

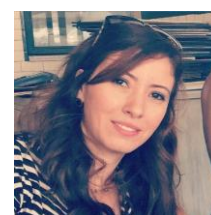


## MULTIPLE REGRESSION ANALYSIS OF DIVERSIFICATION EFFECT ON GDP PER CAPITA: THE CASE OF UAE & SAUDI ARABIA



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### ABSTRACT

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Since the 1990s, the Gulf Cooperation Council (GCC) countries aimed to focus in their economic planning on diversification of their economies that are mainly dependent on oil with varying degrees depending on the country, to avoid the high fluctuations in global oil prices that cause volatility and instability in their national incomes. Applying an empirical and comparative approach for two distinguished economies out of the six GCC countries, namely United Arab Emirates (UAE) and Saudi Arabia (SA), this study aims to use time series data over the period 1980-2014 for both countries to reflect the diversification attempts' effect on GDP per capita. A simple multi-variant regression is applied using the value added contribution of three main sectors: industry, agriculture and services, to test whether changes in the percentages contribution of these factors did have an impact on GDP per capita in these countries over the years. Results concluded that the diversification efforts do affect the level of GDP per capita in both countries with higher statistical significance in Saudi Arabia. Comparing pre and post-diversification eras revealed stronger effect of the sectors' contribution after diversification plans' implementation. UAE appeared to have benefited more than Saudi from the diversification efforts in terms of its GDP per capita level.

**Contribution/ Originality:** This paper shall contribute to the GCC economic literature by providing first empirical analysis of the effect of diversification on GDP/capita for the two biggest countries in the GCC region. The paper provides a benchmark that can be used for the other four countries namely: Bahrain, Kuwait, Qatar and Oman.

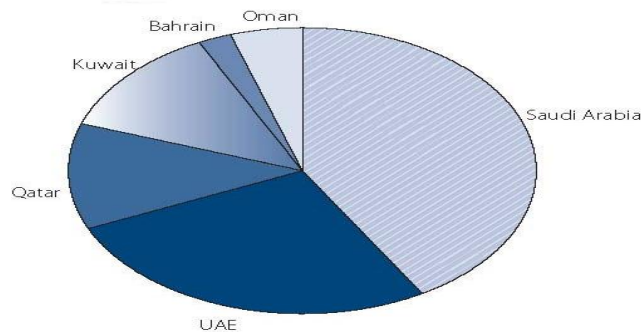
## 1. INTRODUCTION

The Gulf Cooperation Council (GCC) consists of six countries: Bahrain, Kuwait, Qatar, Oman, Saudi Arabia and United Arab Emirates representing an overall GDP as of 2015 of around \$1704.1 billion and an overall approximate 40% of total world oil reserves residing in its land, the largest in the world with 486.8 billion barrels<sup>1</sup>, and 22% of world proven gas reserves.

<sup>1</sup> [www.gcc-sg.org/eng/](http://www.gcc-sg.org/eng/)

Not much abundant research has covered these countries, however in the last two decades more interest has been growing to research these economies from different aspects however research has been hindered due to lack of sufficient statistical data.

The following figure represents a macro outlook showing the relative sizes and shares of the respective countries within the GCC region.



**Figure-1.** Relative size of GCC economies  
Source: Haque (2011).

As the above figure shows, Saudi Arabia and UAE are the biggest two economies in this region. Their relative GDPs as of 2014 according to the [World Bank Economic Indicators Database \(n.d\)](#) are US\$753,832 million and US\$399,451 million respectively. Therefore, choosing these countries is believed to be a good representation of the region. The GCC countries depend largely on the production and export of oil (roughly 40% of the region's GDP and around 80% of its exports) and as many news indicate the depletion of most reserves of oil within 25 years, these countries are extensively working hard to diversify their economies. According to [Shayah \(2015\)](#) 'economic diversification is when the country has incomes from many different sources that are not directly related to each other'. In the past decade, the GCC countries have been sharing promising economic drivers like growing wealth, both sovereign and private due to the increasing oil prices which they tried to use to invest in growing sophisticated projects (huge economic cities, internet, universities' cities equipped with highly advanced technologies, mega islands construction projects, heavy industries, petro-chemical industries, education, tourism, financial services, etc.). Historically, these countries have experienced high income and budget surpluses during high oil prices era and low income accompanied with budget deficits during oil prices downturn (the current situation). To avoid such fluctuations in income statuses, GCC countries and remarkably UAE followed by Saudi Arabia have given high priority for economic diversification aiming to establish some kind of stability and sustainability in income levels over the years. The effect of the implemented efforts of diversification measured by the changes in the contribution of the three main sectors; agriculture, industry (including oil extraction and oil-related production) and services will be examined to see if they explain changes in GDP per capita.

