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Six oil abundant Gulf countries, cursed or blessed?

An empirical research of the presence of the resource curse in rental states

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Abstract

An empirical analysis has been done to observe the effects that the sector growth has in the countries that are part of the Gulf Cooperation Council on regional and individual economic growth. These countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. When running a panel data model with fixed effects, it appears that for most countries economic diversification is not improving over time. Policy implementations and regional efforts do not provide enough support to drive growth in all sectors. The manufacturing sector is hardly of influence to economic growth for almost all countries. For half of the countries, the oil sector is still the main driver of economic growth. The other half has a services sector with a strong influence on economic growth. Finally it appears that tourism is a sector that is strong in all countries except Saudi Arabia, whose service sector is led by the transport sector.

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1 Introduction

Many scientists have tried to explain what happens when a country discovers natural resources and how that influences the economy. Many conclude that the exploitation of natural resources could lead to a reduction of economic growth, and many countries have ended up being poorer than they were before the discovery[1]. This phenomenon is called the *resource curse* and several channels are provided to explain what drives this phenomenon, such as the so-called *Dutch Disease*.

The Dutch disease is a term that originated in the nineteen sixties when the Netherlands discovered a big field of natural gas. The export of this product became a booming industry, but at the expense of the country's traditional manufacturing sector. Countries like Australia, the United Kingdom and Norway experienced similar setbacks. Apparently being abundant in natural resources is something that might actually cause a barrier to the long-term economic growth of the country. The countries mentioned above managed to diversify their economies in such a way that the long-term negative effect is not noticeable anymore nowadays, but some other countries like Mexico, Nigeria and Venezuela were not that successful.

Many studies find that developing countries with abundant natural resources are ironically disadvantaged since their economic development occurs slower than that of other developing countries[2]. Sachs & Warner (1997) were one of the first scientists to test empirically whether the resource curse exists. Many scientists have used their data and model as a basis for their own research. These empirical analyses have provided more clarity about the indicators of the resource curse. Institutional quality is a major influence on the relationship between natural resources and economic growth (Gylfason (2004) and Mehlum, Moene and Torvik (2006)). Boschini, Petterson and Roine (2007) find that it is not only the institutions but also the type of natural resources that define the possibility of a resource curse. Also the openness of the country to trade is of influence to economic growth (Arezki and Van der Ploeg (2007)).

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1 For example Sachs & Warner (1997), Gylfason (2004) and Arezki and Van der Ploeg (2007).

2 More details can be found in the articles by Auty (1993), Sachs & Warner (1997), Gylfason et al (1999) and Mehlum, Moene and Torvik (2006).

In this research the resource curse phenomenon will be observed through economic diversification and economic growth. When a country faces a boom in their natural resources or an increase in its resource revenue, some sectors might not benefit as explained by the Dutch Disease. To ensure long-term growth, it is important that more than one sector is driving this growth. The countries tested in this research are the six states that are part of the Gulf Cooperation Council (GCC). These countries are Bahrain, Oman, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates (UAE). These six countries are unique compared to many others because of their numerous common features like their welfare systems, the enormous share of expats that are working in the country and their hydrocarbon reserves and revenues. Because of the latter, all countries have generated a vast amount of wealth per local inhabitant. However, there are some indications that Bahrain and Oman are running out of oil and gas[3]. This would have disastrous consequences for these countries if their GDP and economic growth would still be dependent on the oil revenues. Harb (2008) finds however, that five of the six countries are not dependent in the long run on their oil revenues to drive economic growth. In the short run there is still a slightly negative relationship between the two. Coury and Dave (2009) also confirm this result.

It is important to know for the six GCC countries what is driving their growth. Which sector is leading economic performance and did the countries manage to diversify the economy of the region?

First this chapter will go into more detail about the six countries that are part of the GCC and their economic situation since 1980. Chapter 2 will provide an overview of the theory of the resource curse and the empirical tests that have been performed. Chapter 3 will explain the model and data used to analyze this phenomenon for the Gulf countries. Chapter 4 will give an analysis of the results and chapter 5 concludes.

[3] For more details see the overview of the European Central Bank (2008)

1.1 The Cooperation Council for the Arab States of the Gulf

In 1981, the leaders of the six countries, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates came together and agreed that because of their strong ties in kinship, culture and structure they should work together to face the future economic challenges. The objective of the new founded council was mainly to create a region where inter-country trade was open and substantial for all countries. It would become an open area that would cooperate and create a strong front in the international market[4]. In the past two decades, trade barriers have been taken down by implementing structural changes including free movement of products, capital, services and national labour[5]. Other reforms that Fasano and Iqbal (2003) mention are the permission all GCC nationals have to own real estate in all member states and the harmonization of the bank sector. The next step is to increase the employability of its work force to become less dependent on the expatriates.

The region hosts almost 38 million inhabitants and has an aggregate GDP of $412 billion[6]. The countries of the GCC are oil and gas abundant, making them among the richest states in the world. However, according to the study of Sturm et al (2008) they are also still very resource dependent. Their oil reserves represent 42% of global oil reserves and their gas reserves account for 23% of global gas reserves. About 70% of oil revenues account for export revenues and for around 80% of government revenues. The oil share in GDP within the GCC region is about 50% on average[7]. Since a few years, it has become clear that for some of these countries, other forms of income are necessary since their oil and gas reserves are running out. This is especially the case for Bahrain and Oman, for which this moment of complete depletion is most near, but also the other countries are aware of the possible consequences of not diversifying their economies. What is going to ensure their trade balance surplus when oil is not part of their exports anymore? Another challenge they face is their fiscal policy that is constrained by high domestic debt service payments. To maintain the level of wealth currently existing within the

4 www.gccsg.org, More details about the agreement are written in the United Economic Agreement.

5 More details about the regional changes can be read upon in the book of Fasano and Iqbal (2003).

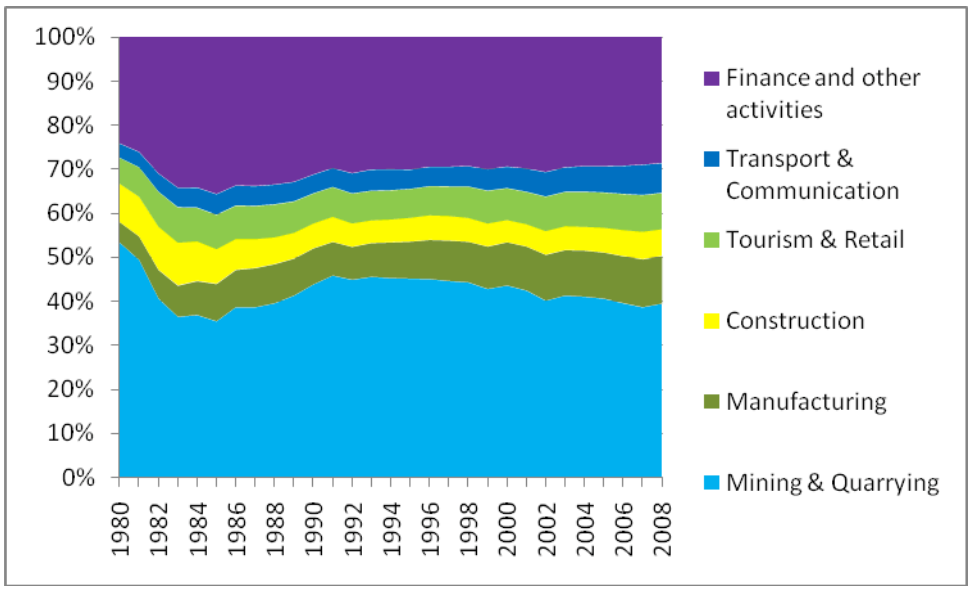
6 Data of the United Nations Statistic Division are used to calculate regional aggregates.

7 Numbers are taken from the research of Sturm et al (2008).

countries, fiscal policy should be created keeping a conservative oil price mind. Nationally and internationally they announced all kind of policy changes to make this diversification part of the future, but until now it has not been clear to what extent these changes have actually helped concerning economic growth. Graph 1.1 shows an overview of the added value of the different sectors as percentage of GDP for the GCC region within the period of 1980 to 2008[8]. It is clear that the mining and quarrying sector has lost some of its share to other sectors. All other sectors have grown since 1980 apart from the 'other activities' sector that includes finance and education. This sector has lost part of its share after 1984. The three sectors that show the biggest growth in share of GDP between 1980 and 2008 are Manufacturing, Tourism & Retail and Transport & Communication.

When establishing the GCC region the first and most severe progress toward regional integration has been made. The goal of turning the region into a common market is still not reached. A common external tariff has been implemented in the region, but individual country regulations on areas like foreign investment and ownership are still not harmonized.

Graph 1.1: Added value of sectors as percentage of GDP for GCC 1980 – 2008



[8] Data used to produce graphs 1.1 to 1.7 are taken from the United Nations Statistics Division.

1.2 The Six countries of the GCC

In the past years the six Gulf countries have implemented different policies to diversify their economies and become less dependent on oil. All the six countries are facing a population growth of 3.2% on average in the past years, which led to a young population (Sturm et al (2008)). Most locals are employed in the public sector and the government is facing a limit in possible job creation. Official unemployment figures are not available, but the United Nations estimated these figures to lie between 6% for the UAE and 26% for Saudi Arabia[9]. To solve this problem the government needs to diversify its economy since the oil sector is very capital intensive and has a limited need for labour. According to an overview of Sturm et al (2008), comprised of gathered data from the IMF, AMF, World Tourism Organization, CIA World Fact book and national authorities, there are different trends appearing in the region. The work of Fasano and Iqbal (2003) confirm these trends and they will be provided in more detail below.

1.2.1 Kingdom of Bahrain

Graph 1.2 shows the development of the different sectors since 1980 in Bahrain[10]. It is clear that between 1980 and 1985 an increase of activity has taken place in the finance sector. The mining and quarrying sector was the one that decreased in percentage as part of GDP. Since 1985 the share of the sectors as part of GDP stabilized and only transport & communication and manufacturing increased a bit while finance decreased slightly.

Other research[11] has confirmed that Bahrain is known to be the new financial hub of the GCC region. Especially in Islamic Finance they are leading in the Middle East. They were the first country to issue Islamic government bills to harmonize the institutions that practice Islamic Finance and improved the regulations for Islamic banking[12]. Graph 1.2 shows that tourism is also a stable and important sector within Bahrain. Especially regional tourism is something the country has been focussed on.

[9] For the other countries the unemployment rates of youth of the age 15-24 provided by the United Nations (2009) are 17% for Qatar, 19% for Oman, 21% for Bahrain and 23% for Kuwait.

[10] Data used to produce graph 1.2 are taken from the United Nations Statistics Division.

[11] The research of Sturm et al (2008) and Fasano and Iqbal (2003) will provide more details about the development of the different sectors.

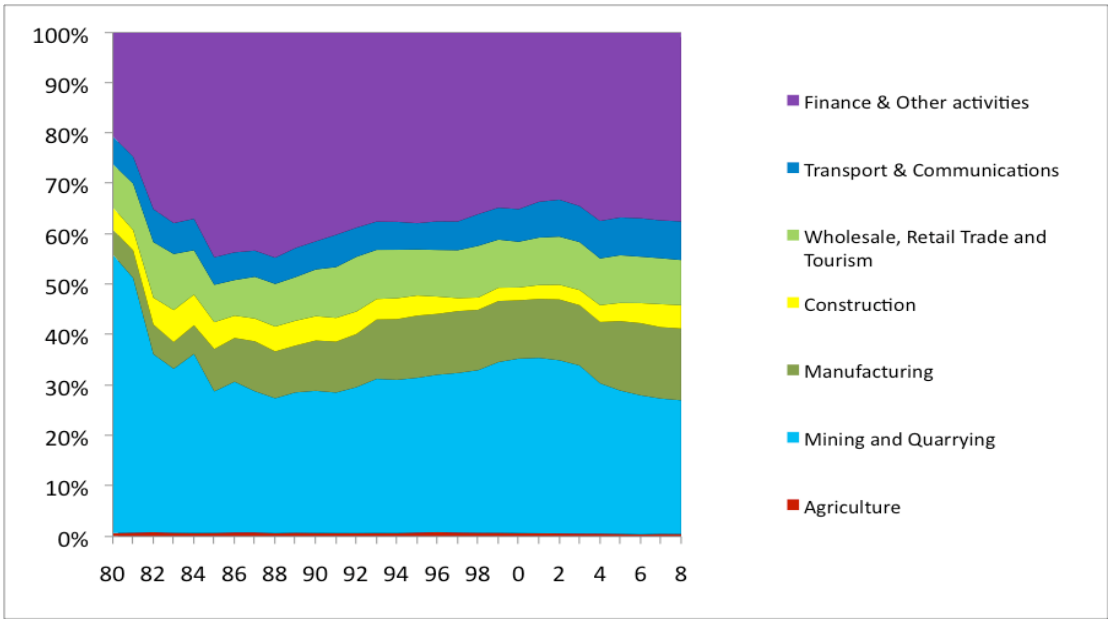
[12] Information is taken from the research of Fasano and Iqbal (2003).

