Diversification of the Angolan Exports – Challenges and Benefits

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Abstract

In recent years several researchers have published papers on exports concentration (diversification) urging policymakers in the undeveloped world to endeavour to diversify their exports since this can contribute to boost the growth of per capita GDP. Researchers such as Imbs and Wacziarg (2003) and Hesse (2008) found a non-linear U shaped curve relationship between export concentration and GDP per capita growth in several non-oil producing countries around the world.

In order to investigate this relationship, for the case of Angola, a growth regression model was applied using OLS estimator with time series data from 1995 to 2011. This master dissertation investigates the case of Angola, an oil-producing country with one of highest export concentrations in the world, and found that the higher export concentration has been detrimental to the growth of GDP per capita taking into account that this growth would have been higher if the export concentration was lower (higher diversification).

Therefore, this master dissertation found a non-linear concave relationship between export concentration and GDP per capita growth in the case of oil-exporting countries[1] and not a U shaped curve as other researches had found earlier (Imbs and Wackiazrg (2003) and Hesse (2008)). However running regression for some no-oil exporting countries[2] we found in the U shaped curve, a case to say that the pattern followed by oil-exporting countries is different from the non-oil producing countries, perhaps due to the fact that oil-exporting countries have on average higher export concentration levels than the non-oil exporting countries.

[1] Angola, Algeria, Egypt, Equatorial Guinea, Iran, Iraq, Kuwait, Libya, Nigeria, Norway, Qatar, Russia, Saudi Arabia, Sudan, Tunisia, Venezuela and United Arab Emirates

[2] China, Botswana, Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, USA, Zambia, Zimbabwe and others

Sumário Executivo

Título da Dissertação: ***Diversificação das Exportações em Angola - Desafios e Benefícios***

Nos últimos anos, vários investigadores têm publicado artigos sobre a concentração (diversificação) de exportações, exortando os políticos nos paises em vias de desenvolvimento a esforçarem-se para diversificar suas exportações, pois isso pode impulsionar o crescimento do PIB per capita. Pesquisadores como Imbs e Wacziarg (2003) e Hesse (2008) encontraram uma relação empirica não-linear, em forma de U, entre o nível de concentração das exportações e crescimento do PIB per capita em diversos países em todo o mundo.

A fim de investigar essa relação, um modelo de regressão de crescimento foi aplicado com estimador OLS com dados em séries temporais desde 1995 a 2011. Esta dissertação de mestrado investiga o caso de Angola, um país produtor de petróleo, com um dos maiores níveis de concentrações de exportações no mundo; os resultados encontrados são que a concentração das exportações tem sido prejudicial para o crescimento do PIB per capita, tendo em conta que este crescimento teria sido maior se a concentração de exportação fosse menor (ou seja se houvesse maior diversificação).

Assim este trabalho encontrou uma relação côncava entre a concentração das exportações e crescimento do PIB per capita no caso dos países exportadores de petróleo[3], e não uma curva em forma de U, como outras pesquisas tinham encontrado anteriormente (Imbs e Wackiazrg (2003) e Hesse (2008)) no caso de países não produtores de petróleo. No entanto extendendo o estudo para países não produtores de petróleo[4] re-encontramos a curva em forma de U, um caso para dizer que o padrão seguido por países exportadores de petróleo é diferente dos países não produtores de petróleo. Essa diferença pode dever-se ao maior nível de concentrações de exportações dos países produtores de petróleo em comparação com a maioria dos não produtores.

[3] Angola, Algeria, Egipto, Guine Equatorial, Irão, Iraque, Kuwait, Libia, Nigeria, Noruega, Qatar, Russia, Arabia Saudita, Sudão, Tunisia, Venezuela e Emiratos Arabeis Unidos

[4] China, Botswana, Congo, Lesotho, Madagascar, Malawi, Ilhas Maurícias, Moçambique, Namibia, Seychelles, Africa do Sul, Swazilandia, Tanzania, EUA, Zambia, Zimbabwe e Outros

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1. Introduction

Exports diversification is a very important topic that interests not only policy makers, but also researchers of international organizations and academics. Several papers and case studies (Hesse, 2008; Misztal, 2011; Carrère, Cadot, Strauss-Khan, 2011) have shown the importance of export diversification for the economic growth in some countries around the world, finding a positive relationship between export diversification and GDP per capita, showing that an decrease of the level of export concentration (increase in the level of export diversification) leads to an increase of GDP per capita growth.

In a volatile and uncertain world, countries with higher levels of export concentration are very sensitive to any change in the international market affecting severely the economic situation of those countries regarding growth, revenue, employment, and poverty. Data from the United Nations Conference on Trade and Development shows clearly that developing countries are the ones with higher export concentration levels and in turn with more volatile economic growth throughout the years due to the less export diversification, whereas developed countries have a more stable economic growth as result of having higher export diversification.

According to the UNCTAD database, Angola is one of the developing countries with the highest export concentration in Africa, with the index of 0.971 in 2011 (measured by Herfindahl index). This index illustrates well how concentrated Angolan exports are! In fact, data from Angola Customs shows that oil represents more the 95% of the total exports and if combined with diamonds the percentage goes up to 98%.

Angolan exports depend entirely on oil and diamonds, with more emphases on oil. The price of oil, which is set in the international market, “commands” the economic prospects of the country; if the price is high in a certain year, the economic growth is higher in that year, as occurred between 2004 and 2008, and lower if the price low, fact that happened in 2009 and 2010.

The fact that Angola is one of the countries with the highest export concentration in Africa (with all its implications in term of volatile growth) plus experience from the summer internship that I had last year at CMI in Norway, I was motivated to write this master dissertation on this topic to see: if Angola can really diversify its exports, although this is not an easy task and neither impossible; among the main drivers of export diversification presented by the literature, the ones that are related with Angola; the benefits that can come from this process; and if there is a linkage between export diversification and economic growth in the case of Angola.

Therefore in this dissertation we attempt to answer the following **research questions**: *Can Angola benefit from export diversification? To what extent can export diversification increase GDP per capita growth in Angola? Does Angola follow the U-shaped pattern in the relationship between export concentration and GDP per capita growth as Hesse (2008), Imbs and Wacziarg(2003) argued as being the case of most of the countries around the world?*

It is important to highlight that this paper differs from the others because it studies specifically the Angolan case, of course it follows the literature and the case studies by Hesse (2008), where he showed the positive relationship between export diversification and economic growth in more than 90 countries, and by Misztal (2011) that studied only the European Countries, showing that export diversification in those countries has been increasing GDP per capita growth.

2. Literature Review

2.1 The importance of export diversification (Why diversify exports, some stylized facts)

An African popular proverb says, *it is important and necessary not to sow only one type of crop, because if it fails the entire village will severely be affected and suffer*. This proverb helps us to see how important and crucial it is for a country not to rely only on one export product or to concentrate its export on few goods in these uncertain and turbulent times that we are living today, although the classical theory of David Ricardo (1817) pointed out that every country should specialize and concentrate on producing

and exporting the goods where it has the comparative advantages in comparison to its trade partners[5].

The theory of international trade started by Adam Smith (1775) in his classic book the *Wealth of Nations* and developed in details by Ricardo (1817) on his book *the Principles of Political Economy and Taxation,* (where he formulated the law of comparative advantages and gave the classical example of Portugal and England about the production and export of wine and cloth by the two countries and argued that since Portugal has comparative advantages in producing wine over England it should focus on this product and England on other hand on the production of clothes since it had comparative advantages over Portugal), and extended in modern times by the Heckscher-Ohlin-Samuelson theory, urges the nations to focus their efforts on producing and exporting goods and services in where they have comparative advantages over their trade partners.

However, the international trade theory does not imply that the nations should not differentiate exports by producing and exporting diversified sets of goods and services. The lack of comparative advantage should not hold back a country to produce and export different products taking into account one can learn to improve the efficiency in production by not holding back but yes, by producing. Besides, there are sound and valid reasons why a country should endeavour to make an effort to diversify its export and not to concentrate it on few products.

The literature on export diversification presents several reasons and some stylized facts why a country should strive to diversify its exports, among them: first of all the positive effect export diversification has on GDP per capita; second the role of export diversification as a hedge against sectoral fluctuation or volatility, third, the impact of export diversification on natural resources curse or Dutch Disease; and finally the effect of export diversification on democracy improvement.

[5] Of course Ricardo develops his model in a static environment.

We will now examine each of the above mentioned reasons to see how important export diversification is and why countries should set economic policies aiming at it.

2.1.1 First reason: export diversification has a positive effect on GDP per capita growth

In theory, a country which diversifies exports produces more different goods and services with the same number of workers and thereby or in doing so, it increases the gross domestic production per capita. In fact this does not occur in a linear way, since according to Imbs and Wackziarg (2003) the relationship between export concentration (measured by Gini index) and GDP per capita plotted graphically has a "U" shaped curve. They argued that decreasing export concentration (which implies the increasing export diversification) leads to an increase in the level of GDP per capita up to certain amount (a threshold that they computed ranging between 9 to 11 thousand USD) from which a country starts to specialize in exporting some goods and services which will lead to concentrate the export again.

Also Hesse (2008) in his working paper found out an empirical evidence of a positive effect of export diversification (concentration) on GDP per capita growth. According to him the "effect is potentially nonlinear with developing countries benefiting from diversifying their exports in contrast to the most advanced countries that perform better with export specialization"[6].

A more recent empirical research done by Misztal (2011) concerning *export diversification and economic growth in European Union member states* concluded that "during the years 1995 to 2009 exports diversification (concentration) was one of the most important factors that determined the level of GDP per capita in the EU" [7]. He found that the impact of export concentration on changes in GDP per capita was about 0.33 and that more than 30 percent of the variability of income per capita in the EU was due to the changes in the index of export concentration. It is important to

[6]Hesse, H., 2008. Export Diversification and Economic Growth: Commition on Growth and Development, Working Paper No.21 page V.

[7] Misztal (2011), *Export diversification and economic growth in European Union member states*, Oeconomia 10 (2) 2011, page 63

highlight that in the particular case of the EU countries, he did not find a U shaped curve, as Imbs and Wickziarg did in 2003, but yes, a W shaped curve, which meant according to him, during 1995 to 2009 "the exports diversification increased in countries of EU with relatively low GDP per capita, while the exports concentration increased in countries with relatively high GDP per capita"[8]. Regarding the income per capita threshold beyond which the countries of the EU he studied increased their level of export concentration was 6,000 USD for the poorest countries and about 20,000 USD for the richest countries of the EU.

Thus, it's crucial to diversify exports (reduce export concentration index) in order to have a higher level of GDP per capita growth and to generate more income for the populations in the economy.

2.1.2 Second reason: export diversification can serve as a hedge against economic growth volatility

The world statistics on economic growth show us clearly that the growth rates, throughout the past century, of poor countries around the world are more volatile and unstable vis-à-vis to those of the rich and more developed countries. Why is this so? Why do poor countries face greater fluctuation and instability of growth than the rich countries? The answer to this questions helps to see how important diversification is.

Koren and Tenreyro (2007) on their paper on *volatility and development*[9] did a volatility accounting analysis in order to find out the source of the growth volatility in poor countries. They presented three main reasons, one of them was the less developed countries concentrate their production in fewer and more volatile sectors and very often the sectors where they specialize in are affected by aggregate shocks either internal (due to country specific risk such us political instability or even macroeconomic policy) or external (coming from the international markets). They concluded that almost 50 percent of volatility that poor countries experience is for the

[8] Misztal (2011),E*xport diversification and economic growth in European Union member states*, Oeconomia 10 (2) 2011, page 63

[9] This paper was published in The Quarterly Journal of Economics pages 243-287, February 2007

reason that they concentrate or specialize in fewer and more volatile sectors. This does not occur with rich countries since they have a more diversified economic structure which allows them to have a more diversified exports structure.

So, Koren and Tenreyro (2007) showed that by having a diversified economic structure (which in its turn leads to a diversified exports structure) developed countries are able to shield themselves against economic growth volatility and sustain their economic development. Less developed countries, if they want to protect themselves from the growth instability that they have being facing throughout the years, should strive to diversify their production structure by producing and exporting new products and not relying only on their fewer and volatile existing production sectors which are the main source of their income.

The international financial and economic crisis that affected and is still affecting the world in current days was a wakeup call for all countries and particularly for the poor ones to diversify their economies and exports if they do not want to pass through the same experience again in the years to come. Countries with a more diversified economic structure were less affected by this crisis, revealing clearly that diversifying the export structure is indeed a protection or shield against economic volatility and poor countries are urged to do so if they want to have a less volatile and sustainable economic growth and development.

2.1.3 Third reason: the positive impact that export diversification might have on the fight against natural resources curse and Dutch disease

It is well documented in the economic literature, through statistic data and empirical researches, how most of resource-rich countries all over the world[10], especially in

[10] Of course with exception of countries such as Australia, Botswana, Chile, Canada and Norway, that although riches in natural resources, were able to be "growth winners" by taking full advantages their resources to diversify their economy and maintain in this way a steady and sustainable economic growth with strike contrast with other countries such as Angola, Bolivia, Congo Democratic, Nigeria, Zambia, Saudi Arabia and Venezuela. Mehlum et al (2006*), Institutions and the resource curse*, The Economic Journal, 116 (January) pages 1-20.

South America and in Africa, have tended to fail to grow fast and steadily despite the natural resource abundance that they have. This phenomenon is called natural resource curse due to fact that the resources in this countries, instead of boosting a sustainable economic growth, are actually viewed as detrimental to the growth. Sachs and Warner (1995) in their working paper entitled *natural resources abundance and economic growth*, documented what they called a statically significant evidence of the negative relationship between natural resource intensity or concentration and subsequent economic growth, consequently confirming empirically the theory of natural resource curse.

Other phenomenon linked to natural resource curse is the Dutch disease that for some is viewed as one of the causes of the natural resource curse since this so called disease is the crowding out of the no-natural resources sectors of the economy, such as the manufacturing industry, caused by the increase of the real exchange rate and wages driven by the increase of the revenues from natural resource exports, damaging in this way the other productive sectors of the economy. However, Frankel (2010) argued that viewing the Dutch Disease like this; we are in effect referring to natural resource curse.

In view of the damaging effect o that natural resource curse and Dutch disease have on the economic growth, what role does a diversification of the economic structure can have in counteracting this effect? Well, Matsuyama (1992), in his paper where he formalized a model of endogenous growth that demonstrated the relation between agricultural productivity and growth, gives the intuition that the manufacturing industry is characterized by learning by doing and this implies that a diversification out of extractive industry (of natural resource endowment) into other economic sectors such as services and manufacturing industries could help boost a sustainable economic growth.

For this reason, export diversification if taken seriously can be used as a valid reason to set economic policies aiming to promote export differentiation through the targeting

of economic structure diversification by using the revenues from the natural resource exports to strengthen and support the no-commodities sectors of the economy. A well or fairly diversified economy, and consequently export structure, can be viewed as *a shield* against the tendency of allowing the revenues coming from the extraction of natural resources to hinder and crowd out the other sectors of the economy. Policymakers in this case are forced to carefully ponder over the advantages and disadvantages, not only in the short term, but also in the long-run for the economy as a whole of allowing the existence or presence of this harmful phenomenon in the economy. That's why we argue that promoting export diversification can have a positive effect on the ruling out of resource curse and Dutch Disease phenomenon's in the economy.

2.1.4 Fourth reason: export diversification may help in the improvement of democracy

The transition from oligarchic (or dictatorship) institutions to democratic ones during the centuries was accomplished in some cases with the emergence of middle classes and their consequential economic empowerment from gradual participation in the ownership structure of existing economic activities and in new ones. Acecmoglu (2008) argued that the high levels of income distribution that maybe obtained in democratic institutions is one of the attractive features of the democracy. According to him, democratic societies "may be better able to take advantage of new technologies[11]" making it possible to start new businesses faster than in dictatorship societies.

The extent to which diversification can lead to better democratic institutions needs to be carefully analysed in view of the fact that not all forms of diversification lead to better institutions; this warning comes from Wiig and Kolstad[12] (2011). These two Norwegian researchers argued that it is the pattern of industrial activity, in which an

[11] Acecmoglu (2008), *Oligarchic versus Democratic Societies*, Journal of the European Economic Association March 2008 6(1) page 1

[12] Arne Wiig and Ivar Kolstad are both economists and seniors researchers at Chr. Michelsen Institute (CMI) of Norway

economy is centred on, which affects institutions like democracy rather than diversification per se, and where diversification has a positive impact on institutions, in some cases diversification might be hard to accomplish when it intimidates the power of the ruling party or elite.

Although not all forms of diversification lead to enhanced democratic institutions, it is a fact that diversification increases the income per capita and if well distributed this will improve the economic capacity of the citizens which in its turn will more likely allow them to earn higher incomes and give them more power to demand or require changes in institutions that can benefit all in the economy and not only the ruling elite. So, it is good to promote export diversification in view of its effect on the quality of institutions and economic democracy or liberalism.

After reviewing the literature, let us now have an overview of the Angolan economy, which is the object of study in this master dissertation to see how it is faring on the road to diversification, what benefits it can take from diversifying its exports and the challenges involved.

3. Overview of the Angolan Economy

Angola is a country located in the southern African region sharing borders with Democratic Republic of Congo in the North, Zambia in the East, Namibia in the South and the Atlantic Ocean in the West. It has an area of 1,246,700 km^2 with a shoreline of 1,650 km of coast with four major ports along the shore, namely the ports of Cabinda, Luanda, Lobito and Namibe. Besides the ports the country also has three main border posts of customs: the border post of Luvu in the Zaire Province (in the north at the border with Congo); the border post of Luau in the Moxico Province (in the East at the border with Zambia) and border post of Santa Clara in the Province of Cunene (in the South at the border with Namibia).

3.1 Looking at Macroeconomics (Causes and Consequences of the lack of diversification)

After becoming independent from Portugal in 1975, Angola faced an intense civil war that destroyed most of the economic infra-structure which led to the paralysation of

most economic activities (agriculture and the industry) except the production of oil and diamond that were used mainly to finance the war. In 2002 the war ceased and eventually the country gained peace. With the peace Angola increased the production of oil and diamonds and started to invest in agriculture and industry and other sectors of the economy such as services which led to the boom of GDP growth as we can see in the table 1 below.