## 2. LITERATURE OVERVIEW

Literature background revealed several studies tackling diversification in GCC countries from several aspects. Since GCC economies highly depend on oil, diversification becomes a mean of controlling risks in these countries ([Hvidt, 2013](#)). Evidence of diversification in the region can be recognized from the decrease in the share of oil and gas to GDP and increase in spending in other sectors with remarkably UAE leading with over 400% increase within three years on industrial infrastructure particularly in aviation, aerospace and defense ([Davidson, 2011](#)). Moreover, diversification in the GCC tackled other sectors, like financial services, education, communication, healthcare and other non-oil related industries. Yet, diversification in this region has been facing lot of challenges due to weak institutions, lack of coordination between public and private sectors, limited investments in research and development, poorly skilled national workforce incapable of meeting the requirements of the private sector,

inefficient legal and regulatory system, and lack of accountability and transparency (Mishref and Al-Balushi, 2015). Saudi Arabia has witnessed great deal of growth in its GDP due to high prices of oil that stayed over almost a decade making Saudi's economy the world's 19th-largest economy. In ten years (2003-2013) its GDP doubled, household income rose by 75 percent, and 1.7 million jobs were created (Al-Kibsi *et al.*, 2015). The United Arab Emirates as well especially Abu Dhabi and Dubai have been investing billions of dollars to diversify their economies in order to diminish reliance on oil and petrochemical sectors. Both the emirates are pumping money into trade, tourism, logistics, aviation, infrastructure and banking and finance (Shayah, 2015). However, all the region including our two chosen countries are faced with obstacles for growth despite their current relatively wealthy economic situation and these challenges can be summarized as follows:

- Future Depletion of oil reserved
- Volatility of global oil prices
- The big share of the government in the employment sector that's funded basically from oil export revenues
- Capability of the governments in ensuring stability and maintaining high living standards for their people

To face the above challenges, solutions by policy makers and economic advisors rotated basically around imposing taxations which is not the topic of this research and diversification of these economies away from the oil sector, which is the main concern of this study.

Basically, theoretical background shows the effect of export diversification in inducing higher per capita income growth (Hesse, 2008). Moreover, Al-Marhubi (2000) in a conventional cross-sectional country growth regression found that export diversification promoted economic growth. Also, Imbs and Wacziarg (2003) have studied the relation between domestic sectoral concentration and per capita income patterns across countries. Partially, their study inspired our methodology that shall relate concentration of sectors through their value-added contribution to GDP and the GDP per capita. Many OECD countries such as Australia, Canada and the Scandinavian countries started out as resource-based economies but succeeded in diversifying their economies (Hesse, 2008) a path that GCC countries are trying to follow to avoid the downfalls in their income during oil downfalls and lot of efforts have been put and planned for.

### 3. METHODOLOGY

The aim of this study is to test the effect of changes in percentages shares of the main sectors (time series data available for agriculture, industry (including oil) and services) in the economy over the period 1980-2014 on GDP per capita in both Saudi Arabia and UAE. The model used will just check for vertical diversification across sectors rather than horizontal diversification (within the same sector). The model is considered simple in its economic terms, unlike the 'Solow growth model' that provides theory based strategy for testing the relationship between export diversification and GDP per capita growth (Hesse, 2008) and other methodologies used in testing the effect of diversifications where many possible growth factors were included in regression analysis. Hesse (2008) in his methodology on testing economic diversification and growth relationship had used several variables including schooling, population growth, investment, export concentration, openness, agriculture/GDP ratio, manufacturing/GDP ratio and services/GDP ratio. Hesse's research was a comprehensive study covering 99 countries but excluding oil-exporting countries which is the aim of this research. The method used here shall be simpler in terms of the number of variables used; however it's believed to add value to the literature by empirically testing the effect of diversification among the main sectors in the economy for two countries that have been putting lot of efforts in this regard. Most research tackling diversification in GCC countries where rather descriptive of the past trends and plans for the future, or policy advices on how these economies can perform better in regard to diversification while pinpointing challenges facing them and recommending policies to overcome these obstacles. The model shall be based on multiple regression analysis to check the effect of the three independent variables (value added contribution of agriculture, industry and services) on the dependent variable (GDP per capita). The

sample of the data consists of time series data covering the period 1980-2014 for two countries seeking diversification Saudi Arabia and United Arab Emirates; data were extracted from the World Bank Development Indicators Database. The simple regression model will be as follows:

$$\text{GDP/Capita} = \alpha + \beta_1\text{Ag} + \beta_2\text{In} + \beta_3\text{Se}$$

GDP/Capita = Annual GDP per capita

Ag = % value added contribution to GDP by the agriculture sector

In = % value added contribution to GDP by the industry sector

Se = % value added contribution to GDP by the services sector

$\alpha$  = the constant that GDP per capita is earned regardless of any factor

$\beta_1$ -  $\beta_3$  = are coefficients of partial regression indicating the effect of each independent variable on the dependent variable ceterus paribus.

The main research question will rotate around three main issues: 1) whether diversification efforts away from the oil sector did really lead to higher GDP per capita. The main hypothesis was derived from literature background on the engines of growth (Singariya and Sinha, 2015) studying the effect of agriculture and manufacturing contribution of GDP per capita growth in India. So, the first research question will be: Is there a positive relationship between the value-added share of agriculture, manufacturing and services on one side and GDP per capita in both Saudi Arabia and UAE on the other side? 2) Then we will examine if the coefficients of the sectors' contribution became stronger after the diversification era (mainly after 2000) and lastly, 3) whether diversification was more effective in UAE or in Saudi Arabia?

#### 4. DATA ANALYSIS

Before undertaking any time series economic analysis, it would be useful to compute the descriptive statistics of all the selected variables and see some time series trends that would assist in the interpretation of the results later. The below tables derived from 'minitab' analysis of the data show the basic descriptive statistics for the data of both countries.