The government has liberalized several tourism facilities and the public transport company. The postal services and telecommunications sector has been privatized recently[13].

There are two products contributing to the export revenue of Bahrain. The main export products are petroleum related and account for 70% of total export. Te other product of importance to Bahraini export is aluminium. The two main countries exported to are Saudi Arabia and the United States[14]. The trade surplus of Bahrain is $2.2 billion however a deficit is recorded with several countries in Asia and Europe.

Foreign Direct Investment (FDI) inflows have decreased between 2006 and 2007 to $1.7 billion. Outflows on the other hand almost doubled in this period to $1.6 billion. Inward FDI stocks accounts for 65 percent of GDP and stock outflows for almost 40 percent of GDP[15]. Fasano and Iqbal (2003) mention some regulations to attract FDI inflows to Bahrain like the possibility of 100% ownership by non-GCC members of companies and buildings. Apparently so far this has not been successful.

Graph 1.2: Added value of sectors as percentage of GDP for Bahrain 1980 – 2008



13 For more details see the overview of Fasano and Iqbal (2003).

14 Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

15 Data are gathered from UNCTAD World Investment Report 2009.

1.2.2 State of Kuwait

In Kuwait only the mining and quarrying sector and the finance sector combined with other activities have been fluctuating in the past 30 years (see graph 1.3[16]). The other sectors have pretty much been stable as percentage of GDP. Only the transport and communication sector has slightly increased since the second half of the nineties. According to the work of Sturm et al (2008) the country is working on its finance sector, which is indeed increasing generally since 1995. To enhance this sector, Kuwait has adopted a foreign investment law to allow non-GCC individuals to own and trade shares on the Kuwait Stock Exchange[17]. A privatization law has been approved to improve the investment climate. However, the FDI inflows have remained the same between 2006 and 2007 and also the FDI stocks inflow did not change significant between 2006 ad 2007. The outflows have increased and also the outward stocks have made a jump from 4.4% of GDP in 2000 to 13.3% of GDP in 2007[18].

For Kuwait the main export product remains oil and it accounts for 93% of total export in 2007. The main receivers of the oil were several countries in Asia and Iraq. The trade balance has a surplus of $16 billion although large deficits exist with North America, and many Asian countries [19]. However, Kuwait is still very dependent on their oil production and reserves looking at the percentage of GDP it still represents.

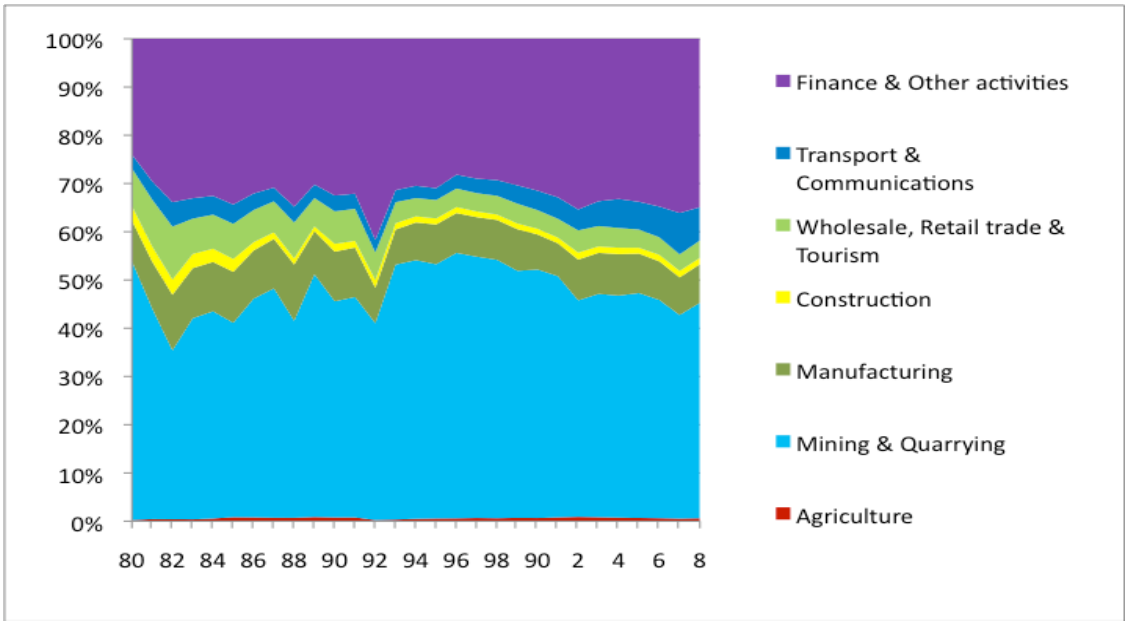
16 Data used to produce graph 1.3 are taken from the United Nations Statistics Division.

17 According to Fasano and Iqbal (2003) this is the only structural reform conducted in Kuwait for the financial sector.

18 Data are gathered from UNCTAD World Investment Report 2009.

19 Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

Graph 1.3: Added value of sectors as percentage of GDP for Kuwait 1980 – 2008



1.2.3 Sultanate of Oman

As can be seen in Graph 1.4, the added value of the construction sector as percentage of GDP has decreased in the late eighties. In that period, a small increase occurred in the mining and quarrying sector. Between 1990 and 2000 everything remained stable for the manufacturing and transport & communications sectors to increase from then on. The mining and quarrying sector incurred a loss in percentage of added value to GDP since 2000.

Fasano and Iqbal (2003) confirm this development of the manufacturing sector to a certain extent. They also stress the improvements Oman has made to attract foreign direct investment inflow. One improvement they mention is the possibility for non-GCC firms to own buildings and lease land. Another reform is the lowering of tax disparity between foreign and Omani companies. The FDI inflows between 2006 and 2007 have increased from respectively $ 1.6 billion to $3.1 billion. The inward FDI stocks accounted for 21.8% of GDP in 2007. The outward flows and stocks have been stable between 2000 and 2007[20].

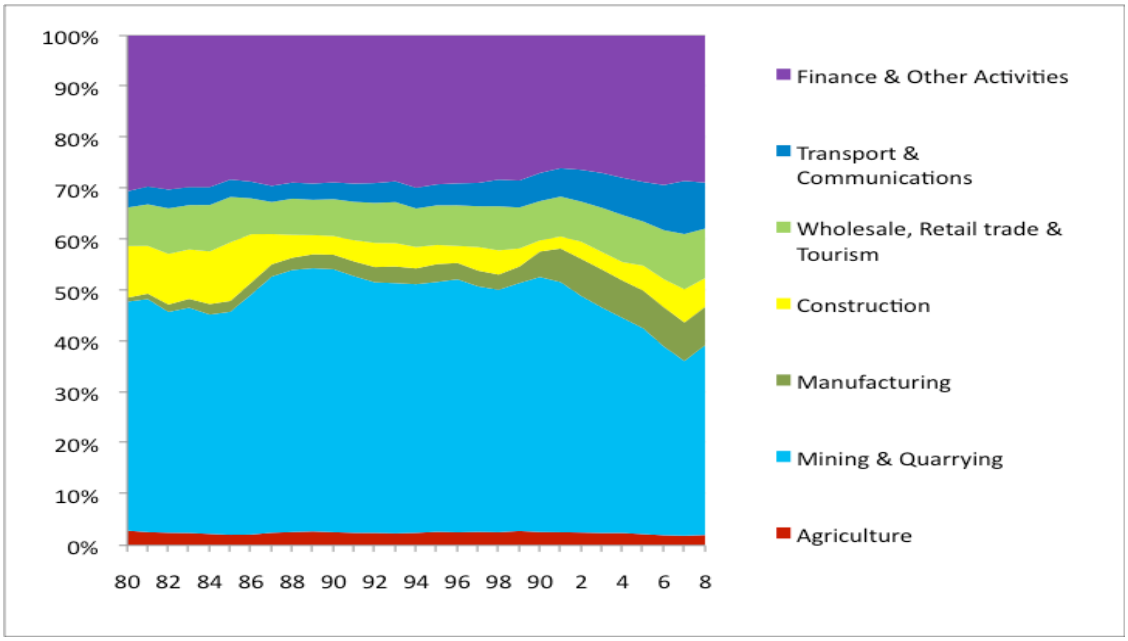
According to them however, more rapid development is needed to ensure the wealth of the nation in the coming decades.

For Oman oil exports account for 80% of total export. Main receivers of the oil

[20] Data are gathered from UNCTAD World Investment Report 2009.

exports are China and Japan. The country has a trade surplus in 2007 of $8.7 billion, which shows a slight drop compared to the trade surplus of 2006 that was set on $10.5 billion[21]. Trade with Europe, North America and Western Asia resulted in deficits.

Graph 1.4: Added value of sectors as percentage of GDP for Oman 1980 – 2008



1.2.4 State of Qatar

Qatar is actually the only country where the mining and quarrying sector has increased as part of GDP compared to the other sectors. This is mainly due to the exploration of gas, which became a big focus for Qatar. According to Sturm et al (2008) it is mainly the tourism sector next to the gas sector that has experienced a rapid development. Many conference centres have been build or upgraded to host international conferences and seminars. According to graph 1.5 however, it was not tourism, but transport & communication and construction that increased their share. Fasano and Iqbal (2003) mention some steps that Qatar has taken to privatize certain sectors. The local oil and gas distribution has been sold for 60 percent to a local private company. Also the water and electricity sector has been partially entered by corporate organizations and a power generation plant is sold to a

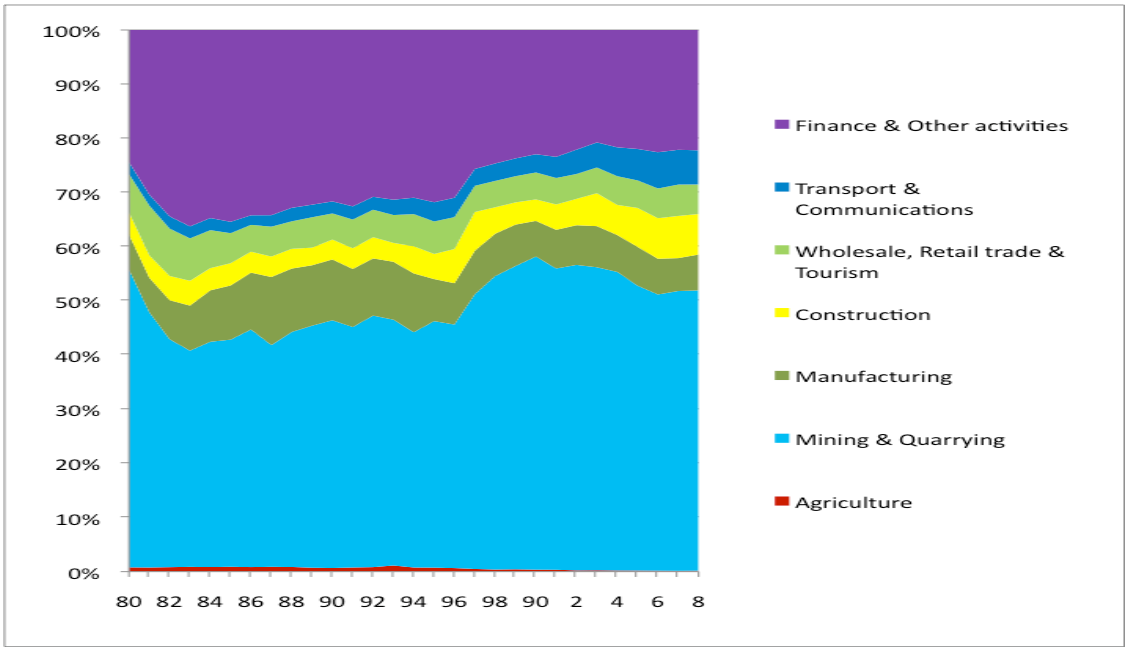
[21] Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

company that is majority-owned by the local private sector.

