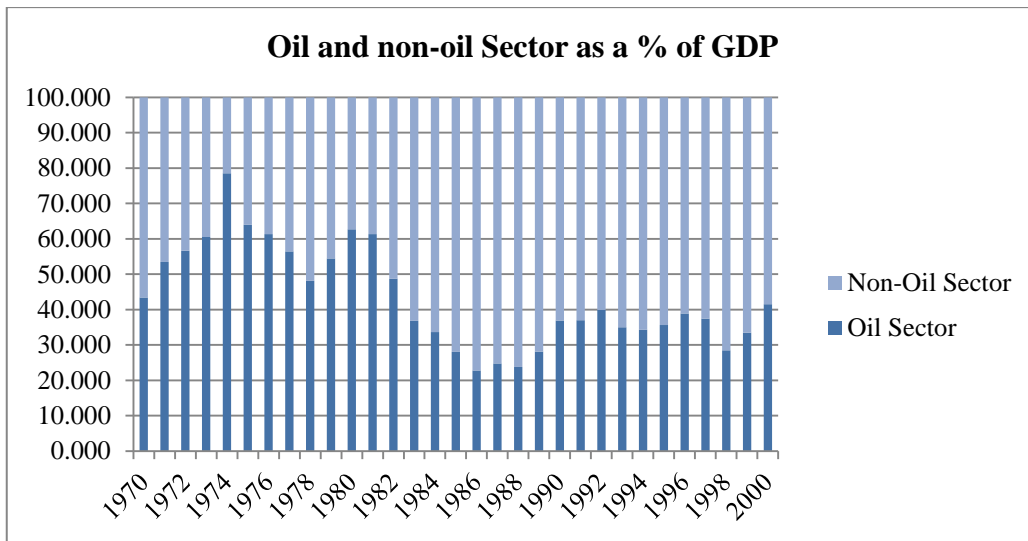


Figure 07: Oil and non-oil Sectors as a percentage of GDP
 Source: SAMA, Annual Report

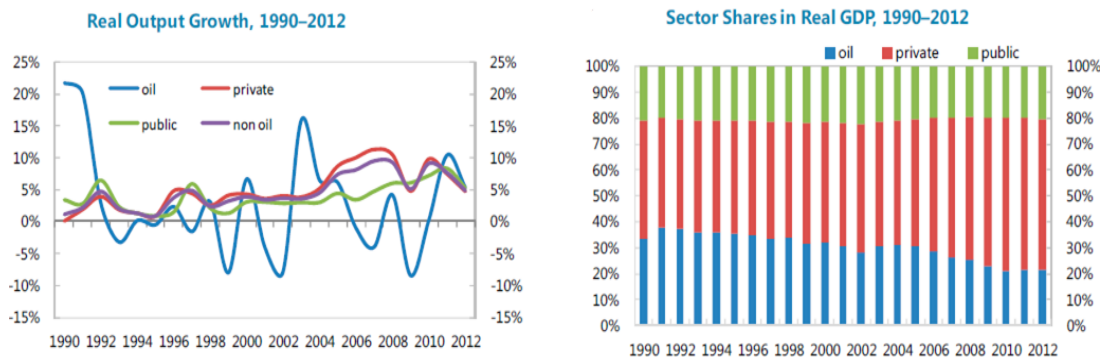


Figure 08: Real Output Growth and Sector Shares in Real GDP, 1990-2012
 Source: CDSI