##### UAE

Variable	Mean	StDev	CoefVar	Minimum	Median	Maximum
GDP per capita (current	33346	6945	20.83	22477	32505	45720
Services (% of GDP)	44.59	6.82	15.30	26.85	44.25	57.80
Industry (% of GDP)	54.25	7.29	13.43	40.02	54.98	72.66
Agriculture (% of GDP)	1.2995	0.5745	44.21	0.4906	1.1639	2.3332

##### Saudi Arabia

Variable	Mean	StDev	CoefVar	Minimum	Median	Maximum
GDP per capita (current	11530	5635	48.87	5791	8569	24883
Industry (% of GDP)	53.67	8.60	16.03	37.82	51.68	71.49
Services (% of GDP)	42.34	7.35	17.35	27.52	42.87	57.25
Agriculture (% of GDP)	3.960	1.764	44.56	0.986	4.216	6.343

It is realized that average GDP per capita in UAE is higher than the Saudi average individual income with higher contribution of both industry and services sectors. Looking at the allocation of the Saudi economy across the three main sectors at different time intervals from 1980 up to 2014, it can be noticed that there's a decrease by almost 15% in the contribution of the industry sector (mainly oil) for the favor of the services sector (education, healthcare, transportation, financial services, etc.) as presented in the below figure. Contribution of the agricultural sector showed a boost in the 1990s due to the investments in wheat as a strategic commodity to achieve self-satisfaction, however investments showed to be more costly than importing it which lead to deviation away from these investments in the following years.

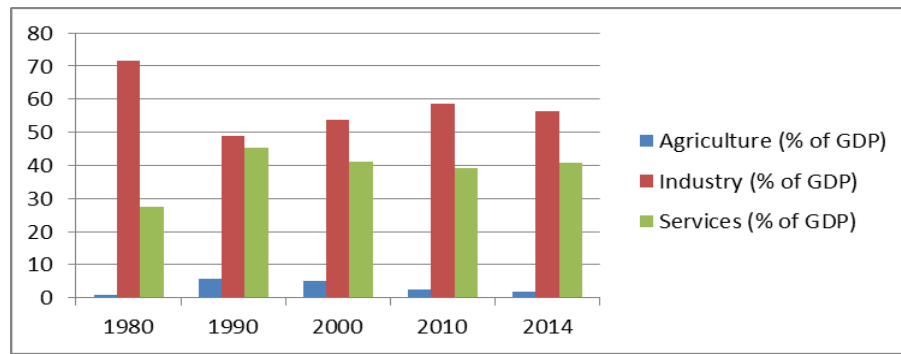


Figure-2. Economic Contribution by Sector in Saudi Arabia

Source: World Bank Database

Similarly, it is noticed that the UAE economy has decreased its oil contribution to GDP over the specified period by almost 17% to the favor of the services sector (education, healthcare, technology, tourism, etc) as presented in the below graph:

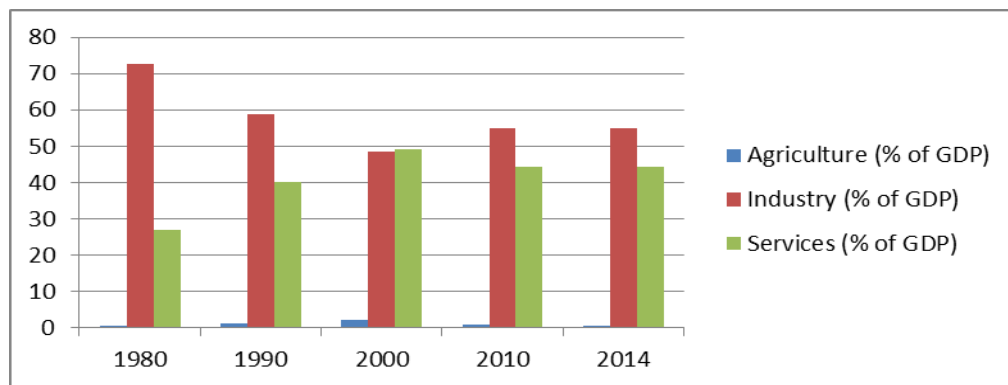


Figure-3. Economic Contribution by Sector in UAE

Source: World Bank Database

Therefore, it's clear that diversification efforts in both countries are reflected in the changes of contribution by each sector. But through mere observation, did this help in elevating the GDP per capita over the specified period? A surge in GDP per capita in Saudi Arabia is well recognized from 1980 to 2014 as shown below:

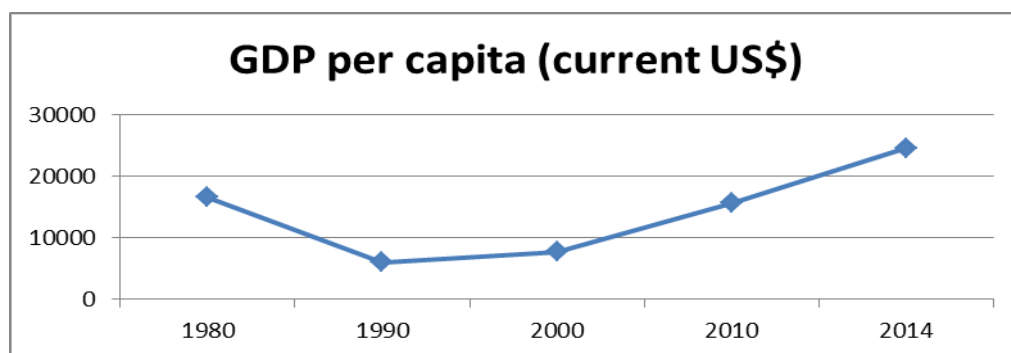


Figure-4. GDP per Capita Trend in UAE

Source: World Bank Database

In UAE, it is noticed that after the diversification efforts that started in 1990s but surged after the 2000's that the GDP per capita has been increasing and reaching a similar level to what it was in 1980 before the drop of global oil price in the 1980s and the two Gulf Wars that all had its negative impact on income.