Exports in Qatar have tripled between 2003 and 2007 and the trade surplus increased to $20 billion. The main products that Qatar exports are oil and gas. Oil represents 62% of total export and gas exports account for 30% of total exports in 2007[22].

FDI inflows as well as outflows have increased for Qatar. In 2007 the inflow of FDI recorded $4.7 billion and the outflow recorded $5.2 billion. The inward stocks accounted for 24% of GDP compared to 10.8% in 2000. The outward stocks accounted for 9.9% of GDP compared to 0.9% in 2000. Overall it appears that improvements have been made concerning FDI[23]. One of the reasons for this improvement could be the reduction on corporate tax with 5% to a maximum amount of 30%[24].

Graph 1.5: Added value of sectors as percentage of GDP for Qatar 1980 – 2008



22 Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

23 Data are gathered from UNCTAD World Investment Report 2009.

24 This policy reform is provided by Fasano and Iqbal (2003).

1.2.5 Kingdom of Saudi Arabia

According to Sturm et al (2008) Saudi Arabia has its aim to become the leading country in manufacturing. Graph 1.6[25] shows that indeed the manufacturing sector has slightly increased compared to the other sectors. Building the King Abdullah Financial District is an attempt to boost the financial sector, but so far the share of this sector compared to others has only been decreasing. Another measurement taken by the government to improve the finance sector is the opening of the stock market by allowing foreigners to trade through open-ended mutual funds[26]. Fasano and Iqbal mention privatization as another focus area of the government. Especially the telecommunications sector has been liberalized by privatizing 30 percent of the Saudi Telecommunications Company. Other sectors that are appointed by the government for privatization are education, electricity, water and air transportation.

Export of Saudi Arabia adds to a total amount of $234.9 billion in 2007. The trade surplus two folded in 2007 to $144 billion since imports increased in a much slower pace than exports. Oil export accounts for 80% of total export and among the main receivers are Japan and the United States[27].

The FDI inflows of Saudi Arabia have increased between 2006 and 2007 with 30% to $24 billion. The inward FDI stocks account for 19% of GDP and have an actual value of $76 billion[28]. The structural reforms that Fasano and Iqbal (2003) mention were meant to attract more FDI inflows and apparently the country has succeeded. Some of these reforms were the cut on income tax for corporations from 45% to 30% and the possible ownership of real estate for non-Saudis in most of the country.

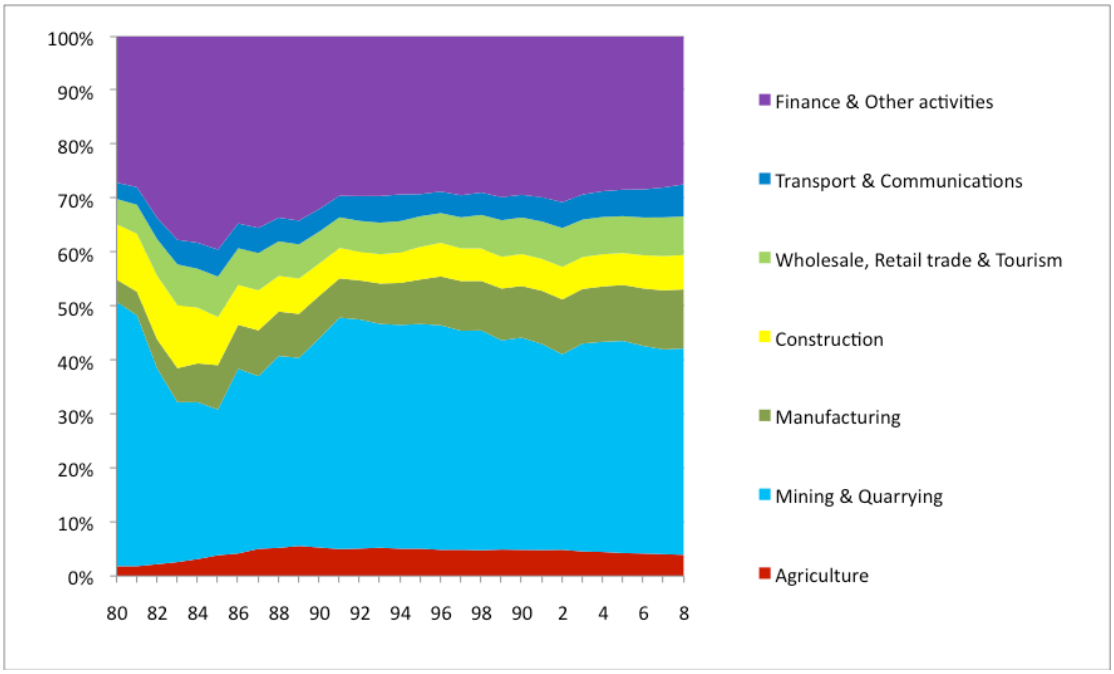
25 Data to produce graph 1.6 are taken from the United Nations Statistics Division.

26 Reforms are provided by Fasano and Iqbal (2003).

27 Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

28 Data are gathered from UNCTAD World Investment Report 2009.

Graph 1.6:
Added value of sectors as percentage of GDP for Saudi Arabia 1980 – 2008



1.2.6 United Arab Emirates

The UAE is together with Bahrain the best example of economic diversification within the GCC region according to Sturm et al (2008). Graph 1.7[29] clearly shows that all sectors have been growing compared to the mining and quarrying sector. Its high development in tourism, which is internationally focused, and transportation, making it a regional trading hub, it is becoming less dependent on its oil income[30]. The free trading zones function as a selling point to attract foreign investments. Apparently this has succeeded since FDI inflows have increased over the past years to a total of $14.8 billion in 2007. The inflow of FDI stocks accounts for 29.1% of GDP in 2007. FDI outflows are recorded at $14.5 billion and the outward FDI stocks account for 18.3% of GDP.

As all countries are, also the UAE is persistent in developing its financial sector. To accelerate this development it founded the Dubai International Financial Centre and established a formal stock market in 2000[31].

The oil exports in the UAE account for only 48% of total exports. Other products are

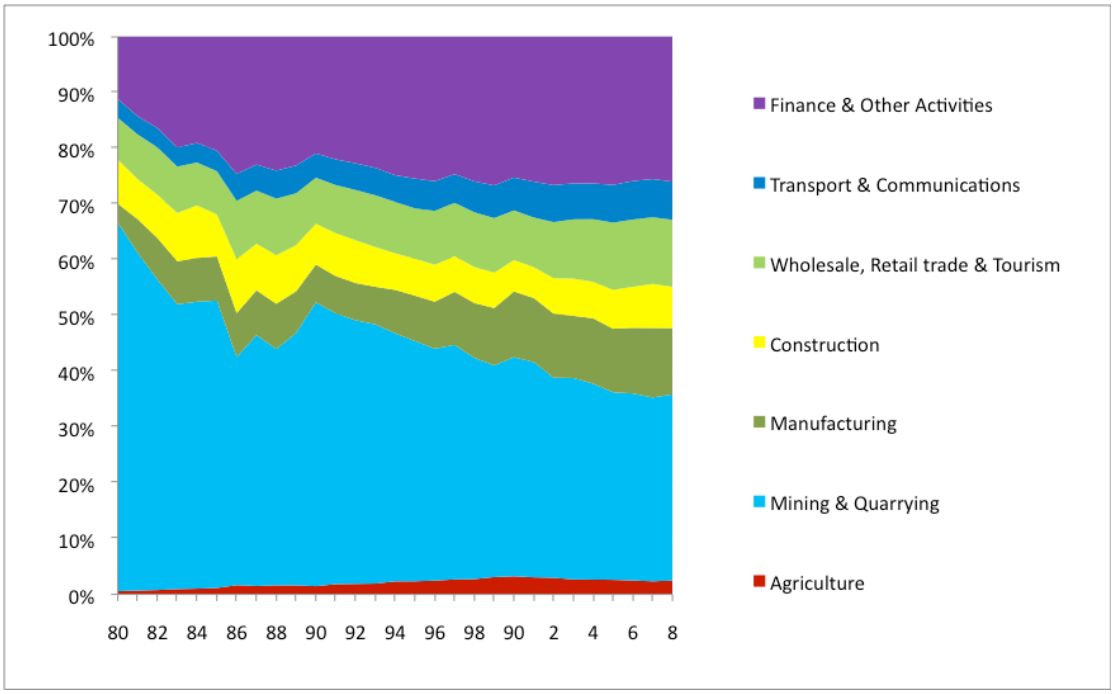
[29] Data used to generate graph 1.7 are taken from the United Nations Statistics Division.

[30] The research of Sturm et al (2008) and Fasano and Iqbal (2003) both confirm this development for the UAE.

[31] More details about the reforms of the financial sector are provided in the research of Fasano and Iqbal (2003).

gold, diamonds, and commodities. Total exports in 2007 had a value of $156.6 billion and with imports at $127 billion this resulted in a trade surplus of $29.6 billion. Trade deficits are still present with North America, South-Eastern Asia and Europe[32].

Graph 1.7: Added value of sectors as percentage of GDP for UAE 1980 – 2008



The six countries in the gulf all feel their economies are leading in the region. Bahrain claims to be the financial hub of the region, UAE and especially Dubai is the trade and tourism hub and Qatar will be the next Financial, educational and health hub of the Gulf[33]. Of course it is impossible for all of the countries to be economic leaders which is why it is interesting to see what is actually happening with the economy in the region. By establishing the Gulf Cooperation Council (GCC) six countries agreed to cooperate and together build on a strong region with a strong economy that is capable of competing with the rest of the world. However, is their effort bearing fruit? It seems that the Gulf countries are still very dependent on their oil and the question remains in what matter the sectors are contributing to economic growth.

32 Figures are obtained from the International Merchendise Trade Statistics provided by the United Nations for the year 2007.

33 http://www.reuters.com/article/MiddleEastInvestment09/idUSTRE59P35P20091026 28-10-2009

1.3 Hypothesis and limitations

So far it has not been clear whether the diversification within the region and the individual countries actually worked. Fasano and Iqbal (2003) and the European Central Bank (2008) did analyze the economy. However, these are descriptive analysis identifying what sector is causing economic growth. To ensure economic growth in the long run, when the oil is not available anymore, it is important to know what sectors are causing growth. Hence, the main question of this research is whether the economy of the GCC and its individual countries has diversified and what sectors influence economic growth.

Most scientists that have done empirical research the resource curse, like Sachs & Warner (1997) and Gylfason (2004), did not include the Gulf States in their datasets. The main reason for this is that data about these countries is only recently available. Another reason for these countries to be excluded from the current empiric research is their governance structure and size. The first and main contribution of this research is that it analyzes the possible existence of the resource curse within the GCC region. The second contribution is that it indicates the sectors that are causing economic growth, which is also different to the current research performed by Fasano and Iqbal (2003).

Most research on the resource curse, as will be shown in more detail in chapter 2, use the stock or export as share of GDP as indicator for natural resources. This is not the case here and the third contribution to this field of research is that the results of the resource curse are being tested, instead of the causes. It is still the resource dependence, expressed in added value of the mining and quarrying sector to GDP, that is tested, but in combination with the added value of the other sectors. It will provide an overview of the economic situation in some of the richest countries in the world and the role of their natural resources.