Table 1: Angolan Economic Growth Rates (after the war)

Annual GDP Growth (%)	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP	3.31	11.18	18.26	18.60	23.19	13.82	2.39	3.39	3.40
Oil GDP	-2.20	13.10	26.00	13.10	20.40	12.30	-5.10	-3.10	-5.50
Non-Oil GDP	12.80	9.30	13.60	25.90	25.70	15.20	8.30	7.80	8.50

Source: BNA, MINPLAN, IMF and Economic Reports of CEIC/UCAN

A year after the cease of the war, Angola recorded a growth rate of 5.31%[13] and from there on the average growth rate was about 17.01% from 2004 up to 2008. The peace allowed Angola to have a tremendous growth mainly due to the increase of oil production that was stimulated by the increase of the demand and price of oil in the international market. This period of high growth that Angola had from 2002 to 2008 is considered to be the *mini golden age* of the Angolan economy[14] given that Angola never in its history has had such remarkable growth.

These growth rates reveal how concentrated the Angolan economy is. As we can see in table 1, in every year that the oil sector had a negative growth (2003, 2009, 2010, 2011) the overall GDP growth rate is less and lower although the non-oil sector had a positive growth rate. The financial and economic international crisis was a wakeup call to the Angolan authorities since this led them to realize, after experiencing the bad consequences of relying only on the oil production, that it is crucial and necessary to diversify the economy as Jensen and Paulo (2011) argued.

[13] According to Professor Alves da Rocha (one of the most known Angolan economists, former assessor of the Ministry of Planning and current director of CEIC/UCAN) this growth rate was due to the break in the growth production of oil in 2003 compared to the preceding year which led to a decrease of the overall rate of GDP since oil production represented at that time 54,9% of the GDP. – *Economic Growth in Angola to 2017 the main challenges, Angola Brief December 2012 Volume2 No.4.*

[14] Professor Alves da Rocha was the one that named this period as the *mini golden age*

The several projects of reconstruction that were implemented after the peace stirred most of the growth of the non-oil sector during *the golden age* period. Data from the Ministry of Planning show that during this period the sector of construction (public works and civil construction) had an average growth of about 30% whereas the agriculture was about 15%, and the manufacturing industry was about 25 %. These higher rates of growth of the non-oil sector need to be interpreted carefully taking into account that after the end of the war the non-oil sector started, so to speak, nearly from the scratch thus having a very low base from where the growth started to be counted.

The current Gross Domestic production of Angola today is almost 8 times greater than what it was after the end of the war in 2002. In 2011 the GDP was estimated to be 104 thousand millions of USD whereas in 2003 it was about 12 thousand millions as the table 2 shows.

Table 2: Population, GDP per capita and Unemployment Rates (after the war)

Indicator Name	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP (current US$ millions)	12,463.59	18,954.40	30,619.44	43,784.51	61,796.53	79,620.70	65,161.07	80,856.69	104,331.61
Population, total (millions)	15.42	15.96	16.49	17.01	17.53	18.04	18.56	19.08	19.62
GDP Per Capita	808.28	1,187.81	1,856.96	2,573.99	3,526.12	4,414.06	3,511.76	4,237.35	5,318.04
Unemployment Rate (%)	42.31	40.35	34.54	32.33	25.33	23.90	26.63	24.70	24.81

Source: Unemployment rates from Economic report of CEIC/UCAN; Population from World Bank Data base; GDP from WB data base and the Ministry of Planning of Angola.

Since 2003 the Angolan total population has been growing on average at the rate of nearly 3% a year this is lower than the rate at which the GDP has been growing (an average of 10.8% from 2003 to 2011). This fact allowed a GDP per capita increase from $808.28 in 2003 to $5.318.04 in 2011 contributing to the improvement of the Human Development Index that increased from 0.375 in 2000 to 0.508 in 2012, corresponding to an average annual increase of 2.6%[15]. Still in 2012 Angola was ranked at 148 out of the 187 countries, with a low human development index. The life expectancy at birth increased by 6.3 years between 2000 and 2012 while in 2000 was 45.2 years, in 2012 was 51.5 years. The mean years of schooling has not increased so much since in 2000 this was 4.4 and in 2012 was still 4.7.

[15] Human Development Report 2013 – Explanatory note on 2013 HDR composite indices – Angola.

The unemployment rate is still very high according to the estimates of the research centre for scientific studies of Catholic University of Angola (CEIC/UCAN) although it has been decreasing from 2003 to 2011. Almost 24.81% of the labour force in Angola is unemployed making life difficult for the majority of the households since without income they cannot feed their families contributing to the increase of the poverty rate among the population.

The high unemployment can be explained on the one hand due to the lower years of schooling of the labour force (most of the companies import a lot of workers from abroad arguing that is due to the lack of skilled local workers) and on the other hand due to concentration of the economy on oil production which is highly capital intensive requires fewer workers in comparison to the non-oil sector such as agriculture, manufacturing industry and services. Thus, endeavouring to diversify the economy will for sure help to increase the employment rate and decrease the unemployment among the labour force in Angola and consequently decrease the high poverty rate that still plaguing the Angolan population and improve their life conditions. This can be one of the most important channels for diversification to improve welfare.

With the end of the war the Angolan government managed to set economic policies that allowed the country to achieve macroeconomic stability regarding the main macroeconomic variables such as the inflation rate, the exchange rate and the net international reserves. Having those variables stabilized was fundamental and it still is today, to ease the business climate and to inspire trust and confidence to the investors and entrepreneurs making them to feel comfortable to invest in the economy.

Table 3: Other Macroeconomics Variables

Others macroeconomic variables	2003	2004	2005	2006	2007	2008	2009	2010	2011
Inflation Rate (%)	76.56	31.02	18.53	12.21	11.78	13.17	13.99	15.31	11.38
Exchange Rate (AOA/USD)	78.79	85.63	80.78	80.08	74.83	74.85	89.40	92.64	95.28
Net Intern. Reserves (US$ millions)				8,172.00	11,191.00	17,499.00	12,621.48	17,368.70	26,084.20

Source: INE, BNA; CEIC/UCAN

As table 3 shows the inflation rate was very high in 2003, in the first year of peace, it was 76.56% and four years later, in 2007, the inflation rate was 11.78%. This tremendous reduction was due to the good monetary policy and instruments used by

the Central Bank (Banco Nacional de Angola) to reduce and stabilize the inflation rate and they managed to do so. In order to inspire trust to the investors in the economy, because of the high inflation, at that time the Central Bank allowed the use of the United States Dollars as currency along with the local currency Kwanza (AOA) in the economy. Everyone could use dollars in almost every transaction even to pay salaries and ask loans from the commercial banks and this was particularly convenient and good to the importers and exporters given that they used dollar in their international trade.

The Central Bank used the exchange rate (kwanza (AOA)/ Dollar) as an anchor to keep the inflation rate (measured by the consumer price index) under control and reducing in this way the prices of goods and services in the economy[16]. As we can see on the table 3, the reduction of inflation was related with the reduction of the exchange rate from 2003 to 2007. In order to have the exchange rate lower and under control the Central Bank used the net international reserves. In this period of the golden age[17] the export of oil was excellent and this allowed the Central Bank to have the dollars needed to stabilize the exchange rate and controlling in this way the inflation rate. Nevertheless, at the end of 2008 with the start of the international crisis the export of oil dropped dramatically affecting negatively the inflow of the international reserve in the economy. This fact put the Central Bank in an awkward and difficult situation since they could no longer count on the international reserve to control the exchange rate and the inflation rate, that is why we saw an increase of the inflation rate from 2008 to 2010. But in 2011 and 2012 with an increase in the of price of oil in the international market, things slightly improved, as it was possible to keep the inflation under 10% in 2012, with the international reserves reaching the value of 29 thousand millions of dollars, almost 27% of GDP and represents more than 7 months of imports.

[16] The Consumer Price Index used to measure the inflation rate by the National Bureau of Statistic (INE) refers only to prices of the capital of the country (Luanda) and not of all the country (the 18 provinces). According to INE this is so due to the lack of infra-structure and staff to cover all the country. Then the inflation rate presented are only of Luanda and it is important to highlight that more the 70% of the economic activities are concentrated in Luanda as Aves da Rocha documented in his book on regional umbalances and inequalities in Angola (2010).

[17] As Professor Alves da Rocha calls it

But the problem of inflation in Angola is not only a monetary one; other factors also play a big role such as the quality of the infra-structures and of the institutions (the port, the Customs, the customs brokers, the high level of bureaucracy in these institutions); the lack of the national production of most of the consumable goods that leads the country to import more than 60% of this type of goods and importing in this way also a part of the inflation; and the lack of law enforcement with regard price speculations, etc.

Regarding the bureaucracy in the institutions, most of the companies that respond to the quarterly[18] survey done by the CEIC/UCAN to measure the climate of doing business in Luanda complain about the efficiency of the instructions related with the international trade and the quality of infra-structures (such as electricity, water, telecommunications, roads and other facilities) since these factors, according to them, make the cost of doing business too high. This fact is not surprising since the report of the World Bank on doing business ranks Angola in the group of countries where doing business is not easy and is highly costly. *The Report of 2013 ranks Angola in the position 172[19] out of 185* worldwide and among the factors that contributes to this are the length of time needed to start a business, the difficulties to get property registration, construction permits, credit and loans and the difficulties to trade across the borders. Then if Angola really wants to diversify its economy and consequently its exports it is imperative to improve and ease the climate to do business.

In summary the macroeconomic variables presented in the table 3 also help us to see how important and fundamental it is to diversify the Angolan exports in order to achieve a more sustainable macroeconomic stability and to ease the environment to do business. The country needs urgently to have other main products of exports besides oil, in order to diversify its source of international reserves. The Angolan authorities and policymakers should take to heart the wakeup call that the

[18] This quarterly survey is called Barómetro de conjuntura económica (barometer of the economic conjuncture) and surveys more than 150 companies to get their perception if the climate of doing business in the prior quarter was favourable to them or not.

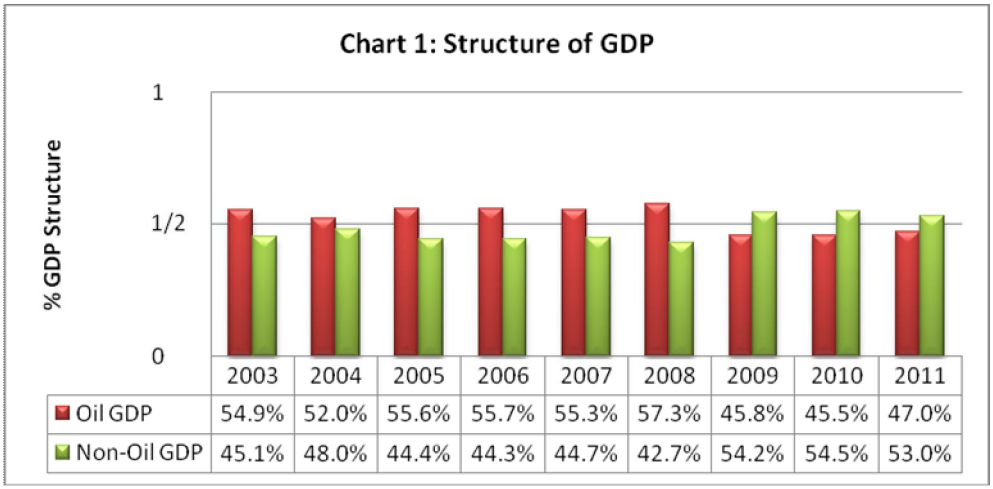
[19] Doing Business Report 2013, pages 4 and 5, World Bank

international crisis aroused and commit themselves to diversify the economy and its exports. The depreciation of the Kwanza in relation to the US dollar would have been a great opportunity to export more products if Angola exported more of other products rather than oil, in view of the fact that with the depreciation of the local currency the exports become cheaper to the international buyers.

3.2 The Structure of the Economy

3.2.1 The GDP´s Structure

The Angolan Gross Domestic Production is made of or comes from several economic activities such as agriculture, fishing, diamonds and other minerals, oil, manufacturing industry, construction, energy and water, merchant services and other services (banking, insurance, telecommunications and so on). But as for the sake of national accounts and statistics, the GDP is divided or grouped in two main categories of production: oil and non-oil. The oil GDP refers to all production related with the extraction of crude oil and its derivatives and refinery, whereas the non-oil GDP is the production of all other goods and services without including the oil sector. The graph 1 the structure of the Angolan GDP according to the classification stated above.



	2003	2004	2005	2006	2007	2008	2009	2010	2011
Oil GDP	54.9%	52.0%	55.6%	55.7%	55.3%	57.3%	45.8%	45.5%	47.0%
Non-Oil GDP	45.1%	48.0%	44.4%	44.3%	44.7%	42.7%	54.2%	54.5%	53.0%

Source: Data from BNA, MINPLAN, CEIC/UCAN and own calculations

As we can see from the chart 1, from 2003 up to 2008, during *the mini golden age*, more than half of the all Angolan Gross Domestic Production was oil related production, showing how concentrated the Angolan GDP was; the whole depended solely on one commodity. The all other sector production all combined (agriculture,

fishing, diamond and other minerals, oil, manufacturing industry, construction, energy and water, merchant services) was less than 45% of GDP on average.

From 2009 to 2011, the years of the international crisis that affected deeply the price of oil, the non-oil GDP was able to overcome the weight of the oil sector in the economy, weighting more than 53% of the total GDP. In our understanding this was possible for the most part due to the two factors:

Firstly due to the accumulative decrease of oil production in this period of 13.7% (on average -4.57 of decrease per year) compared to period of 2004 to 2008 where we had positive growth rate of the oil sector; doing a simple empirical calculations[20] we see that during this period the decrease of oil production led to the accumulative destruction of the growth of the overall GDP of about -6.33%, on average about -2.1% year.

Secondly owing to the positive modest growth of the non-oil sector that on average was 8.2% year. If was not for this positive growth of the non-oil sector, Angola could have faced a big recession. During this period this sector was able to have an accumulative contribution to the overall growth of GDP of about 13.26%, on average 4.42 per year.

3.2.2 The Exports' Structure

Before presenting the composition and structure of the Angolan exports let us first have a quick view of its position in the international trade and within the different regional and international organizations that is part of.

Angola is a member of the World Trade Organization, a worldwide organization *whose primary purpose is to open trade for the benefit of all*[21] involved in the international trade. The country got WTO accession on 23 November 1996, eleven years after the

[20] The Calculations imply just multiplying the growth of the oil sector with its respective weight on the GDP (growth oil GDP * % Oil Sector on GDP)

[21] http://www.wto.org/english/thewto_e/whatis_e/wto_dg_stat_e.htm

establishment[22] of this organization with more than 150 countries members. Belonging to this organization can actually be good and advantageous for the country given that as a member it has opportunity to export its products to all other members without great obstacles concerning tariffs and import duties that might hinder the international trade. And as a member of the Least Developed Countries negotiation group within the WTO, Angola as a poor country can get special preference to export its agricultural and some manufacturing products to developed countries, under the Generalised System of Preferences, thus by diversifying the exports Angola can benefit and take advantages of being member of the WTO.

Data from WTO gives note that in 2011 Angola's share in the world total exports was about 0.37% whereas the imports were 0.11%.

Table 4: Angolan Trade Profile in 2011

Breakdown in economy's total	Exports	Imports
MERCHANDISE TRADE (million US$)	66.996,00	20.190,00
Agricultural products	0,0%	23,0%
Fuels and mining products	98,3%	6,3%
Manufactures	1,7%	70,2%
COMMERCIAL SERVICES TRADE (million US$)	732,00	22.415,00
Transportation	3,6%	16,2%
Travel	88,3%	0,8%
Other commercial services	8,1%	83,0%

Source: WTO database

Those figures per se do not give us much information. It is important to breakdown those figures to see deeper and obtain meaningful information about the Angolan exports. As we can in the table 4, of all merchandise exported, 98.3% was just mineral, that is oil and diamonds whereas manufactures were only 1.7% and agricultural products almost zero because are insignificant. Looking at the imports we see that 23% of them were agricultural products and 70% manufactures. Here we see a great room

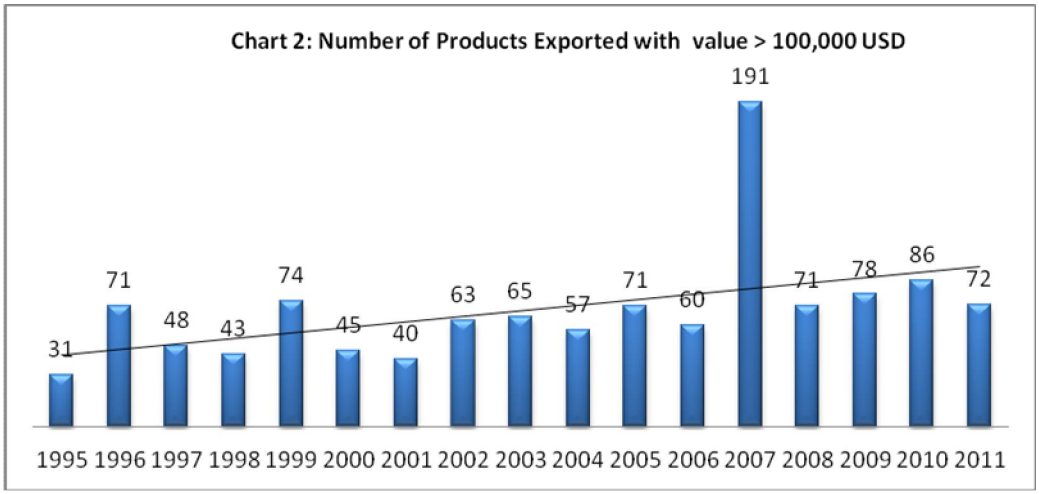
[22] The WTO was established in January 1, 1995. It has its headquarters in Geneva, Switzerland. On March 2, 2013 the WTO had 159 countries as members.

to diversify the exports, if Angola could invest in agriculture and manufacturing could reduce some imports of these goods and even export more, reducing in this way the weight that oil and diamonds have.