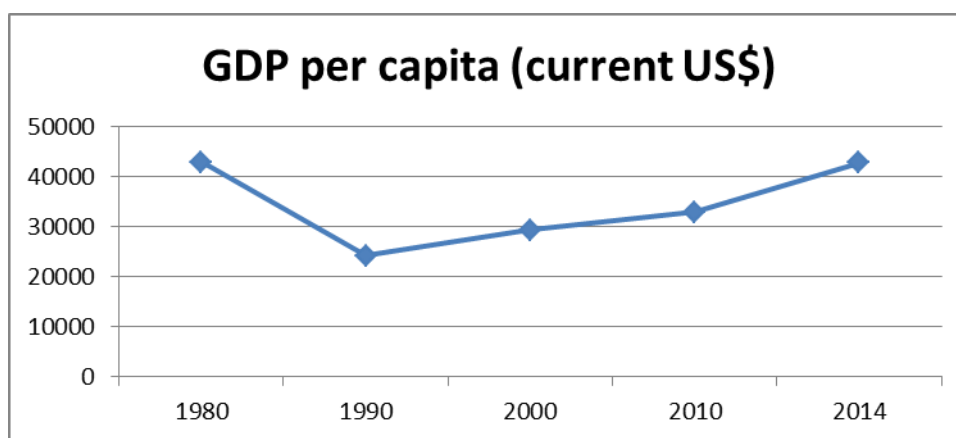


Figure-5. GDP per Capita Trend in Saudi Arabia

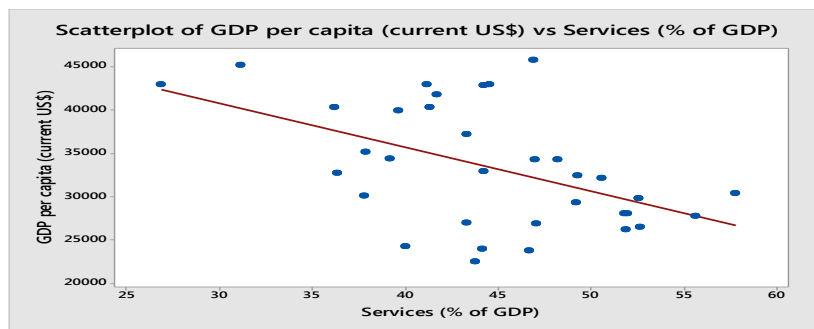
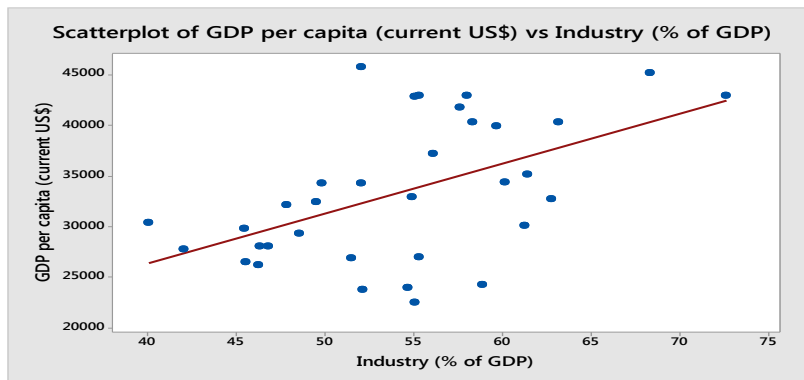
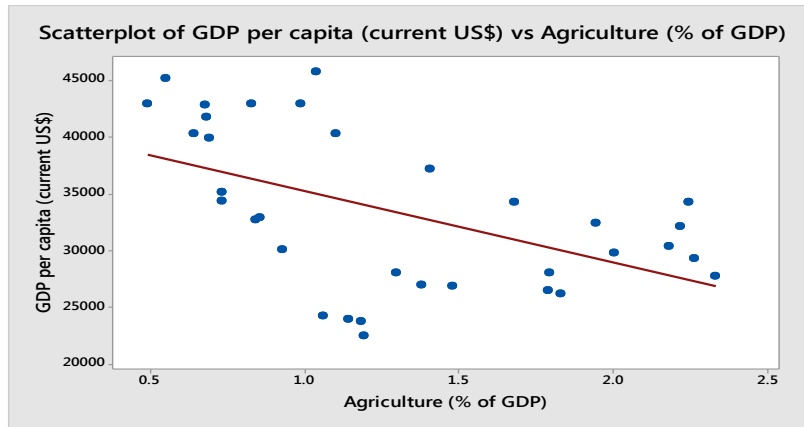
Source: World Bank Database