There are a few limitations to this research and the first is that the availability of the data is limited. This made it not possible to include all sectors separately that could be of value to the research. The effect of this lack of data might cause omitted variable bias. There are however no other data available to include instrumental variables to the estimated equations to correct for this bias.

A second limitation is that not all variables are robust. The non-robust variables are eliminated from the models, which leaves simple but strong models to test. They do provide us with an indication of what the economy looks like, but no extensive conclusions can be drawn.

2 Theoretical framework and review

2.1 The Resource Curse

Much literature has been written about this phenomenon, each looking at different aspects of the cause of the resource curse and the Dutch disease. Corden and Neary (1982), Neary and Van Wijnbergen (1986), Gelb (1988) and Auty (1990) are some of the first to put forward some of the economic and political causes that might be behind the poor economic performance of resource-abundant countries.

Gelb (1988) identifies the resource curse by using four different theoretical approaches, which are the linkage theory, the neoclassical and related growth theory, the export instability theories and the booming sector theory or Dutch disease theory.

According to the linkage theory, the growth in a country is explained by the stimulus that a leading sector provides to the economy by affecting other sectors with its impulse. Gelb differentiates between production linkage, consumption linkage and fiscal linkage. Production linkages refer to the increase in input and output due to backward and forward linkages. The backward linkages refer to the possibility of stimulating the upstream supplying industries and the forward linkages to the possible stimulation in downstream processing industries. In high-rent activities, the production linkages are of less importance, since the initial activities are important to the final value of production. The benefits of production linkages are more present when intermediate inputs are increasing the final value of production.

The second category is the consumption linkages, which can be favourable or adverse to the development of the country. The adverse effect occurs when the revenues are accrued by private owners who do not have the overall gain of the economy in mind. Hence, these investments might inhibit the development of other sectors.

The fiscal linkages are an important determinant looking at oil windfalls. Resource rents most commonly go directly to the government. When they consume these resource rents, governments focus on the options for expanding public services and enabling private consumption to rise by transferring fiscal revenues to the private sector. However, this might not happen efficiently since certain policy choices might

create an uneven allocation of these revenues. On the other hand, direct consumption might not reach all groups at reasonable costs. Another problem that arises concerning fiscal linkages concerns the ownership of the surplus. Since this surplus is most often in hands of a few decision makers, their bad planning and rent-seeking behaviour can lead to ineffective investments. The final problem with fiscal linkages that Gelb highlights is the fluctuating fiscal revenues since investments made during a boom can be hard to reverse in periods of recession.

The neoclassical growth theory states that growth in output is generated by an increase in quantity of the factors of production, like labour and capital, and their allocation across activities. It is constrained by domestic savings, foreign exchange and fiscal revenues. Rent-intensive activities actually relax these three constraints, which results in a prediction of a positive effect of the oil windfalls on growth. This theory contradicts the resource curse theory since it expects an expansion of economic growth rather than a downfall.

The export instability theories question the negative effects that arise from the variability of oil income in comparison to the benefit of temporarily high income. In developing countries, exports are more concentrated on agriculture and mineral commodities relative to developed countries. Agricultural exports are price-inelastic on demand but do depend on price shocks whereas mineral exports are price-inelastic on both demand and supply side. On the mineral side this inelasticity causes big fluctuations in price and revenue since demand of these products are very responsive to economic activity in regions of consumption. Hence, terms of trade variations are expected to be larger for developing countries than for developed countries especially concerning oil exporters. Since many variables like investments and employment are stochastic, and because of that hard to reverse, oil shocks can negatively influence growth.

The booming sector theory or Dutch disease theory is explained by Gelb in a similar way as Cordon and Neary (1982) and is mainly about the reallocation of factors of production which causes some sectors to boom and others, like manufacturing to decline. Van Wijnbergen (1984) explains the process very simply. Because of the export of natural resources, the local currency increases. This increase reduces total export. At the same time, part of the oil revenues are spend on products that are non-tradable and the consumption of these products stimulates growth in this sector. This will lead to a real appreciation, which means the relative price of non-tradable goods increases in terms of traded goods. Hence, resources move from the non-oil traded goods to the non-traded goods sector.

A more extensive explanation of the Dutch Disease is given by Corden and Neary (1982). They model a small open economy with three sectors: two produce a good that is traded on the world market with exogenously given prices and the third is a service sector oriented towards the domestic market. When the sector that trades the natural resource expands because of new explored sources, two effects can occur. The first is the spending effect. Since more income is generated in the country because of the boom in one sector, this income is spent domestically in the service sector. This leads to price increases in the service sector, causing resources to shift away from the tradable sectors into the service sector, while the reverse effect takes place on the demand side.

The resource movement effect, on the other hand, pertains to the increase in the marginal product of labour following a boom in the natural resources sector. The movement of labour from one sector into the other increases the de-industrialization effect. The movement of labour from the service sector to the natural resource sector will even add to the shift in labour caused by the spending effect that in addition increases the de-industrialization effect.

It is difficult to see beforehand what the final effect is on the service sector, since both effects move the output of this sector in different directions. The problem for most countries however is the lowering of output in the other tradable sector, which is most of the time, the manufacturing sector. For a lot of countries this sector is the most innovation- and research-intensive sector. For natural resource abundant

countries this means that they have to miss these developments and in the long run miss growth in their economies (Sachs and Warner, 1995).
The main consequence of the discovery of natural resources is, according to this model, the crowding-out effect on other sectors of the economy.

Neary and Van Wijnbergen (1986) state that the initial effect of a discovery of natural resources actually benefits the economy as a whole. Only the allocation of the output is something that is observed within their model and de-industrialization seems to be a result of the spending effect and the resource movement effect.

Auty (1993) also explains the resource curse by means of the linkage theory and the Dutch Disease theory. He states that the fiscal linkages are dominating since the income through mining was very volatile and resulted in a fluctuation of tax income. Hence, the government had a difficulty to effectively use taxes for development.

2.2 Empirical review of the resource curse

Pioneers in the empirical research on the resource curse are Sachs & Warner (1997). They first performed an empirical research in 1995 but extended this by using 1970 as base year instead of 1971 and 1990 as end year instead of 1989. The results remained the same. They performed a worldwide cross-sectional research to this phenomenon and proved that in the period 1970 – 1990 economies with a high ratio of natural resource export to GDP in 1970 had a slow economic growth.
The model used for this cross-sectional research is specified below:

$$G = \alpha_0 + \alpha_1 \ln(y(0)) + \alpha_2 Z + \varepsilon$$

G =ln(y(t)/y(0))/T and represents economic growth. The convergence theory states that the economic growth rate should be negatively related to initial income, which means α_1 should be negative. Z represents other characteristics that clarify country's steady state income level and a goal of this model is to test whether a measure of resource intensity is part of it.
To see whether this is the case, a cross-sectional regression is performed, where the percentage of primary sector exports to GDP in 1970 and initial income on growth variable are regressed on economic growth. After this first regression, other

variables are added, which are openness (a measure of integration to the global economy), capital accumulation, quality of institutions, global commodity price shocks, expenditure ratios of the government, terms of trade volatility, and government institutions efficiency. Outliers and countries with too little available data were omitted from the regression.

To test robustness of the negative effect for the measure of natural resource intensity, alternative variables for natural resource abundance are used. These variables are mineral production as a share of GDP in 1971, primary exports as part of total exports in 1970 and the log land area per capita in 1971 (since land abundance tends to be correlated with resource abundance).

There are four channels highlighted that might cause the negative relationship between economic growth and resource abundance. The first hypothesis is that resource intensity increases rent seeking and corruption and lowers government efficiency. The second hypothesis is that developing countries implement an inward looking development strategy that can lower investment rates or lower growth directly. Another hypothesis is that overall demand of resource abundant countries is higher than that of other countries in combination with higher relative prices of non-traded goods. Again this could affect investment rates and growth since it might affect the relative prices of investment goods. The fourth and last hypothesis is that being resource abundant decreases labour productivity since labour is moved from sectors that have a high learning-by-doing effect to sectors that do not. This shift in labour is caused by higher foreign demand for resource exports and higher local demand for non-tradable goods. They find evidence that institutional quality and policy choice are related to resource abundance, but human capital accumulation and savings rates are not.

Mehlum, Moene and Torvik (2006) find evidence that it is mainly the institutions that cause economic growth to slow down, not only the fact of having natural resources. They identify two types of institutions: 'grabber-friendly' institutions and 'producer-friendly' institutions. When a country is dealing with 'grabber-friendly' institutions, it means that rent seeking is similar to wealth grabbing. When income increases, it will push the profit for the grabbers, since the institutions facilitate this, but it won't

affect producers' profit. Profits are put out of productive activities and the aggregate income of the country will decrease. When a country has 'producer-friendly' institutions, the opposite is happening. Profits go to producers, which means it is productive to the economy and overall income will increase. They perform a regression based on the model and data of Sachs & Warner (1995) and add one variable to include the effect of institutions on resources. . Their results show indeed that countries with 'producer-friendly' institutions are not part of the resource curse.

A research done by Boschini, Pettersson and Roine (2007) confirms the conclusion that the quality of institutions is decisive in whether a country is cursed because of its resources. An addition to this conclusion is that apart from the institutions, the type of resources that a country possesses also determines whether a country is facing the resource curse. According to them, there are some resources that in combination with bad institutions are more likely to cause rent seeking, corruption or conflicts. To obtain results on this matter they run a regression based on the data of Sachs & Warner (1997) but modify their model. They identify the different types of resources and add a variable that combines the quality of institutions and the type of resources a country has. Their results confirm their hypotheses. They find that especially diamonds and precious metals are resources that are sensitive to attract the resource curse when they are combined with bad institutions.

Arezki and Van der Ploeg (2007) also show that institutions are part of the cause for the resource curse and that by opening up to trade, the chance of falling into the resource curse becomes smaller. The dataset used is an extended version of the dataset used by Sachs & Warner (1997) and their approach is to regress models used before by other scientists and see whether their results hold when adding variables or when using instrumental variables instead of the original ones. They confirm the results that Sachs & Warner obtained by performing an OLS regression with similar variables but when instrumental variables are used, the estimates are not significant anymore. The results obtained by Mehlum, Moene and Torvik (2006) do hold when again empirically tested. To the research of the latter they add the observation that countries with open trade policies are less sensitive to the resource curse than

countries with more restrictive trade policies. When they extend the sample period they even find that trade policies are more influential to economic growth in combination with natural resources than are institutions. Another interesting conclusion is the result that when the stock of resources is used, instead of export share of resources in GDP, the resource curse holds even when control variables are used for geography, openness and institutions.

Stijns (2005) uses reserves as a measure of resource abundance and finds no proof of the resource curse in the period 1970 – 1989. He reproduces the model estimations that Sachs & Warner (1997) did except for the different measure of resource abundance. According to Stijns, Sachs & Warner used a measure of resource dependence by using the export share of minerals in GDP and not a measure of resource abundance. Stijns (2005) shows that by using reserves as a measure of resource abundance these resources have not been a significant determinant of economic growth in the seventies and eighties. This lack of significance is due to the fact that minerals affect economic growth through positive and negative channels. A positive channel is school attendance as well as a constructive rule of law and bureaucratic performance. Investment and saving rates seem to be higher for a country that is resource abundant, which could increase the economic performance of the country. The negative channels are based on the 'Dutch Disease' theory and indicate that some countries experience a trade specialization in manufacturing and because of that a lower share of resource exports in GDP. Especially countries with minerals happen to have a smaller size of the non-traded services sector.

Lederman and Maloney (2007) base their research model on the standard dynamic growth models, mainly provided by Barro (1991) but with a proxy for relative endowments, which is net exports per worker. According to them this is the best way to define the endowment or stock of natural resources. They also include a proxy for institutional quality. The hypothesis to test is whether natural resources influence the institutions in place since these influence the effect of natural resources on economic growth. Their results prove that no curse is present in

resource abundant countries not even indirectly by influencing the institutions present in a country.

