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Resource Dependence and Economic Growth: Distinguishing between Renewable and Non-Renewable Commodities.

By

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Abstract: Sustained economic growth is essential for developing countries in order to develop. Resource dependent countries face difficulties creating sustained growth as most suffer from a resource curse. Building on previous literature, this research aims at exploring the resource curse literature, with a focus on the time period 1995-2016, which includes the commodity boom, for countries located in Sub-Saharan Africa and Latin America. Findings are that the negative relationship between resource dependence and economic growth, remains prevalent. Additionally, different types of commodities show differing effects on economic growth, where dependence on non-renewable resources is more deterrent for economic growth than dependence on renewable resources.

Keywords: Resource Curse, Industrialisation, Sustained Economic Growth

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1. Introduction

In the last two decades, many developing countries have been showing a pattern of increased economic growth. However, contrary to what would be expected according to the premise of economic backwardness, this has not led to convergence (Abramovitz, 1986). While some countries have been able to catch-up with the developed world, most are still lagging behind. Many of the latter are located in Sub-Saharan Africa as well as in Latin America. This is especially surprising since a large share of these countries are richly endowed with natural resources, which so far has not helped them to generate sustained economic growth. Instead, the resource dependence of these countries can be largely seen as the root of the lack of economic growth (Sachs & Warner, 1995).

Overall, industrialisation through structural change has been argued to be the pathway for economic growth (Rodrik, 2017). The industry sector can be divided up into the resource-extractive industry and manufacturing. Figure 1 shows the extent of the resource value-added and manufacturing value added to GDP in Sub-Saharan Africa and Latin America, in order to show the importance of both sectors. The manufacturing sector shows a downward trend in both regions which is argued to be of importance for the lack of economic development in these regions. Furthermore, the figure shows that in Sub-Saharan Africa, the resource value-added excels that of manufacturing, showing that this is an important source for the economies in this region, thus indicating that Sub-Saharan Africa is highly reliant on resource usage.

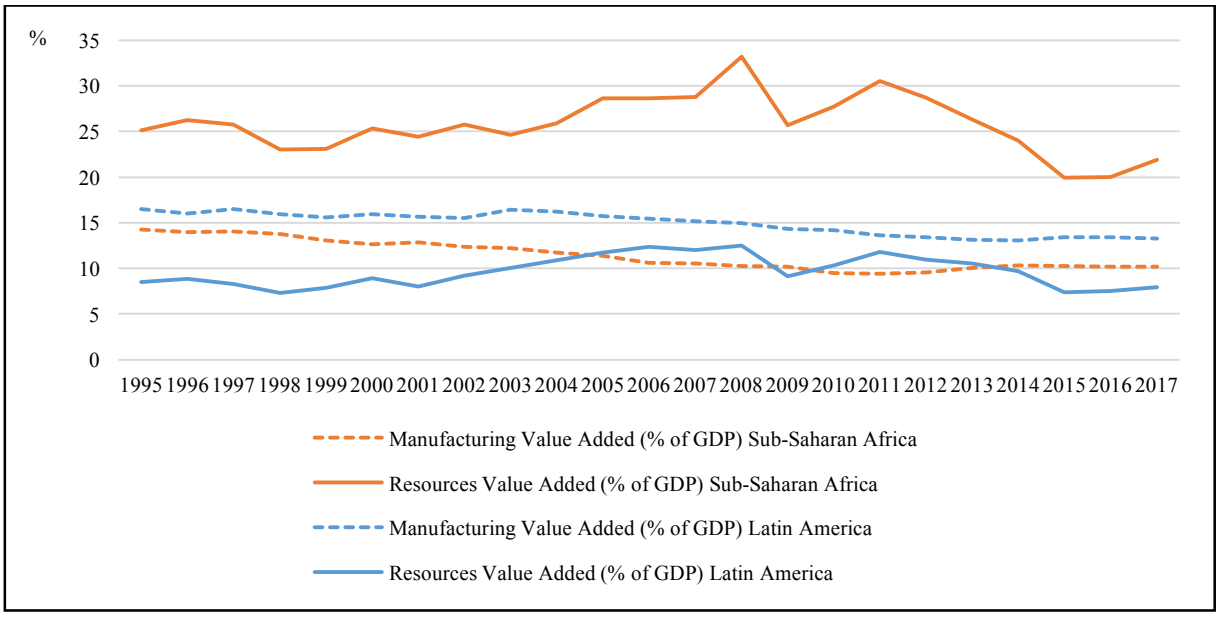

Figure 1 - Value-Added (% of GDP) in Sub-Saharan Africa and Latin America, Source: World Bank – World Bank Development Indicators (2018)