So, it can be deduced that there appears to be kind of positive relationship between diversification efforts starting effectively after the year 2000 with the higher GDP per capita, but can this be proven statistically. The following section will try to focus on this point and test empirically by applying simple multiple regression analysis to check the relationship between the contributions of each sector on the GDP per capita. The research will examine three main hypotheses by regressing our GDP per capita in both countries on agriculture, industry and services sectors simultaneously and separately for 34 years. The first hypothesis tests the existence of a significant relationship between the value added share of each of the three main sectors in the economy and the GDP per Capita of these economies. A significant positive relationship indicates that expansion of the share of any of the sectors contributes to higher GDP per capita, however a negative relationship will indicate an expansion in one of the sectors will lead to lower GDP per capita. The second hypothesis will check if the relationship between the level of GDP/capita and each sector became stronger after diversification efforts implementation. This will be assessed by two separate regression equations estimating for the two time periods before diversification plans implementation (1980-1999) and after (2000-2014). If the coefficient of the post diversification plans implementation turned out to be stronger than the coefficients of the pre diversification efforts implementation then this will support the idea that diversification lead to higher levels of GDP/capita. The third hypothesis will test if the coefficients of the sectors' contributions were stronger for UAE than Saudi Arabia. The research will proceed with full analysis of UAE's economy followed by the Saudi economy.

#### 4.1. UAE's Regression Analysis

- 1- *Hypothesis #1: Is there a relationship between the value-added share of agriculture, industry and services sector and the level of GDP per capita?*

Before running the regression, the linear relation between the dependent variable and each of the independent variables is tested. Below are the scatter plots that show a kind of linear relation between the GDP/Capita in UAE and each of the sector's contribution to GDP.



#### 4.1.1 Regression Equations

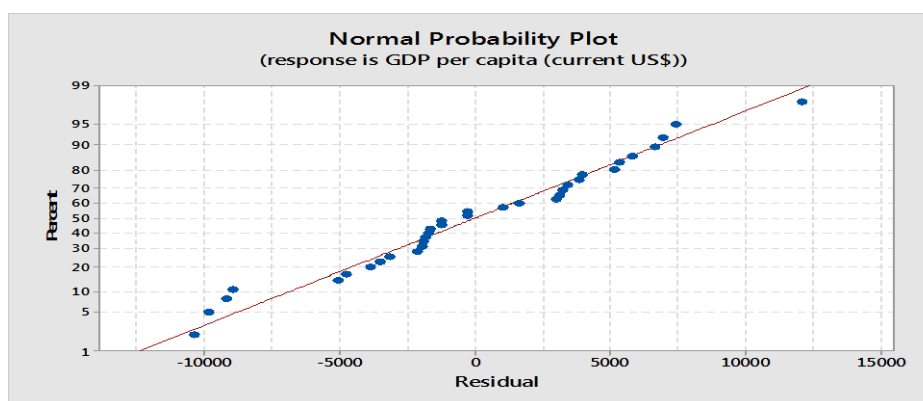
Running the regression analysis in minitab using time series data of 34 years, the following regression equation for UAE is retrieved:

$$\text{GDP per capita (current US\$)} = -849068 + 2438 \text{ Agriculture}(\% \text{ of GDP}) + 8935 \text{ Industry}(\% \text{ of GDP}) + 8848 \text{ Services}(\% \text{ of GDP})$$

The regression equation indicates that GDP/capita is positively related to each of the three main sectors in the economy. The coefficients show the effects of each sector's percentage increase on the GDP per capita. For example, the value of  $\beta_1=2438$  indicates that an increase of 1 % of agricultural contribution in the economy will lead to \$24.38 average annual increase in the Emiratis individual income. The value  $\beta_2 = 8935$  indicates that if industry's (including oil) contribution to the economy increases by 1%, an average annual income for an individual in UAE will increase by \$89.35. Moreover,  $\beta_3 = 8848$  means that every 1% contribution of the services industry does increase the GDP per capita by \$88.48 on average.

We also checked for the multivariate normality of the residuals and we get as per the below graph many of the points laying on or very close to the line, with very few outliers, which reflects that the distribution is very close to normal.





#### 4.1.2. Coefficient of Determination

If we look at the  $R^2$  of the regression it turned out to be 41.06% indicating that 41.06% of the GDP/Capita value is explained by the variations in the value added contributions of the three sectors simultaneously. Of course this percentage indicates that definitely there are other factors that determine GDP/capita and that may include the value of exports, exports concentration, investments level, schooling and other factors that are not included within the scope of this study. When analyzing the statistical significance (p-values) of the coefficients of each sector we find out that industry and services sectors are statistically significant but not the agricultural sector. However, when we regress GDP/capita on the value added share of agriculture alone, we find a significant negative relation indicating that an expansion in the agriculture sector affects GDP/capita negatively. This exactly coincides with Singariya and Sinha (2015) findings of India where the authors concluded that the industry sector acted as the support for the engine of growth and not the agriculture sector.

Below, we present our regression results for the three sectors simultaneously followed by the regression of GDP per Capita on each sector separately.