Other opponents of the resource curse are Brunnschweiler and Bunte (2008). They state that when 'resource dependence' is used as a proxy for resource abundance, which means export of natural resources as percentage of GDP, instead of actual resource abundance, which is the stock of the natural resource, the resource curse is detected. Resource abundance is actually positively related with economic growth and institutional quality. Resource dependence is negatively correlated to economic growth as tested before by Sachs & Warner (1997), but this effect becomes insignificant when a proxy for resource abundance is added to the regressed model. The reason for this conclusion according to them is based on the effect that resource rents have on economic growth and institutional quality. This effect might be different than the effect of resource stocks, which might still be in the ground. Resource rents might cause the rent seeking behaviour and corruption that create the effects appointed by the previous researches.

Van der Ploeg and Poelhekke (2009) say that it is not the national factors like geography and culture that influence economic growth, but the volatility of output per capita growth. They define three characteristics that increase volatility. The first is resource dependence, which increases volatility through the volatility of the primary commodity prices. The other two are the institutional and physical trade barriers and their associated policy shocks. They find that an increase in volatility though these channels aggravates economic growth.

Other authors have examined the relationship between oil exports and economic growth for the gulf countries. Al-Youssif (1997) studied this relationship for four GCC countries, Kuwait, Saudi Arabia, UAE and Oman and used the period 1973-1993 for observation. His conclusion states that there is no proof of a long-run relationship between exports and GDP. In the short-run there is sign of a positive relationship. He concludes that the diversification of the economies of these four countries is crucial to long-term economic growth.

An addition of Harb (2008) to this previous research is the separation of non-oil GDP as part of total GDP. The period tested is 1973 to 2005 and five GCC countries are included in the research, which are Kuwait, Oman, Qatar, Saudi Arabia and UAE. He finds that oil export does not have a long run relationship on the overall performance of the economy. Some evidence is present of a short-run effect that is mainly caused by local policies. Since no negative relationship is observed between natural resources and economic growth, they suggest that the revenue coming from oil is not the reason for the bad economic performance of the countries.

Coury and Dave (2009) are the first scientists to perform an empirical research to test whether economic diversification is actually happening in the GCC countries. They include all six countries in their analysis and test over a period of 1980 to 2005. To test whether their hypothesis of economic diversification is correct, they use a technique to generate pooled mean group estimators. These estimators combine the effect of the mean-group estimates and the fixed effects estimates and allow testing the six GCC countries as one economic block while maintaining their specific country features. The model to test is:

$$\Delta \ln y_{it} = a_{oi} - \phi_i(\ln y_{i,t-1} - \sum_{j \in J} a'_j \ln \beta^j_{i,t}) + \sum_{k \in K} a_{k,i} \ln \beta^k_{i,t} + c_i \Delta \ln p_{i,t}$$
$$+ \sum_{j \in J \cup K} b_{j,i} \Delta \ln \beta^j_{i,t} + d_i \Delta^2 \ln p_{i,t} + e_i t + \varepsilon_{i,t}$$

The variable $\Delta \ln y_{it}$ represents the two dependent variables, which are the growth rate in percentages of output per worker and the growth rate in percentages of non-hydrocarbon output per worker. To define the independent variables the Solow growth model is used and these variables are the rate of capital accumulation (savings), oil and natural gas revenue, government spending, exports, imports, financial development and the one-year lagged version of GDP per worker or hydrocarbon GDP per worker (depending on the dependent variable used). This last variable is included as a convergence indicator. The variable $\ln p_{it}$ represents the growth rate of the working age population. No form of human capital is included because of lack of data. With this model some of the regressors can be constrained to ensure the common features of the countries are taking into consideration when

running the regression. These regressors will be summed in set K and are capital accumulation and government spending. The other variables are gathered in set J and these are the regressors that are different for the six countries.

Their results show that oil and natural gas revenue is of big influence to economic growth as well as non-hydrocarbon growth. This independent variable has a positive relation with both dependent variables, which indicates that the economic progression of these six countries is still very dependent on their revenue from natural resources. Hydrocarbon revenue lagged one year mainly drives the non-hydrocarbon growth per worker.

Government spending does not influence economic growth and this is consistent with other resource curse theories. Savings is positively related to economic growth, but when looking at non-hydrocarbon growth, it is negatively related, which is a contrasting result. The other independent variables do not have a significant relationship to either of the dependent variables. One explanation provided why the growth rate of the labour force is not influencing economic growth is the labour market that the gulf countries are dealing with. Companies can choose from a wide variety of workers beyond the local workers, which is different to most OECD regulations. Because of this wide variety, the wages are exogenously given since companies do not have to increase their wages to recruit enough workers. The fact that wages are exogenous and not related to their marginal product causes output per worker to be fixed, which indicates a constant return to capital.

According to Coury and Dave it is clear that the natural resources of the GCC countries are still the main drivers of economic growth, despite the attempts of the government for economic diversification.

Overall it is seen that countries that have natural resources have a higher risk of not diversifying their economy. Whether this is due to their natural resources or something else is still open for discussion. The Gulf countries are still resource abundant, which means there are enough reserves available in the countries, even though this abundance is becoming less for Bahrain and Oman because of their depletion of resources. They are also resource dependent, since still a major part of their income for all six countries is coming from the exports of the mining and

quarrying sector. Their slow economic growth could be an effect of the resource dependence rather than their resource abundance as indicated by the research of Brunnschweiler and Bunte (2008). Coury and Dave (2009) find that it is the resource dependence that is leading growth. The question remains however whether this economic abundance and dependence is shifting. What sectors are causing economic growth? This research will provide an insight in what happened in the Gulf countries since the eighties and which sectors are now leading economic growth per capita. Is it still oil, or did the government manage to have other areas take over in the past years as policy was planned for?

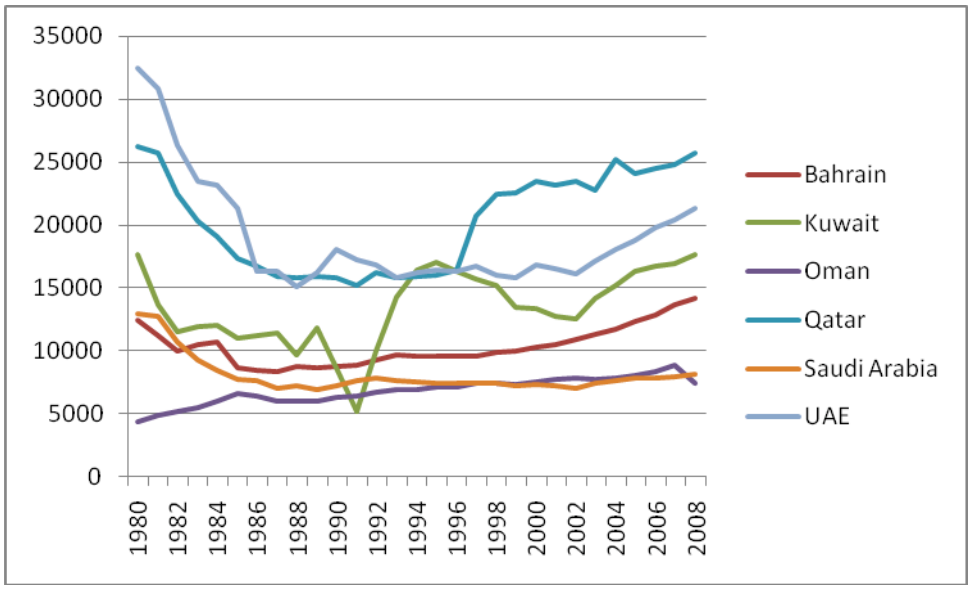
3 Method and Data

3.1 The GCC region

In this research, an estimation of the influence of the growth in the added value of different sectors on the growth in GDP per capita is attempted. It aims to provide some insight on whether the different policies to diversify the economy in the six Gulf countries are bearing results.

Below in graph 3.1[34] we see the flow of GDP per capita from 1980 till 2008. It starts with a decrease in GDP per capita till the mid nineties and from then on it starts growing. Kuwait, Qatar and UAE are experiencing big fluctuations in their GDP per capita. For Bahrain, Oman and Saudi Arabia it is a slightly more linear growth.

Graph 3.1: GDP per capita of the six GCC countries from 1980 to 2008



To verify whether growth in the added value of the different sectors is something that explains this change in GDP per capita and which sector has the biggest influence we perform a panel data regression employing a two-way fixed effects error component model. This is to make sure that errors caused by unobserved country effects and time-specific effects are accounted for.

[34] The data used to generate this graph are obtained from the United Nations Statistics Division.

The reason a panel data method is chosen over a cross-sectional method in the regional model is that by using panel data, more observation points are used which makes the estimates more reliable than when cross-sectional data are used. This higher reliability is due to the larger variability of the dataset and lower collinearity among the variables compared to a cross-sectional approach (Hill, a.o. 2008). Another problem that panel data can diminish is an omitted variable bias (Pindyck & Rubinfeld, 1998).

The fixed effects model is chosen over the random effects model since in our research of the regional model, the effects of the countries through time on GDP growth are fixed. The values of the independent variables of the countries do not have a random effect on the dependent variable.

The basic model that will give us a first hint of what the influence of the different sectors will be on the annual growth rate of GDP per capita is given in equation 3.1.

Equation 3.1:

$$GDPcapgr_{it} = \alpha + \beta_1 Oi\lg r_{it} + \beta_2 Mangr_{it} + \beta_3 Servgr_{it} + \varepsilon_{it}$$

The dependent variable, $GDPcapgr_{it}$, represents the annual average growth rate of GDP per capita. The GDP data for the years 1980 to 2008 are taken from the United Nations Statistics Division and are measured as the real value in constant 1990 USD. The data for the population are taken from the World Development Indicators provided by the World Bank.

$Oilgr_{it}$ is the first independent variable and stands for the average annual growth rate of the added value of the oil sector to GDP. The added value of the oil sector to GDP is the real constant value with 1990 as index year and is measured in USD. This variable is expected to have a strong positive influence on the growth rate of GDP per capita. This can intuitively be explained by the fact that if there is growth within the oil sector, the wages go up, investment goes up which results in an increase in the growth rate of GDP per capita. The core of the resource curse theory is that the discovery of natural resources, oil in this case, results in a boost of that sector. $Mangr_{it}$ is the variable that represents the average annual growth rate of the added

value of the manufacturing sector to GDP. The added value of the manufacturing sector to GDP is measured in USD and has a real constant 1990 value. The effect of the growth in the manufacturing sector on the growth rate of GDP per capita is expected to be positive, since a similar intuitive explanation can be given as for the effect of growth in the oil sector to the growth rate of GDP per capita. However, the resource curse theory is not decisive on this matter. According to some scientists[35] the fact of being resource dependent or abundant actually slows down economic growth. As mentioned in chapter 2, there are different channels through which this can happen. One of these channels is that the manufacturing sector is not developed in a way to enhance economic growth. An insignificant and small value for the coefficient could be an indication of this indirect effect on economic growth through the manufacturing sector. However, the tested model cannot provide a clear reason for this effect.

The last independent variable of equation 3.1 is $Servgr_{it}$. The added value of the services sector to GDP is the real value in constant 1990 and measured in USD. The expected effect of the growth of the services sector on economic growth is positive. According to the resource curse however, this effect is not clear. As Gelb (1988) and Corden & Neary (1982) explain, the services sector can either profit from the boom in the oil sector or it can diminish its output. This model will only explain whether the services sector explains a part of the economic growth within a country. However, the sign of the coefficient could indicate the indirect effect that the resources have on the economic growth through the services sector.

After estimating the above model, some control variables will be added to the model to make sure the results obtained in the beginning are robust. According to Barro (1992) and Levine & Renelt (1992) the variables that are causing economic growth are the average annual rate of population growth, the investment share of GDP, the initial level of real GDP per capita in 1995 and the initial 1995 secondary school enrolment rate. However, they used a cross-sectional method to generate their results. Since in this research a model is used with panel data estimated with fixed

[35] More details can be found in the articles of Brunnschweiler & Bulte (2008) and Coury and Dave (2009).

effects, it is not possible to include the variables that represent the initial level of GDP per capita and the initial 1995 school enrolment rate as control variables since it is not possible to include a variable with constant value for every year (Wooldridge, 2003). To still control for the convergence effect, a similar variable is used as in the research of Coury and Dave (2009). This variable is the differenced variable of the annual growth rate of GDP per capita. Since there is not enough data available for the six GCC countries on secondary school enrolment rate to calculate a sufficient amount of growth rates I decided to leave this variable out of the regression.