Table 4 also gives us information regarding the export and import of commercial services, 88.3% of exported services were travel whereas other commercial services (such as communication, construction, insurance, financial, computer, information, other business, and cultural and recreational services, and royalties and license fees) were just 8.1%, too low in comparison to the imports of these services that were 83% of the total imported commercial services. These figures tell us that Angola can as well diversify its exports by investing in the sectors of commercial services and export more of these services than what is being done currently. For that purpose to be accomplished it is crucial to invest in quality education among the population and especially the young generation.

Now we are going to look at the breakdown of the Angolan exports according to the figures from the national customs services of Angola to see in details the main products exported by the country and their respective weight in the nations´ total exports.

According to the Standard International Trade Classification (SITC) revision 3 at 3 level of the United Nations Conference on Trade and Development (UNCTA), the export lines of Angola is made up of many products such as crude oil, diamonds, refined petroleum, natural gas, coffee, sisal, fish and fish products, timber, cotton, agricultural products and many other products and services. According to the National Customs the export line of Angola contains more than 2 thousands products; but the most exported number of products, with the monetary value greater than 100,000 USD, is shown in the chart 2.

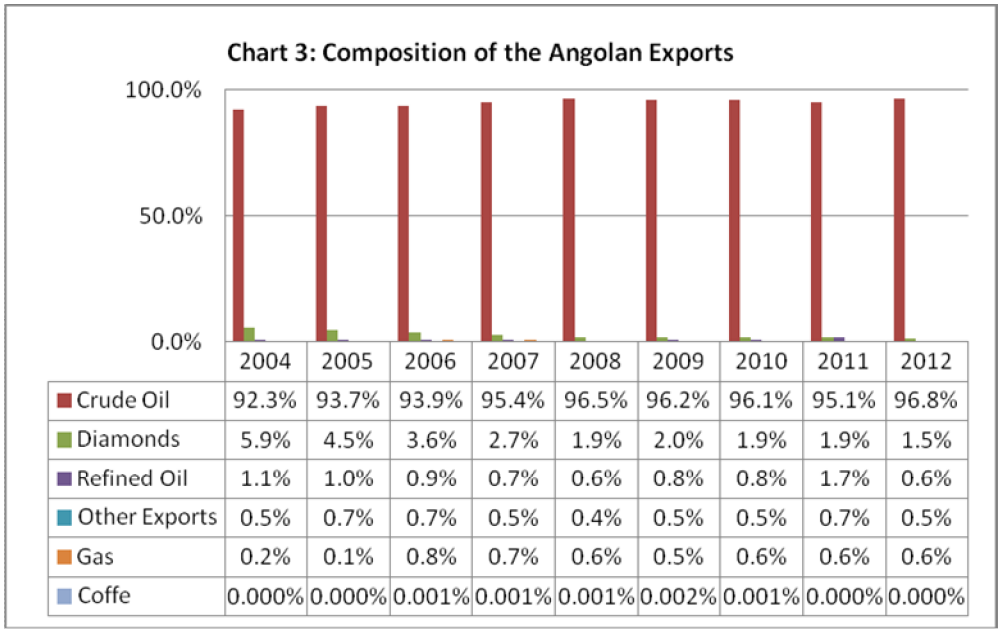


Source: UNCTAD data base

As we can see in the chart 2, in 1995 Angola exported 31 different products with monetary value higher than 100,000 USD and considering the period between 1995 and 2001, a period of war, the average in this time was 50 per year; after the end of the war in 2002, the average number of the most exported products increased. Between 2002 and 2011 the average was 69 without including 2007 and 81 if 2007[23] is included.

Out of all total number of exported products, crude oil, refined oil, gas, and diamonds are among the main exported products and the crude oil is of course the most exported product of all.

[23] The year 2007 was an outlier in the history of the economic growth of Angola since in this year the country recorded the highest growth rate of its economy and thus the high level of the number of products exported which the monetary value was greater than 100,000 USD in 2007 can be explained due to this fact. Some facts might explain this: in 2007 Angola joined the Organization of Petroleum Exporting Countries (OPEC) and also in this very year Angola got a credit line from the Chinese Eximbank amounting to US$2.5 billion. (in 2004 and 2005 Angola had already received up to US$4 billion)



	2004	2005	2006	2007	2008	2009	2010	2011	2012
Crude Oil	92.3%	93.7%	93.9%	95.4%	96.5%	96.2%	96.1%	95.1%	96.8%
Diamonds	5.9%	4.5%	3.6%	2.7%	1.9%	2.0%	1.9%	1.9%	1.5%
Refined Oil	1.1%	1.0%	0.9%	0.7%	0.6%	0.8%	0.8%	1.7%	0.6%
Other Exports	0.5%	0.7%	0.7%	0.5%	0.4%	0.5%	0.5%	0.7%	0.5%
Gas	0.2%	0.1%	0.8%	0.7%	0.6%	0.5%	0.6%	0.6%	0.6%
Coffe	0.000%	0.000%	0.001%	0.001%	0.001%	0.002%	0.001%	0.000%	0.000%

Source: Alfandegas de Angola and BNA

The Chart 3 shows clearly how the Angolan exports are concentrated on just one product, which is the crude oil. In 2004 more than 92% of the total export was crude oil and this percentage is increasing from year to year as we can see in the graph 3. From 2004 to 2012 the export of crude oil on average was 95% of the exports; just in 2012 alone the weight was more than 96 percent. The weight of diamonds in the total value of the exports has been decreasing since 2004, in this year the more than 5% of the total exports were diamonds whereas in 2012 the weight was less than 2%. The weight of refined oil is on average almost 1 percent of the exports strikingly inferior to the export of the crude oil. This shows that nearly all crude oil that Angola produce is not refined within the country but is sold as such; even part of the refined oil that is consumed internally is imported from abroad[24].

The export of natural gas is on average 0.5% of the total exports; these figures would actually be higher if Angola did not burn most of the natural gas coming from the process of the extraction of the crude oil. But with the implementation of the Angola

[24] According the report of the Alfandegas de Angola (Angolan Customs) 2012, the imported refined oil is on average more than 4 percent.

LNG Project[25], a specific factory (industry) destined to recover and treat the natural gas and then export it, the weight of the natural gas in the total exports will certainly increase in the near future.

The other exports comprised on average more than 50 products out of 57 in 2004 and in other years more than 85 percent of the total number of products exported. But in terms of percentage weight in the total value of the exports they represent less than 1% of the total value of exports. What room to diversify the exports Angola has, just by increasing the intensive margin and not even touching the extensive! To increase the intensive margin of these other exports, the authorities should know exactly who are the ones that export these products, what challenges they are facing and what can be done to help them, why they do not export more quantities of these goods and so forth. Because on their own the small enterprise exporters or the small companies that export cannot or are not able to export more quantities without help (either financial or by facilitating the process of obtaining an export credit line[26], either institutional by easing the bureaucracy of the institutions that deals with the exports) from the authorities.

In the chart 3 we also see that the weight of coffee in the total exports is almost zero throughout the years; this fact really saddens those who know the history of the Angolan exports. The young generation would not believe that before the independence from Portugal in 1975, for more than 20 years coffee was on the top of the main exported products and in the period of 1960 to 1973 Angola was the 4th biggest producer and exporter of coffee in the world! At that time coffee represented on average more than 30% of the total exports being the most exported product,

[25]Angola LNG is a project that is being implemented in the province of Zaire and was established in 2008. According to the website of the Project, Angola LNG has the potential to produce one billion cubic feet of clean gas per day for domestic and international markets. The facility will be supplied by the over 10 trillion cubic feet of gas reserves that are available from offshore Blocks of crude oil extraction 0, 1, 2, 14, 15, 17 and 18. (http://www.angolalng.com/project/aboutLNG.htm)

[26] Many countries have Export and Imports Banks that help their companies to export more and more since without Money is very hard to export products successfully and find new markets. In this regard we have the EximBank of the USA, of China and other countries.

followed by diamonds, cotton, sisal and agricultural products representing on average 9 to 15%[27].

Angola started exporting oil in 1959; in 1960 the share of oil was 0.74% and only in 1973 the crude oil was on the top of the most exported products[28], constituting 30% of the total export, whereas coffee 26%; from there on coffee almost disappeared from the commercial balance, letting crude oil and diamonds alone to dominate[29].

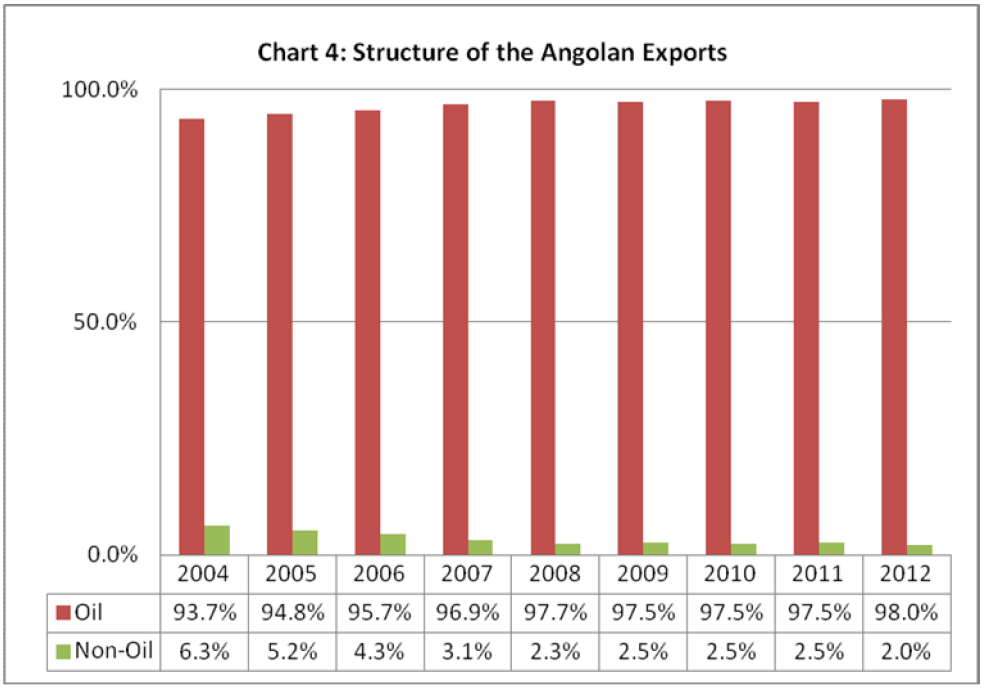
The civil war that occurred soon after the proclamation of the independence affected dramatically the agricultural production, since farmers were destroyed and most of the arable lands were mined with the land mine. However, fortunately the war is over now and most of land mines are being cleared then this is the time to invest again in coffee and cotton production and start exporting these products again as it was before the independence. Once more, the figures of the coffee exports show us that it is indeed possible to diversify the Angolan exports by focusing not only on the extensive margin but particularly on the intensive margin, by promoting the increase of the production and exports of coffee, cotton and other agricultural products.

Now if we aggregate the exports in just two categories, as we did in the GDP, oil and non-oil exports we clearly see the highly concentration of the Angolan exports.

[27] Dilolwa, Carlos Rocha, Historia Económica de Angola, Editora Nzila 2000, Pages 120-149

[28] Dilolwa, Carlos Rocha, Historia Económica d Angola, Editora Nzila 2000, Page 99

[29] Unfortunately from 1975 to 1989 there are almost no records of the trade or export of coffee.



Source: BNA and Alfandegas de Angola

As can be seen in the chart 4, only in 2004 and 2005 the oil export were less than 95% of the total exports but from 2006 onward the weight was more than 96% and in 2012 the weight reached 98%! As obvious the weight of the non-oil exports has been decreasing since 2004 and in 2012 was only 2%.

According to the data that we are analysing there is no evidence of export diversification process in Angola given that the oil export is getting more and more weight whereas the non-oil is decreasing. The facts are unambiguous and very clear that something must be done soon in order to free the Angolan economy from the total dependence on the crude oil, by engaging with commitment in the process of diversifying the exports.

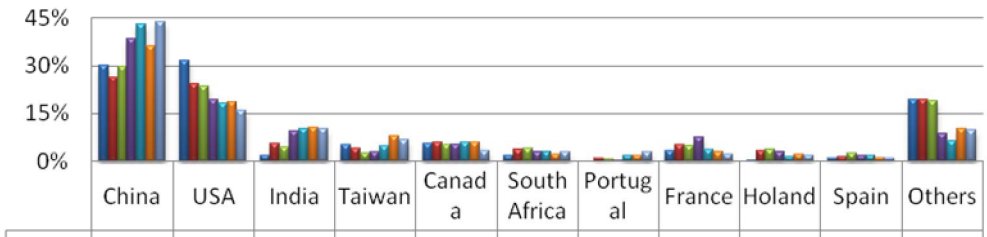
3.3 Angola´s Main Trade Partners in the Exports

Angola has trade relationship with many countries around the world, importing[30] most of the goods and services from them and exporting to them its main export products

[30] We do not present the imports in this work because our focus is just on the exports. But data from National Customs Services and the Central Bank show that the main import partners are: Portugal (18%), China (11%), USA (7.6%) and others. See the Appendix page 55, table 12.

namely crude oil and diamonds. The main trade partners to whom Angola exports its products are presented in the chart 4.

Chart 5 : Top 10 of Angola´s Main Trade Partners (In Exports)



	China	USA	India	Taiwan	Canada	South Africa	Portugal	France	Holand	Spain	Others
2006	30%	31%	2%	5%	5%	2%	0%	3%	0%	1%	19%
2007	26%	24%	6%	4%	6%	4%	1%	5%	3%	2%	19%
2008	30%	23%	4%	3%	5%	4%	1%	5%	4%	3%	19%
2009	38%	19%	9%	3%	5%	3%	1%	8%	3%	2%	9%
2010	43%	18%	10%	5%	6%	3%	2%	4%	1%	2%	6%
2011	36%	18%	11%	8%	6%	2%	2%	3%	2%	1%	10%
2012	44%	16%	10%	7%	3%	3%	3%	2%	2%	1%	10%

Source: BNA and Alfandegas de Angola

As can be seen in the chart 5, since 2007 China has become the main trade partner of Angola in the exports, being the country where more than one third of crude oil is exported[31]; the USA is the second biggest trade partner[32], followed by India, Taiwan, Canada, South Africa, Portugal, France, Holland and Spain. The other countries comprise more than 20 countries such as the UK, Sweden, Switzerland, Japan and others.

The oil exports have been concentrated on China; this makes the country depend on one or few importers which can cause troubles in the future. Diversifying the destination of exports might also be away to diversify the exports itself, since by doing so the country is promoting what it produces and attracting in this way more buyers.

[31] Jensen and Paulo (2011) argued that "China is by far the largest Angola´s creditor which lent more than US$ 14,5 Billion (thousands million) up to 2011" for the process of national reconstruction that has being carried out by the government after the end of the war. As part of the guarantee of the debt, Angola and China agreed that China would have privilege on the export of the crude oil. This can be one of the reasons why China has become the main trade partner of Angola regarding the exports of oil.

[32] The USA was the biggest trade partner in the exports (oil) of Angola since the Independence up to 2007

It is interesting to see that among the top ten there is only one African country, South Africa. Angola is a State member of the Southern African Development Community (SADC), a regional economic community comprising 15 Member States founded in 1992 which aims, among others, to promote sustainable and equitable economic growth and socio-economic development through efficient, productive systems, *deeper co-operation and integration*[33], and achieve economic regional integration by promoting a free regional trade. In this Community Angola is the second biggest economy after the South African economy which is the biggest economy in the region and in the continent. Congo, Zambia and Namibia (countries that share borders with Angola) are also members of this community[34] and the trade between them is very low, almost zero. Then in the process of exports diversification, Angola has a regional market with more than 270 million of inhabitants where it can export its products and enhance the competiveness of its firms or companies. With the construction of the Refinery of Lobito probably the export of refined oil to the countries of the region will be more significant than what is seen today.

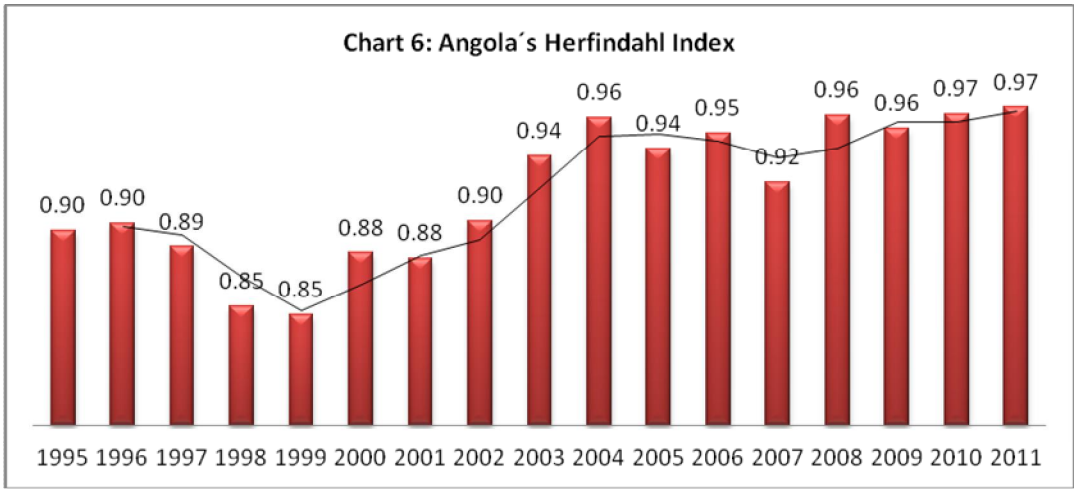
3.4 Export Concentration indicator (Herfindahl Index)

After observing the Angolan exports´ structure there is no doubt that its exports are concentrated on just one commodity which represents more than 95 percent of the total value of the exports. In this section we are going now to look at the exports concentration indicator (Herfindahl Index) computed by the United Nation Conference on Trade and Development for all countries members since 1995; of course our attention is on the case of Angola and some countries within the Southern African Developments Community region just to help us make some comparisons.