**Model-1.** UAE Regression Analysis: GDP per cap versus Agriculture (% , Industry (% , Services (%)

Term	Coef	SE Coef	T-Value	P-Value
Constant	-849068	355906	-2.39	0.024
Agriculture (% of GDP)	2438	4084	0.60	0.555
Industry (% of GDP)	8935	3543	2.52	0.017
Services (% of GDP)	8848	3602	2.46	0.020

**Model-1 A.** Regression Analysis: GDP per capita (current US\$) versus Agriculture (% of GDP)

Term	Coef	SE Coef	T-Value	P-Value
Constant	41552	2583	16.09	0.000
Agriculture (% of GDP)	-6315	1822	-3.47	0.002

$$\text{GDP per capita (current US\$)} = 41552 - 6315 \text{ Agriculture (\% of GDP)}$$

**Model-1 B.** Regression Analysis: GDP per capita (current US\$) versus Industry (% of GDP)

Term	Coef	SE Coef	T-Value	P-Value
Constant	6513	7883	0.83	0.415
Industry (% of GDP)	495	144	3.43	0.002

$$\text{GDP per capita (current US\$)} = 6513 + 495 \text{ Industry (\% of GDP)}$$



**Model-1 C.** Regression Analysis: GDP per capita (current US\$) versus Services (% of GDP)

Term	Coef	SE Coef	T-Value	P-Value
Constant	56048	7026	7.98	0.000
Services (% of GDP)	-509	156	-3.27	0.003

GDP per capita (current US\$) = 56048 - 509 Services (% of GDP)

Our results coincide again with Singariya and Sinha (2015) interpretation of the engine of growth argument stating that if the coefficient of manufacturing shares is substantially higher than the coefficient of agriculture share this is interpreted as a support for the engine growth theory which eventually lead to higher GDP/capita. Also, if the coefficient of manufacturing share is significant and the coefficient of agriculture is not, this is interpreted as support of the engine of growth argument. This lead to test for mediation effect following the procedure of Baron and Kenny (1986) methodology, which involves three regression equations. First, the mediator should be regressed on the independent variable. Second, the dependent variable should be regressed on the independent variable. Third, the dependent variable should be regressed on both the independent variable and the mediator. Four conditions must hold for a successful test of full mediation: (1) the independent variable must be significantly related to the mediator in the first equation, (2) the independent variable must be significantly related to the dependent variable in the second equation, (3) the mediator must be significantly related to the dependent variable in the third equation and (4) the effect of the independent variable (agriculture in our case) reduces in size and becomes non-significant in the third equation when the mediator is also introduced (Khaldi, 2006).

#### 4.1.3. Multi-Collinearity

Testing for multi-collinearity in the independent variables (the economic sectors) in UAE, there appeared quiet high correlation between all the sectors but specifically significantly high was the correlation between the services sector and the industry sector that was shown in the correlation matrix at a level of 99% as well as the Variance Inflation Factor (VIF) which was way high. This explains why the signs of the predictors converted when applying the multiple regression from what they were in the simple regression. This violates one of the regression assumptions and suggest that the predictors in the model may not have been so accurate which is understandable in our case as we know there are many other factors that affect the GDP per capita in UAE other than the allocation of economic sectors. Also, the multicollinearity between the industry and services sectors is highly understandable as observed from the time series data that the deduction in the value added share of the industry sector is all added to the value added share of the services.

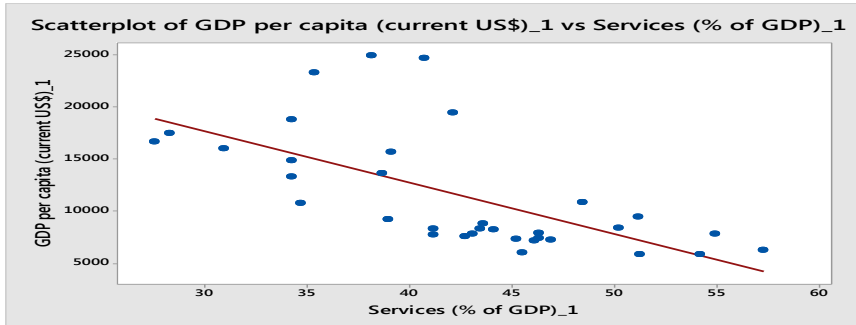
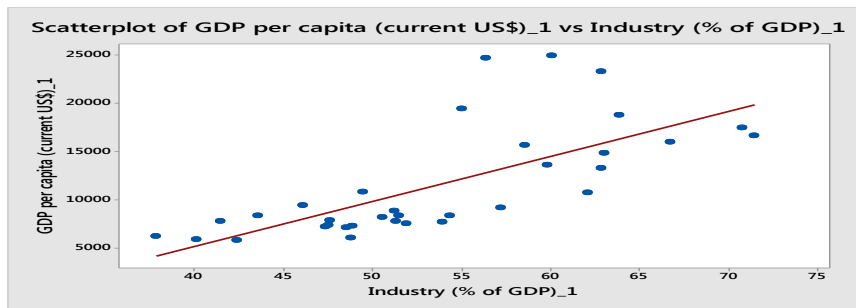
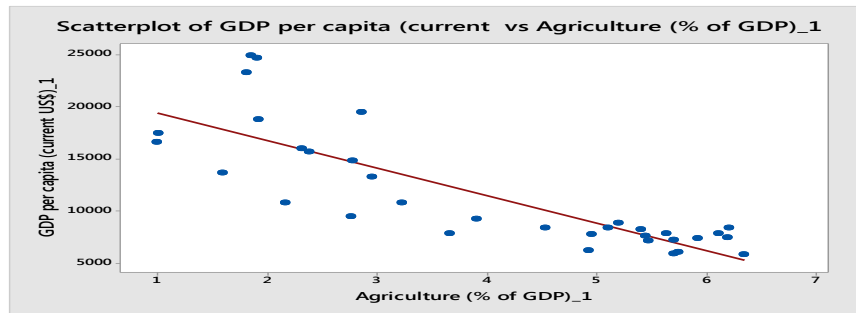
2- *Hypothesis #2: Does the relationship between the value-added share of agriculture, industry and services sector and the level of GDP per capita gets stronger after diversification had been implemented?*