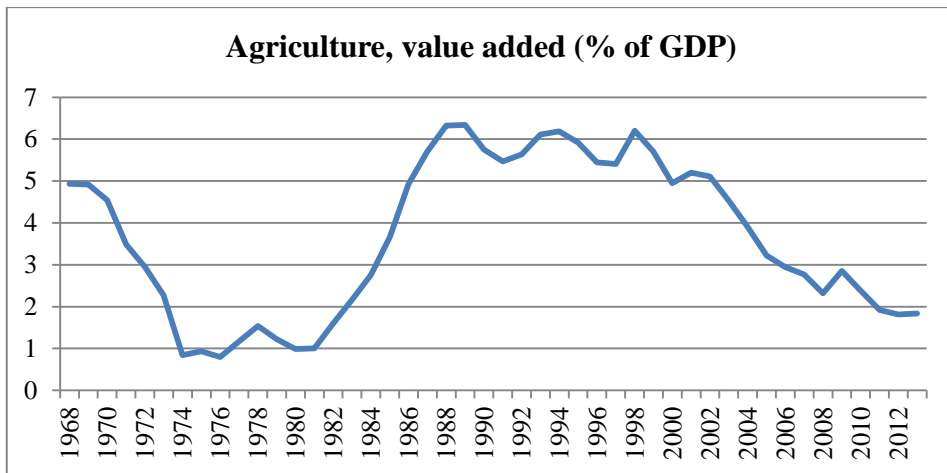
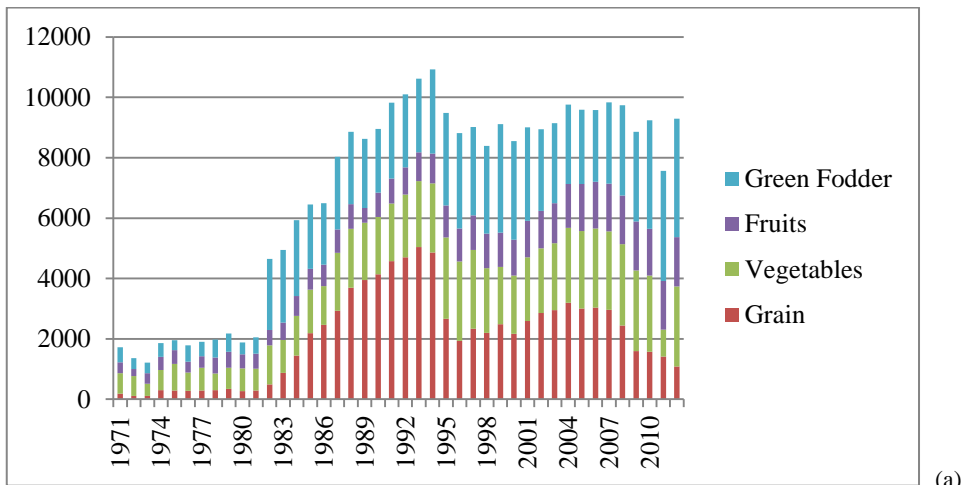
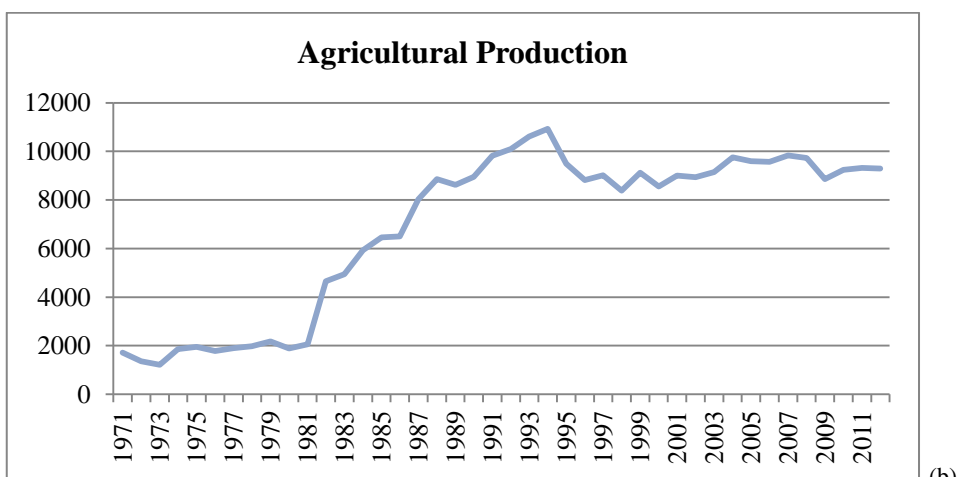


Figure 09: Agricultural Sector, Value added (% of GDP)
 Source: World Bank Development Indicators



(a)



(b)

Figure 10 (a) and (b): Agricultural Production in thousand tons
 Source: SAMA, Annual Report