It is important to remember that the Herfindahl index is normalized to range between zero and one; a value close to zero implies full export diversification, whereas values close to one mean a high export concentration.

[33] SADC mission statement (http://www.sadc.int/about-sadc/overview/sadc-mission/)

[34] The other members are: Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Seychelles, Swaziland, Tanzania and Zimbabwe.

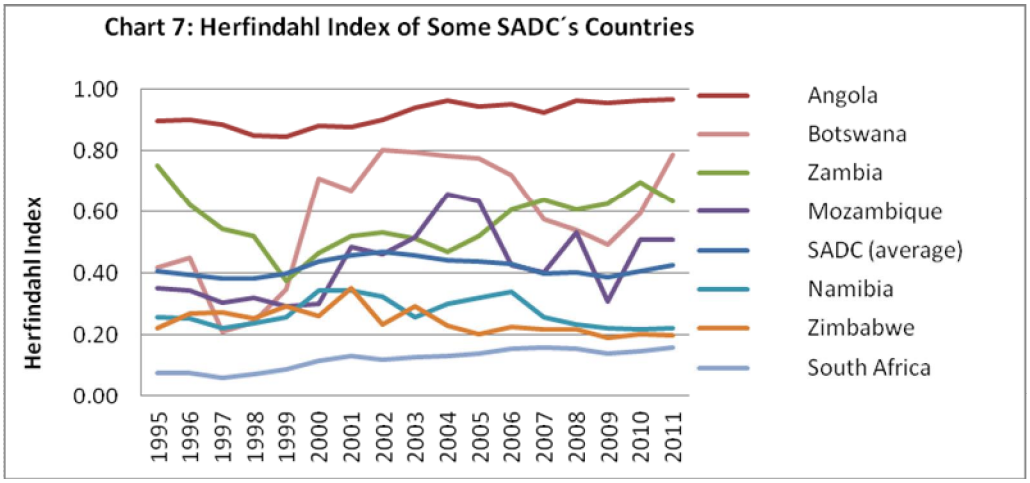


Source: UNCTAD database

Chart 6 is unambiguous about how highly concentrated the Angolan exports are, the Herfindahl index is above 0.9 very close to 1 the upper limit of concentration. It is noteworthy that from 1997 to 2001 the concentration index is lower than 0.9 and within this period in 1998 and 1999 was recorded the lowest concentration index being this 0.85. One of the reasons that might explain this fact is the higher diamond production and exports that occurred in this period and the lower crude oil production due to the intensity of the war in these years, helped decrease the exports concentration index. With the end of the civil war in April of 2002 the concentration index started to increase again reaching the value of 0.97 in 2011. During the period of peace from 2002 to 2011, only in 2007 was recorded a lower index (0.92) throughout all this period. This is not surprising since in the graph 2 we saw that in this year Angola exported the largest number of products which monetary values were higher than 100,000 USD recorded in its modern history, more than 190 different products and experienced the highest economic growth rate; of course this explains the lower concentration index in 2007.

How does Angola compare with the other countries within SADC? Chart 7 helps us answer this question. The average export concentration of SADC is about 0.4[35] and we selected some countries to compare with Angola.

[35] This is an arimethic average that was computed by us according to the data from UNCTAD of the 14 countries member of SADC available; although there are 15 countries, we just used 14 because data for Madagascar is not available.

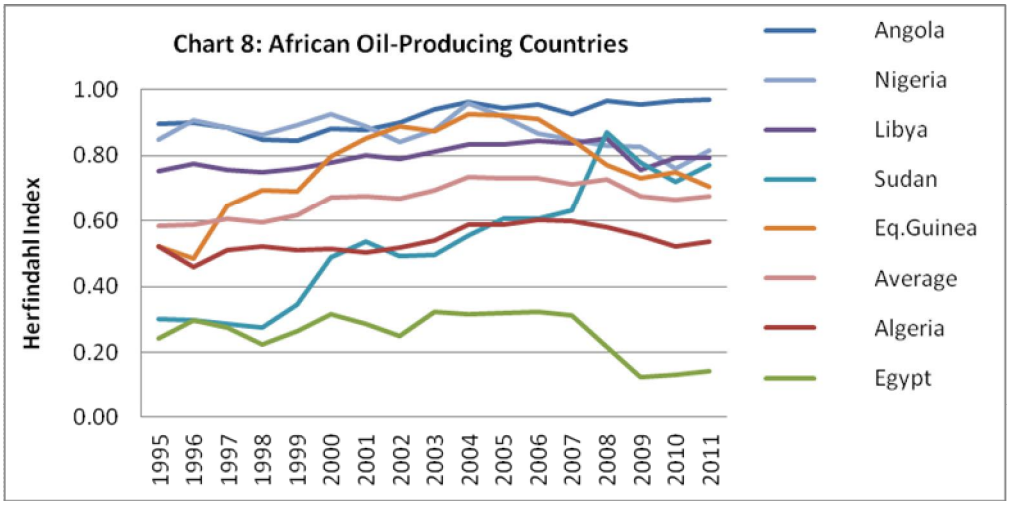


Source: UNCTADstat

Chart 7 shows that by far Angola is the country with the highest export concentration index within SADC, its index being two times higher than the average of the region. Botswana, Zambia and Mozambique also have a concentration index above the average of SADC but far from those of Angola. Namibia, Zimbabwe and South Africa[36] present an index much below of the SADC´s average, meaning that these countries are the ones with more diversified exports within region. Clearly Angola can learn from them how to diversify the exports given that those countries managed to differentiate their exports.

Comparing Angola with the countries of SADC alone can be misleading since among the SADC´s countries Angola is the biggest crude oil producer. To avoid what some people might call an unfair comparison, we will now compare Angola with other African and non African countries main producers of crude oil to see how concentrated their exports are in comparison to Angola.

[36] South Africa is the country with the lowest export concentration Index in the region, its concentration index being on average 0.12. This means that South Africa is the country that has more diversified exports in the region followed by Zimbabwe (0.24) and Namibia (0.27).

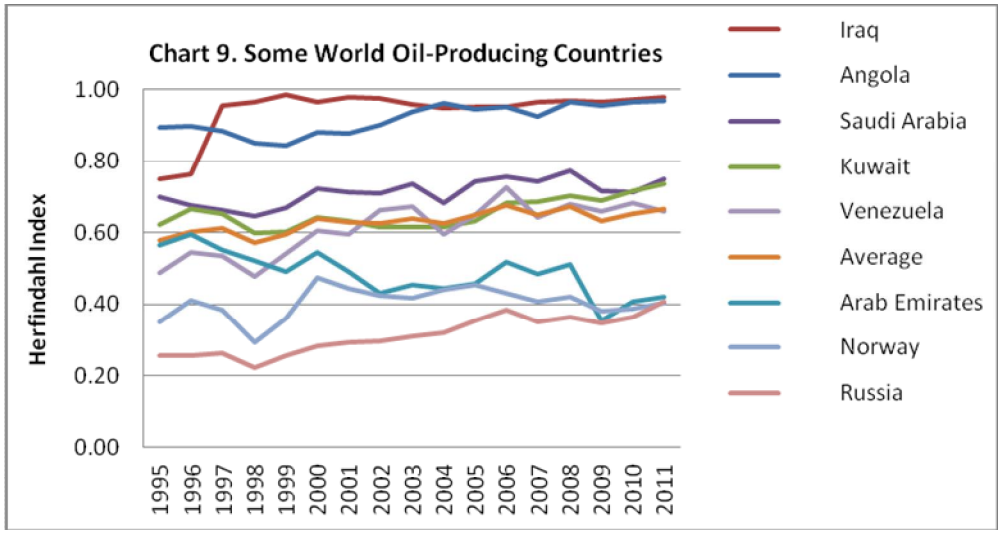


Source: UNCTADstat

Chart 8 shows us the export concentration index of the biggest African oil-producing countries, still Angola is the country with the highest export concentration although is not the biggest crude oil producer in the continent[37]. The average export concentration index of these countries is about 0.67 and Angola is very above of this average; Nigeria (the biggest oil producer) Libya, Sudan and Equatorial Guinea are also above the average showing that they have a high export concentration index but lower than of that of Angola. Algeria and Egypt have their export concentration index below the average; and Egypt with the average index of 0.26 is managing to reduce its concentration index particularly since 2007, whereas with other African oil-producing countries the index is increasing. Algeria is the second biggest oil producer in Africa producing more oil than Angola; even so its export concentration index is on average 0.54, much lower that of Angola (0.92 on average). The fact that not all African oil-producing countries have a high export concentration index (above 0.9), seems that high export concentration does not have to do with oil production per se, but yes it has to do with the internal economic policies and priority of its government regarding the sectors of the economy they will focus on according to their objectives and goals.

[37] In 2011 Nigeria was the biggest producer with 2,4 million of barrels per day, followed by Algeria (2,07 million), then Angola the #3 (1,9 million), Libya the #4 (1,7 million), Egypt the #4 (662 thousand), Sudan (514 thousand) and Equatorial Guinea (322 thousand) according to Index mundi (http://www.indexmundi.com/g/r.aspx?v=88)

For the sake of completeness we are going also to compare the export concentration index of Angola with that of the other oil-producing countries outside of the African continent to see if they also have a very high concentration index. The chart 9 plots the export concentration index of some major oil-producing and exporting countries in the world[38] along with that of Angola to see how concentrated their exports are in comparison with Angola.



Source: UNCTADstat

It is interesting to see that Angola is sharing the rank with Iraq as the oil-exporting countries with the highest export concentration index. In 1995, 1996 and 2004 Angola had the highest index whereas in the remaining years Iraq is on the top. Throughout all of this period the average index for Angola is 0.92 as for Iraq is 0.94. Saudi Arabia, Russia, Emirates, Norway and Kuwait that export more oil than Angola they all have a export concentration index lower than Angola, showing that besides oil they export others goods and services. Venezuela almost exports the same quantity of oil as Angola, but its export concentration index is much lower (0,61 on average). Just exporting a large quantity of crude oil does not necessarily imply that a country will have a high export concentration index as in the case of Angola. The world´s biggest oil-

[38]Saudi Arabia is the world Biggest oil Exporter (7,6 million barrels per day); Russia ranks the #2 exporter (5,01 million barrels per day); Iran the #4 (2,5 million b per day); United Arab Emirates the #4 (2,2,3 million B per day); Norway the #5 (2,1 million) Iraq the #6 (2,1 million); Kuwait the #7 (2,1 million); Venezuela the#12 (1,8million) .Angola is ranked the #13 (1,8 million). (http://www.indexmundi.com/g/r.aspx?v=88)

exporting countries, as the chart 9 shows, do not have export concentration indexes as high as Angola has.

The year 2007 recorded a slight decrease of export concentration index of almost all oil-exporting countries except Iraq and Kuwait. In the case of Angola the decrease is really noteworthy since its line is very close of that of Iraq and in this year there is a notable gap, greater that of 2009 when all countries were affected severely the financial and economic international crisis.

Since we have seen the overview of the Angola economy with emphasis on the structure of its Gross Domestic Production and particularly on its exports, we are going to run some regressions that will help us to see what effects the Angolan export concentration has had on its GDP per capita growth, to measure what Angola can gain or is forsaking by diversifying its exports.

4. Methodology and Data Collection

In order to measure the effect that exports concentration levels has had on the Angolan GDP per capita growth this dissertation uses an econometric approach based on Hesse's (2008) paper on Export *Diversification and Economic Growth*[39] using an augmented growth regression analysis. On his paper Hesse used a dataset comprising up to 99 countries excluding the eastern European countries and the oil-exporting countries (as well as Angola). The model is the following:

$$\Delta\hat{y}_t = \alpha\hat{y}_{t0} + \beta X'_t + \varphi F(H_t) + \xi_t$$

Where:

$\Delta\hat{y}_t$ denotes the log difference of income per capita in period t,
$\hat{Y}t_0$ the log initial income,

[39] Heiko Hesse is an economist in the Global Financial Stability Division, Monetary and Capital Markets Department at the International Monetary Fund (IMF). The paper is the working paper no. 21 that he wrote on behalf of the Commission on Growth and Development of World Bank. The main variable of interested used is the export concentration index measured by the Herfindahl index and he confirmed the U shaped curve that Imbs and Wacziarg (2003) found.

X'_t - a vector of potential determinants of growth (Saving rate, Gross Capital Formation, Population Growth, Years of Schooling , Life expectancy and the Oil Price Index[40]);

$F(H_t)$ is a function of the Herfindahl exports concentration index, the main variable of interest in the model, that captures the non-linear relationship between export concentration and GDP per capita growth. We want to test if this function in the case of Angola is a U-shaped curve, as Hesse (2008) argued, or is a concave curve; in this function there is the Herfindahl index and its square, if the coefficient of the square is negative the function is concave otherwise is U-shaped curve.

ξ_t - the residual error component

The Solow Growth framework, as said by Hesse (2008), "provides an intuitive and theory-based strategy for testing the relationship between export diversification (concentration) and GDP per capita growth"[41]. This growth regression based on the augmented Solow model use factors or variables that can affect the steady state level of GDP per capita growth.

To estimate this augmented growth regression model and hence investigating the relationship between the Angolan GDP per capita and the export concentration index and other variables, the classical linear regression model Ordinary Least Squared is used in this work.

Although OLS is one of the most simple and basic econometric regression methods it is a very useful method to investigate the relationship between the dependent variable and the regressors or explanatory variables especially when all its assumptions are met[42].

[40] Since Angola is an oil-exporting country the oil price index was included in this model to see to what extent the price of oil has contributed to the growth of GDP per capita. Taking into account that Angola is a country with low life expectancy it is also important to see the effect of this variable on the Angolan GDP per capita growth.

[41] Hesse, H (2008), *Export Diversification and Economic Growth*, Working Paper No.21 Word Bank Page 10.

[42] See the Apendex for the discussion of the assumptions

Besides OLS, other estimations methods such as linear regression with panel-corrected standard errors, which is robust to the possibility of non-spherical errors,[43] were used just to compare the results and see if the standard errors are not so different from those of OLS, if this is the case this means that the errors are in fact spherical. Linear LM random-effects model was also used just to compare the estimates of the coefficients and see if there is a stark contrast between them[44].

4.1 The Sample

To check the robustness and validity of the result obtained for the particular case of Angola, and to get rid of the problem associated with small sample, regressions for other countries were run to verify the results of the Angola estimates. Since Angola is a member of SADC, regression was made for the 15 countries (Angola, Botswana, Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe) comprising this regional organization to see how the results compare to those of Angola. (*Results in Table 9*)

Regression for main oil-exporting countries in Africa and the World[45] were as well run to verify the results taking into account that Angola is the third oil-exporter in Africa and the seventh in the world. The sample is made of 18 countries namely: Angola, Algeria, Egypt, Equatorial Guinea, Iran, Iraq, Kuwait, Libya, Nigeria, Norway, Qatar, Russia, Saudi Arabia, Sudan, Tunisia, Venezuela and United Arab Emirates. (*Results in table 8*)

Then the sample was enlarged to include other countries besides SADC and oil-exporting countries. In this last regression 22 countries were regressed altogether (

[43] Delia Bailey and Jonathan N. Katz (), Implementing Panel-Corrected Standard Errors in R: The pcse Package.

[44] The results of this alternative estimations are presented in the Apendex

[45] Bear in mind that Hesse (2008) in his working paper he left out the oil-exporting countries in the sample of countries he regressed, perhaps due to higher levels of export concentrations this countries have in comparison to others.

Angola, Botswana, Brazil, China, Egypt, Kuwait, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Norway, Russia, Saudi Arabia, South Africa, Sudan, Swaziland, Tanzania, Tunisia, United States of America, Venezuela and Zambia (Results in table 9). Therefore 4 different samples were used to investigate the relationship between per capita growth and export diversification.

As it was stated before, in the Angolan national accounts the GDP is disaggregated in two categories: the oil and non-oil GDP. In this dissertation it was also possible to have regressions for the oil GDP per capita and for the non-oil GDP per capita to see how the export concentration and oil price indices affect each category (Results in table 8).

4.2 Data description

The total dataset comprise in altogether up to 35 countries, of course with the main focus on Angola; and the data range from 1995-2011, 17 years in total. It was not possible to extend the data beyond 1995 due to the fact that the Herfindahl index (export concentration or diversification index) is only available since 1995 and this variable is the main variable of interest in this thesis. The explanation of each variable is described in the table 6.

Table 5: Variable Definitions and Sources

Variables	Description	Source
Dlngdppc	Natural log difference of GDP per capita growth	WDI
Ln(GDPpc t0)	Natural log of the per capita initial GDP growth	WDI
Saving Rate	Gross savings (% of GDP) as gross national income less total consumption, plus net transfers	WDI
GrCapFormation	Gross capital formation (% of GDP) outlays on additions to the fixed assets of the economy	WDI & WMR
PopGrowthDep	Sum of the population growth and 0.05 which proxies for the depreciation and rate of tech progress	WDI
LNAvLifeExp	Natural log of the Average Life Expectancy at birth (years) of both males and females	WDI
LNExYSchool	Natural logs of the number of Years of Schooling that a child[46] of school entrance age can expect to receive	UNDP-IHDI
Herfindahl Index	Herfindahl index of Concentration or diversification of exports	UNCTADstat
Herfindahl^2	The Square of the Herfindahl index	
LNOilPriceIndex	Natural Logs of the yearly average of Oil Price Index (Crude Oil (petroleum), Price index - Monthly Price)	Index Mundi

[46] In Barros and Lee dataset there is not data for Angola concerning the Years of Schooling for an adult, that why the Number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life was used as a proxy.

