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Title: Statistical Analysis of Economic Development in the Kingdom of Saudi Arabia (KSA)

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Abstract

This study analyzed the economic growth of the Kingdom of Saudi Arabia, and its contributing factors. Saudi Arabian economy heavily depends on oil revenue. The heightened competition in the energy market and a big increase in the number of Saudis reaching working age are forcing the Saudi Arabian government to diversify the economy in to power generation, telecommunications, natural gas exploration, petrochemical sectors and expanding the role of the private sector in the healthcare, education and tourism industries. The effects of these factors and their role have assessed using macro-level data. The source of data was the World Bank. Regressions analysis and other relevant methods were used for the analysis to assess the effect of various socioeconomic and development indicators on economic growth (gross domestic product (GDP)). The analysis indicates a positive significant relation of exports of goods and services, export of oil, foreign direct investment, industrial growth, and agriculture on GDP while a significant negative relationship of population size is found with GDP. The results thus provide an indication of growth of effect non-oil factors on economic growth.

Key words: economic growth, gross domestic product, oil-export, and industrial growth

1. Introduction

1.1 Background

The character of the Saudi economy in the past three decades has led to the acquisition of many varied features. After the oil boom at the beginning of the Seventies, the Saudi economy began to modernize. Prior to that, it was economically simple, consisting of agriculture, grazing, and some primitive industries. In addition, the fees received from trade and services dependent on pilgrims was the most important source of government revenue.

In the mid-Seventies, the rise in oil prices led to the acquisition of enormous financial resources, and this became the most important source of income. With these financial resources, the government has implemented a number of infrastructure projects. The economic and development policies of the state aimed to encourage and support the private sector by providing loans and services, and by exempting them from taxes and customs duties. This resulted in generally increased economic growth and, in particular, growth of the industrial sector. The lower oil prices in the mid-Eighties decreased oil revenue. The lower revenues had a negative effect on the government budget and on infrastructure project financing.

The dependence on oil as a single source of income has led to negative consequences which may be devastating for the national economy. It can be seen that in many countries of the world there is a strong positive relationship between growth rates and stability, as well as on the diversity of the basis of the national economy and multiple sectors of production. The risk is particularly acute when national income is mainly dependent on natural resources. The risk is high when the source is depleting and, at the same time, prices og oil in world markets are based on political and economic variables beyond the control of the producing country[10]. Saudi Arabia is increasingly emphasizing on non-oil revenue earning so as to have stability in economic growth and development.

1.2 Economic Growth and Development

The economic development of a country or society is usually associated with (amongst other things) rising incomes and related increases in consumption, savings, and investment. Of course, there is far more to economic development than income growth; for if income distribution is highly skewed, growth may not be accompanied by much progress towards the goals that are usually associated with economic development. Not all developed countries exhibit all these characteristics in equal measure.

Economic growth can follow many different paths, and not all of them are sustainable. Indeed, there are many who argue that given the finite nature of the planet and its resources, any form of economic growth is ultimately unsustainable.

Economists usually measure economic growth in terms of gross domestic product (GDP) or related indicators, such as gross national product (GNP) or gross national income (GNI) which are derived from the GDP calculation. GDP is calculated from a country's national accounts which report annual data on incomes, expenditure and

investment for each sector of the economy. Using these data it is possible to estimate the total income earned in the country in any given year (GDP) or the total income earned by a country's citizens (GNP or GNI).

GNP is derived by adjusting GDP to include repatriated income that was earned abroad, and exclude expatriated income that was earned domestically by foreigners. In countries where inflows and outflows of this sort are significant, GNP may be a more appropriate indicator of a nation's income than GDP.

Human Development Index: The weaknesses inherent in the use of GDP as a measure of development has led to the creation of other measures. The most well-known of these is the human development index (HDI) published on a regular basis by The United Nations Development Program (UNDP) in its *Human Development Report*. The HDI is a composite index that rates countries according to their overall performance in relation to three criteria

- life expectancy
- education
- per capita GDP (using PPP dollars)

1.3 Economic Growth and Sustainability

Much of the literature and debate about sustainable development is concerned with the relationship that exists between economic growth, on the one hand, and sustainability, on the other. Analysts are greatly divided on this issue, especially with regards to long-term growth trends.

Most of the arguments revolve around the forms of development that are compatible with 'sustainability' and those which are not. There is a widespread view that past and present patterns of economic growth are environmentally and socially unsustainable. This view is especially strong amongst environmentalists and political activists, but also exists within development agencies and academia. What is usually implied in this view is that the perpetuation of current patterns of growth will result in escalating ecological breakdown and social upheaval. A potential consequence of this will be to end the increasing levels of consumption that have been a feature of global economic development over the past century or more. Such effects will be felt locally, nationally and globally although the worst of these effects are expected to be felt by people in developing countries.

A large proportion of the income measured by GDP is earned by exploiting and mining natural resources and the environment or involves damage to the environment. Many claim that the environment cannot continue to provide ever-rising incomes indefinitely. Some point out that GDP is an inappropriate measure of economic performance as it does not account for the depreciation of the natural capital that is used to generate it, or for the damage caused by pollution, including the effects of greenhouse gases on global climate change. For some countries, steps have been taken to develop a parallel set of national accounts that do incorporate changes in environmental capital. However, the approach is still in its infancy and GDP remains the most widespread and influential indicator of an economy's performance.

1.4 Objective of the Research

The main objective of this research is to assess the trends and determinants of economic growth and its relation with socioeconomic factors. Saudi Arabian economic developments based on the economic growth measuring indicators.

a) To assess the trends of oil revenue in the share of economic growth.
b) To assess the role of non-oil revenue in economic growth.
c) To assess the relationship of economic growth and the improvement of socioeconomic and demographic factors.
d) To assess the significance of the effect of consumption expenditure on economic growth

2. Literature Review: Saudi Arabian Economy and Global Market

2.1. Saudi Arabian Economic Overview

Saudi Arabia has an oil-based economy with strong government controls over major economic activities. It possesses about 16% of the world's proven petroleum reserves, ranks as the largest exporter of petroleum, and plays a leading role in OPEC. The petroleum sector accounts for about 87% of budget revenues, 42% of GDP, and 90% of export earnings[3].

Saudi Arabia's economy has grown very strongly in recent years as it has benefited from high oil prices and output, strong private sector activity, increased government spending, and the implementation of a number of domestic reform initiatives. Rising oil prices and oil production have also resulted in large external and fiscal surpluses, and government debt has declined to very low levels. The economic outlook remains favorable. Nevertheless, the substantial drop in oil prices since the summer of 2014 is an important risk to the outlook.

Developments in the global oil market are therefore central to the economic outlook. Lower oil prices will have an immediate negative effect on the fiscal and external balances, and over time will also likely lead to slower growth. The reliance of the Saudi Arabian economy on oil revenues raises two key challenges for policymakers. The first is how they should best manage the country's current heavy dependence on oil revenues and ensure that the domestic economy is insulated to the extent possible from volatility in the global oil market. The second is how they can help the economy to diversify so that the current reliance on oil revenues is reduced over time.

Saudi Arabia is encouraging the growth of the private sector in order to diversify its economy and to employ more Saudi nationals. Over 6 million foreign workers play an important role in the Saudi economy, particularly in the oil and service sectors; at the same time, however, Saudi Arabia is struggling to reduce unemployment among its own nationals. Saudi officials are particularly focused on employing its large youth population, which generally lacks the education and technical skills the private sector needs.