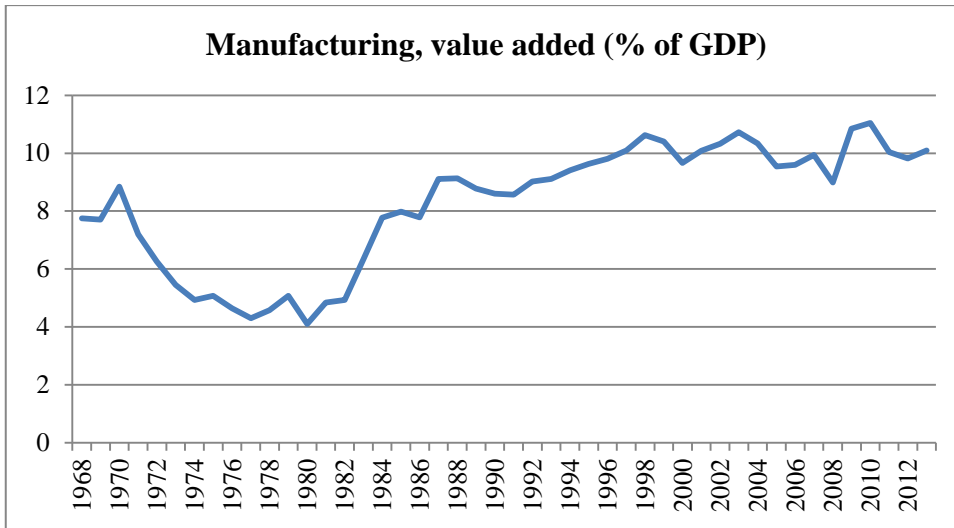


Figure 11: Manufacturing Sector, value added (% of GDP)
 Source: World Bank Development Indicators

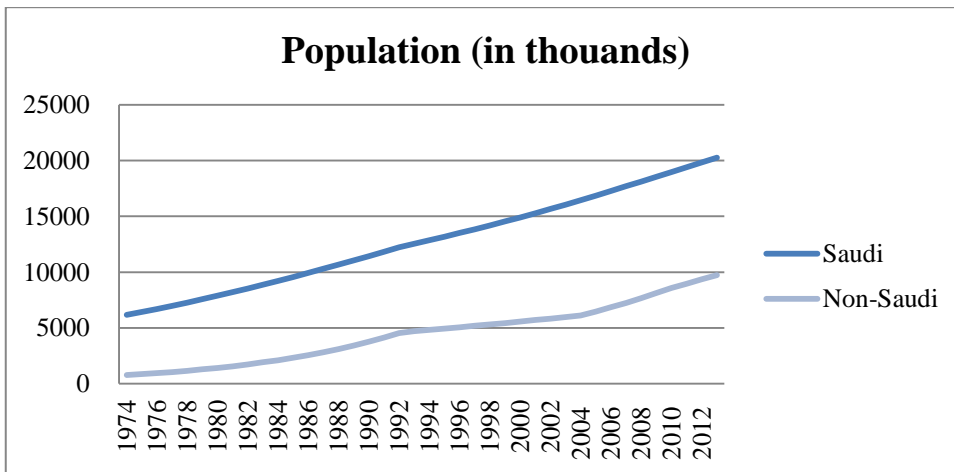
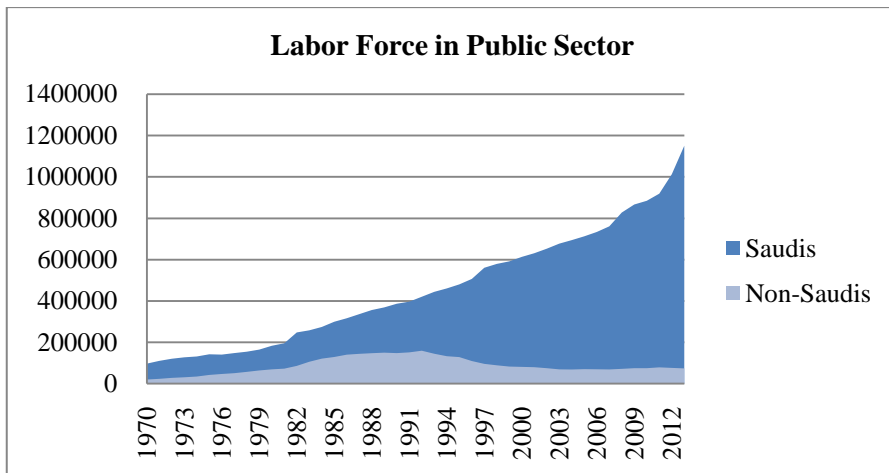
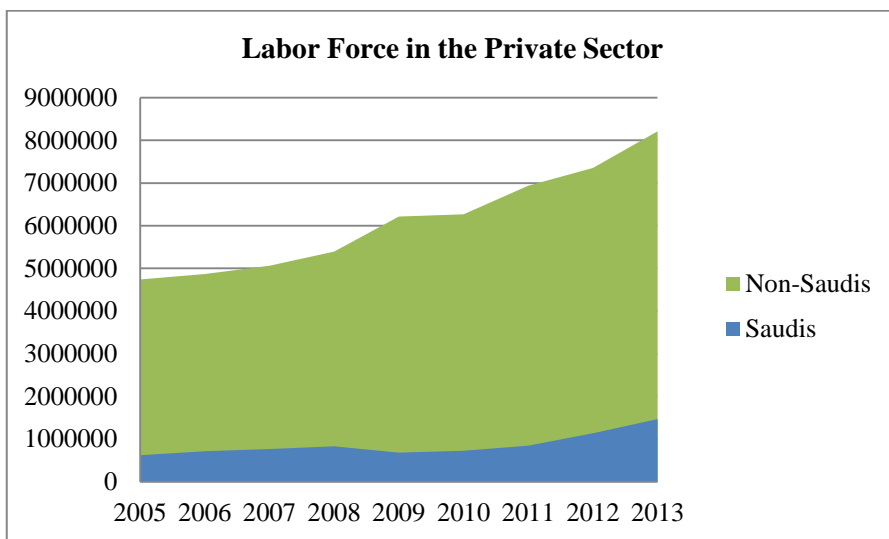