Influential scholars including Auty (1993) and Sachs and Warner (1999) have developed the theory of the natural resource curse, stating the adverse effect of natural resources on economic growth for rich-endowed countries. This paper will continue on this premise, focusing on Sub-Saharan Africa and Latin America. These regions contain a large share of the world resource dependent countries. Additionally, most of these are developing countries. This creates a focus in the study, since the countries under investigation are more comparable, therefore giving rise to more specific results and subsequently create opportunities for clear policy advice.

Sachs and Warner (1995) established the so-called resource curse theory based on trends in the period of the 1970s and 80s. This specific period is characterised by economic turmoil in Latin America and the 'lost-decades' in Sub-Saharan Africa. Subsequently, the finding that resources are unfavourable for economic growth is not necessarily surprising. Therefore, the following study will do a similar analysis for a different time period, namely 1995 till 2016, given that these years are characterised by increasing international trade, economic development, and a growing demand of commodities. This so-called commodity boom increased incomes in many resource dependent countries, therefore it might be possible that there is no evidence for the resource curse in the time period studied in this paper. Subsequently, it is especially interesting to see the development of the relationship between economic growth and natural resource dependence for the recent time period and assess whether these findings are comparable to those of Sachs and Warner.

Moving on from the resource sector, several scholars (e.g. McMillan & Rodrik, 2011, Rodrik et al., 2017) argue that the non-extractive industry sector is fundamental to economic growth and that structural change is necessary in order to create sustained economic growth. The traditional way to approach this is to diversify and focus on industrialisation. Thus far, however, most resource dependent countries have had difficulties in succeeding in the industrialisation process, instead focusing on the extraction of resources.

Another important element of the established link between resource dependence and economic growth is that it does not make any distinction between the effects of the different types of natural resources (Sachs & Warner, 1999). Natural resource is a broad term and overall refers to 'natural assets such as materials, minerals, forests, water and fertile land that occur in nature and can be used for economic gain' (Babeeb et al., 2017). Since these types of natural resources are highly different, it would be compelling to argue that their effect on economic growth differs as well. Broadly, natural resources can be split up into renewable resources, which mostly comprise of agricultural products and non-renewable resources, which refer more towards point-source resources such as minerals and oil. Therefore, next to focusing on a different time period compared to previous literature, this paper contributes to the natural resource – economic growth debate by distinguishing natural resources into groups and analysing the effect of different sectoral resource dependence on economic growth.

This research aims at extending the existing literature concerning the resource curse, with a focus on economic growth in Sub-Saharan Africa and Latin America. This will be done by examining the resource curse within the time period of 1995 – 2016. Additionally, categories

are created in which different types of resources are split up according to whether they are renewable or non-renewable in order to observe if there are differences in their effect on economic growth. Furthermore, since industrialisation is arguably essential for economic development, it is explored in which way the natural resources influence the industrialisation process. This research aim is specified in three working hypotheses. Subsequently, this paper posts the following research question: What is the effect of resource dependence on economic growth? With a sub-research question stating: Does this effect differ between renewable and non-renewable resources and which role does the industrialisation process play in this?

The results found in this paper show that resource dependence generally has a negative influence on economic growth. While in line with the research of Sachs and Warner (1995), these results might be seen as surprising given that the time period studied includes a commodity boom. Additionally, the resource curse is found to be more extensive in the case a country is dependent on non-renewable resources than renewable resources. This is argued through the countries primarily relying on the former having less economic linkages and creating more corruption and unfavourable politics.

Countries such as Norway or Canada have proven that the resource curse can be avoided or overcome, reaching sustained economic growth through not fully relying on the extraction of its primary resource. However, as evident from the number of countries that have overcome the resource curse vis-à-vis the ones that have not, it is not an easy undertaking. The main reasons for the poor economic development in richly endowed countries are mainly stemming from a bad quality of institutions caused or reinforced by natural resource wealth, limited spill-over effects and little structural change.