The expanded model is given in equation 3.2:

$$GDPcapgr_{it} = \alpha + \beta_1 Oilgr_{it} + \beta_2 Mangr_{it} + \beta_3 Servgr_{it} + \beta_4 Popgr_{it} + \beta_5 GDPcapgr1_{it} + \beta_5 Inv_{it} + \varepsilon_{it}$$

The three added variables are $Popgr_{it}$, $GDPcapgr1_{it}$ and Inv_{it} where $Popgr_{it}$ stands for the average annual rate of population growth. Population growth is obviously expected to have a negative relationship to GDP per capita since a decrease in the population results in a higher average GDP per individual living in the country.

The variable $GDPcapgr1_{it}$ represents the average annual growth rate of GDP per capita, lagged by one year. A negative relationship is also expected between the lagged version of average annual GDP growth per capita and actual annual GDP growth per capita. This is explained by the convergence theory (Barro, 1991). If there is similarity between the countries in structural parameters, poor countries tend to have a higher annual growth rate than rich countries. This is mainly due to the diminishing returns to capital since the marginal product of capital will be higher in poor countries than in rich countries, where more capital per worker is available.

The variable Inv_{it} represents the investment share of GDP in percentages. The data are taken from the Penn World Tables and are available from 1980 to 2007. Inv is expected to have a positive relationship with GDPcapgr. If the share of investment goes up, which means aggregate demand increases, economic growth will increase. Levine and Renelt (1992) find in their research that this is the only variable that has a robust positive correlation with economic growth when performing a cross-sectional data research.

For most countries there is more specific data available about the services sector. The three sub sectors that have enough data available are construction, tourism & retail and transport & communications. Another sub-sector of the services sector is the 'other activities' sector. Since finance is part of this sector, it is important to include it in the estimated equation. Equation 3.3 will provide a more detailed insight into the growth of the services sector and the sub-sectors that push this growth most.

Equation 3.3:

$$GDPcapgr_t = \alpha + \beta_1 Oilgr_{it} + \beta_2 Man_{it} + \beta_3 Consgr_{it} + \beta_4 Transportgr_{it} + \beta_5 Tourismgr_{it} + \beta_6 Othergr_{it} + \beta_7 Popgr_{it} + \varepsilon_{it}$$

The sub-sector variables are $Consgr_{it}$, $Othergr_{it}$, $Tourismgr_{it}$ and $Transportgr_{it}$. The variable $Consgr_{it}$ represents the average annual growth rate of the added value of the construction sector as part of GDP.

$Othergr_{it}$ is a variable that represents the annual average growth rate of the real added value of the 'other activities' sector to GDP. The sub-sector other activities includes the finance sector, education and social security.

The variable $Tourismgr_{it}$ represents the average annual growth rate of the sub-sector that includes tourism, wholesale and retail as part of GDP. For ease it is called the tourism sector from now on.

The variable $Transportgr_{it}$ represents the average annual growth rate of the sub-sector including transport and communications as part of GDP. From now on it will be referred to as the transport sector.

All sub-sectors are expected to have a similar effect on economic growth as the services sector has when estimating equation 3.2. This is due to the fact that the total value of the four sub-sectors is equal to the value of the services sector. When a certain sub-sector is leading growth in the overall services sector, this would show by having a positive significant coefficient that is substantially higher than the coefficient of the other sub-sectors.

After obtaining the results for the period 1980 to 2008 the sample period will be shortened to 1997 to 2008. If diversification is a result of recent policy implementations, there will be a difference between results of the two periods.

3.2 The country models

To get a better idea about the economic situation within the different countries, the model of equation 3.2 and 3.3 will also be tested for the 6 individual countries. Time cross-sectional data are used since only one country is tested at a time. The results will provide an indication whether there are certain countries leading regional growth in a sector.

Unfortunately it is not possible to test the models for two sample periods, one from 1980 to 2008 and the other from 1997 to 2008. This is due to the insufficient number of observation points when shortening the period tested.

The expectations for the main three sectors and the control variables are similar to the expectations for the regional models. For the sub-sectors of services the expectations differ since the analysis before showed different results for the countries. It is expected that Bahrain will have a positive significant relationship between economic growth and the transportation & communication sector and the manufacturing sector. If Fasano & Iqbal (2003) are correct, there will also be a positive relationship between economic growth and the 'other' sector of which finance is part.

The results of Kuwait should indicate a positive relationship between GDP per capita growth and growth in the finance and transport & communication sector since these were the sectors increasing their share over the period tested.

For Oman the expected sectors to show a positive significant relationship with economic growth are manufacturing and transport & communication.

For Qatar these sectors are transportation & communication and construction. If the European Central Bank (2008) is correct, the tourism sector will also show a positive significant relationship with GDP per capita growth.

The expectation for Saudi Arabia is that the manufacturing sector will show a positive significant relationship with economic growth. If the King Abdullah Financial District is bearing any fruits, there should also be a positive relationship between

economic growth and the 'other' sector.

The UAE is expected to have a positive relationship between economic growth and the tourism and transportation & communications sector. When the UAE is indeed the best example of diversification in the GCC region, all sectors should have a positive relationship with economic growth.

4 Empirical Analyses

4.1 The GCC model tested

The sample used is dated from 1980 to 2008. Because of the use of panel data there are enough observations available to obtain constructive results.

In testing equation 3.2 and 3.3, some alterations are made to the model however, since some variables were not robust. There was no sign of multicollinearity, even though the R^2 of the regression is extremely high so no variables needed to be withdrawn from the model. Appendix 2 will provide more details about the procedures used.

The adjusted model of equation 3.2 is given in equation 4.1:

$$GDPcapgr_{it} = \alpha + \beta_1 Oi\lg r_{it} + \beta_2 Servgr_{it} + \beta_3 Popgr_{it} + \beta_4 GDPcapgr1_{it} + \varepsilon_{it}$$

The results of this estimation are given in table 4.1. Since there is also presence of heteroskedasticity and serial correlation the model has to be estimated again to correct for this problem. These results are also given in table 4.1 and as can be seen the results remained the same. Finally, the differenced version of variable Popgr has to be used since this variable has presence of unit root.

The new equation estimated is equation 4.2:

$$GDPcapgr_{it} = \alpha + \beta_1 Oi\lg r_{it} + \beta_2 Servgr_{it} + \beta_3 Popgr_{it-1} + \beta_4 GDPcapgr1_{it} + \varepsilon_{it}$$

Table 4.1: Regression results of initial equation 3.2

	Equation 4.1	Corrected model	Equation 4.2
Oilgr	0.4876**	0.4876**	0.4895**
Servgr	0.4932**	0.4932**	0.4893**
GDPcapgr1	0.0396**	0.0396**	0.0224*
Popgr	-0.9837**	-0.9837**	
Popgr-1			-1.0008**
C	0.0014	0.0014	0.0030
R^2	0.9804	0.9804	0.9779

* Significant on the 5% level

** Significant on the 1% level

By estimating equation 4.2 we see that the growth in the oil and services sector has a positive effect on annual GDP growth per capita. Both effects are almost similar. The growth in the manufacturing sector is not a robust variable when regressed on the annual GDP growth per capita. This means the effect of manufacturing growth is negligible compared to the effect the oil and services sector have on annual GDP per capita growth. The oil sector and service sector are causing growth, but the manufacturing sector is not.

When testing the different subsectors of the services sector the following model will be regressed after testing for multicollinearity, robustness of the variables, heteroskedasticity and unit root (see appendix 2 for the details of the tests):

Equation 4.3:

$$GDPcapgr_t = \alpha + \beta_1 oilgr_t + \beta_2 man_t + \beta_3 consgr_t + \beta_4 transportgr_t + \beta_5 tourismret_t + \beta_6 othergr_t + \beta_7 Popgr_t + \varepsilon_t$$

The results are shown in table 4.2 after estimation using all corrections:

Table 4.2: Regression results of initial equation 3.3

	Equation 4.3
Mangr	0.0247
Oilgr	0.4880**
Consgr	0.0467**
Othergr	0.2852**
Tourismgr	0.1010**
Transportgr	0.0607**
Popgr-1	-1.0184**
C	0.0017
R^2	0.9804

* Significant on the 5% level

** Significant on the 1% level

As can be seen, all subsectors of services are of influence to economic growth. The sector 'other', of which finance is part, has the biggest influence. This is consistent with earlier observations. The growth in the manufacturing sector however is not significant when all alterations are made to the model. This is similar to the result obtained when the initial model was estimated.

To check whether the economic situation concerning diversification has changed in the last decade, the same procedure will be followed with a sample dated from 1997 to 2008.

When changing the sample, the only thing to check again is to see which variables are robust when estimating the model. Multicollinearity, heteroskedasticity, serial correlation and unit root will not change when only the years of the sample used changes.

Equation 4.4:

$$GDPcapgr_{it} = \alpha + \beta_1 Oi\lg r_{it} + \beta_2 Servgr_{it} + \beta_3 Popgr_{it-1} + \beta_4 GDPcapgr1_{it} + \varepsilon_{it}$$

The results of this estimation are given in table 4.3.

Table 4.3: Regression results of equation 4.4

	Equation 4.4
Oilgr	0.5436**
Servgr	0.5036**
Popgr1	-1.0436**
C	-0.0018
R^2	0.9544

* Significant on the 5% level

** Significant on the 1% level

The effect of the oil sector and services sector on economic growth is significant and almost similar as was also the case when using a wider sample. Manufacturing growth was not a robust variable and because of that not estimated in this model. This means that the effect of manufacturing sector growth has no effect on aggregate economic growth.

When the subsectors are used to see which of them are driving the influence of the services sector on economic growth we obtain the results as shown in table 4.4. The estimated equation is equation 4.5.

Equation 4.5:

$$GDPcapgr_t = \alpha + \beta_1 oilgr_t + \beta_2 consgr_t + \beta_3 tourismret_t + \beta_4 othergr_t + \beta_5 Popgr_{t-1} + \varepsilon_t$$

Table 4.4: Regression results of equation 4.5

	Equation 4.5
Oilgr	0.5458**
Consgr	0.0412**
Othergr	0.3398**
Tourismgr	0.1322**
Popgr-1	-1.0554**
C	0.0006
R^2	0.9535

* Significant on the 5% level

** Significant on the 1% level

These results show that only the growth in the transport sector is not of influence to economic growth. The growth of the manufacturing sector is again not of influence to the overall economic growth since the variable is not robust. These results are different to the estimations when using the wider sample. The reason for this result is not clear. In the data analysis of the individual countries, it seemed that the transport sector did increase as share of GDP for several countries. It might be that the development in the transport sector happened when the resources were recently discovered and that other sectors grew stronger in the last ten years when the infrastructures were in place.

4.2 Country results

After observing that there are indeed two sectors boosting economic growth for the region, which are the natural resource sector and the non-tradable sector, the two models will be estimated for the individual countries. One model represents all three major sectors, which are manufacturing, oil and services and the other model includes the several subsectors as part of services. This way it is possible to see if some countries are initiating or leading growth in some areas or whether the regional effects are a combination of multiple causes.

All the individual country datasets are also tested for multicollinearity, robustness,

heteroskedasticity, serial correlation and normality. The results of these test and possible adaptations to the model can be found in appendix 3.

For these regressions again a sample dated from 1980 to 2008 is used.

4.2.1 4.2.1 Bahrain

No variables are causing multicollinearity and after testing for robustness the following models will be regressed for Bahrain:

Equation 4.6:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Servgr_t + \varepsilon_t$$

Equation 4.7:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 consgr_t + \beta_3 tourismret_t + \varepsilon_t$$

Both models are tested for heteroskedasticity, serial correlation and normality and no corrections have to be made.

The results of the regressions are given in table 4.2.