Figure 12: Population (in thousands)
 Source: SAMA, Annual Report



(a)



(b)

Figure 13 (a) and (b): Distribution of Labor Force between Saudis and non-Saudis in Public and Private Sectors
 Source: SAMA, Annual Report

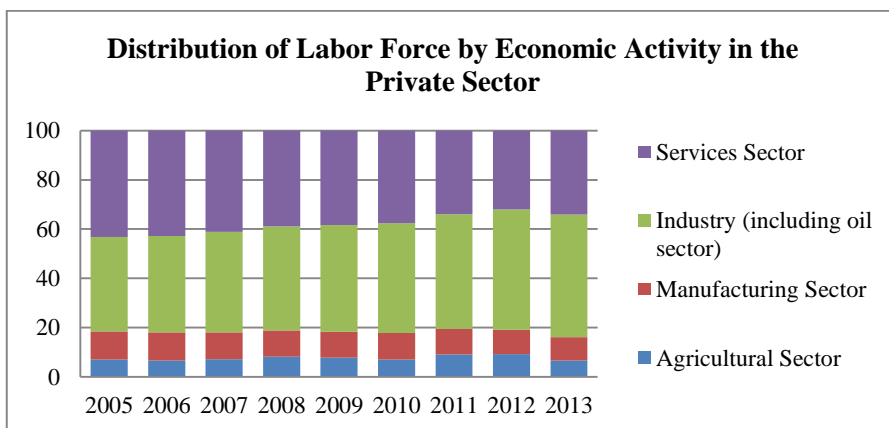


Figure 14: Distribution of Labor Force by Economic Activity in the Private Sector
 Source: SAMA, Annual Report

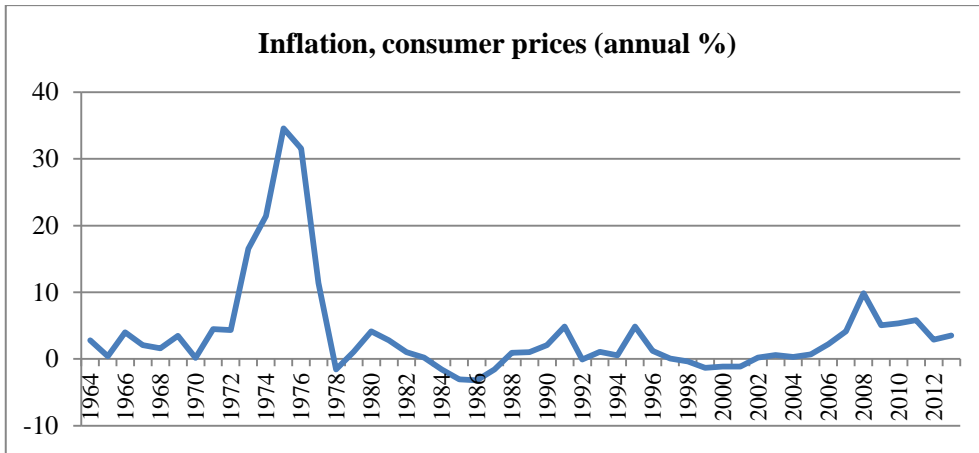


Figure 16: Inflation Rates, Consumer Prices (annual %)
 Source: World Bank Development Indicators