5. Results´ Analysis

The results of the estimated augmented Solow Growth Model that investigate the relationship GDP per capita growth and other variables especially the export concentration index are presented in the tables 6 to 9 as follow: In table 6 Angola (17 years); In table 7 Angola (Oil and Non-oil); In table 8 Oil-producing countries (17 years) and In table 9 SADC and Other Countries (17 years, complete set of analysis in the sample)

5.1 Angola's GDP per capita growth and export concentration

Looking at the Angola's results in the table 6, it is possible to see that, although most of the variables (Saving rate, the initial income, and population growth adjusted for the depreciation, life expectancy, herfindahl indices and the oil price index) has the predicted signal and effect on

Table 6: Regression for Angola's GDP per capita growth					
Methods of Estimatation: OLS (Robust)					
Variables	**Coefficients**				
Ln(GDPpc t0)	-0.409	*-0.396*	-0.412	-0.399	-0.216
St Dev	*0.145*	*0.101*	*0.131*	*0.090*	*0.051*
P-value	*0.022*	*0.003*	*0.012*	*0.001*	*0.001*
Saving Rate	0.422	*0.416*	0.424	0.419	0.779
St Dev	*0.233*	*0.220*	*0.213*	*0.200*	*0.218*
P-value	*0.107*	*0.091*	*0.078*	*0.063*	*0.004*
GrCapFormation	-1.412	*-1.435*	-1.410	-1.435	-3.265
St Dev	*0.713*	*0.566*	*0.688*	*0.539*	*0.553*
P-value	*0.083*	*0.032*	*0.071*	*0.024*	*0.000*
PopGrowthDep	-19.461	*-18.628*	-19.180	-18.131	-37.245
St Dev	*13.960*	*11.220*	*11.937*	*9.453*	*8.492*
P-value	*0.201*	*0.131*	*0.143*	*0.084*	*0.001*
LNAvLifeExp	0.214		0.228		
St Dev	*1.488*		*1.455*		
P-value	*0.889*		*0.879*		
LNExYSchool	-0.009	*-0.014*			
St Dev	*0.111*	*0.107*			
P-value	*0.935*	*0.901*			
Herfindahl Index	**2.308**	***3.866***	**2.194**	**3.845**	**6.622**
St Dev	*10.919*	*1.296*	*10.677*	*1.275*	*1.663*
P-value	***0.838***	***0.015***	***0.842***	***0.013***	***0.002***
Herfindahl^2	**-1.255**	***-2.118***	**-1.192**	**-2.107**	**-3.363**
St Dev	*6.073*	*1.104*	*5.946*	*1.066*	*1.388*
P-value	***0.841***	***0.087***	***0.846***	***0.076***	***0.034***
LNOilPriceIndex	0.454	*0.457*	0.453	0.455	
St Dev	*0.167*	*0.151*	*0.166*	*0.149*	
P-value	*0.026*	*0.014*	*0.023*	*0.012*	
Number of Obs	**17**	**17**	**17**	**17**	**17**
F (k, n-k)	77.38	97.53	38.30	47.24	131.85
Prob > F	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.961**	**0.961**	**0.961**	**0.961**	**0.920**
Root MSE	0.071	0.067	0.067	0.064	0.087
Herfindahl Star	**0.920**	**0.913**	**0.920**	**0.913**	**0.985**

Source: Own calculations using STATA

GDP per capita growth and the test F shows that the model is globally significant, most of the individual coefficients are not statistically significant even at the 10% level except for the initial GDP per capita, saving rate and oil price index.

But taking the variable life expectancy out of the regression, things improve a bit and now just the population growth and years of schooling that are not statistically significant at the 10% level. Now in the last column, by leaving both life expectancy and years of schooling out of the regression[47] the remaining variables are all now

[47] Note that the same was done with the constant term of the regression; since this was very high (about 90) it was necessary to suppress it for the other variable to become statistically significant as it can be

statistically significant and even the explanation power of the model measured by the R-square which is 96% remains the same suggesting perhaps that those two variables do not explain very well the growth of GDP per capita in Angola.

Focusing the attention on the last column where all the variables are statistically significant at the 10% level of significance, it can be seen for example in case of the saving rate has a positive effect on the GDP per capita growth in Angola; an increase of 1%, holding other variables constant, of the saving rate may result in 0.2% growth of the GDP per capita. This shows how important it is to urge and encourage the population in general and the economic agents in particular to have the culture of saving in view of its effect on the economic growth.

The *gross capital formation* variable, that is the outlays on the fixed assets of the economy, which was expected to have a positive effect on the GDP per capita growth, has actually a negative effect. One of the reasons that might explain this is perhaps the lower social and economic return on the investment on the fixed assets that are observed in the country due to the poor quality of the assets themselves.

For instance a huge investment was made in 2002 in the Bonded Warehouse to facilitate the import and export of some products, but today this facility does not work as it was intended. There are also many cases of roads, hospitals, schools that were built and in less the two years were again being rebuilt. This perhaps might explain the negative effect of this variable on the GDP per capita growth; because it is one thing to invest and another to get the benefit from it.

The population growth although it has the right sign and is statistically significant its coefficient is too high to accept this result. What matter in this case is its right sign and economic meaning, showing that holding other variable constant an increase in the

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seen in the appendix table 6.2. The R-square with the constant term was about 91%. But in other regressions for SADC, oil-exporting and the other 22 countries were not necessary to suppress the constant term since it was normal.

population leads to the decrease of the GDP per capita. Angolan population is about 19 million and the growth rate is on average 3% per year and the growth rate of real GDP per capita (on average 6% since 1995) is above the growth of population which is good.

Concerning the *oil price index*, this variable is significant at 1% level of significance and it has a positive effect on the GDP per capita in Angola, which is not surprising since the country is an oil producing one and almost 50% of its all production is crude oil and its derivatives and in term of total exports the share of this sector is nearly 95% as it was shown in the third part of this dissertation.

The coefficient of oil price index variable in the regression is .455 and if viewed as elasticity, it can be said that the elasticity of the oil price index over the GDP per capita in Angola is .455, meaning that an increase of 1% in the oil price index in the international market, holding other variables constant, might result in .455 increase in the growth of per capita income in Angola.

5.1.1 The effect of Herfindahl exports concentration index on the Angolan GDP per capita

Focusing now the attention to the main variable of interest in the model, that is the Herfindahl index that measures the export concentration (diversification) index, it can be seen that the Herfindahl index has a coefficient of 3.85 and it is statistically significant at almost 1% of significance level whereas the square of this variable has a negative coefficient of -2.12 and is significant at 10% level.

The export diversification literature says that the relationship between the level of exports concentration and income per capita is not linear, that why besides the Herfindahl index the square of this variable was also used as regressor in the model. As we can see the non-linear relationship was confirmed by the regression and this means initially an increase of the level of export concentration has a positive effect on the growth of the GDP per capita in Angola up to certain point where this increase start

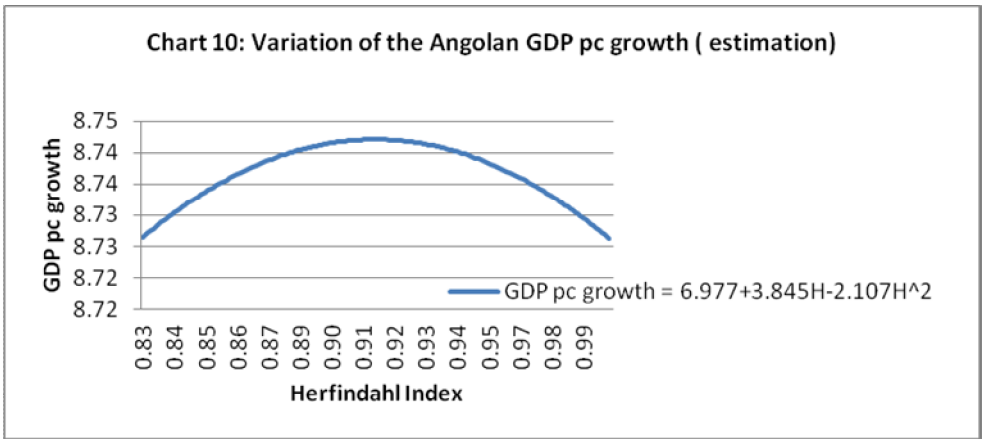
decreasing the GDP per capita instead of increasing it. Actually this is like a concave function where there is a maximum point from where the dependent variable starts decreasing.

To illustrate, suppose ***GDP pc growth = 6.977 + 3.845H – 2.118H^2*** is the function that explains income per capita growth in Angola, holding other variables constant. By taking the first derivative of this function and equalling to zero, the inflection point and maximal point can be obtained and the second derivative if negative shows that the curve is concave. From this function we can see that the second derivative is negative (-4.236) proving that this is a concave function.

Taking the first derivative and equalling to zero, the maximal and critical point from where the function starts to decrease:

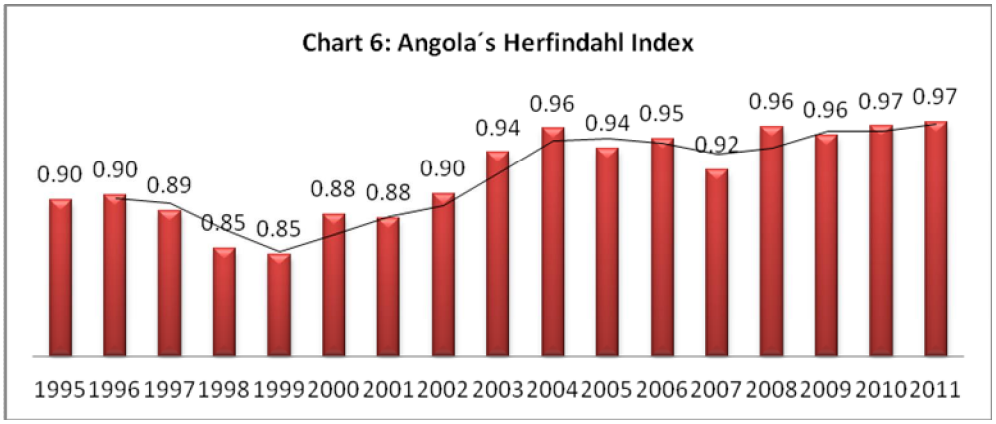
$3.845 - 2 * 2.108H$ >> $H = \frac{3.845}{4.214}$ >> **H***=0.913** this is value of export concentration index that according to the results of the regression that perhaps may had yield the largest increase in the growth of GDP per capita in Angola. Export concentration index beyond this critical value is detrimental to per capita economic growth.

Using a graph helps to illustrate this point we have:



Source: Own Estimations

As the chart 10 shows, the maximal point of export concentration is .913 and the corresponding contribution to the variation of GDP per capita growth is 1.76%. This finding is in stark contrast to what Hesse (2008) found, U shaped curve. But for the particular case of Angola is a concave shaped curve. To see this let us repeat chart 6 that display the Herfindahl index for Angola.



Source: UNCTAD

Supposing these estimations are true, then we say that since 2003 (a year that the concentration was .941 as the chart 5 shows) the level of export concentration in Angola has been detrimental to the growth of GDP per capita. Diversifying the exports will boost the growth of per capita GDP and it is urgent to do so.

5.1.2 The oil and non-oil GDP per capita growth Regressions

Looking now at the disaggregated regressions for the oil and non-oil GDP per capita for the case of Angola, table 7 shows the results that were obtained. But in this table the focus will just be on two main variables, the gross capital formation and the oil price index.

Table 7: Regressions for Angola's Oil & Non-Oil GDP per capita				
Methods of Estimatation: OLS (Robust)				
Variables/Coefficients	**Oil GDP per capita**		**Non-oil GDP per capita**	
Ln(GDPpc t0)	-0.713	-0.703	-0.289	-0.286
St Dev	*0.063*	*0.067*	*0.248*	*0.212*
P-value	*0.000*	*0.000*	*0.273*	*0.207*
Saving Rate	0.202	0.187	0.436	0.433
St Dev	*0.161*	*0.151*	*0.709*	*0.572*
P-value	*0.242*	*0.246*	*0.554*	*0.467*
GrCapFormation	0.353	0.377	-2.960	-2.959
St Dev	*0.709*	*0.698*	*2.004*	*1.848*
P-value	*0.630*	*0.601*	*0.174*	*0.140*
PopGrowthDep	17.108	14.821	-58.420	-58.994
St Dev	*15.678*	*13.727*	*37.465*	*32.971*
P-value	*0.304*	*0.306*	*0.153*	*0.104*
LNExYSchool	0.061		0.015	
St Dev	*0.081*		*0.479*	
P-value	*0.467*		*0.975*	
Herfindahl Index	**1.198**	**1.286**	**5.173**	**5.206**
St Dev	*1.715*	*1.634*	*3.456*	*3.411*
P-value	***0.502***	***0.450***	***0.169***	***0.158***
Herfindahl^2	**-2.163**	**-2.203**	**-0.479**	**-0.494**
St Dev	*1.139*	*1.132*	*3.140*	*2.783*
P-value	***0.090***	***0.080***	***0.882***	***0.863***
LNOilPriceIndex	**1.114**	**1.127**	**-0.047**	**-0.044**
St Dev	*0.130*	*0.124*	*0.446*	*0.414*
P-value	***0.000***	***0.000***	***0.919***	***0.917***
Number of Obs	**17**	**17**	**17**	**17**
F (k, n-k); Wald chi2(k)	150.140	151.640	13.00	17.460
Prob > F; chi2	0.000	0.000	0.000	0.000
R-squared	0.972	0.972	0.816	0.816
Root MSE	0.066	0.064	0.166	0.158

Source: Own calculations using STATA

It is interesting to note that the gross capital formation, though not statistically significant, has a positive effect on the oil GDP per capita whereas on the non-oil GDP has a negative effect and is statistically significant at 1% level of significance in the linear regression heteroskedastic panel-corrected standard error. This actually can mean that the investments on the oil sector are more profitable and of better quality than the investment made on the non-oil sector.

It is also interesting to see the effect that the oil price index has both on the oil and non-oil GDP per capita. For the case of the oil GDP, the oil price index has a positive effect and is statistically significant, being the elasticity of at least 1.114, meaning that an increase of 1% in the oil price index might result in the increase of GDP per capita in 1.12%, holding other variables constant. But for the case on non-oil GDP per capita, although not statistically significant, the oil price index has a negative effect.

5.2 Including the main oil-exporting countries in the sample

In order to check the robustness of the results got from the regression of Angola and to see if this is an isolated pattern of concave shaped curve in the relationship between export concentration and GDP per capita, it was necessary to run regression for just oil-exporting countries to see if the pattern is confirmed; and the table 8 gives the results of regression.

Although the coefficients of Herfindahl index of these regressions are not statistically significant as it were in the case of Angola, the coefficients have the same sign that of positive for the Herfindahl index and negative for its square, showing the characteristics of a concave function where the slope of the variable of the second degree is negative.

This a case to say that for the oil-exporting countries export concentration increases GDP per capita up to certain point and from then on it starts to decrease the growth of GDP per capita and diversifying export is beneficial to keep the GDP per capita growing. From these results it is possible now to understand why Hesse (2008) excluded the oil exporting countries in his sample, because those countries follow a different pattern, that is of concave shaped curve and not U shaped.

Table 8: Regressions for the 17 Oil-Producing Countries' GDP per capita				
Methods of Estimatation: OLS (Robust)				
Variables	Coefficients			
Ln(GDPpc t0)	-0.023	-0.025	-0.023	-0.008
St Dev	*0.014*	*0.013*	*0.008*	*0.014*
P-value	*0.091*	*0.057*	*0.004*	*0.585*
GrCapFormation	0.230	0.249	0.246	0.247
St Dev	*0.120*	*0.120*	*0.119*	*0.122*
P-value	*0.056*	*0.039*	*0.040*	*0.043*
PopGrowthDep	0.408	0.363	0.308	0.498
St Dev	*0.413*	*0.417*	*0.338*	*0.418*
P-value	*0.324*	*0.384*	*0.363*	*0.235*
LNAvLifeExp	-0.150			-0.144
St Dev	*0.133*			*0.138*
P-value	*0.264*			*0.298*
LNExYSchool	0.052	0.011		0.046
St Dev	*0.057*	*0.053*		*0.060*
P-value	*0.362*	*0.838*		*0.443*
Herfindahl Index	**0.200**	**0.140**	**0.125**	**-0.072**
St Dev	*0.288*	*0.271*	*0.250*	*0.282*
P-value	***0.487***	***0.606***	***0.617***	***0.800***
Herfindahl^2	**-0.093**	**-0.021**	**-0.013**	**0.175**
St Dev	*0.270*	*0.246*	*0.235*	*0.262*
P-value	***0.730***	***0.931***	***0.956***	***0.504***
LNOilPriceIndex	**0.073**	**0.073**	**0.073**	
St Dev	*0.015*	*0.015*	*0.015*	
P-value	***0.000***	***0.000***	***0.000***	
Constant	0.322	-0.184	-0.166	0.535
St Dev	*0.472*	*0.124*	*0.089*	*0.490*
P-value	*0.495*	*0.139*	*0.063*	*0.276*
Number of Obs	**286**	**286**	**286**	**286**
F (k, n-k); wald chi2(k)	7.21	8.07	7.61	2.63
Prob > F; chi2	**0.000**	**0.000**	**0.000**	**0.012**
R-squared	**0.149**	**0.143**	**0.146**	**0.089**
Root MSE	0.162	0.162	0.162	0.167

Source: Own calculations using STATA

5.3 The whole sample (Regression for SADC and other 22 Countries)

After seeing the non-linear concave relationship between exports concentration index and GDP per capita in the oil-producing countries, let us now see what pattern the majority of non-oil producing countries follow in general. The table 9 shows the results of the regression.