In 2015 the Kingdom incurred a budget deficit estimated at 13% of GDP, and it faces a deficit of $87 billion in 2016, which will be financed by bond sales and drawing down reserves. Although the Kingdom can finance high deficits for several years by drawing down its considerable foreign assets or by borrowing, it has announced plans to cut capital spending in 2016. Some of these plans to cut deficits include introducing a value-added tax and reducing subsidies on electricity, water and petroleum products. In January of 2016, Crown Prince MUHAMMAD BIN SALMAN announced that Saudi Arabia intends to list shares of its state-owned petroleum company, ARAMCO - another move to increase revenue and outside investment[4].

This growth model, which is dependent on oil exports and public-sector spending, has been a recurrent topic over the past two decades for Saudi and international economists. Many of whom argue that the Saudi's economy should diversify away from oil to ensure sustainability. Several of the government's five-year development plans have also outlined diversification as a priority objective.

2.2. Economic Diversification in Saudi Arabia

Saudi Arabia's economy has evolved significantly over the past decade, but further diversification is important. As stated in the Ninth Development Plan of the Kingdom of Saudi Arabia: "With successive development plans recognizing the risks inherent in one-sided heavy reliance on production and export of crude oil, diversification of the production base of the Saudi economy has been, ever since the beginning of development planning, a prime target for economic development." The government has used rising oil receipts to increase investments in human resource development and public infrastructure. The share of non-oil output in GDP has increased steadily, although export diversification has been more limited. While non-oil exports have grown quite strongly, they remain a small share of total exports and are largely concentrated in products closely related to oil. Experience from other oil-exporting countries suggests diversification is a long and difficult process. Saudi Arabia does not appear to suffer from traditional Dutch disease problems holding back the development of a competitive nonoil tradable sector, although oil revenues may crowd out tradable production in other ways. The relatively higher wages available in the public sector mean this is often a more attractive employment choice, particularly for lower-skilled workers, than the private sector. For firms, producing goods and services to meet the consumption and investment needs of the domestic market is a more reliable profit source than gearing business plans toward riskier export activities. Addressing these incentives while undertaking further reforms to strengthen the business environment and improve the education and skills of the workforce will be necessary to meet the government's goal of further economic diversification[8].

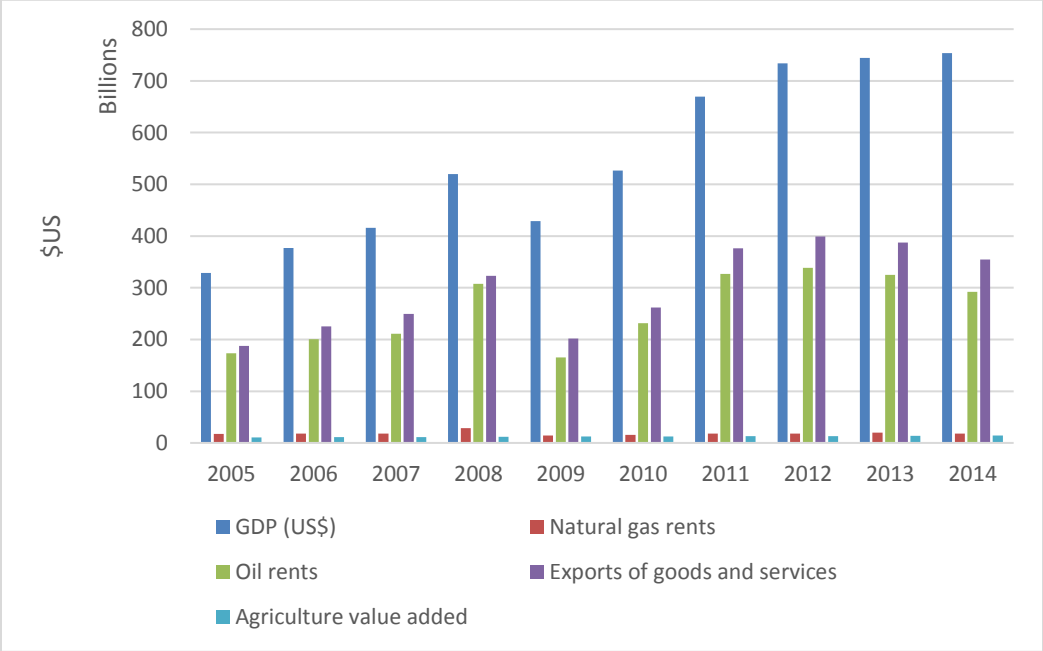


Figure 2. 1 Selected Economic development indicators

The non-oil sector in Saudi Arabia has grown strongly over the past decade. While oil GDP rose, non-oil output almost tripled during 2004-13 in nominal terms and doubled in real terms.13 on average, nominal non-oil output now constitutes half of total GDP, with the share of private sector (non-oil) activity in total output amounting to over

a third, on average. However, in real terms, the share of non-oil economic activity increased by some 10 percentage points of GDP between 2004 and 2013, reaching almost 80 percent by 2013 due to stronger private sector activity. Real growth in the non-oil sector has outpaced that in the oil sector, yet decelerated starting in late 2010. Real growth in non-oil GDP averaged 7.7 percent during 2004-13, compared to oil GDP growth of 1.6 percent. The contribution of non-oil output to overall GDP growth over the past decade has averaged 5.7 percentage points compared to the smaller and more volatile contribution of oil GDP to overall growth. Nevertheless, non-oil growth has steadily decelerated since 2010, beginning with wholesale and retail trade in 2011, and followed by slower growth in other sectors over the past two years (manufacturing, construction, transport and communication, and to some extent, government services). Within the energy sector, efforts are ongoing to diversify energy sources away from oil through the development of gas, solar, and other sources.

2.3. Saudi Arabia's Economic Diversification Plan

Saudi Arabia has the longest and most elaborate tradition of planning among the GCC countries, institutionalized in the Ministry of Economy and Planning (MoEP). Since 1970, nine development plans have guided the economy. The latest, the *Ninth Development Plan*, covers the years 2010–14. In 2004 a *Long-Term Strategy*, which spans the time period of 2005–24, was published. The subsequent plans, namely the eighth and the ninth, have been aligned with this strategy. Besides these plans, there are eight sector plans, the so-called *National Plans*. They cover areas such as youth, transport, privatization, employment, science and technology, industry etc. (MoEP 2010b).

The *Long-Term Strategy* was established in response to a number of challenges, notably the 'emerging challenges of providing productive employment to Saudi national manpower and improving the quality of life' (MoEP 2004: Section 3.1). Among the aims of the *Strategy* is to raise the national economy to the level of advanced economies, which implies doubling the per capita income between 2004 and 2024, creating jobs for the fast growing and thus young population, increasing the role of non-oil production in the economy, and reducing the share of oil and gas in total exports from 72 per cent to 37 per cent during the plan period. As such, diversification and expansion of the economy base of society are the central focus of the plan and have, it claims, been the key objective of economic and social development ever since the development planning system was initiated some thirty years earlier (MoEP 2004: Section 3.2.2.A).

The *Ninth Development* Plan targets the problems of living standards, lack of employment opportunities, regionally uneven growth and lack of international competiveness for the Saudi economy. The primary means to tackle those problems, besides the issue of uneven growth within the regions of Saudi Arabia, is increased participation by the private sector in the economy. The private sector is expected to increase production, open the country for investments (including FDI) and exports, and, not least, create jobs for the citizens (MoEP 2010a: 31ff., 2010c: 712ff.)