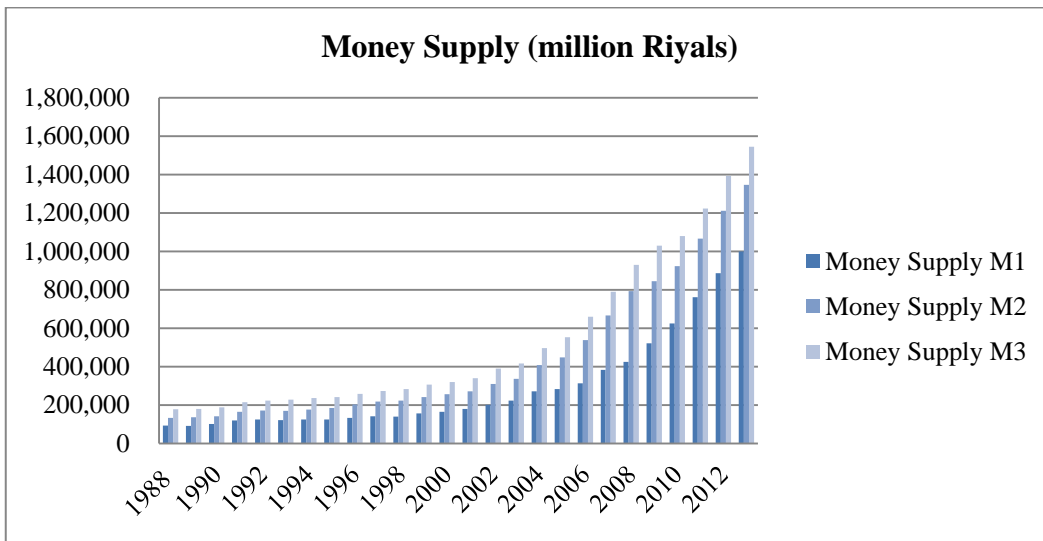


Figure 17: Money Supply in million Saudi Riyals
 Source: SAMA, Annual Report

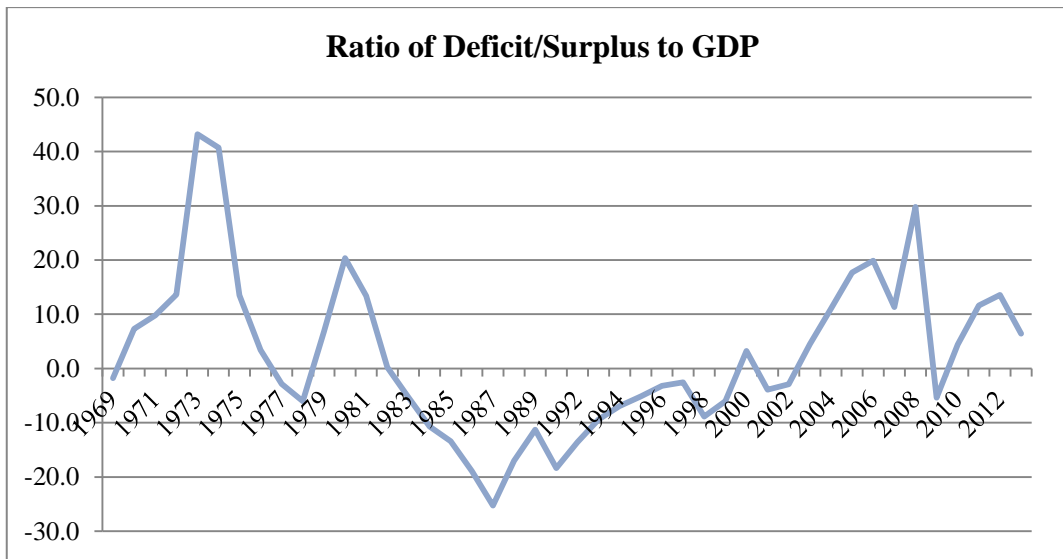


Figure 18: Deficit/Surplus to GDP Ratio
 Source: SAMA, Annual Report



Figure 19: Women in the Labor Market
 Source: Central Department of Statistics and Information of Saudi Arabia

APPENDIX II

Year	GDP Growth Rate	CPI	Current	Composition of Real GDP			% of Oil in Total Government Revenue	Share of Saudi Arabia in World Oil Production (%)
	(% /year)	Inflation Rate (%/year)	Account Balance (U.S. \$mill)	Oil	Private	Govt.		
1980-84	1	1.38	10690.7	53.1	27.5	19.4	79.5	12.5
1985-89	0.86	-1.26	-10275.6	27.4	44.5	28.1	62	8.1
1990-94	4.36	1.54	-15438.6	38	36	26	60.4	13
1995-99	1.26	0.8	-3415.3	36.6	36.8	26.6	70.7	12.7
2000-01	3	-0.01	14419.1	40.5	39.9	19.6	NA	12