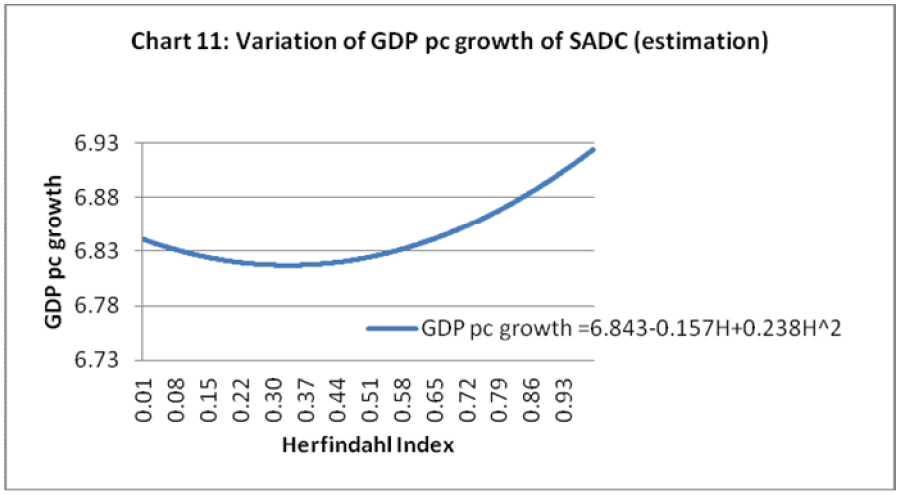
Table 9: Regressions for SADC & other 22 Countries GDP per capita						
Methods of Estimatation: OLS (Robust)						
Variables/Coefficients	**SADC**			**22 Countries**		
Ln(GDPpc t0)	-0.006	-0.002	-0.003	-0.030	-0.022	-0.014
St Dev	*0.013*	*0.012*	*0.012*	*0.010*	*0.009*	*0.010*
P-value	*0.667*	*0.885*	*0.798*	*0.003*	*0.016*	*0.175*
Saving Rate	note available for all countries			0.332	0.352	
St Dev				*0.063*	*0.061*	
P-value				*0.000*	*0.000*	
GrCapFormation	-0.005	0.018	0.007	-0.273	-0.256	0.013
St Dev	*0.088*	*0.081*	*0.086*	*0.104*	*0.102*	*0.098*
P-value	*0.958*	*0.823*	*0.938*	*0.009*	*0.012*	*0.898*
PopGrowthDep	0.558	0.478	0.441	-2.660	-2.547	-2.735
St Dev	*0.345*	*0.331*	*0.330*	*0.970*	*0.968*	*1.005*
P-value	*0.107*	*0.150*	*0.182*	*0.006*	*0.009*	*0.007*
LNAvLifeExp	0.058		0.021	0.086		0.100
St Dev	*0.070*		*0.021*	*0.056*		*0.034*
P-value	*0.405*		*0.322*	*0.125*		*0.004*
LNExYSchool	-0.033	-0.033	-0.003	-0.045	-0.042	-0.025
St Dev	*0.055*	*0.054*	*0.053*	*0.039*	*0.039*	*0.042*
P-value	*0.552*	*0.541*	*0.954*	*0.257*	*0.287*	*0.547*
Herfindahl Index	**-0.163**	**-0.157**	**-0.206**	**-0.193**	**-0.203**	**-0.129**
St Dev	0.187	0.186	0.198	0.108	0.108	0.121
P-value	*0.383*	*0.399*	*0.299*	*0.074*	*0.060*	*0.286*
Herfindahl^2	**0.253**	**0.238**	**0.303**	**0.290**	**0.281**	**0.306**
St Dev	*0.199*	*0.197*	*0.209*	*0.126*	*0.126*	*0.143*
P-value	*0.207*	*0.227*	*0.147*	*0.022*	*0.027*	*0.033*
LNOilPriceIndex	0.061	0.060		0.064	0.061	
St Dev	0.012	0.012		0.010	0.010	
P-value	0.000	0.000		0.000	0.000	
Constant	-0.333	-0.125		-0.032	0.259	
St Dev	*0.260*	*0.077*		*0.223*	*0.129*	
P-value	*0.202*	*0.105*		*0.887*	*0.046*	
Number of Obs	**255**	**255**	**255**	**374**	**374**	**374**
F (k, n-k); Wald chi2(k)	5.330	6.030	8.820	14.610	14.950	20.070
Prob > F; chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.132**	**0.129**	0.213	**0.197**	**0.192**	**0.271**
Root MSE	0.128	0.128	0.133	0.128	0.128	0.138

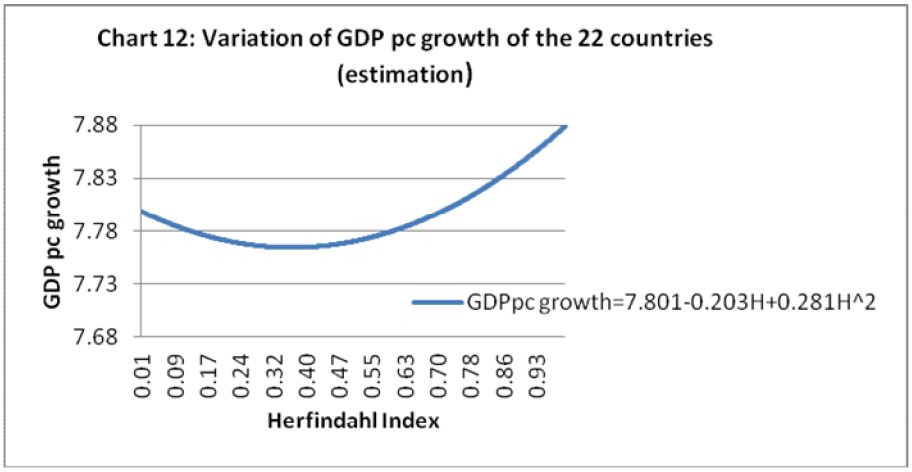
Source: Own calculations using STATA

Focusing the analysis only on the Herfindahl export concentration index, it can be seen that the sign of the coefficient of this variable is exactly the opposite of the results obtained for the oil-producing countries; the signs are exactly equal to those of the other 22 countries.

Holding other variables constant and plotting the equation that relates GDP per capita growth and export concentration for the case of SADC and the 22 countries, as it was

done for Angola, the results can be seen in the chart 10 and 11 that the curve is a U-shaped and not a concave.





Source: Own Estimations

The value of the coefficients of the Herfindahl index and the square, for the both SADC's and the other 22 countries confirm the U shaped curve found by Hesse (2008) and Imbs and Wacziarg (2003) showing that for the majority of non-oil producing countries around the world they can initially increase their GDP per capita growth by decreasing the export concentration (diversifying the exports) up to a certain point or level and then they can again increase the GDP per capita by specializing (increasing the exports concentration) as it occurs in some developed countries.

It can also be said that export concentration has been detrimental to the economic growth performance of SADC's countries and that they can benefit from diversifying their exports; whereas for most developed countries they perform better with export concentration or specialization[48].

In summary when considering only non oil-exporting countries, U-shaped curve is found as in the case of Hesse (2008); but if the sample includes only oil-exporting countries (that in most of cases have higher export concentrations index) a concave curve is found.

[48] Hesse (2008), Export Diversification and Economic Growth, Working Paper No.21 pages 12, 13

6. Conclusion, Limitations and Future Research

This research showed that Angola is one of the countries with the highest export concentration in the world with the index of .97 and this is actually confirmed by the structure of its exports where oil has a weight of more than 95%. Therefore it is imperative to diversify the exports in order to protect the country against economic growth volatility due to the changes in the international markets, which can favourite sustainable growth rates that may lead to an economic development if the income is fairly distributed.

The analysis in this paper showed that for Angola the relationship between the exports concentration and GDP per capita growth is non-linear concave curve, a pattern that is common to the oil-exporting countries; which is different from the majority of non-oil producing countries that follow a pattern of a U shaped curve as Hesse (2008) pointed out in his working paper.

Although it is a challenging process, Angola can indeed diversify its exports and get benefit from this process. By seriously investing on the human capital accumulation, the quality and seriousness of the institutions both public and private, the quality of infrastructures (such ports, airports, road and rail ways, telecommunications and good transportation networks), a good investment climate (reducing bureaucracy, increasing the law enforcement), and good economic policies with commitment, Angola will certainly succeed in diversifying its exports .

According to the results of the estimations for Angola, .913 might be the critical export concentration index that may have yielded the largest GDP per capita growth between 2002 and 2003 (export concentration beyond this value is disadvantageous to the growth). From 2003 up to now the export concentration actually have been detrimental to growth, since this growth could have been higher if the level of export concentration was lower (higher diversification).

Certainly by diversifying its exports Angola can achieve higher GDP per capita for its citizens, thus it is important to make every effort possible to diversify the country's export structure.

Of course the fact of just using data from 1995 to 2011 (just 17 years) can be a limitation that might in somehow to accept the results of this research, however a window is open for future research trying to extend the time of sample perhaps considering 30 years instead of just 17 to see if the results will still hold. Here only exports were analysed, what about the imports? Can they contribute to export diversification? Future research may answer these questions.

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8. Appendix

Acronyms

BNA – Banco Nacional de Angola (Central Bank of Angola)

CEIC/UCAN - Centro de Estudos e Investigacao Cientifica da Universidade Catolica de Angola (Research Center of Catholic University of Angola)

CMI – Christian Michelsen Institute of Norway (a Norwegian Research Institute)

GDP pc – Gross Domestic Production per capita

IHDI – International Human Development Indicators

INE – Instituto Nacional de Estatistica

OLS – Ordinary Least Squares

SADC – Southern Africa Development Community

SNA – Servico Nacional de Alfandegas (Angolan National Customs Services)

PCSE – Panel Corrected Standard Errors

UNCTAD – United Nations Conference on Trade and Development

UNDP – United Nations Development Program

USD – United States Dollar

WDI – World Development Indicators

WMR – World Macroeconomic Research

WTO – World Trade Organisation

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2.2 Measures of Export Concentration (Diversification): the main indicators

The body of literature on export diversification actually uses indicators from income-distribution literature, that measure income concentration to compute measures of export diversification.

In fact, what is calculated by these indicators is export concentration and by extension is applied to measure export diversification taking into account that if the level of export of a given country is concentrated, it means that is not diversified; and inversely if the export level is less concentrated, it implies export diversification. In this regard, the most commonly used export concentration indices in the literature are Herfindahl, Theil and Gini. We begin in the following subsection by defining such measures.

2.2.1 The Herfindahl Index

This concentration index is the one used by the UNCTAD and is computed according to the following formula[49]:

$$H_j = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{x_i}{X}\right)^2} - \sqrt{1/n}}{1-\sqrt{1/n}}$$

Where:

H*j* = Herfindahl export concentration index of a given country

x*i* = value of exports of product *i*

$X = \sum_{i=1}^{n} x_i$ Where *X* stands for total value of export and

n = number of products (SITC Revision 3 at 3-digit group level).

Herfindahl index is normalized to range between zero and one. A value close to zero implies fully export diversification, whereas values close to one mean highly export concentration.

2.2.2 The Theil Index

This index is determined using the following formula:

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{x_i}{\mu}\ln\left(\frac{x_i}{\mu}\right)$$

Where

$\mu = \frac{\sum_{k=1}^{n} x_k}{n}$ Denotes the average export value,

[49] This formula was taken from http://unctadstat.unctad.org/TableViewer/summary.aspx

n= total number of different products exported (number of export lines) and

x_i= value of exports of product *i*

Carrère, Cadot and Strauss-Khan (2011) argued that Theil´s index is of particular interest because "it can be calculated for groups of individuals (export lines) and decomposed additively into within-groups and between-groups components (i.e., the within- and between-groups components add up to the overall index)"[50] .

Therefore, Theil´s index is usually decomposed into two sub indices, the *between* and the *within* groups. This decomposition helps to compute the concentration level that may exist within a specific export line (which is made up of different products of the same category) or the concentration level that may well exist between export lines.

The Between Groups sub-index as

$$T^B = \sum_{j=0}^{1} \frac{n_j}{n} \frac{\mu_j}{\mu} \ln\left(\frac{\mu_i}{\mu}\right)$$

The Within groups is defined as

$$T^W = \sum_{j=0}^{1} \frac{n_j}{n} \frac{\mu_j}{\mu} T^j \ , \ T^j = \frac{1}{n_j} \sum_{i \in j} \frac{x_i}{\mu_j} \ln\left(\frac{x_i}{\mu_j}\right)$$

Where
T^j= Theil´s subindex for group j (J=0,1)
n_j= the number of export lines in group j and
μ_j= group j´s average export value

To better understand the evolution of export diversification and how it occurs in general, the literature makes distinction between what is called the intensive and extensive margins of exports. The intensive margin, according to Hummels and Klenow (2005), is to export larger quantities of each existing good included in the current number of export line; in this case a country exports more volume of the products or goods that it has been trading. In extensive margin, however, a wider set of goods,

[50] Cadot and Strauss-Khan (2011) page 2

different from the existing goods, are exported. Here, an economy produces and exports new goods, increasing the number of export lines. Whereas in intensive margin, the number of export line remains the same since what is being exported is the same product but in higher volume.

2.2.3 Hummels and Klenow´s Intensive and Extensive Margins

These two authors presented an effective way to measure the Intensive and Extensive margins of exports in their paper about " The Variety and Quality of a Nation´s Exports", published in 2005. In this paper they came out with formulas to compute both the intensive and extensive margin. The formulas that are being used in this section is in fact a version from Cadot Et Al (2012), since on his paper the formulas are presented in more understandable way according to our purpose. Then, these two measures can be defined by using:

1. Intensive Margin

$$IM^a = \frac{\sum_{k \in G_1^a} x_k^a}{\sum_{k \in G_1^a} x_k^W}$$

2. Extensive Margin

$$EM^a = \frac{\sum_{k \in G_1^a} x_k^W}{\sum_{k=1}^{m} x_k^W}$$

Where

a Is a subscript standing for a given country;

x_k^a The value of country *a´*s export of good *k*

x_k^W The world´s export of good *k*

G_1^a Stands for the group of country *a´*s active export lines and

m Total number of goods exported worldwide.

As regards intensive margin, the formula helps us to know how much of the world´s export of a given good does a country export, that is, the share of this good in the

world´s export of that good. The extensive margin, according to Hummels and Klenow, "can be thought of as a weighted count of country *a*´s active export lines relative to the world´s"[51]. Essentially this margin tells us "how much of the goods which country a exports counts in world trade"[52].

If one wants to compute the country´s share in world trade, one can just multiply both margins, that is ($IM^a * EM^a$ = Country´s share in world´s total exports).

2.2.4 Gini Index

Gini index is wildly used in different fields of economics and other sciences. To measure export concentration using this index, it is just a matter of ordering the exports by increasing size and computing the cumulative export shares. To define the index let us define

Export shares $s_i = \frac{x_i}{X_k}$ and Accumulative export shares $X_k = \sum_{i=1}^{k} s_i$.

In this way, Gini Index will be defined by

$$G = 1 - \sum_{k=1}^{n} \left(\frac{(X_k - X_{k-1})}{n} \right)$$

This index range is from zero to one; where a value close to one implies very high export concentration, consequently, very low export diversification. And value close to zero denotes export diversification.

Of all export concentration measures presented above, we are going to use the Herfindahl index in our study, as calculated by the United Nations Conference on Trade and Development (UNCTAD). UNCTAD computes this index since 1995 and is available for countries and group of countries.

[51] Hummels and Klenow (2005), The American Economic Review, page 710, June 2005

[52] Cadot et al survey diversification, page 6, 2012

2.3 Drivers of Diversification

After presenting the main indicators used to measure export diversification, now we are going to review what the literature says about the possible drivers of diversification according to several empirical studies done on this topic.

Agosin, Alvarez and Ortega (2012) on their working paper about *determinants of export diversification around the world* found out the following factor as drivers of export diversification:

- **Human capital accumulation**: according to their regression, human capital, measured by years of schooling, contributes positively to diversify exports. This positive relationship is explained by the fact that the increase in the level of education tends to increase the levels of entrepreneurship and productivity of the workers, enabling a country to change its production pattern and in its turn the exports, "going from primary exports to manufactured goods and high-value services. In these latter two categories, the scope for diversification is likely to be higher"[53].
- **Terms-of-trade**: about this factor they found that improvement in terms of trade is more likely to concentrate export, but this concentration is lower for the countries with higher years of schooling. Hence, countries with higher education levels can take advantages of term of trade improvement to expand export lines by producing new products or goods and services that can result from the entrepreneurship spirit that levels of education generate.

Another empirical research done by Parteka and Tamberi (2008) on *Determinants of Export Diversification* [54]using a panel dataset (from 1985-2004) for 60 countries around the world, presents additional factors that drive manufacturing exports diversification at least in the countries included in the dataset; those factors are:

[53] Agosin, Alvarez and Ortega (2012) *determinants of export diversification around the world 1962-2000, page16*

[54] Parteka and Tamberi (2008) on *Determinants of Export Diversification: An Empirical Investigation, page20*

- **Country size** (measured either by GDP or Population): their research revealed that, in general, holding other factors constant, "an increase in country size by 1% can be associated with an increase in the degree of exports diversification by approximately 0.2%". These results actually confirm that the bigger the population of a country is, greater is the likelihood of producing different goods due to the bigger internal market and diversity of tastes among the population; this also holds true for the GDP since the richer a country is the higher is the possibility of producing and exporting different goods and services.
- **Easy access to main world markets**: an economy that wants to export a diversity of products has to find *mechanisms* that easily enable it to get entrance to the markets; taking into account the trade is done in a world full of barriers of different types, so it is crucial to explore mechanisms such as Unilateral, Preferential and Regional Trade Agreements in order to overcome trade barriers that do not allow an easy access to markets. In this regard, Parteka and Tamberi (2008) found that increasing the distance to main markets can decrease the level of exports diversification by approximately 0.2-0.3%, showing that minimizing the distance definitely boosts export diversity.