2.4. Plan Review

Saudi Arabia is massively larger than the other GCC countries in terms of land mass, population and energy reserves. It has a population of 27 million, of whom 8.4 million are non-nationals; it sits on top of 19 per cent of the world's proven oil; and it has

succeeded in establishing industrial muscle within petrochemicals, processing crude output into downstream products of oil through some forty years of diversification strategies. Given not only the country's size but the time elapsed since the start of its oil era (beginning straight after World War II) and the level of institutional development, change of policies and implementation of plans are glacial in speed when compared to those of the small 'city-states'. Despite an oil production of close to 10 million barrels of oil a day in 2011, the country has the lowest GDP per capita among the GCC countries, due to its large population and relatively underdeveloped economy.

There is no specific mention of the future role of 'the state'. So far development has been state led, in the sense that a significant part of economic activity has relied upon public sector spending (not only on investments in e.g. infrastructure and schools, but also on the vast public sector recurrent spending), which is tightly linked to the income from oil and gas. So, even though the private sector contribution to GDP is almost 60 per cent, this does not indicate that the economy is market driven.

There is a distinctly neo-liberal flavor to the plans, due to the significant focus on the merits of the private sector and a market-driven economy. This orientation is in accordance with the actual implementation of liberal reforms since the early 2000s, aimed at improving the business climate in Saudi Arabia and, as a part of this, the climate for domestic and especially foreign investments. Attracting FDI has a very high priority, both in the private and in the public sector, for example in utilities or gas and oil extraction. In this way FDI is believed to assist the country in building a new production base. Investments in the utilities sector are especially welcome. The liberalization process of opening up the economy to foreign competition has a flip side: many Saudi-owned firms were not competitive enough and thus have been forced to close down.

A key achievement in the liberalization process has been the attainment of membership of the World Trade Organization (WTO) in December 2005. The Saudi Arabian General Investment Authority (SAGIA), with powers vested directly by King Abdullah, has made a special effort in branding the country as 'business friendly' to attract FDI, and has consequently succeeded in improving the procedures needed to start, operate and close a business. As a result, the 2012 World Bank *Doing Business* index rated Saudi Arabia as the twelfth easiest place in the world to do business.44 Even though there is evidence to question the soundness of this ranking, there is no doubt that Saudi Arabia has carried through a significant number of reforms to ease the business climate since the early 2000s.

3. Methodology

This section presents information on source of data, definition and selection of variables, and statistical methods used in the analysis.

3.1. Data Analysis

Source of Data: The sources of these data are the IMF, the World Bank, the Saudi Arabian government and other relevant publications.

Data analysis has been conducted using appropriate statistical software Excel and SPSS. Drive conclusions and recommendations based on the analysis of the data.

Dependent variables: GDP at market prices (current billion US$)

Independent variables:

- Foreign direct investment (billion US$)
- Final consumption expenditure, etc. (billion US$)
- Gross savings (billion US$)
- Population growth (annual %)
- Population (million)
- Agriculture value added
- Natural Gas Rent (billion US$)
- Oil rent (billion US$)
- Export of goods and services (billion US$)
- Industry, value added (% of GDP)
- Services, etc.., value added (% of GDP)

3.2 Statistical Methods

a) Pearson Correlation

The Pearson's Correlation measures a sample correlation coefficient, r, which measures the strength and direction of linear relationships between pairs of continuous variables. The Pearson Correlation evaluates whether there is statistical evidence for a linear relationship among the same pairs of variables in the population, represented by a population correlation coefficient, ρ. The formula of the Person coefficient is:

$$r_{xy} = \sqrt{\frac{\sum_{i=1}^{n}(\mathrm{x}_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(\mathrm{x}_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}}, \qquad \text{where, } -1 \le r_{xy} \le +1$$

Assumptions: The calculation of Pearson's correlation coefficient and subsequent significance testing require the assumptions on data to hold: 1) interval or ratio measurement scale, 2) linearly related, and 3) bivariate normally distributed

b) **Linear Regression Analysis**

1) The Simple Regression Model

The variable we want to predict is called the dependent variable. The variable we are using to predict the value of the dependent variable is called the independent variable. The simple regression model is:

$$Y_i = \alpha + \beta x_i + \varepsilon_i$$

Where Y (the dependent variable) is random variable, X (the independent variable) is fixed or non-stochastic, and ε is a random error term whose value is based on an underlying probability distribution. The regression parameters α and β represent intercept and the slope of the regression equation.

The estimated linear regression line has an equation of the form E(*Y)* = *a* + *bX*, where X is the explanatory variable and Y is the dependent variable. The estimated slope of the line is *b*, and *a* is the estimate of intercept (the value of *y* when *x* = 0).

2) The Multiple Regression Model

The multiple regression is an extension of simple linear regression by assuming that the dependent variable Y is a linear function of a series of independent variables X_1, $X_{2,\ldots,}$ X_k and an error term. It is used when we it is desired to predict the value of a variable based on the value of two or more other variables. The multiple regression model is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + + \beta_k X_{ki} + \varepsilon_i$$

Where Y is the dependent variable, the X's are the independent variables, and ε is the error term. β_0 represents intercept and β_j , the coefficient of Xj . Multiple regression also allows us to determine the overall fit (variance explained) of the model and the relative contribution of each of the predictors to the total variance explained.

4. Results and Findings

4.1 Economic Development Indicators

Figure 4.1 (a) shows the exports of goods and services as a % of GDP. In 2014 Saudi Arabia exported $306B, making it the 15th largest exporter in the world. During the last five years the exports of Saudi Arabia have decreased at an annualized rate of -0.8%, from $319B in 2009 to $306B in 2014. The most recent exports are led by Crude Petroleum which represent 75.8% of the total exports of Saudi Arabia, followed by Refined Petroleum, which account for 6.45%.

Figure 4.1 (b) shows the industry, value added as a % of GDP. It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

Figure 4.1 © shows Services, etc., value added as a % of GDP. They include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Starting from year 2000 the service in declining.

Agriculture - value added (% GDP) is shown in Figure 4.1 (d). Agriculture includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. According to Figure 4.4, there is a steep decline in agriculture, value added from year 2000 onwards.