To show the effect of diversification whether it was effective in leading to higher GDP/Capita, we followed same methodology of Singariya and Sinha (2015) in testing whether the effect of the value added share of the manufacturing sector on GDP per capita in India was stronger in different periods (1971-1991) and (1992-2013). Therefore, we regressed GDP/Capita on the value added shares of the three sectors at different periods pre-diversification plans implementation (1980-1999) and after diversification implementation (2000-2014). Regression equations for the two periods differed showing the coefficients of pre-diversification efforts are substantially lower than the post-diversification coefficients, this can be interpreted as support of the hypothesis that yes diversification does have stronger positive effect on GDP/Capita. Also, it's worth mentioning that multicollinearity measured through the VIF between the industry and services was much less before the diversification era which proves that the correlation after the diversification is due to the fact that the diversification is mainly going from the industry side to the services side (tourism, media, education, healthcare, financial services, etc.).

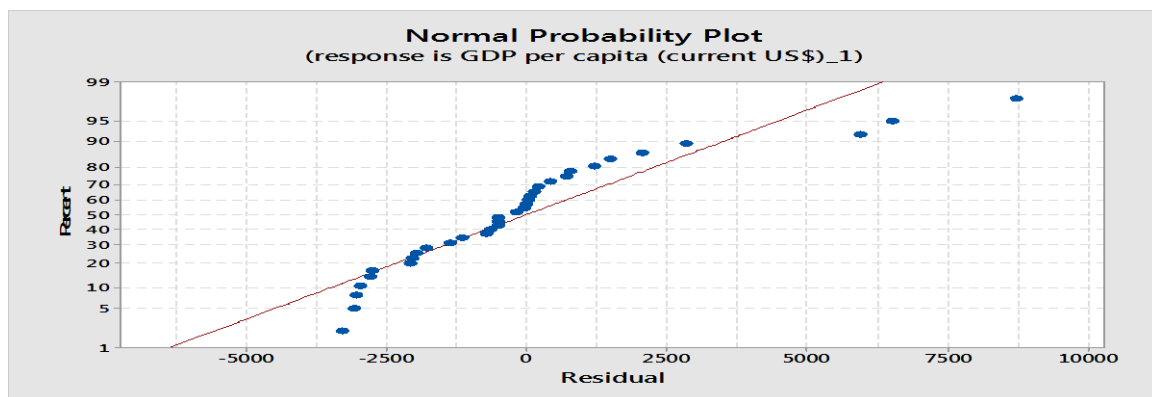
### 4.3. Saudi Arabia Data Analysis

1- Hypothesis #1: Is there a relationship between the value-added share of agriculture, industry and services sector and the level of GDP per capita?

Checking for linearity in the Saudi Economy, we get the following kind of linear relation between the GDP/Capita and each of the three economic sectors:



When checking for normality, the distribution of the residuals from the regression does not seem to have a normal distribution as shown in the below graph:



### 4.3.1 Regression Equation

$$\text{GDP per capita (current US\$)}_{-1} = 922380 - 10950 \text{ Agriculture (\% of GDP)}_{-1} \\ + 8961 \text{ Industry (\% of GDP)}_{-1} - 9129 \text{ Services (\% of GDP)}_{-1}$$

The regression equation indicates that GDP/capita is negatively affected by the agriculture and the services sectors but not the industry sector. The coefficients show the effects of each sector's percentage increase on the GDP per capita. For example, the value of  $\beta_1 = -10950$  indicates that an increase of 1 % of agricultural contribution in the economy will lead to \$109.5 average annual decrease in the Saudi individual income. The value  $\beta_2 = 8961$  indicates that if industry including oil contribution to the economy increases by 1%, an average annual income for an individual in Saudi will increase by \$89.61. Moreover,  $\beta_3 = 9129$ , means that every 1 % contribution of the services industry does decrease the GDP per capita by \$91.29 on average. It seemed that the positive effect of the industrial contribution out ways the negative effects of the other two sectors. The coefficient of determination proves that 76.63% of the value added contribution by the sectors does determine the level of GDP per capita in Saudi. Looking at the statistical significance of each sector in the multiple regression analysis we find that all p-values are less than 0.05 which make them statistically significant in determining the level of GDP per capita. When regressing GDP/Capita on each sector separately, we see highly positive effect of the industry while the other two sectors remain negative. Though negative relation with the agriculture sector is highly understandable as the climate in Saudi is so tough and unsuitable for agricultural growth it's very costly and inefficient to grow up these products, as for the negative relation with the services we can relate this to the fact that the services industry requires high investments that will show their positive effect on GDP/capita level on the long run. Since diversification in Saudi started lately converting the negative effect of the services sector into positive may require more years in the future for the spending in this sector to materialize.