An additional contribution to literature regarding drivers of export differentiation comes from the paper *Trade Diversification: Drivers and Impact* by Cadot, Carrère and Strauss-Kahn (2011). Using a panel dataset of 87 countries from 1990-2004, they run a regression that enable them to see among several factors which factors contribute to the reduction of levels of export concentration. Thus, they present the following factors:

- **Quality of Infrastructures**: infrastructures such as roadways, paved roads, telecommunication lines, ports and airports, and good transportation networks play a key role in determining the diversity of products to be exported; exporting several goods demands for good infrastructures that can smooth the process of export differentiation. Concerning this factor their estimates reveal that "a 10% increase in the infrastructure index decreases the Theil's index

(export concentration measure) by about 0.7%"[55]. This implies that better infrastructure quality indeed boosts export diversification. Knowing that a country has infrastructures that make possible producers to export their products smoothly motivates the enterprises to produce and export different products.

- **The Quality of Institutions**: on his own a producer cannot export products directly without an assistance from both public and private institutions constituted to promote and facilitate the exports, such: as the governmental ministers related to the products subject to export, the customs, the customs brokers, the chambers of commerce, the export and import banks and on so on. If these institutions do work in an effective way, (by reducing to the minimum the level of bureaucracy, being quick in the approval of the processes, being interested and committed in the economic policies aiming at export diversification and supporting the export of new goods or products either from existing producers or from new ones), they are a fine instrument to drive export diversity. Clearly the good quality of institutions has a positive impact on diversification, being capable of reducing the level of export concentration.
- **Unilateral Trade Liberalization**: it is often said that liberalizing unilaterally the trade can cause harm to the economy since this will increase the imported goods within the economy provoking a deficit in the balance of trade. Remarkably the Cadot et Al study revealed that the unilateral trade liberalization combined with the years of schooling increases export diversification. This occurs through the impact that the imported goods can have on the total factor productivity at the firm level, since firms with skilled and educated workers tend to learn from imported goods, understanding how these products are made and what can be done differently. Consequently, "import liberalization can be taken as a positive shock on TFP, which should,

[55] Cadot el Al (2011) ,*Trade Diversification: Drivers and Impact*, page 267

raise the number of industries with an upper tail of firms capable of exporting — and thus raise overall export diversification"[56].

John Page (2008) points out another important aspect or factor that plays a crucial role in the process of diversifying the exports through the expansion of the extensive margin, which is, creating new export lines by promoting the production and exports of new goods. He calls this factor:

- **A Good Investment Climate**: entrepreneurship flourishes within an appropriate business environment that permits the smoothly doing of business and the creation of new firms or companies be it small, medium or large. To promote export diversification, the governments must strive to provide a good investment climate to every economic agent in the economy, by reducing to the minimum the risks and costs associated with corruption, political instability, sovereign risk, bad economic policies, and legal enforcement of the laws. In view of the fact that international investors usually look for countries and markets where there is an excellent investment climate, and not too expensive to open and start new businesses, governments can attract new investors to invest in the production of new goods and incentivise them to export the rest to other markets.

OLS Assumptions

The econometric literature presents four main assumptions[57] that when met turn the OLS estimators not only efficient but also consistent. The assumptions are the following:

Linearity

This assumption implies that the relationship between the regressand and regressors is linear; and from the model that is being used it is easily seen that the relation is linear since the coefficients are all linear.

[56] Cadot el Al (2011) ,*Trade Diversification: Drivers and Impact*, page 269

[57] These assumptions in particular were taken from Fumio Hayashi Econometrics pages 4-12, Princeton University Press, 2000.

Exogeneity

The exogeneity assumption requires that the regressors must be orthogonal to the error term of all observations. It is well known that for most time-series data this assumption is not often satisfied because some models include lagged variables, as in the case of model that is being used that includes the log of initial income.

However, in the case of time-series data the exogeneity implies that the regressors are orthogonal to the contemporaneous error term and not necessary to the past ones. Taking into account that all regressors that are being used were taken from well known international organizations it is reasonable to assume are independent or orthogonal to the current errors.

No Multicollinearity

This assumption requires the absence of very high levels of correlation between two or more regressors among the independent variables. In the case of the regressors of the model that is being used there is no reason to suspect the presence of multicollinearity.

Table 13: Correlations

Variables	dlngdppc	Ln(GDPpc t0)	Saving Rate	GrCapFormation	PopGrowth	LNAvLifeExp	LNExYSchool	Herfindahl	Herfindahl^2	LNOilPrice
dlngdppc	1									
Ln(GDPpc t0)	-0.034	1								
Saving Rate	0.208	0.427	1							
GrCapFormation	0.034	-0.152	0.37	1						
PopGrowthDep	-0.037	-0.291	-0.099	-0.183	1					
LNAvLifeExp	-0.015	0.739	0.434	0.06	-0.31	1				
LNExYSchool	-0.083	0.744	0.327	-0.053	-0.452	0.643	1			
Herfindahl Index	0.138	-0.05	0.154	-0.148	0.507	-0.267	-0.308	1		
Herfindahl^2	0.16	-0.011	0.15	-0.156	0.504	-0.242	-0.312	0.967	1	
LNOilPriceIndex	0.288	0.226	0.154	0.013	-0.065	0.069	0.151	0.094	0.11	1

Source: own Calculations using STATA

As it can be seen in the table 13, the correlations between the regressors are not so high to suspect the failure of no multicollinearity in the model; hence this assumption is satisfied in view of the correlations shown in the table 13.

Spherical errors variance

This assumption is usually split into two parts: homoskedasticity, which means that the error term has the same variance in each observation; and no autocorrelation implying that the errors are correlated between observations.

Regarding the homoskedasticity assumption a heteroskedasticity test was run in the STATA to see if the errors are homoskedastic or not here is the result of the test:

estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of dlngdppc

chi2(1) = 0.85
Prob > chi2 = 0.3579

According to the test[58], with the p-value being greater than the significance level (5%), the null hypothesis is not rejected that the error are homoskedastic.
Consequently the assumption of spherical error variance is also satisfied in this model.
It is true that even when the error is found to be (conditional) heteroskedastic, the OLS estimator is still consistent and valid statistical inference can be conducted with the robust standard errors[59]. With this in mind a robust standard error were used in order to make sure that the efficiency for statistical inference is safeguarded.
Besides OLS, Linear regression with panel-corrected standard errors, which is robust to the possibility of non-spherical errors[60] and if the standard errors are not so different from those of OLS this means that the errors are really in fact spherical. Linear LM random-effects model was also used just to compare the estimates of the coefficients and see if there is a stark contrast between them.

[58] For all the regression run, only when regressing the non-oil GDP per capita that the heteroskedasticity test was positive (Ho:Constant variance Variables: fitted values of dlngdpnopc chi2(1) = 14.74 Prob > chi2 = 0.0001)

[59] Fumio Hayashi Econometrics pages 133, Princeton University Press, 2000.

[60] Delia Bailey and Jonathan N. Katz (), Implementing Panel-Corrected Standard Errors in R: The pcse Package.

Regressions Related Data (Angola)

Table 6.1: Summary Statistics of Angola					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdppc	17	0.161	0.191	-0.229	0.447
lngdppct0	17	6.977	0.899	5.846	8.393
savingrate	17	0.183	0.213	-0.186	0.773
grcapformation	17	0.182	0.090	0.088	0.357
popgrowthdep	17	0.030	0.003	0.027	0.035
lnavlifeexp	17	3.848	0.064	3.740	3.934
lnexyschool	17	1.722	0.331	1.470	2.322
herfindahindex	17	0.919	0.042	0.846	0.971
herfindahl2	17	0.846	0.076	0.715	0.942
lnoilpriceindex	17	4.225	0.669	3.198	5.278
year	17	2003	5.050	1995	2011

Table 6.2: Regression for Angola's GDP per capita						
Angola	Methods of Estimatation					
Variables	OLS Robust					
Ln(GDPpc t0)	0.082	-0.409	*-0.396*	-0.412	-0.399	-0.216
St Dev	*0.223*	*0.145*	*0.101*	*0.131*	*0.090*	*0.051*
P-value	*0.726*	*0.022*	*0.003*	*0.012*	*0.001*	*0.001*
Saving Rate	0.923	0.422	*0.416*	0.424	0.419	0.779
St Dev	*0.283*	*0.233*	*0.220*	*0.213*	*0.200*	*0.218*
P-value	*0.014*	*0.107*	*0.091*	*0.078*	*0.063*	*0.004*
GrCapFormation	-4.545	-1.412	*-1.435*	-1.410	-1.435	-3.265
St Dev	*1.311*	*0.713*	*0.566*	*0.688*	*0.539*	*0.553*
P-value	*0.010*	*0.083*	*0.032*	*0.071*	*0.024*	*0.000*
PopGrowthDep	17.118	-19.461	*-18.628*	-19.180	-18.131	-37.245
St Dev	*21.721*	*13.960*	*11.220*	*11.937*	*9.453*	*8.492*
P-value	*0.456*	*0.201*	*0.131*	*0.143*	*0.084*	*0.001*
LNAvLifeExp	-7.432	0.214		0.228		
St Dev	*3.238*	*1.488*		*1.455*		
P-value	*0.055*	*0.889*		*0.879*		
LNExYSchool	0.066	-0.009	*-0.014*			
St Dev	*0.129*	*0.111*	*0.107*			
P-value	*0.627*	*0.935*	*0.901*			
Herfindahl Index	**-138.694**	**2.308**	***3.866***	**2.194**	**3.845**	**6.622**
St Dev	*59.699*	*10.919*	*1.296*	*10.677*	*1.275*	*1.663*
P-value	***0.053***	***0.838***	***0.015***	***0.842***	***0.013***	***0.002***
Herfindahl^2	**75.027**	**-1.255**	***-2.118***	**-1.192**	**-2.107**	**-3.363**
St Dev	*32.237*	*6.073*	*1.104*	*5.946*	*1.066*	*1.388*
P-value	***0.053***	***0.841***	***0.087***	***0.846***	***0.076***	***0.034***
LNOilPriceIndex	0.258	0.454	*0.457*	0.453	0.455	
St Dev	*0.159*	*0.167*	*0.151*	*0.166*	*0.149*	
P-value	*0.150*	*0.026*	*0.014*	*0.023*	*0.012*	
Constant	91.097					
St Dev	*37.341*					
P-value	*0.045*					
Number of Obs	**17**	**17**	**17**	**17**	**17**	**17**
F (k, n-k)	21.88	77.38	97.53	38.30	47.24	131.85
Prob > F	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.950**	**0.961**	**0.961**	**0.961**	**0.961**	**0.920**
Root MSE	0.0646	0.071	0.067	0.067	0.064	0.087
Herfindahl Star	**0.924**	**0.920**	**0.913**	**0.920**	**0.913**	**0.985**

Table 6.3: Regression for Angola's GDP per capita						
Angola	Methods of Estimatation					
Variables	Linear with panel-corrected standard erros					
Ln(GDPpc t0)	0.082	-0.409	-0.396	-0.412	-0.399	-0.216
St Dev	*0.206*	*0.082*	*0.060*	*0.076*	*0.056*	*0.049*
P-value	*0.692*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Saving Rate	0.923	0.422	0.416	0.424	0.419	0.779
St Dev	*0.224*	*0.123*	*0.121*	*0.122*	*0.120*	*0.121*
P-value	*-4.545*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*
GrCapFormation	-4.545	-1.412	-1.435	-1.410	-1.435	-3.265
St Dev	*1.324*	*0.555*	*0.548*	*0.555*	*0.548*	*0.476*
P-value	*0.001*	*0.011*	*0.009*	*0.011*	*0.009*	*0.000*
PopGrowthDep	17.118	-19.461	-18.628	-19.180	-18.131	-37.245
St Dev	*17.342*	*11.275*	*10.758*	*10.858*	*10.111*	*12.906*
P-value	*0.324*	*0.084*	*0.083*	*0.077*	*0.073*	*0.004*
LNAvLifeExp	-7.432	0.214		0.228		
St Dev	*3.110*	*0.883*		*0.870*		
P-value	*0.017*	*0.808*		*0.794*		
LNExYSchool	0.066	-0.009	-0.014			
St Dev	*0.092*	*0.102*	*0.101*			
P-value	*0.476*	*0.927*	*0.893*			
Herfindahl Index	**-138.694**	**2.308**	**3.866**	**2.194**	**3.845**	**6.622**
St Dev	*55.933*	*6.545*	*1.230*	*6.427*	*1.220*	*1.466*
P-value	***0.013***	***0.724***	***0.002***	***0.733***	***0.002***	***0.000***
Herfindahl^2	**75.027**	**-1.255**	**-2.118**	**-1.192**	**-2.107**	**-3.363**
St Dev	*30.269*	*3.653*	*0.820*	*3.589*	*0.817*	*1.086*
P-value	***0.013***	***0.731***	***0.010***	***0.740***	***0.010***	***0.002***
LNOilPriceIndex	0.258	0.454	0.457	0.453	0.455	
St Dev	*0.121*	*0.109*	*0.109*	*0.109*	*0.108*	
P-value	*0.033*	*0.000*	*0.000*	*0.000*	*0.000*	
Constant	91.097					
	35.956					
	0.011					
Number of obs	17	17	17	17	17	17
Wald chi2(k)	323.70	415.95	414.46	415.74	414.00	194.12
Prob > chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R Squared	**0.950**	**0.961**	**0.961**	**0.961**	**0.961**	**0.920**
Herfindahl Star	**0.924**	**0.920**	**0.913**	**0.920**	**0.913**	**0.985**

Table 6.4: Regression for Angola's GDP per capita						
Angola	Methods of Estimatation					
variables	Random-effects ML regression					
Ln(GDPpc t0)	0.082	-0.409	-0.396	-0.412	-0.399	-0.216
St Dev	*0.206*	*0.082*	*0.060*	*0.076*	*0.056*	*0.049*
P-value	*0.692*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Saving Rate	0.923	0.422	0.416	0.424	0.419	0.779
St Dev	*0.224*	*0.123*	*0.121*	*0.122*	*0.120*	*0.121*
P-value	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*
GrCapFormation	-4.545	-1.412	-1.435	-1.410	-1.435	-3.265
St Dev	*1.324*	*0.555*	*0.548*	*0.555*	*0.548*	*0.476*
P-value	*0.001*	*0.011*	*0.009*	*0.011*	*0.009*	*0.000*
PopGrowthDep	17.118	-19.461	-18.628	-19.180	-18.131	-37.245
St Dev	*17.342*	*11.275*	*10.758*	*10.858*	*10.110*	*12.906*
P-value	*0.324*	*0.084*	*0.083*	*0.077*	*0.073*	*0.004*
LNAvLifeExp	-7.432	0.214		0.228		
St Dev	*3.110*	*0.883*		*0.870*		
P-value	*0.017*	*0.808*		*0.794*		
LNExYSchool	0.066	-0.009	-0.014			
St Dev	*0.092*	*0.102*	*0.101*			
P-value	*0.476*	*0.927*	*0.893*			
Herfindahl Index	**-138.694**	**2.308**	**3.866**	**2.194**	**3.845**	**6.622**
St Dev	*55.933*	*6.545*	*1.230*	*6.427*	*1.220*	*1.466*
P-value	***0.013***	***0.724***	***0.002***	***0.733***	***0.002***	***0.000***
Herfindahl^2	**75.027**	**-1.255**	**-2.118**	**-1.192**	**-2.107**	**-3.363**
St Dev	*30.269*	*3.653*	*0.820*	*3.589*	*0.817*	*1.086*
P-value	***0.013***	***0.731***	***0.010***	***0.740***	***0.010***	***0.002***
LNOilPriceIndex	0.258	0.454	0.457	0.453	0.455	
St Dev	*0.121*	*0.109*	*0.109*	*0.109*	*0.108*	
P-value	*0.033*	*0.000*	*0.000*	*0.000*	*0.000*	
Constant	91.097					
St Dev	*35.956*					
P-value	*0.011*					
Log likelihood	29.992	27.269	27.240	27.265	27.231	21.164
Wald chi2(k)	50.960	415.950	414.460	415.740	414.060	194.120
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000
/sigma_u			0 (omitted)			
/sigma_e	0.041	0.049	0.049	0.049	0.049	0.070
Herfindahl Star	**0.924**	**0.920**	**0.913**	**0.920**	**0.913**	**0.985**

Angola (Oil & Non-oil)

Table 7.1: Summary Statistics of Angola (oil)					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdpopc	17	0.147	0.258	-0.453	0.515
lngdpopct0	17	6.381	0.859	5.328	7.835
savingrate	17	0.183	0.213	-0.186	0.773
grcapformation	17	0.182	0.090	0.088	0.357
popgrowthdep	17	0.030	0.003	0.027	0.035
lnavlifeexp	17	3.848	0.064	3.740	3.934
lnexyschool	17	1.722	0.331	1.470	2.322
herfindahindex	17	0.919	0.042	0.846	0.971
herfindahl2	17	0.846	0.076	0.715	0.942
lnoilpriceindex	17	4.225	0.669	3.198	5.278
year	17	2003	5.050	1995	2011

Table 7.2: Summary Statistics of Angola (non-oil)					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdpnopc	17	0.177	0.226	-0.530	0.447
lngdpnopct0	17	6.161	0.965	4.939	7.745
savingrate	17	0.183	0.213	-0.186	0.773
grcapformation	17	0.182	0.090	0.088	0.357
popgrowthdep	17	0.030	0.003	0.027	0.035
lnavlifeexp	17	3.848	0.064	3.740	3.934
lnexyschool	17	1.722	0.331	1.470	2.322
herfindahindex	17	0.919	0.042	0.846	0.971
herfindahl2	17	0.846	0.076	0.715	0.942
lnoilpriceindex	17	4.225	0.669	3.198	5.278
year	17	2003	5.050	1995	2011