The remainder of this paper is as follows. Section 2 gives an overview of the previous established literature, focusing on the resource curse, industrialisation, institutions and linkages. Section 3 discusses the data used for the model and the expected effects it will have. Section 4 describes the methodology. Subsequently, in section 5 the performed empirical analysis is evaluated through interpreting and discussing the results. Finally, the paper is concluded in section 6, additionally showing limitations of the study as well as recommendations for the future.

2. Literature Review

Natural resources have proven to be detrimental for a country's economic development as argued by influential scholars including Auty (1993) and Sachs and Warner (1999). The following section evaluates previous literature on natural resources, economic growth and industrialisation.

2.1 Natural Resources

2.1.1 Resource Curse

The natural resource curse, as coined by Auty (1993), refers to the worse economic outcome of countries with rich resource endowment in comparison to less-well-endowed countries. This finding is largely counterintuitive, as one would expect well-endowed countries to benefit from their resources, which often face high international demand. However, these well-endowed countries appear to not only fail to benefit from the resource rich endowment, but on top of that show worse economic performance compared to countries that are less well-endowed (Auty, 1993). There are many potential causes to explain this phenomenon, but according to Auty (1993), this underperformance is dependent on the production function, domestic linkages and deployment or mineral rents. The extraction of natural resources is highly capital intensive; therefore, it does not create many linkages, both productive linkages for inputs and final demand linkages (Auty, 1993). This is stressed by earlier literature such as Hirschman (1958) and Baldwin (1966), arguing that the poor forward and backward linkages cause the resource booms to have little positive externalities for other sectors (Sachs & Warner, 1999). This is based on the premise of the industry sector creating an efficient and productive reallocation of labour and consequently increases living standards (Sachs & Warner, 1995). Moreover, the natural resource sector creates low revenue retention as most of the extracted resources are exported raw creating dependence on foreign capital (Auty, 1993). Therefore, the benefits of a resource boom are not necessarily re-invested into productivity-enhancing activities (Sachs & Warner, 1999). Lastly, due to the high capital-intensity, the natural resource sector does not create many employment opportunities (Auty, 1993), despite labour within the sector being highly productive.

While the resource curse literature is supported by many scholars (e.g. Ross, 2001; Isham et al., 2005; Mehlum et al., 2006; Hodler, 2006), it has also been subjected to criticism by scholars such as Brunnschweiler and Bulte (2008) who contradict the premise that natural resources have an adverse effect on economic growth and focus on the importance of institutions instead. Despite this, studies show that whether the resource curse becomes prevalent depends on multiple influencing channels (Auty, 1993; Gylfason, 2001; Mehlum et al., 2006). These channels influencing the resource curse are among others, the Dutch disease, price volatility and institutions.

2.1.1.1 Dutch Disease

The Dutch disease can be viewed as the predecessor of the natural resource curse, originating from the discovery of natural gas in the Netherlands after which the economy took a dive. In theory, this phenomenon creates premature shrinking of the agricultural sector. It is damaging for the primary and manufacturing sector, as the focus shifts to exporting commodities, creating uncompetitive circumstances for the other sectors, which as a result have to rely on import protection policies (Auty, 1993). Thus, due to the boom in commodities exports, resources shift away from sectors of the economies essential for economic growth (Sachs & Warner, 1999).
The Dutch disease manifests itself through a spending or pull effect. The spending effect, lowers competitiveness as an increased demand for domestic goods causes an increased domestic income based on a natural resource boom. Consequently, non-resource commodities have a relatively higher price caused by inflation and appreciation of the real exchange rate, decreasing competitiveness of non-commodity based sectors (Badeed et al., 2017). The pull effect is created by investments shifting to the natural resource sector. Given that agriculture and manufacturing create more positive spill-overs compared to natural resources (Hirschman, 1958), this lowers the countries competitiveness. Both these effects have the potential to crowd-out non-commodity based production, which could lower the growth perspective of the affected countries (Badeed et al., 2017).