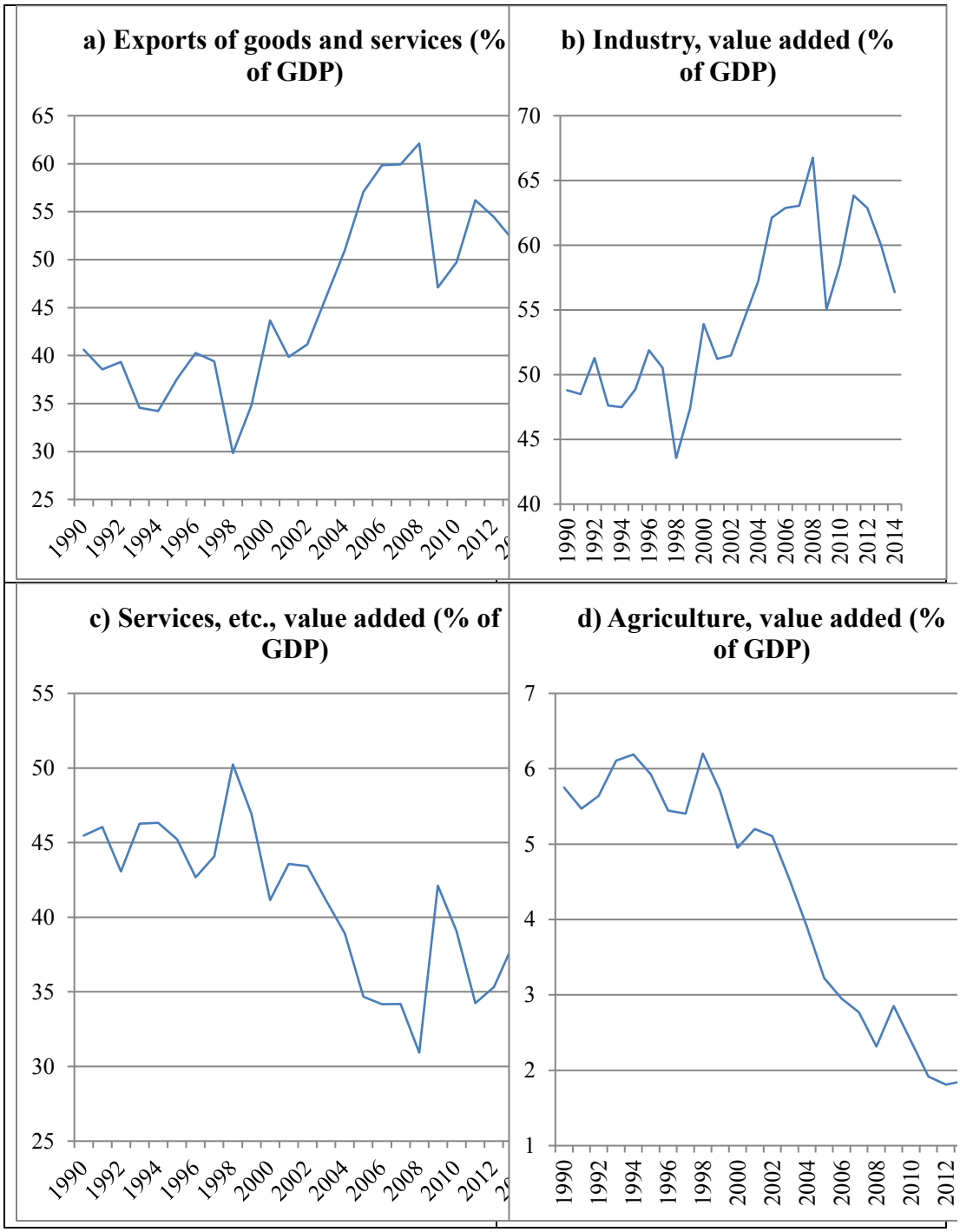


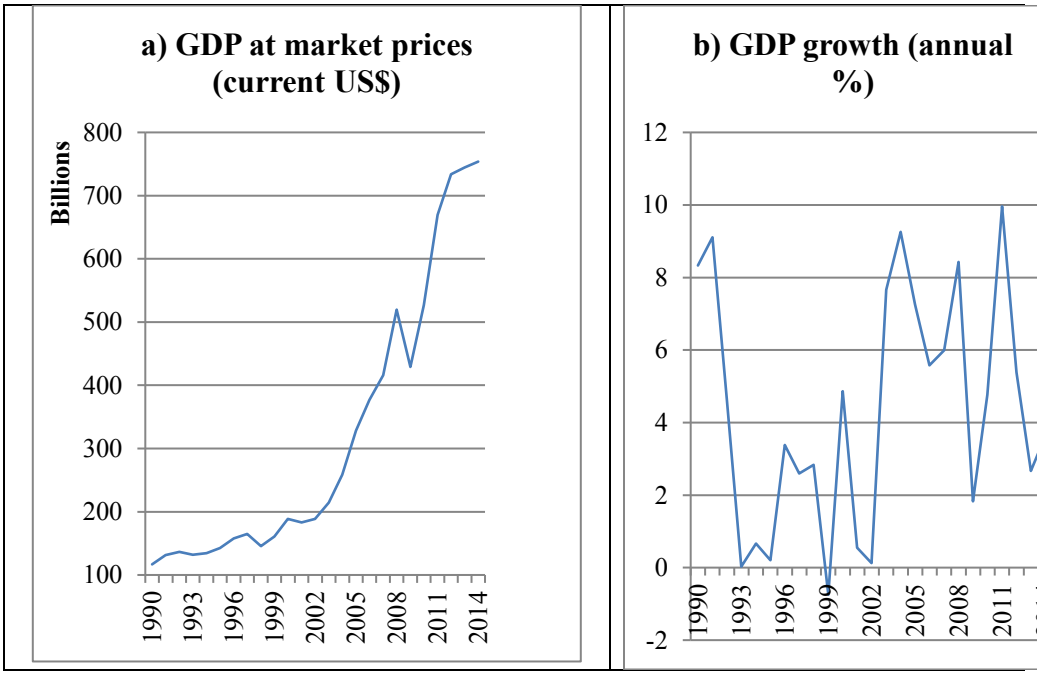
Figure 4.1 Growth Indicators of GDP

Figure 4.2 (a) shows the GDP at market prices. There is an exponential growth of GDP at market prices starting year 2002. The Gross Domestic Product (GDP) in Saudi Arabia was worth 646 billion US dollars in 2015. The GDP value of Saudi Arabia

represents 1.04 percent of the world economy. GDP in Saudi Arabia averaged 214.15 USD Billion from 1968 until 2015, reaching an all time high of 753.83 USD Billion in 2014 and a record low of 4.19 USD Billion in 1968.

Figure 4.2 (b) shows the GDP growth (annual %). Saudi Arabia's economy expanded by 1.50 percent in the March quarter of 2016 over the same quarter of the previous year, compared to a marginally revised 1.8 percent growth in the preceding quarter. It was the weakest growth since the first quarter of 2013. In the first three months of 2016, oil sector grew by 5.1 percent (from +4.5 percent in Q4 2015). In contrast, non-oil sector contracted by 0.7 percent, the lowest performance in at least five years, following a 0.5 percent decline in the December quarter 2015. GDP Annual Growth Rate in Saudi Arabia averaged 5.04 percent from 1969 until 2015, reaching an all time high of 27.49 percent in the fourth quarter of 1974 and a record low of -11.10 percent in the fourth quarter of 1982.

GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Figure 4.2 © shows that the GNI per capita, PPP was stable/constant from year 1992 to 2002. However from 2003 to 2013 there is an exponential growth of GNI per capita.