**Model-2.** Saudi Regression Analysis: GDP per cap versus Agriculture (% , Industry (% , Services (%)

Term	Coef	SE Coef	T-Value	P-Value
Constant	922380	297332	3.10	0.004
Agriculture (% of GDP) <sub>-1</sub>	-10950	2904	-3.77	0.001
Industry (% of GDP) <sub>-1</sub>	-8961	2973	-3.01	0.005
Services (% of GDP) <sub>-1</sub>	-9129	2986	-3.06	0.005

**Model-2 A.** Regression Analysis: GDP per capita (current US\$)<sub>-1</sub> versus Agriculture (% of GDP)<sub>-1</sub>

Term	Coef	SE Coef	T-Value	P-Value
Constant	21950	1384	15.86	0.000
Agriculture (% of GDP) <sub>-1</sub>	-2631	320	-8.22	0.000

Regression Equation

$$\text{GDP per capita (current US\$)}_{-1} = 21950 - 2631 \text{ Agriculture (\% of GDP)}_{-1}$$

**Model-2 B.** Regression Analysis: GDP per capita (current US\$)<sub>-1</sub> versus Industry (% of GDP)<sub>-1</sub>

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-13354	4444	-3.01	0.005	
Industry (% of GDP) <sub>-1</sub>	463.6	81.8	5.67	0.000	1.00

Regression Equation

$$\text{GDP per capita (current US\$)}_{-1} = -13354 + 463.6 \text{ Industry (\% of GDP)}_{-1}$$

**Model-2 C.** Regression Analysis: GDP per capita (current US\$)\_1 versus Services (% of GDP)\_1

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	32334	4471	7.23	0.000	
Services (% of GDP)_1	-491	104	-4.72	0.000	1.00

Regression Equation

$$\text{GDP per capita (current US$)}_1 = 32334 - 491 \text{ Services (\% of GDP)}_1$$

#### 4.3.2. Multicollinearity

Similar to UAE, Saudi Arabia shows high correlation between the Industry and services sectors at the level of 98.9% as well as the VIF which was way high. This violates one of the regression assumptions and suggests that the predictors in the model may not have been so accurate due to many other factors that affect the GDP per capita in Saudi other than the allocation of economic sectors. Also, the multicollinearity between the industry and services sectors is clearly observed from the time series data that the deduction in the value added share of the industry sector all moved to the value added share of the services.

2- *Hypothesis #2: Does the relationship between the value-added share of agriculture, industry and services sector and the level of GDP per capita gets stronger after diversification had been implemented?*

Again, similar analysis for diversification effect in UAE was applied to Saudi Arabia based on Singariya and Sinha (2015) methodology for India, we regressed GDP/Capita on the value added shares of the three sectors at different periods pre-diversification plans implementation (1980-1999) and after diversification implementation (2000-2014). Regression equations for the two periods differed showing, the coefficients of pre-diversification efforts are substantially lower than the post-diversification coefficients, this can be interpreted as support of the hypothesis that yes diversification does have stronger positive effect on GDP/Capita. Also, it's worth mentioning that multicollinearity measured through the VIF between the industry and services was much less before the diversification era which proves that the correlation after the diversification is due to the fact that the diversification is mainly going from the industry side to the services side (tourism, media, education, healthcare, financial services, etc.).

3- *Hypothesis #3: Is diversification effect stronger in UAE than it is in Saudi Arabia?*

We have compared the regression coefficients after diversification in both UAE and Saudi Arabia, we see stronger effect in the UAE economy, suggesting that UAE had been more effective in implementing its diversification plans, a result that agrees with Shayah (2015) that declares that UAE have achieved lot of diversification targets compared to the less diversified Saudi Economy.

## 5. CONCLUSION

Implementing simple multiple regression analysis to test the effect of diversification effort in two Gulf countries that have been planning to move their economies away from the high dependence on oil have been examined with few challenges. GDP/Capita depends on so many factors other than the value added contribution of sectors and literature has highlighted on these factors with different groupings. The research tried to limit the scope of analysis to just the percentage contribution of agriculture, industry and services sectors as factors that determine the level of GDP/Capita while knowing the limitations of this study as definitely more factors can explain more significantly and thoroughly the dependent variable. Results have suggested that there is significant strong positive relation in UAE between the GDP/capita level and the contribution from both industry and services sectors but not significant contribution from the agriculture. For Saudi, all sectors showed significant effect on GDP/capita level. When distinguishing between two eras before and after diversification, stronger coefficients were perceived after the year 2000 which can be considered the start

of diversification plans implementation, and thus supports our hypothesis that diversification really lead to higher levels of GDP/Capita in both countries. When applying cross comparison, UAE showed stronger contributions of its sectors on GDP/Capita than Saudi which lead us to conclude that UAE has done greater efforts in regard to diversifying its economy. The main concern of this research results is the existence of multicollinearity between the industry and services sectors in both countries which is understandable as recognized from the time series data that the decline in the value added share of the industry sector mostly went to the services sector (tourism, education, healthcare, transportation, communication, financial services, etc.). which may open the room for future research that may include further categorizations of the sectors in both economies (specifically sub-categorization of the industry and services sectors) as well as including other factors in determining the level of GDP/capita like population growth, schooling, exports, and the like.

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