2.1.1.2 Commodity Price Volatility

The commodity market is highly volatile, especially for oil and gas and to a lesser extent for other minerals and agricultural production, caused by the elasticities of supply and demand (Frankel, 2010). This volatility creates risks and uncertainty, complicating governmental investments and savings decisions (Arezki & Gylfason, 2011) and increasing transaction costs caused by the cyclical shifts of moving resources, which therefore affects economic development in resource dependent economies (Frankel, 2010; Arezki & Gylfason, 2011). This boom and bust pattern creates higher volatility in exchange rates, possibly lowering exports. Given that exports are essential for economic growth, this reduction in exports due to price volatility slows down economic growth (Gylfason, 2001). This is especially the case if the higher exchange rate shifts the export pattern away from high-tech and manufacturing exports (Frankel & Romer, 1999).

Market instability created through price volatility causes difficulties for policy makers, as it is difficult to assess whether the price boom for a specific commodity is permanent (Frankel, 2010). Therefore, in terms of establishing exchange rate policy, the durability of the boom has to be factored in (Badeed et al., 2017; Frankel, 2010), which could hinder effective planning for economic development effectively (Badeed et al., 2017). According to Davis and Tilton (2005) in the case of price downturns both export earnings and government revenues will decrease based on fluctuations caused by price volatility for commodities. Additionally, these fluctuations increase through international lending (Humpreys et al., 2007). Since high commodity prices stimulate commodity-rich countries to borrow abroad, which could foster the boom even further. Consequently, in the case that the prices fall, these borrowed funds have to be repaid often with expenditure reduction, therefore worsening the downturns (Humpreys et al., 2007). The time period studied in this paper is characterised by a commodity boom, which

therefore might create contradicting results to Sachs and Warner (1999), who focused on a time period of economic downturns.

In accordance with the previous literature, the first hypothesis is formed:

Hypothesis 1 – Resource dependence has a negative effect on economic growth.

2.2 Industrialisation

According to the theory of backwardness within the catch-up literature, poor countries should grow faster than rich countries since the former have the advantage of economic backwardness. Economic backwardness as argued by Abramovitz (1986) states that 'in comparisons across countries the growth rates of productivity in any long period tend to be inversely related to the initial levels of productivity'. This is because these backward economies can adopt existing technologies and know-how and subsequently benefit from the latecomer advantage (Andersson & Axelsson, 2016). This theory of convergence, however does not hold in many countries in Sub-Saharan Africa and only a few in Latin America. There is ample empirical evidence on the importance of institutions (Acemoglu & Robinson, 2001) and the importance of geography for developing countries to be able to catch-up to the developed world (Gallup et al., 1998). Resource-poor countries in Asia have been using economic backwardness to create sustained economic growth, mostly through state-led industrialisation (Page, 2012). The key difference between Asia and Sub-Saharan Africa or Latin America's pathway to economic development is the utilisation of the industrial sector. Many countries in Asia have managed to create sustained economic growth through the industry sector, while in Sub-Saharan Africa the decreasing value-added in agriculture goes predominantly towards the service sector all the while Latin America suffers from premature de-industrialisation (Rodrik, 2016). Even though the service sector should not be neglected in importance, as the already large and increasing sector might create an alternative opportunity for economic growth in developing countries (Ghani & O'Connel, 2014), industrialisation is the pathway that so far has proven to lead to sustained economic growth, not just for Asia but additionally for the whole western world (Diao et al., 2017). Therefore, for long-term convergence, there is need for both structural change and other fundamentals including the development of institutions and human capital (Rodrik, 2014).

2.2.1 Structural Change

Traditionally, the manner of creating economic growth and subsequently convergence are predominantly based on structural change. Industrialisation in Sub-Saharan Africa has been underdeveloped, despite it seemingly taking off swiftly in the 1960s. However, this development did not persist after which Sub-Saharan Africa's industrialisation process has not recovered (Rodrik, 2014). This slight upturn in industrialisation after independence was driven by state investment and import substitution, which did not lead to sustained industrialisation in the long-run (Page, 2012). To the contrary, Latin America followed an industrialisation pattern, however, suffered from premature de-industrialisation (Rodrik, 2016).