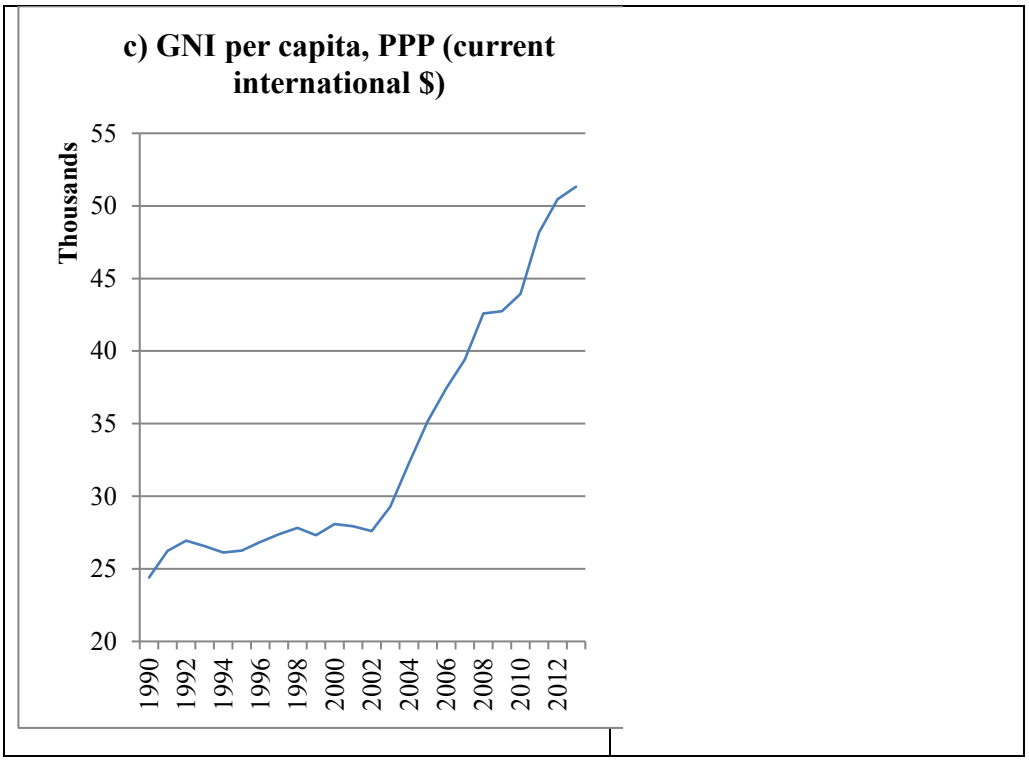


Figure 4.2 GDP growth

4.2 Net export of Goods and Services

Net exports of goods and services is the difference between the exports of goods and services and the imports of goods and services. Exports measures the portion of total production of goods and services—gross domestic product (GDP)—that is provided to the rest of the world; thus, movements in exports reflect changes in foreign demand for Saudi produced goods and services. Imports measures the portion of total the expenditures—gross domestic purchases—that is accounted for by goods and services provided by the rest of the world; thus, movements in imports reflect changes in domestic demand for foreign-produced goods and services. The impact of imports on the Saudi's economy depends on the degree to which they act as substitutes for, or as complements to, domestic production[9].

Together, the two measures reflect the extent to which the Saudi Arabian participates in the global marketplace, which provides broad opportunities for specialization and other economic efficiencies. As the difference between the two, net exports represents the gap between the Saudi Arabia's domestic production and Saudi domestic demand and the extent to which a surplus or deficit of domestic production relative to domestic demand is addressed by foreign markets.

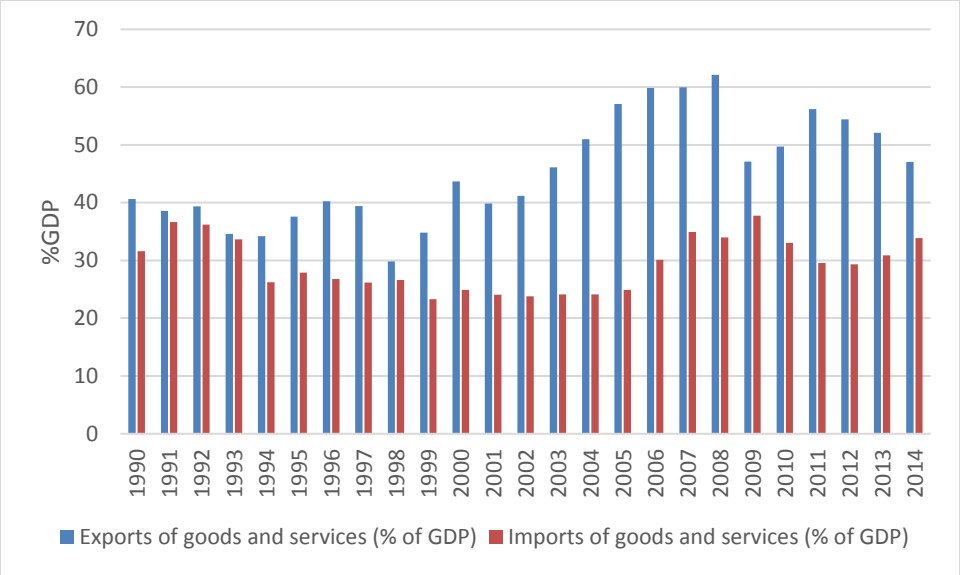


Figure 4. 3 Export and Import

4.3 Results of Simple Linear Regression

Figure 4.4 shows the correlation between GDP vs. Export of Goods and Services. It shows that there is strong positive correlation between the GDP growth and Export of Goods and Services.

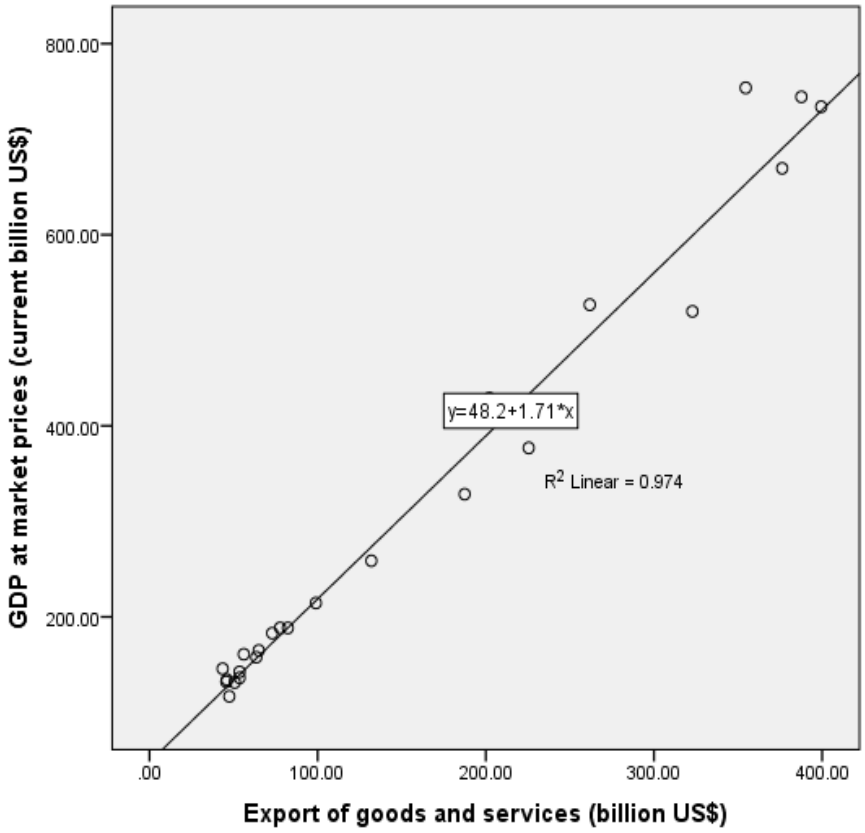


Figure 4. 4 GDP vs. Export of Goods and Services

Figure 4.5 shows the correlation between GDP vs. Foreign Direct Investment. It shows that there is a significant positive correlation between the GDP growth and Foreign Direct Investment.