Table 4.5: Regression results Bahrain

	Equation 4.6	Equation 4.7
C	-0.0174**	-0.0079*
Oilgr	0.4799**	0.3971**
Servgr	0.3555**	
Consgr		0.1434**
Tourismgr		0.1003*
R^2	0.8810	0.9301

* Significant on the 5% level

** Significant on the 1% level

The results show that growth in the oil and services sector has a positive and significant effect on the annual average growth rate of GDP per capita. As can be seen in table A3.1 in the appendix, the average annual growth rate of manufacturing

has no significant effect on the average annual growth rate of GDP per capita. The other sectors that are growing concerning the previous analysis are finance (other), transport and manufacturing. These data show that only tourism is an important sector for economic growth. Finance is a sector that is part of the sector other services as measured by the United Nations Statistics Division. This sector does not influence economic growth according to these results. It is possible however that another part of this measured sector is countering the effect of the finance sector. The transport sector is not of significant influence to economic growth.

4.2.2 Kuwait

The models that will be tested for Kuwait, after checking the variables for robustness and multicollinearity are:

Equation 4.8:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Servgr_t + \beta_3 Mangr_t + \beta_4 Popgr_t + \varepsilon_t$$

Equation 4.9:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Othergr_t + \beta_3 Transportgr_t + \beta_4 Tourismret_t + \beta_5 Popgr_t + \varepsilon_t$$

Generating the correlation matrix showed a very high correlation between the growth rates in the oil sector and the annual growth rates of GDP per capita. This means already that an important part of growth rates of GDP per capita are correlated with the growth rates of the oil sector. This will be confirmed by the results of the regressions.

A white-correction is used when estimating equation 4.9. The results of the two models are given in table 4.6.

Table 4.6: Regression results Kuwait

	Equation 4.8	Equation 4.9
C	0.0004	0.0035
Oilgr	0.5519**	0.5643**
Mangr	0.0645**	
Servgr	0.4015**	
Othergr		0.2564**
Transportgr		0.0688**
Tourismgr		0.1429**
Popgr	-1.0643**	-1.1432**
R^2	0.9775	0.9791

* Significant on the 1% level

** Significant on the 5% level

The results show that there is a positive effect of the growth in the oil, manufacturing and services sector on the average annual growth rate of GDP per capita. The annual growth rate of the population has a negative effect on annual GDP per capita growth rate. All these effects are significant and expected.

The estimated equation 4.9 shows that for services this growth is due to the growth in the transport and communications sector, the tourism & retail sector and the sector 'other activities' of which finance is part. As mentioned in the overview of Kuwait in the first chapter, the oil sector is still of most importance to Kuwait. The services sector however has also an influence to economic growth. The finance sector (as part of other activities) is indeed an important force of this growth as well as the transport and communications sector that did increase its share as part of GDP in the last decade.

4.2.3 Oman

For Oman we will test the following models keeping in mind the robustness of the variables and the multicollinearity between the variables:

Equation 4.10:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Servgr_t + \beta_3 Popgr_t + \beta_4 GDPcapgr1_t + \varepsilon_t$$

Equation 4.11:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Othergr_t + \beta_3 tourismret_t + \varepsilon_t$$

The tests on normality, heteroskedasticity and serial correlation show that a correction for serial correlation is needed for equation 4.11. The results are given in table 4.7.

Table 4.7: Regression results Oman

	Equation 4.10	Equation 4.11
C	-0.0271**	-0.0193**
Oilgr	0.3974**	0.2488**
Servgr	0.5497**	
Othergr		0.3843**
Tourismgr		0.2371**
Popgr	-0.4427*	
GDPcapgr1	-0.1006*	
R^2	0.9815	0.9471

***** Significant on the 5% level

* Significant on the 1% level

The results show that there is a positive effect between the oil and service sector and the economic growth of Oman and the manufacturing sector is not of importance at all. The services sector is more important for the economic growth compared to the oil sector and this growth is mainly driven by the tourism and retail sector and the 'other' sector of which finance is part. The transport & communication sector do not have a significant effect on economic growth even though their share as part of GDP has increased. It seems that the focus the country has on diversifying its economy has more effect than expected when looking at the

shares the different sectors have as part of GDP. The manufacturing sector is increasing its share in GDP, but apparently it is not of influence to economic growth.

4.2.4 4.2.4 Qatar

The economic models that will be tested for Qatar after checking for robustness of the variables and multicollinearity are:

Equation 4.12:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_{tt} + \beta_2 Servgr_t + \beta_3 Popgr_t + \varepsilon_t$$

Equation 4.13

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Mangr_t + \beta_3 Popgr_t + \beta_4 Othergr_t + \beta_5 Tourismret gr_t + \varepsilon_t$$

After correcting for heteroskedasticity, which seems to be present in the model the following results are obtained when estimating the models:

Table 4.8: Regression results Qatar

	Equation 4.12	Equation 4.13
C	0.0012	0.0076
Oilgr	0.4401**	0.4297**
Mangr		0.0896*
Servgr	0.5080**	
Popgr	-0.9315**	-1.0095**
Othergr		0.3537
Tourismgr		0.1130**
R^2	0.9524	0.9571

***** Significant on the 5% level

* Significant on the 1% level

Apparently there is a positive significant effect between the growth rate of the oil and services sector and the growth rate of GDP per capita. When the total services sector is used, the manufacturing sector has no significant effect on economic growth. The oil sector, which includes gas as well, has an effect on economic growth

that is smaller than that of the services sector. This is an interesting result, since a big focus for the Qatari government is the exploration and development of the gas industry. When the subsectors are used, which in this case are the 'other' services sector and the tourism sector, manufacturing does have a significant positive impact on economic growth. The estimated equation 4.13 shows that the strong effect of the growth in the services sector on economic growth is mainly driven by the tourism sector and the 'other' services sector of which finance is part. Qatar is putting its focus on natural gas, which is included in the variable oil in this research. Also tourism appears to be a sector that is indeed growing and positively influencing economic growth as well even though it seemed that its share as part of GDP didn't grow within the period 1980 to 2008. The transport & communication sector and construction sector did increase their share as part of GDP since 1980 but apparently it doesn't have a significant effect on economic growth.

4.2.5 4.2.5 Saudi Arabia

The two models estimated for Saudi Arabia after checking the robustness of the variables and multicollinearity are:

Equation 4.11:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Servgr_t + \beta_3 Popgr_t + \varepsilon_t$$

Equation 4.12:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Popgr_t + \beta_3 Othergr_t + \varepsilon_t$$

As can be seen in appendix 3, a correction has to be made for heteroskedasticity when regressing the models. The results of these regressions are shown in table 4.9.

Table 4.9: Regression results Saudi Arabia

	Equation 4.11	Equation 4.12
C	0.0036	0.0084*
Oilgr	0.3659**	0.3909**
Servgr	0.5181**	
Popgr	-1.0372**	-1.2385**
Othergr		0.6331**
R^2	0.9820	0.9839

***** Significant on the 5% level

* Significant on the 1% level

The growth in the oil and services sector is positively related to the economic growth of the country. From the second model it appears that the sector 'other services' of which finance is part is the main cause of services to have a significant influence.
The manufacturing sector does not have a significant influence on economic growth, even though its share as part of GDP did increase. The finance sector could very well be the cause of the 'other' services sector to be this influential. It is clear however that services are an important source for economic growth as well as oil still is.

4.2.6 4.2.6 United Arab Emirates

The UAE will have the following two models tested after deleting the variables that aren't robust:

Equation 4.13:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Servgr_t + \beta_3 Popgr_t + \varepsilon_t$$

Equation 4.14:

$$GDPcapgr_t = \alpha + \beta_1 Oi\lg r_t + \beta_2 Popgr_t + \beta_3 Othergr_t + \beta_4 Tourismret gr_t + \varepsilon_t$$

None of the variables caused multicollinearity, so no further adaptations have to be made. The tests for normality, heteroskedasticity and serial correlation showed that

no corrections have to be made. The results of the regressions of the above models are given in table 4.10.

Table 4.10: Regression results UAE

	Equation 4.13	Equation 4.14
C	0.0299*	0.0359*
Oilgr	0.5077**	0.5217**
Servgr	0.3879**	
Popgr	-1.4650**	-1.4682**
Othergr		0.1037*
Tourismgr		0.1785**
R^2	0.9833	0.9741

***** Significant on the 5% level*

* Significant on the 1% level

The oil and services sector have a positive influence on the economic growth of UAE and the main influence in the services sector comes from the tourism and retail sector and the 'other' services sector of which finance is part. Manufacturing again has no significant or robust influence that appears to be the case in many Gulf countries. Apparently not all subsectors of the services sector have a significant impact on economic growth, even though their share as part of GDP did increase.

5 Conclusions

In the past decades, a lot has been written about the peculiar phenomenon that natural resources of a country have a negative effect on economic growth. Causes that have been indicated to explain this trend are fiscal linkages, a spending and resource movement effect (Dutch Disease), corruption, institutions, political liberty, investment and a slowdown in learning-by-doing in the non-resource export sector. It has also been tested that the GCC is still very dependent on its resources, but the main question of this research remains whether the six Gulf countries are hit by a resource curse and whether they managed to diversify their economy over time.

This research has shown that the Gulf countries are indeed dealing with a manufacturing sector that is trailing behind the oil and services sector. It is not completely clear what caused this slowdown of one sector compared to the other sectors. The Dutch disease could be an explanation, considering the spending and resource movement effect. When the Gulf countries discovered the oil and gas, their income increased rapidly, making it possible to spend more in the services sector. Data proves that the services sector has become an important sector in all six countries. Its effect on economic growth is even slightly bigger than the effect of the oil sector on economic growth. When looking at the last 10 years however, the oil sector has been the main sector again driving growth. When including the sub-sectors of services into the estimations, it appears that all sectors are relevant for economic growth. However, the transport and communication sector lost their significance in the last 10 years. Overall this indicates that oil is becoming more relevant for the region again.

When analyzing the countries individually, only Qatar and Kuwait seem to have a manufacturing sector that is of significance to economic growth. Especially for Saudi Arabia, who has a focus on this sector, this is an unfortunate outcome.

Half of the countries still have the oil sector that is the main driver for economic growth. For all countries except Saudi Arabia, tourism is leading the influence of the services sector on economic growth. Most countries are trying to boost this sector. For Saudi Arabia it is the ‘other’ sector including finance that is the main driver of economic growth.

Another interesting conclusion is that for all countries except Bahrain, the 'other' sector including finance is partly driving economic growth. Bahrain is the country that has its policy adapted to facilitate the finance sector, but apparently over the period of 1980 to 2008 this has not paid off.

The UAE and Bahrain are the countries that are least dependent on oil exports. The overall regional dependence however is still high. Also the structural reforms to improve the investment climate have not paid off yet for all countries looking at the FDI flows and stocks. The sectors that are of influence to growth in the different countries are not always the ones that the countries are focussing on. However, it is clear that the services sector has become important to the economy besides oil. To maintain growth in the long run, the countries need more development towards diversification.

There are a few ways to move forward to be able to improve the research on the Gulf economies. The first would be to better provide data to do the different analysis necessary to obtain correct and unbiased results. This way it is easier to indicate the leading sectors of the different countries and whether the different countries are beneficiary to the region.

The second improvement would be to extend the variables with oil price fluctuations and possible exchange rates between the sectors. This would better indicate the effect of the Dutch Disease. The reason this has not been added to this analysis is to first get a clear idea about the sectors causing growth and the ones lagging behind. The next step would be to identify the reasons for this.

A third extension of this research is to test the interaction between the different sectors. Is growth in one sector related to growth in another sector? The model used in this research assumes that the growth rates of the different sectors are independent of each other. When analyzing the specific causes of the resource curse in the GCC region the interaction between the sectors should become clear.