The reason for the non-extractive industry sector to be seen as fundamental to economic growth is because labour can easily flow from low value-adding sectors the likes of agriculture into this high value-adding sector. Moreover, due to large differences in labour productivity across sectors, reallocation towards industry lead to firms becoming more productive and efficient (Page, 2012). Productivity is influenced by two specific structural characteristics, namely, diversity and sophistication of exports. According to Cadot et al. (2011) when countries show diversification in both its production and exports, they have higher incomes, and countries which export more highly sophisticated products tend to achieve higher economic growth **(**Hausmann et al., 2007). For the countries dependent on natural resources, this dependency was expected to stimulate economic growth, through state-led industrialisation, using revenues from resource exports (Page, 2012). However, this did not occur as the policies were instead focused on protectionist policies in terms of import substitutions and dependency on trade barriers, whereas export-led growth proved more successful, especially in countries located in Asia (Weiss, 2005). However, in Sub-Saharan Africa and Latin America, the pattern of structural change cannot be observed so far, instead many developing countries are moving from agriculture into services (Rodrik, 2016).

2.2.2 Latin America's and Africa's Growth Path

The world has become increasingly globalised, which provides the opportunity for specialisation according to comparative advantage (Heckscher & Ohlin, 1991, Rodrik, 2014). Therefore, countries which are rich endowed with natural resources are focusing on that specific sector for their income generation. However, since the natural resource sector is found to generate little employment due to its high capital-intensity, countries specialising on natural resource extraction tend to generate little positive externalities to economic growth as increasing the sector does not generate much additional labour (McMillan & Rodrik, 2011). This in contrary to the industry sector where with increasing growth, more and more labour is attracted, therefore creating positive externalities. Thus, while the latter enables structural transformation by moving labour to higher productive sectors, the former does not, meaning that productivity is not enhanced as much when focusing on natural resource extraction compared to a focus on industrialisation (Rodrik, 2016). Therefore, resource dependent economies generate minimal possibilities for structural transformation, as the scope is smaller for productivity enhancing structural change (McMillen & Harttgen, 2014).

Sub-Saharan Africa is the poorest region in the world, which makes it puzzling that the continent is far from benefiting from economic backwardness (Rodrik, 2014). Africa has a structural deficit, caused by its path dependence on high resource dependence together with de-industrialisation (Rodrik, 2014). While it can be debated that Africa's industrialisation has not yet started, its manufacturing sector currently is smaller and less diversified than it was around the 1970s (Page, 2012). Structural change in Africa in the past two decades has not been seen as responsible for stimulating economic growth, despite the continent recently showing growing economic development (Page, 2012). This recent growing development is instead mainly caused by booming commodity prices and an increasing inflow of FDI (Thorbecke & Ouyang, 2016).

Latin America is a different story than Sub-Saharan Africa as it has been industrialising in the past where it followed a commodity-export-led growth strategy and state-led industrialisation (Bértola & Ocampo, 2012). However, reinforced by premature de-industrialisation, the continent did not benefit from the two globalisation waves. Thus, Latin America came to lag further behind Western Europe and the rest of the world (Rodrik, 2014). It is argued that picking up the industrialisation strategy is vital in order for Latin American countries to create advantages of technical progress (Biellschowsky, 2016).

Following the preceding sections, the second hypothesis is:

Hypothesis 2 – Resource dependence is crowding out the industry sector

2.3 Renewable and Non-Renewable Resources

Two main categories of resources have been distinguished by Auty (2001), namely diffuse resources and point source resources. The former, which will be referred to in this paper as renewable resources, are products stemming from larger areas used by productive industries, such as agriculture, forestry and fisheries (Auty, 2001). The latter, referred to in this paper as non-renewable resources, are mostly taken from a 'narrow geographic and economic base' (Isham et al., 2005) and are exploited by extractive industries (Auty, 2001). These mainly refer to mining activities, such as metals or crude oil.

2.3.1 Agricultural Dependence

A large share of the population in poor countries is mostly reliant on subsistence agriculture. These inhabitants stem largely from rural areas (Collin, 2010) and subsequently, large shares of the labour force are occupied with either subsistence or cash crop farming (Johnston & Mellor, 1961). Despite agriculture making up a large share of economic activity and value-added in developing economies (Collin, 2010), this sector remains to show low productivity. Therefore, to develop a sustained growth path for developing economies, non-agricultural productivity growth is crucial (Rodrik, 2014; Collin, 2010). Additionally, the agricultural sector is the main sector to produce funds in order to expand the other sectors such as industry, therefore the agricultural sector is faced with the issue of 'secular decline', meaning that in order for the industry sector to develop, agriculture should grow in productivity (Johnston & Mellor, 1961). Nevertheless, agriculture is seen as the fundamental sector for economic development (Olajide et al., 2012), as it forms the basis of structural change.