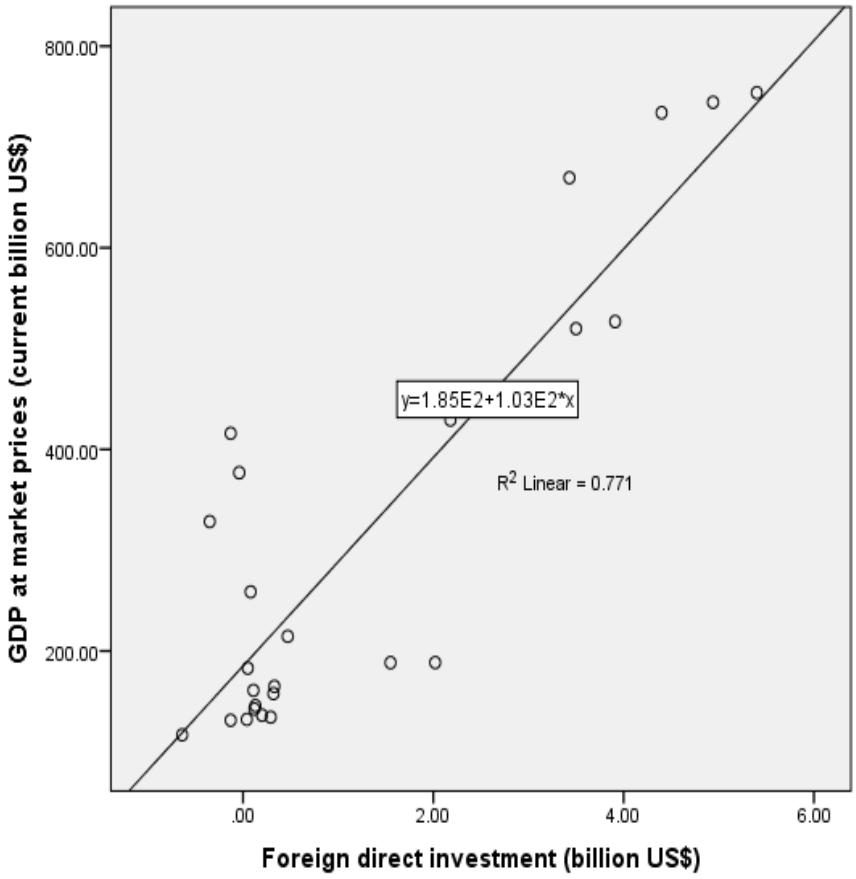


Figure 4. 5 GDP vs. Foreign Direct Investment

Figure 4.6 shows the correlation between GDP vs. Final Consumption Expenditure. It shows that there is a strong positive correlation between the GDP growth and Final Consumption.

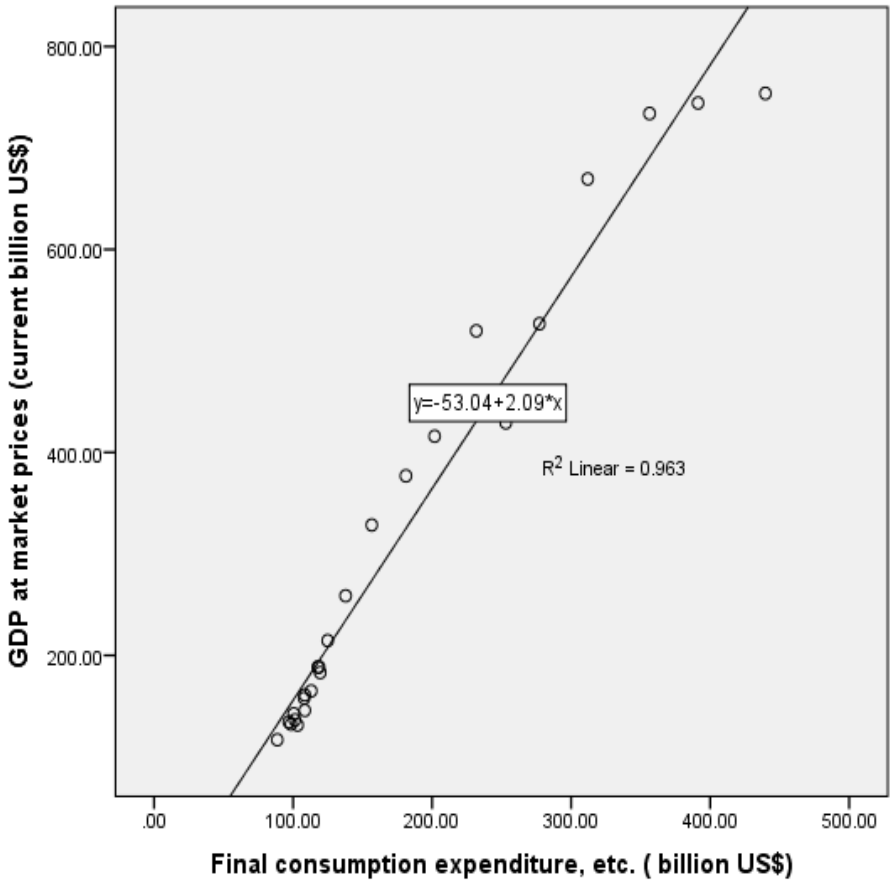


Figure 4. 6 GDP vs. Final Consumption Expenditure

Figure 4.7 shows the correlation between GDP vs. Gross Savings. It shows that there is a strong positive correlation between the GDP growth and Gross Savings.

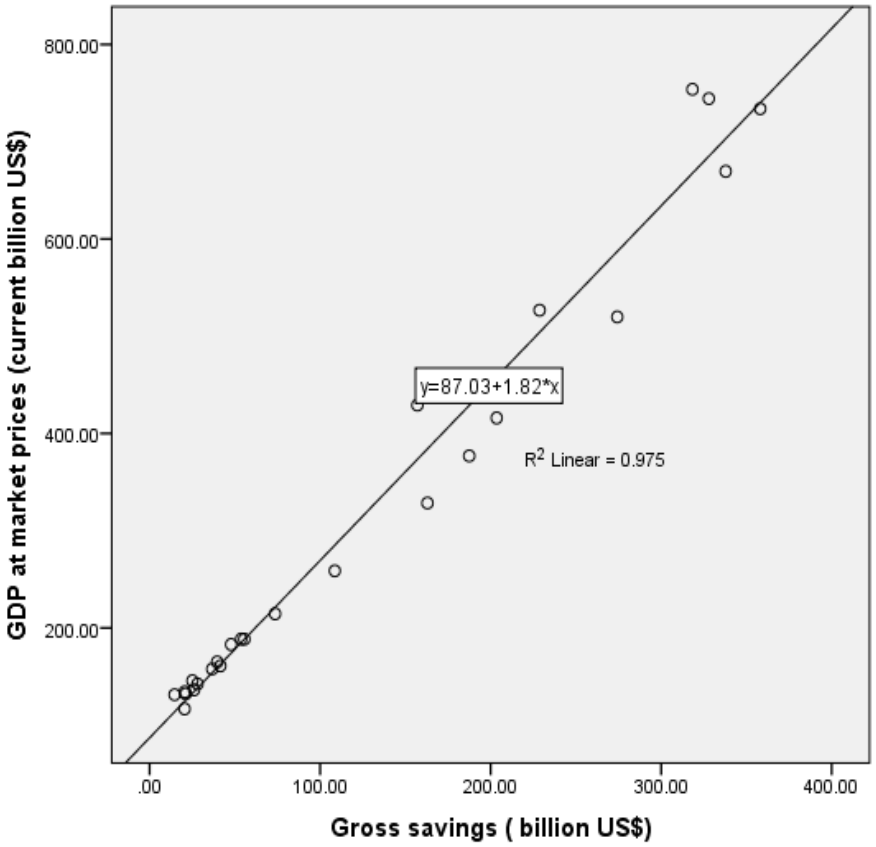


Figure 4. 7 GDP vs. Gross Savings

Figure 4.8 shows the correlation between GDP vs. Population Growth. It shows that there is no correlation between the GDP growth and Population Growth.