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Appendixes

Appendix 1

Table A1.1: Overview of the variables used

Variable	Definition	Years	Source
1. GDPcapgr	Annual GDP growth rate per capita (%)	80 – 08	UNstats
2. Oilgr	Annual growth rate in oil Sector (%)	80 – 08	UNstats
3. Mangr	Annual growth rate in manufacturing Sector (%)	95 – 08	UNstats
4. Servgr	Annual Growth rate in services sector (%)	95 – 08	UNstats
5. Popgr	Annual growth rate of population (%)	95 – 08	WDI
6. Inv	Investment share as percentage of GDP	80 – 07	PWT
7. GDPcapgr1	Annual GDP growth per capita 1 year lag (%)	80 – 08	UNstats
8. Consgr	Annual growth rate in construction sector (%)	80 – 08	UNstats
9. Tourismgr	Annual growth rate in tourism & retail sector (%)	80 – 08	UNstats
10. Transportgr	Annual growth rate in transport sector (%)	80 – 08	UNstats

Note: WDI = World Development Indicators; UNstats = Statistics of the United Nations PWT =Penn World Tables

Appendix 2

To ensure the estimated coefficients are unbiased and consistent, some tests can be performed on the data. In this appendix we will analyze five different problems that might occur when working with panel data and when estimating the model. The first is multicollinearity, the second is the robustness of the variables, the third is heteroskedasticy in the residuals, the fourth is serial correlation and the last is unit root. The literature used for these tests are Pindyck and Rubinfeld (1998), Baltagi (2008) Hill and others (2008) and Wooldridge (2003).

A2.1 Multicollinearity

When testing the original model given in equation 3.2 a high R^2 is obtained which could indicate multicollinearity. There is multicollinearity among data when two explanatory variables are highly correlated with each other. This influences the estimated coefficients, since these coefficients are interpreted as observing the effect of the x variable on the dependent variable y with the assumption that other things remain equal. If two independent variables are correlated, this assumption is not fulfilled and the estimated coefficients cannot be interpreted confidently. According to Pindyck and Rubinfeld (1998) there are only procedures to indicate the presence of multicollinearity, but there are no official tests to proof it.

There are two procedures used here. The first one is to obtain the correlation matrix of the variables estimated to see the correlation between the variables. If the correlation coefficient is high (0.9 or higher) it could indicate the existence of multicollinearity (Pindyck & Rubinfeld, 1998). In the models tested, no variables reach the critical level.

A second way to check whether there is multicollinearity among the data is to estimate auxiliary regressions. An auxiliary regression is performed to obtain a test statistic, not to use its coefficients. It will test one independent variable on all the other individual independent variables. If the R^2 is 0.9 or higher, this indicates a high correlation between the two explanatory variables, which could cause multicollinearity. The model will be kept as given in equation 3.2 since there is no clear cause for multicollinearity.

A2.2 Robustness

The variables used in equation 3.2 have to be checked for their robustness. If the coefficient of the explanatory variable doesn't change its sign or level of significance when other control variables are included, it can be concluded that a variable is robust.

To check this robustness we start with estimating equation 3.1 and will add different control variables in the regressions after to check for equation 3.2. The results are shown below in table A2.3

Table A2.3: Results of regression analysis of the explanatory variables on GDPcapgr for equation 3.1 and 3.2

	3.1					3.2
Mangr	0.0010	-0.0040	0.0052	0.0167		0.0202
Oilgr	0.5095**	0.4977**	0.5052**	0.4901**		0.4821**
Servgr	0.4709**	0.4880**	0.4674**	0.4829**		0.4821**
GDPcapgr 1		0.0752**			0.0387	0.0333*
Inv			-0.0025*		-0.0033	-0.0002
Popgr				-1.0083**	-1.1163**	-0.9778**
R^2	0.9448	0.9477	0.9489	0.9781	0.5088	0.9804

* Significant on the 5% level

** Significant on the 1% level

INV and Mangr will be removed from the model since these variables are not robust. When adding the different variables to obtain equation 3.3, results are obtained as shown in table A2.4.

Table A2.4: Results of regression analysis of the explanatory variables on GDPcapgr for equation 3.3

					Equation 3.3
Mangr	0.1221**	0.0418*	0.0707**	0.1194**	0.0278*
Oilgr	0.5496**	0.4813**	0.5496**	0.5258**	0.4864**
Consgr	0.1604**				0.0392**
Othergr		0.4321**			0.2723**
Tourismgr			0.3056**		0.1191**
Transportgr				0.2718**	0.0704**
Popgr	-0.9184**	-0.9683**	-1.1605**	-1.0833**	-1.0322**
GDPcapgr1	-0.0685*	0.0439*	-0.0568*	-0.0877**	0.0101
R^2	0.9662	0.9779	0.9701	0.9700	0.9809

* Significant on the 5% level

** Significant on the 1% level

All sector growth variables are robust. In equation 3.3, the only variable that is not robust is GDPcapgr1. Hence, the variable will be removed from the model.

A2.3 Heteroskedasticity

If the residuals of a regression are heteroskedastic, the error terms are statistically dependent which means its variance is changing. For the variables to be unbiased and consistent and the statistics and standard errors to be valid, the error term has to be homoskedastic. This is also one of the assumptions set to use the fixed effects model. If heteroskedasticity is present, the fixed effects model might need to be corrected. To test whether there is heteroskedasticity present in the model the Pegan-Breusch test is used (Hill ao, 2008). The test indicates that with a confidence of 95% it can be assumed there is heteroskedasticity within model 3.3.

A2.4 Serial correlation

To test whether there is presence of serial correlation between the errors we use the Durbin-Watson test. The H_0: no serial correlation is rejected when the Watson-Durban statistic is smaller than 2. In this case there is positive serial correlation. If the Durban-Watson statistic is bigger than 2, there is presence of negative serial correlation and the H_0 will also be rejected. In both cases we have to correct for it.

By running the regression of model 3.2 we obtain a Watson-Durban statistic of 1.55. This means there is presence of positive serial correlation. In equation 3.3 the Watson-Durban statistic is 1.88, which also means there is presence of positive serial correlation. Since there is evidence of heteroskedasticity and serial correlation in the model, a correction has to be made when running the regression. In Eviews this can be done by using a generalized (weighted) least squares method. The GLS method appropriate when both are present in the model is the period SUR (seemingly unrelated regression).

A2.5 Unit Root

The last that should be tested to make sure the model is specified and estimated correctly is the presence of unit roots. As mentioned in Rubenfeld and Pindyck (1998) it is necessary that the variables are stationary. If variables follow a random walk, the OLS would not generate consistent estimators.

The variable population is suspected to have unit root and we will test this variable per country, since that is the only way unit root can be detected. The H_0: presence of unit root is tested by using the Dickey-Fuller test in Eviews.

If unit root is present, it would be best to use the differenced version of that variable since that is the only way to yield stationary series (Pindyck & Rubinfeld, 1998).

For the variable popgr in Bahrain unit root cannot be rejected. The other countries obtain a similar result when testing popgr for unit root. This means the model will be modified using the differenced version of the variable popgr.

A2.5 Robustness of the variables when using the sample 1997 to 2008

First the different regressions will be estimated when adding a control variable each time. Table A2.8 will show the results.

Table A2.8: Regressions to test robustness of the variables of equation 3.2

					Equation 3.2
Oilgr	0.6075**	0.5371**	0.5832**	0.5343**	0.5253**
Mangr	0.0043	0.0086	-0.0060	0.0356	0.0047
Servgr	0.3522**	0.5000**	0.4432**	0.3947**	0.5126**
Popgr1		-1.0446**			-0.9434**
GDPcapgr1			0.2519**		0.0791
Inv				-0.0027	-0.0004
R^2	0.8611	0.9546	0.8902	0.8778	0.9464

* Significant on the 5% level

** Significant on the 1% level

The results show that the only robust variables are Oilgr, Servgr and Popgr1. The other three will be removed from the model.

The results of the different regressions estimated to define model 3.3 for the subsectors of services are given in table A2.9.

Table A2.9: Regressions to test robustness of the variables of equation 3.3

					Equation 3.3
Mangr	0.0036	-0.0058	-0.0265	-0.0015	-0.0073
Oilgr	0.5668**	0.5475**	0.5886**	0.5560**	0.5431**
Consgr	0.0437*				0.0378*
Othergr		0.3546**			0.2530**
Tourismgr			0.2065**		0.1491**
Transportgr				0.0823*	0.0432
Popgr1	-0.8505**	-0.9970**	-1.0917**	-0.8240**	-1.0734**
GDPcapgr1	-0.0078	0.0073	0.0363	-0.0135	0.0680
Inv	0.0004	0.0002	0.0015	0.0004	0.0005
R^2	0.8890	0.9216	0.9180	0.8864	0.9521

* Significant on the 5% level

** Significant on the 1% level

The four variables that are not robust are transportgr, mangr, inv and GDPcapgr1 and will be removed from the estimated model.

Appendix 3

To test the model in equation 3.3 for the individual countries, first some test will be done to make sure the data used are correct and the estimated coefficients are consistent and unbiased. First the robustness and multicollinearity of the variables will be observed again, and then there is a check to see whether the model has to be corrected for serial correlation, heteroskedasticity or normality. The tests performed for these latter three are respectively the Breusch-Godfrey test, the White test and the Jarque Bera test. All three tests can be done in Eviews.

The Breusch-Godfrey test is a test on serial correlation among the residuals and it is to test the hypotheses:

H_0: There is no presence of serial correlation

H_1: Serial correlation

When the p-value of the F-statistic is 0.05 or higher, the H_0 cannot be rejected and it can be said that with 95% certainty there is absence of serial correlation.

The White test is a test to see whether the residuals are heteroskedastic. The following hypotheses are tested:

H_0: Homoskedasticity

H_1: Heteroskedasticity

If the p-value of the F-statistic is 0.05 or higher, the H_0 cannot be rejected and the residuals are homoskedastic with 95% certainty.

The Jarque-Bera statistic can be seen in the table when running a test on normality in Eviews. If the p-value given under the statistic is 0.05 or higher, we cannot reject the H_0 with 95% certainty, which is in this case the presence of normality in the errors. The hypotheses tested:

H_0: The errors are normally distributed

H_1: The errors are not normally distributed

The literature used to perform these test is Wooldridge (2003) and in the country overviews in this appendix the hypotheses are not mentioned again. Only the conclusion whether it is present and a correction is needed is given in chapter 4 when discussing the results.

A3.1 Bahrain

First, some different regressions will be run on GDPcapgr to test the robustness of the different variables. In table A3.1 the results of these regressions are shown. The only variables that do not change sign or lose significance are Oilgr, Servgr, Consgr and Tourismgr. This means that the other variables should be deleted from the model.

A3.2 Kuwait

A similar procedure as used for Bahrain will be used for Kuwait. The table with the different regressions to test the robustness of the variables is given in table A3.10. When using the variables Mangr and Servgr to identify the sector growth, there are only 3 robust variables: Oilgr, Servgr, Mangr and Popgr. Mangr is a fragile variable since it doesn't change sign and in most regressions it is significant at least at the 5% level. When the subsectors are added to the regression instead of servgr, the variables Oilgr, Popgr, Othergr, Transportgr and Tourismgr are robust. The non-robust variables are deleted from the model.

A3.3 Oman

For Oman we also tested the variables on robustness by running regressions while including different variables. The results of the different regressions are shown in table A3.19. When testing the first model, it appeared that only oilgr and servgr. Popgr and gdpcapgr1 are fragile variables since they don't change sign but do differ on the level of significance among the different regressions. In the second model it are only the variables oilgr, othergr and tourismgr.

A3.4 Qatar

When testing the equations 3.2 and 3.3 for Qatar we first checked what model had to be used by checking for robustness and multicollinearity. It seems that the two control variables Inv and GDPcapgr1 and the variable Mangr are not robust (for results see table A3.4). When running different regressions to test the robustness of the variables in the second model it shows that Oilgr, Popgr, Othergr and Tourismgr are robust. Mangr is a fragile variable since it does not change sign but it does change its significance.

A3.5 Saudi Arabia

After running the regressions to test for the robustness of the variables, it seems that oilgr, servgr and popgr are the only robust variables concerning the first model tested (for the results of the regressions see table A3.5). In the second model it are the variables oilgr, othergr and popgr are robust.

A3.6 United Arab Emirates

For the UAE it seems that, when checking for the robustness of the variables, the same model will be estimated as for Saudi Arabia. The second model however is slightly different. Here the variables oilgr, popgr othergr and tourismgr are robust (for results see table A3.6).