Table 7.3: Regressions for Angola's Oil & Non-Oil GDP					
Angola	**Oil GDP per capita**		**Non-oil GDP per capita**		
Variables	Linear with panel-corrected standard error		Linear reg heteroskedastic panels corrected standard errors		
Ln(GDPpc t0)	-0.713	-0.703	-0.289	-0.286	-0.301
St Dev	*0.054*	*0.052*	*0.120*	*0.109*	*0.086*
P-value	*0.000*	*0.000*	*0.016*	*0.009*	*0.000*
Saving Rate	0.202	0.187	0.436	0.433	0.398
St Dev	*0.115*	*0.114*	*0.299*	*0.274*	*0.208*
P-value	*0.079*	*0.101*	*0.146*	*0.114*	*0.056*
GrCapFormation	0.353	0.377	-2.960	-2.959	-2.771
St Dev	*0.519*	*0.524*	*1.074*	*1.077*	*0.755*
P-value	*0.496*	*0.471*	*0.006*	*0.006*	*0.000*
PopGrowthDep	17.108	14.821	-58.420	-58.994	-56.948
St Dev	*10.660*	*10.132*	*19.257*	*19.244*	*15.912*
P-value	*0.109*	*0.144*	*0.002*	*0.002*	*0.000*
LNExYSchool	0.061		0.015		
St Dev	*0.098*		*0.216*		
P-value	*0.531*		*0.943*		
Herfindahl Index	**1.198**	**1.286**	**5.173**	**5.206**	4.873
St Dev	*1.216*	*1.221*	*1.672*	*1.798*	*1.293*
P-value	***0.324***	***0.292***	***0.002***	***0.004***	*0.000*
Herfindahl^2	**-2.163**	**-2.203**	**-0.479**	**-0.494**	-0.349
St Dev	*0.810*	*0.817*	*1.454*	*1.507*	*1.530*
P-value	***0.008***	***0.007***	***0.742***	***0.743***	*0.820*
LNOilPriceIndex	**1.114**	**1.127**	**-0.047**	**-0.044**	
St Dev	*0.099*	*0.098*	*0.226*	*0.221*	
P-value	***0.000***	***0.000***	***0.836***	***0.841***	
Number of Obs	17	17	17	17	17
F (k, n-k); Wald chi2(k)	595.10	581.27	408.95	330.89	354.39
Prob > F; chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.972**	**0.972**	**0.816**	**0.816**	**0.816**

Oil-Producing Countries

Table 8.1: Summary Statistics of 17 Oil-Producing Countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdppc	286	0.094	0.173	-0.453	0.620
lngdppct0	286	8.364	1.512	5.395	11.464
grcapformation	286	0.244	0.131	0.007	1.136
popgrowthdep	286	0.053	0.030	0.011	0.186
lnavlifeexp	286	4.199	0.168	3.740	4.399
lnexyschool	286	2.384	0.357	1.435	2.868
herfindahlindex	286	0.608	0.232	0.125	0.986
herfindahl2	286	0.424	0.274	0.016	0.971
lnoilpriceindex	286	4.233	0.650	3.198	5.278
year	286	2003	4.869	1995	2011

Oil-Producing Countries	**Table 8.2: Linear with PCSE**			
Variables	Linear with panel-corrected SE			
Ln(GDPpc t0)	-0.023	-0.025	-0.023	-0.008
St Dev	*0.013*	*0.013*	*0.008*	*0.013*
P-value	*0.073*	*0.045*	*0.003*	*0.563*
GrCapFormation	0.230	0.249	0.246	0.247
St Dev	*0.110*	*0.111*	*0.112*	*0.112*
P-value	*0.036*	*0.025*	*0.027*	*0.027*
PopGrowthDep	0.408	0.363	0.308	0.498
St Dev	*0.393*	*0.399*	*0.328*	*0.399*
P-value	*0.299*	*0.363*	*0.348*	*0.212*
LNAvLifeExp	-0.150			-0.144
St Dev	*0.125*			*0.130*
P-value	*0.231*			*0.267*
LNExYSchool	0.052	0.011		0.046
St Dev	*0.054*	*0.050*		*0.056*
P-value	*0.334*	*0.830*		*0.418*
Herfindahl Index	**0.200**	**0.140**	**0.125**	**-0.072**
St Dev	*0.272*	*0.260*	*0.240*	*0.268*
P-value	***0.462***	***0.591***	***0.603***	***0.789***
Herfindahl^2	**-0.093**	**-0.021**	**-0.013**	**0.175**
St Dev	*0.254*	*0.235*	*0.226*	*0.248*
P-value	***0.713***	***0.928***	***0.954***	***0.480***
LNOilPriceIndex	**0.073**	**0.073**	**0.073**	
St Dev	*0.015*	*0.015*	*0.015*	
P-value	***0.000***	***0.000***	***0.000***	
Constant	0.322	-0.184	-0.166	0.535
St Dev	*0.443*	*0.120*	*0.086*	*0.462*
P-value	*0.467*	*0.123*	*0.055*	*0.248*
Number of Obs	**286**	**286**	**286**	**286**
F (k, n-k); wald chi2(k)	61.86	60.10	59.40	20.490
Prob > F; chi2	**0.000**	**0.000**	**0.000**	0.005
R-squared	**0.149**	**0.143**	**0.143**	0.089

SADC and 22 Countries

Table 9.1: Summary Statistics of SADC Countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdppc	255	0.061	0.135	-0.448	0.471
lngdppct0	255	6.843	1.342	4.652	9.406
grcapformation	255	0.217	0.097	0.015	0.748
popgrowthdep	255	0.056	0.025	-0.011	0.092
lnavlifeexp	255	3.967	0.160	3.736	4.298
lnexyschool	255	2.215	0.322	1.470	2.660
herfindahlindex	255	0.406	0.217	0.062	0.971
herfindahl2	255	0.211	0.223	0.004	0.942
lnoilpriceIndex	255	4.225	0.650	3.198	5.278
year	255	2003	4.909	1995	2011

Table 9.2: Summary Statistics of 22 Countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
dlngdppc	374	0.075	0.141	-0.453	0.471
lngdppct0	374	7.801	1.557	4.795	11.464
savingrate	374	0.231	0.132	-0.191	0.773
grcapformation	374	0.226	0.082	0.088	0.748
popgrowthdep	374	0.067	0.010	0.045	0.102
lnavlifeexp	374	4.107	0.197	3.736	4.399
lnexyschool	374	2.354	0.357	1.435	2.868
herfindahindex	374	0.388	0.237	0.062	0.971
herfindahl2	374	0.207	0.222	0.004	0.942
lnoilpriceindex	374	4.225	0.650	3.198	5.278
year	374	2003	4.906	1995	2011

Table 9.3: Regressions for SADC & other 22 Countries						
SADC & 22 Countries	**SADC**			**22 Countries**		
Variables	Linear with panel-corrected standard error			Linear with panel-corrected standard error		
Ln(GDPpc t0)	-0.006	-0.002	-0.003	-0.030	-0.022	-0.014
St Dev	*0.011*	*0.010*	*0.010*	*0.009*	*0.007*	*0.008*
P-value	*0.601*	*0.862*	*0.770*	*0.001*	*0.003*	*0.093*
Saving Rate				0.332	0.352	
St Dev	N.A for all countries			*0.068*	*0.067*	
P-value				*0.000*	*0.000*	
GrCapFormation	-0.005	0.018	0.007	-0.273	-0.256	0.013
St Dev	*0.091*	*0.087*	*0.090*	*0.099*	*0.099*	*0.092*
P-value	*0.959*	*0.834*	*0.941*	*0.006*	*0.009*	*0.892*
PopGrowthDep	0.558	0.478	0.441	-2.660	-2.547	-2.735
St Dev	*0.352*	*0.339*	*0.341*	*0.826*	*0.826*	*0.856*
P-value	*0.113*	*0.158*	*0.195*	*0.001*	*0.002*	*0.001*
LNAvLifeExp	*0.058*		*0.021*	*0.086*		*0.100*
St Dev	*0.071*		*0.021*	*0.056*		*0.028*
P-value	*0.412*		*0.322*	*0.122*		*0.000*
LNExYSchool	-0.033	-0.033	-0.003	-0.045	-0.042	-0.025
St Dev	*0.043*	*0.043*	*0.044*	*0.032*	*0.032*	*0.034*
P-value	*0.450*	*0.438*	*0.944*	*0.162*	*0.192*	*0.459*
Herfindahl Index	**-0.163**	-0.157	-0.206	**-0.193**	**-0.203**	**-0.129**
St Dev	*0.175*	*0.175*	*0.182*	*0.113*	*0.113*	*0.120*
P-value	*0.350*	*0.369*	*0.257*	*0.088*	*0.073*	*0.282*
Herfindahl^2	**0.253**	0.238	0.303	**0.290**	**0.281**	**0.306**
St Dev	*0.179*	*0.178*	*0.186*	*0.123*	*0.123*	*0.132*
P-value	***0.158***	*0.181*	*0.104*	***0.018***	***0.022***	***0.021***
LNOilPriceIndex	0.061	0.060		0.064	0.061	
St Dev	*0.013*	*0.013*		*0.011*	*0.010*	
P-value	*0.000*	*0.000*		*0.000*	*0.000*	
Constant	-0.333	-0.125		-0.032	0.259	
St Dev	*0.267*	*0.084*		*0.215*	*0.105*	
P-value	*0.213*	*0.137*		*0.883*	*0.014*	
Number of Obs	255	255	255	374	374	374
F (k, n-k); Wald chi2(k)	38.600	37.830	68.950	91.810	88.840	138.750
Prob > F; chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.132**	**0.129**	0.213	**0.197**	**0.192**	**0.271**

Data Related with Angolan's Exports

Table 10: Main Exported Merchandises or goods (values in USD)			
N/O	**Merchandises**	**2011**	**%**
1	Óleos brutos de petróleo ou de minerais betuminosos	62,787,403,668	95.1
2	Diamantes não industriais em bruto ou simplesmente serrados, clivados…	1,194,930,095	1.8
3	Óleos leves e preparações, destinados a sofrer uma transformação química	583,376,269	0.9
4	Propano	308,950,480	0.5
5	Gasolinas de aviões	188,343,508	0.3
6	Gasóleo destinado a outros usos	151,648,903	0.2
7	Butano	107,499,685	0.2
8	Óleos para motores, compressores, turbinas	105,245,594	0.2
9	Outros querosenes	59,545,465	0.1
10	Outros diamantes não industriais	51,966,263	0.1
11	Partes das máquinas de sondagem ou de perfuração…	43,543,823	0.1
12	Camarões congelados	20,446,409	0.0
13	Outros óleos lubrificantes e outros	18,834,293	0.0
14	Outros motores e geradores, eléctricos, excepto os grupos electrogéneos	16,958,879	0.0
15	Outras partes das máquinas e aparelhos das posições 84.26, 84.29 ou 84.30	15,673,526	0.0
16	Outros aviões e outros veículos aéreos, de peso superior a 15 000 kg, vazios	15,500,000	0.0
17	Outras obras de ferro ou aço	14,957,582	0.0
18	Outras partes de turbinas hidráulicas, rodas hidráulicas, e seus reguladores	12,906,307	0.0
19	Outros dispositivos - torneiras, válvulas e dispositivos semelhantes…	10,443,361	0.0
20	Outras embarcações para o transporte de mercadorias ou para o transporte…	10,000,000	0.0
Sub – total		**65,718,174,109**	**99.6**
Outros		**271,792,701**	**0.4**
Total		**65,989,966,810**	**100**

Source: Alfandegas de Angola

Table 10.1: Main Exported Merchandises or goods (Values in USD)			
N/O	**Merchandises**	**2012**	**%**
1	Óleos brutos de petróleo ou de minerais betuminosos	73,223,143,740	96.80
2	Diamantes não industriais em bruto ou simplesmente serrados, clivados…	1,087,818,318	1.40
3	Propano	321,500,805	0.40
4	Óleos leves e preparações, destinados a sofrer uma transformação química	254,145,026	0.30
5	Butano	126,914,810	0.20
6	Gasóleo destinado a outros usos	74,170,062	0.10
7	Outras obras de ferro ou aço	59,675,316	0.10
8	Gasolinas de aviões	56,835,638	0.10
9	Óleos para motores, compressores, turbinas	47,849,200	0.10
10	Outros querosenes	27,690,324	0.00
11	Camarões congelados	21,888,311	0.00
12	Partes das máquinas de sondagem ou de perfuração…	20,549,760	0.00
13	Outros helicópteros de peso superior a 2000kg, vazios	10,895,036	0.00
14	Outras partes e acessórios de instrumentos e aparelhos de geodesia, topografia…	10,796,994	0.00
15	Outros diamantes não industriais	9,090,638	0.00
16	Novas plataformas de perfuração ou de exploração, flutuantes ou submersíveis	8,743,719	0.00
17	Outros contentores, incluídos os de transporte de fluido…	7,350,352	0.00
18	Outras turbinas a gás de potência superior a 5000 kw	7,140,838	0.00
19	Outros garrafões, garrafas, frascos, boiões, vasos, embalagens tubulares…	6,860,243	0.00
20	Motores hidráulicos de movimento rectilíneo (cilindros)	6,628,202	0.00
Sub – total		**75,389,687,334**	**99.70**
Outros		**241,917,590**	**0.30**
Total		**75,631,604,924**	**100**

Table 11: Angola's Main Export Trade Partners (values in USD)				
N/O	**Code**	**Countries**	**2011**	**%**
1	CN	China	23,946,105,154	36.3
2	US	E.U.A	12,193,785,470	18.5
3	IN	Índia	6,964,425,329	10.6
4	TW	Taiwan	5,278,269,945	8
5	CA	Canadá	3,885,185,360	5.9
6	FR	França	2,082,705,239	3.2
7	IT	Itália	1,898,180,232	2.9
8	ZA	África do Sul	1,451,939,527	2.2
9	NL	Holanda	1,398,605,715	2.1
10	PT	Portugal	1,304,163,472	2
11	ES	Espanha	697,121,996	1.1
12	GB	Reino Unido*	643,611,174	1
13	AE	Emiratos Árabes Unidos	548,574,072	0.8
14	PE	Peru	524,833,467	0.8
15	BR	Brasil	511,050,728	0.8
16	MY	Malásia	362,724,289	0.5
17	IL	Israel	328,771,344	0.5
18	CH	Suíça	300,442,712	0.5
19	SE	Suécia	294,532,853	0.4
20	CD	Republica Democrática do Congo	203,204,381	0.3
Sub - total			**64,818,232,460**	**98.2**
Outros			1,171,734,350	1.8
Total			**65,989,966,810**	**100**

Table 11.1: Angola's Main Export Trade Patners (values in USD)				
N/O	**Code**	**Countries**	**2012**	**%**
1	CN	China	33,011,093,576	43.6
2	US	EUA	11,936,335,622	15.8
3	IN	Índia	7,669,962,229	10.1
4	TW	Taiwan	5,097,930,387	6.7
5	CA	Canadá	2,484,012,700	3.3
6	ZA	África do Sul	2,252,281,245	3
7	PT	Portugal	2,149,476,634	2.8
8	FR	França	1,645,405,412	2.2
9	NL	Holanda	1,426,370,644	1.9
10	GB	Reino Unido*	1,166,659,462	1.5
11	CH	Suíça	857,162,071	1.1
12	IT	Itália	806,790,258	1.1
13	PA	Panamá	776,688,334	1
14	ES	Espanha	718,057,032	0.9
15	AE	Emiratos Árabes Unidos	584,515,230	0.8
16	PE	Peru	407,954,267	0.5
17	NO	Noruega	338,313,451	0.4
18	ID	Indonésia	323,183,291	0.4
19	GR	Grécia	250,162,329	0.3
20	BR	Brasil	177,210,213	0.2
Sub - total			**74,079,564,388**	**97.9**
Outros			1,552,040,535	2.1
Total			**75,631,604,924**	**100**

Table 12: Angola's Main Import Trade Partners (values in USD)				
N/O	**Code**	**Countries**	**2011**	**%**
1	PT	Portugal	3.411.405.445	16,5
2	KR	República da Coreia	2.338.793.927	11,3
3	NL	Holanda	1.863.206.953	9,0
4	CN	China	1.825.990.613	8,8
5	US	U.S.A	1.670.195.833	8,1
6	ZA	África do Sul	1.004.793.897	4,9
7	BR	Brasil	920.496.936	4,5
8	FR	França	870.200.254	4,2
9	GB	Reino Unido	780.363.688	3,8
10	BE	Bélgica	629.250.802	3,0
11	AE	Emiratos Árabes Unidos	417.902.333	2,0
12	JP	Japão	406.913.259	2,0
13	SG	Singapura	355.366.037	1,7
14	IN	Índia	345.541.216	1,7
15	MY	Malásia	302.926.697	1,5
16	DE	Alemanha	299.166.839	1,4
17	ES	Espanha	284.076.643	1,4
18	IT	Itália	233.813.541	1,1
19	NA	Namíbia	210.780.859	1,0
20	TH	Tailândia	206.356.037	1,0
Sub – total			**18.377.541.809**	**88,9**
Outros			2.290.514.058	11,1
Total			**20.668.055.867**	**100.00**

Table 12.1: Angola's Main Import Trade Partners (values in USD)				
N/O	**Código**	**Countries**	**2012**	**%**
1	PT	Portugal	4.105.223.411	18,9
2	CN	China	2.555.194.665	11,8
3	SG	Singapura	1.836.637.830	8,4
4	US	EUA	1.657.747.652	7,6
5	BR	Brasil	1.141.927.649	5,3
6	ZA	África do Sul	1.088.001.779	5,0
7	GB	Reino Unido	860.164.411	4,0
8	FR	França	821.144.339	3,8
9	BE	Bélgica	784.289.474	3,6
10	AE	Emiratos Árabes Unidos	636.829.380	2,9
11	NL	Holanda	614.963.054	2,8
12	JP	Japão	569.322.067	2,6
13	IN	Índia	548.714.727	2,5
14	ES	Espanha	438.213.271	2,0
15	KR	República da Coreia	420.403.796	1,9
16	DE	Alemanha	341.108.512	1,6
17	IT	Itália	282.427.154	1,3
18	AR	Argentina	265.225.422	1,2
19	TH	Tailândia	230.666.535	1,1
20	MY	Malásia	219.060.951	1,0
Sub - total			**19.417.266.078**	**89,3**
Outros			2.319.253.166	10,7
Total			**21.736.519.244**	**100**