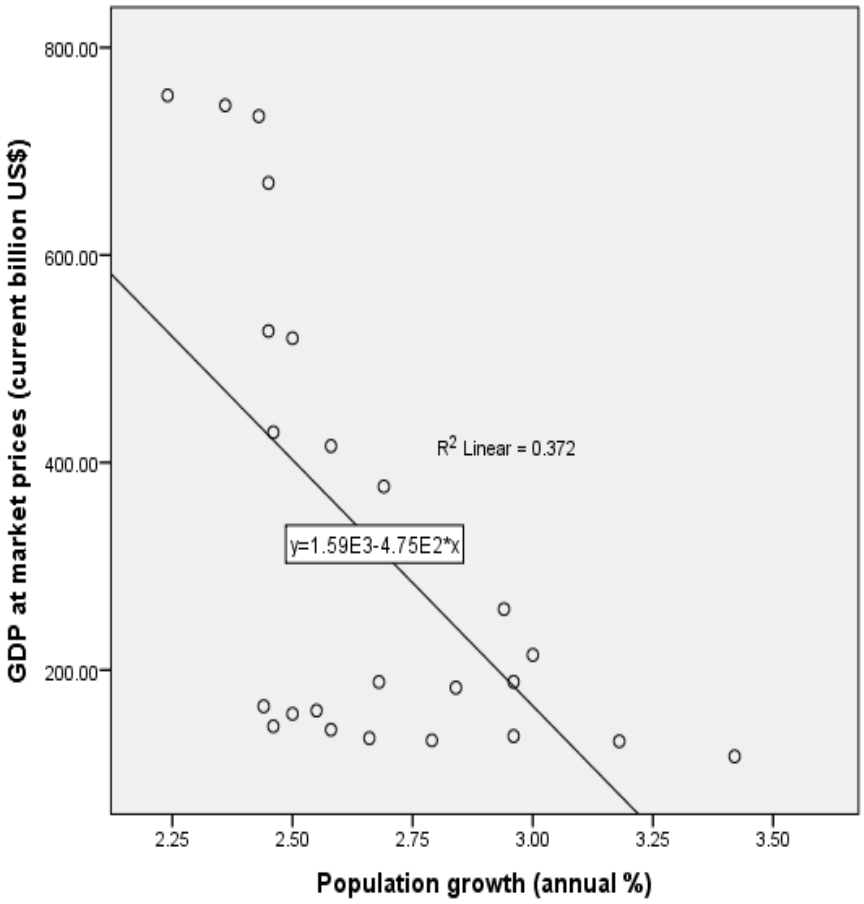


Figure 4. 8 GDP vs. Population Growth

Figure 4.19 shows the correlation between GDP vs. Agriculture Value Added. It shows that there is a strong positive correlation between the GDP growth and Agriculture Value Added.

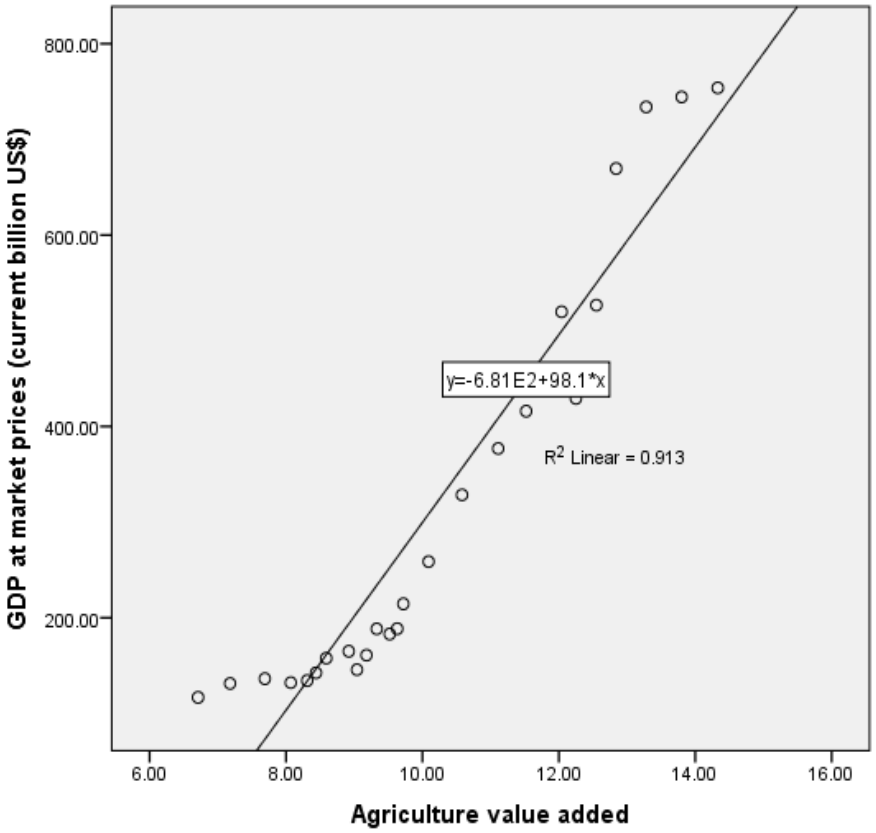


Figure 4. 8 GDP vs. Agriculture Value Added

Figure 4.9 shows the correlation between GDP vs. Oil Rent. It shows that there is a strong positive correlation between the GDP growth and Oil Rent.

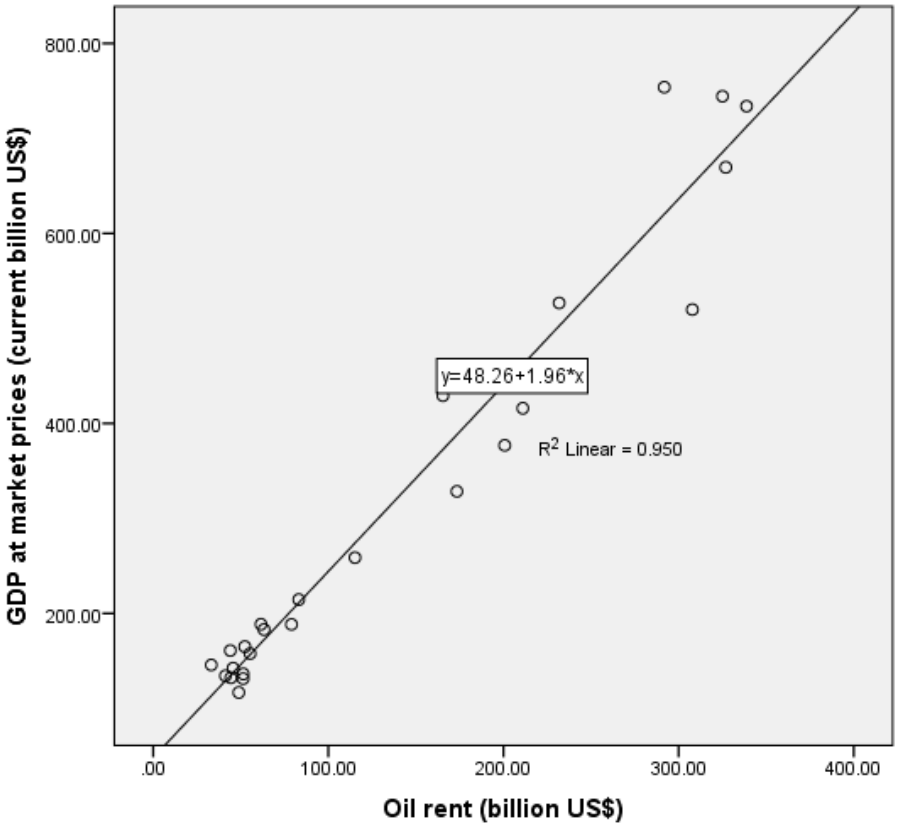


Figure 4. 9 GDP vs. Oil Rent

4.4 Results of Multiple Regression Analysis

Table 4. 1 Descriptive Statistics of Selected Variables

Variables	Mean	Std. Deviation	N
GDP per capita (current US$)	12674.7700	6367.08221	25
Foreign direct investment (billion US$)	1.2872	1.86209	25
Final consumption expenditure, etc. (billion US$)	177.8552	103.14892	25
Gross savings (billion US$)	126.7660	118.75559	25
Population growth (annual %)	2.6780	.28177	25
Agriculture value added	10.1888	2.13606	25
Natural Gas Rent (billion US$)	10.1196	7.71348	25
Oil rent (billion US$)	137.7012	109.09274	25
Export of goods and services (billion US$)	158.2180	126.87337	25
Population (million)	23.0956	4.49777	25