Table 01: Selected Macroeconomic Indicator

Source: SAMA, Annual Report

	Cumulative Production (1990–2012)		Average Spare Capacity (2012)		Reserves (2012)	
	Billion barrels	Percent of global supply	Million barrels/day	Percent of global supply	Billion barrels	Percent of global reserves
Saudi Arabia	78.0	12.7	2.0	2.2	265.9	15.9
Russia	69.9	11.4	...	...	87.2	5.2
US	60.2	9.8	...	...	35.0	2.1
Iran	32.4	5.3	0.3	0.3	157.0	9.4
China	28.5	4.7	...	...	17.3	1.0
Mexico	27.6	4.5	...	...	11.4	0.7
Venezuela	26.0	4.2	0.1	0.1	297.6	17.8
Canada	22.1	3.6	...	...	173.9	10.4
Norway	21.6	3.5	...	...	7.5	0.4
U.A.E	21.4	3.5	0.1	0.1	97.8	5.9
Nigeria	18.1	3.0	0.4	0.5	37.2	2.2
Kuwait	18.0	2.9	0.1	0.1	101.5	6.1
United Kingdom	16.6	2.7	...	...	3.1	0.2
Iraq	14.7	2.4	0.2	0.2	150.0	9.0
OPEC	251.8	41.1	3.6	4.0	1211.9	72.6
Global	612.1	100.0	3.6	4.0	1668.9	100.0

Table 02: Saudi Arabia's Role in the Global Oil Market

Source: BP Statistical Review of World Energy 2012, IEA; and IMF staff calculations

	Total World	Europe	North America	Asia and Pacific	Latin America	Africa	Middle East
Algeria	744	518	123	93	11	-	-
Angola	1669	313	159	1103	50	44	-
Ecuador	388	5	256	20	107	-	-
IR Iran	1215	128		1085	-	2	-
Iraq	2390	535	419	1413	14	-	10
Kuwait	2058	84	320	1613	-	41	-
Libya	589	533	5	45	1	4	-
Nigeria	2193	965	395	373	263	197	-
Qatar	599	-	-	599	-	-	-
Saudi Arabia United Arab Emirates	7571	952	1459	4586	80	222	272
Venezuela	2701	6	2	2611	-	81	-
	1937	88	773	726	350	-	-
OPEC	24054	4127	3911	14267	876	591	282

Table 03: OPEC Members' Crude Oil Exports by Destination (1000 b/d), 2013
Source: UNDP, 2013

	I Plan 1970-1975	II Plan 1976- 1980	III Plan 1981-1985	1986	1987
Total GDP	13	9.2	-1.6	-8.7	4.7
Oil Sector	15.1	4.8	-14.5	-15.1	25.6
Non-oil Sector	10.1	14.8	6.2	-6.7	-2.4
Government	20	14.6	2.8	-3.7	-1.6
Private	6.6	14.9	7.8	-7.8	-2.7
Agriculture	3.6	6.9	9.5	13	14
Construction	21.4	15.8	-2.4	-20	-12.8
Utilities	3.4	21.9	21.2	11.4	10.5
Manufacturing	3.9	9.8	7.3	1.9	1.1
Refining	0.9	6.1	3	16.7	4.2
Other	10.8	15.4	11.7	-9.8	-2
Transport	0.7	19.3	7.1	-11.8	-7.6
Trade	13.8	22.7	8.7	-11.8	-6.5
Finance	7.9	23.7	2.5	-2.5	-6
Services	7.1	10.6	4.4	-0.8	-4

Table 04: Growth in Oil and Major non-Oil Sectors (compounded annual real rates of growth)

Source: Saudi Arabia Monetary Agency, Annual Report 1407, 1987, p. 15

Volatility and Correlation of Oil Revenue, Spending, and Non-oil Growth				
	Oil Revenue Growth Volatility (std)	Spending Growth Volatility (std)	Correlation between Oil Revenue and Spending Growth	Non-oil Growth Volatility (std)
1980s	44.4	19.8	0.9	4.6
1990s	21.1	16.2	0.7	1.6
2000s	38.5	6.4	0.2	0.7

Table 06: Volatility and Correlation of Oil Revenue, Spending, and Non-oil Growth

Source: IMF (2013)

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