Pearson Correlation Coefficient

Table 4.2 Correlation Matrix

		Agri. value added (%.GDP)	Industry, value added (%,GDP)	Services, etc., value added (%,GDP)	Exports of goods and services (%,GDP)	Urban population (%)	Mortality rate, under-5 (/ 1,000)	Life expectancy at birth, total (years)	Population, total	Fertility rate, total	Primary completion rate, (%)
GDP at market prices (curt. US$)	r.	**-.933****	**.551**	**-.418**	**.377**	**-.764****	**-.760****	**.815****	**.938****	**-.801****	**.748**
Agriculture, value added (% ,GDP)	r.	**1**	**-.735****	**.612***	**-.608***	**.853****	**.876****	**-.905****	**-.972****	**.922****	**-.602**
Industry, value added (%,GDP)	r		**1**	**-.985****	**.961****	**-.608***	**-.675***	**.655***	**.603***	**-.701***	**-.901***
Services, etc., value added (%, GDP)	r			**1**	**-.971****	**.503**	**.574**	**-.544**	**-.466**	**.592**	**.903***
Exports of goods and services (%,GDP)	r				**1**	**-.455**	**-.538**	**.509**	**.451**	**-.573**	**-.936****
Urban population (annual %)	r					**1**	**.992****	**-.991****	**-.918****	**.979****	**-.964****
Mortality rate, under-5 (per 1000)	r						**1**	**-.995****	**-.920****	**.993****	**-.851***
Life expectancy at birth, total (years)	r							**1**	**.951****	**-.994****	**.882***
Population, total	r								**1**	**-.949****	**.863***
Fertility rate, total (births/ woman)	r									**1**	**-.854***

**. Correlation is significant at the 0.01 level (2-tailed).; and *. Correlation is significant at the 0.05 level (2-tailed); r. =Correlation

Table 4.2 Presents Pearson correlation coefficients between pairs of the selected variables. The first row of the table shows the correlation coefficients of each

independent variable with dependent variable. The results show a significant negative relation of GDP of market price with agriculture value added (% of GDP). Although not statistically significant, the industry value added (% of GDP) and export value added (% of GDP) have shown a positive relation with GDP at market price, while service value (% of GDP) shown a negative relation with the dependent variable. The relationship with urban population (annual % of total) has a significant a negative relation with the dependent variable. The mortality under age five and the total fertility rate have a significant a negative relation with the dependent variable. Both life expectancy and population have positive significant relation with the dependent variable. The completion of primary education has positive relation but not significant.

4.6 Regression Analysis

Table 4. 3 Regression Analysis of GDP per Capital on Selected Variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
		B	Std. Error	Beta			
1	(Constant)	4788.077	243.791		19.640	.000	
	Export of goods and services (billion US$)	49.847	1.212	.993	41.141	.000	0.974
2	(Constant)	3668.361	121.883		30.097	.000	
	Export of goods and services (billion US$)	34.827	1.242	.694	28.045	.000	0.974
	Final consumption expenditure, etc. (billion US$)	19.658	1.527	.318	12.870	.000	0.963
3	(Constant)	5218.043	497.048		10.498	.000	
	Export of goods and services (billion US$)	36.905	1.231	.735	29.986	.000	0.974
	Final consumption expenditure, etc. (billion US$)	20.836	1.336	.338	15.598	.000	0.963
	Population (million)	-90.416	28.378	-.064	-3.186	.004	0.372

Table 4.4 Multiple Regression of GDP at Market Prices on Selected Variables

JSM 2017 - Business and Economic Statistics Section	Unstandardized Coefficients				
Model	B	Std. Error	Beta	t	Sig.
(Constant)	196578338293	247583916165		.794	.436
Foreign direct investment, net inflows (BoP, current US$)	-.020	.082	-.001	-.241	.812
Agriculture value added per worker (constant 2005 US$)	1511383	1559255	.054	.969	.343
Exports of goods and services (current US$)	-.015	.147	-.009	-.101	.921
Natural gas rents (%, GDP)	-1021069004	1385903160	-.007	-.737	.469
Oil rents (%, GDP)	-15962586	182469032	-.001	-.087	.931
Urban population (% of total)	-372790338	1436542141	-.009	-.260	.798
Services, etc., value added (%, GDP)	-2177554629	1975614281	-.088	-1.102	.282
Population, total	-534.095	2376.899	-.017	-.225	.824
Gross savings (current US$)	.922	.128	.503	7.214	.000
Industry, value added (%, GDP)	-1381381738	1724732400	-.065	-.801	.432
Final consumption expenditure (current US$)	1.098	.076	.486	14.446	.000

Table 4.5 Multiple Regression Analysis of GDP on Selected Variable with Backward Elimination

Variable	Unstandardized Coefficients		Beta	t	Sig.
	B	Std Error			
(Constant)	27812544387	4122405368		6.747	.000
Agriculture value added per worker (constant 2005 US$)	1353066.739	229820.	.048	5.887	.000
Natural gas rents (% of GDP)	-2216132520	685377560.	-.015	-3.233	.003
Services, etc., value added (% of GDP)	-648372107	105753150	-.026	-6.131	.000
Gross savings (current US$)	.910	.023	.497	38.998	.000
Final consumption expenditure (current US$)	1.055	.033	.467	32.126	.000

The residual of dependent variable and the Normal P-P plot are shown in Figure 4.23 and Figure 4.24, respectively. The figures show there exist strong linear relationship between the dependent variable and the independent variables of the selected indicators. As shown in Figure 4.25, the regression of standardized value is within negative one time the standard deviation and positive two times the standard deviation. This fact further confirms the acceptability of the model.

Regression Model:

$$\boldsymbol{Y = 27812544387 + 1353066.739X_1 - 2216132520X_2 - 648372107X_3 + .910X_4 + 1.055X_5}$$

where, $\mathbf{Y} = GDP\ per\ Capital\ (current\ US\$$

X_1 = Agriculture value added (US$)

$\mathbf{X_2}$ = Natural gas rents (% of GDP)

$\boldsymbol{X_3}$ = *Service, etc., value added (% of GDP)*

$\boldsymbol{X_4}$ =*Gross saving (current US$)*

$\boldsymbol{X_5}$ =$Final\ Consumption\ Expenditure,\ etc\ (billion\ US\$)$

5. Conclusion and Recommendation

Conclusion

The statistical analysis of most of the economic development indicators show Saudi Arabian economy is continuously growing. However, in the recent years the growth is slowing down due to various domestic and global factors. Some of the domestic factors which threatening the economic growth are the depletion the oil reserve, extra expenditure in firearms to fight terrorism and the intervention in Yemen's instability. The main global factor for slowing down Saudi Arabia's economy might be the instability in the region, the fall of global oil market and the excess production of oil from newly emerging oil producing countries.

The regression model indicated that, among the selected development indicators, Export of Goods and Services, and Final Consumption Expenditure are the most governing factors for the GDP per capital. This fact supports Saudi Arabia's economic diversification plan is feasible and is the best alternative to maintain growth. Therefore, first let us see Saudi Arabia's existing export activities and recommend further improvement.

Recommendations for Future Work

In this research the statistical analysis of Saudi Arabia's economic growth analysis is conducted. Further detail and much deeper study can be conducted using different economic growth indicators. The overall development of the country can be determined based on the economic development analysis and human development analysis. Saudi Arabia is economically developing, however, various research commented that Saudi Arabia is lagging in human development. Further research can be conducted on the human development analysis.

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