Other things being equal, agricultural economies show lower economic performances compared to service-oriented- or industrialised economies (Gylfason, 2000). Moreover, exports are important for economic growth, consequently Sub-Saharan Africa benefits from its exports, even though these largely comprise of agricultural exports (Kwai Fosu, 1990). While non-agricultural exports are more beneficial for economic growth than agricultural exports, for poor economies these different types of exports do not have a significantly different elasticity (Sajuán-López & Dawson, 2010). Consequently, if a country is at the first stages of economic

development, whether it exports agricultural or non-agricultural products is unimportant, as both can be seen as an engine for growth (Sajuán-López & Dawson, 2010). Therefore, increasing agriculture productivity and cash crops for exports is vital to economic development in poorer regions that depend on agriculture for their livelihood. Especially agricultural exports are important for poor economies to increase income and foreign exchange earnings (Johnston & Mellor, 1961).

2.3.2 Point-Source Resources

Point-source resources refer mainly to concentrated and valuable resources, such as minerals, oil and diamonds (van der Ploeg, 2011). Many poor countries are still highly dependent on these as they make up a large share of their GDP. On average in the period 1995 – 2016 for Congo, Angola and Equatorial Guinea, the total GDP consisted of 42, 40 and 37 percent of point-source natural resources respectively (author's calculation based on World Bank, 2018). Due to the valuable nature of these point-source resources, they are prone to lead to unfavourable political economic situations. Since these types of resources are concentrated, extraction can easily be dominated by a small group (Ross, 2003). Furthermore, given that these resources are highly valuable, this incentivizes political leaders or influential groups to control the resource and can therefore prompt conflict (Hodler, 2006). This is additionally contributing to the trend that these resources increase corruption in a country (Leite & Weidmann, 1999).

2.4 Resource Curse Drivers

2.4.1 Institutions

Institutions and governance are important channels for the natural resource curse (Frankel, 2010). A good quality of institutions is fundamental to economic performance and key to growth (Acemoglu et al., 2001). While good institutions can prevent a resource curse, not many countries have been able to escape the resource curse despite having high-quality institutions in place (Collier & Goderis, 2009). However, according to Mehlum et al. (2006), whether the resource dependent countries are falling into the resource trap is based on their institutions either being 'grabber friendly' or 'producer friendly'. In the case of the former, the gains from specialisation flow towards low-productive activities not particularly contributing to economic growth, while the latter attract entrepreneurs into production, and might foster economic growth (Mehlum et al., 2006). Moreover, Mehlum et al. (2006) argue that rich countries with institutions that are of sufficient quality, reap fewer benefits from natural resources than poor countries with relatively weak institutions. Alexeev and Conrad (2009) contest this based on the GDP level of resource rich countries, arguing that industrialised countries with a similar GDP level have better institutions than resource-rich countries. Additionally, Torvik (2009) highlights that the resource curse can be offset with good institutional quality, the same results being found by Sarmidi et al. (2014), who observe a strong negative correlation between institutional quality and the effect of natural resources on economic growth. This has been proven by countries such as Norway and Canada.

Taking Norway as an example, at the time oil was discovered, it already had sound fundamentals with a stable democracy, low levels of corruption and a well-functioning state bureaucracy (Holden, 2013). Arguably due to these factors, the government was able to reap the benefits from the oil sector and use them to reinvest and strengthen the domestic economy (Holden, 2006). Therefore, it might be concluded that while endowments are important for economic growth, the political institutions have been essential in creating a channel between resource endowment and economic growth (Isham et al., 2005).

Resource rents are prominently important for the extent of the resource curse (Auty, 1993) relating to the 'rent cycling theory', where in case there are high resource rents in a country, the natural resources are politically competed for in order to take and maintain ownership, while if there are low resource rents the population has to be stimulated in order to create wealth by the government (Auty, 1993, Frankel, 2010). Therefore, resource rents are affluent to conflict, but also corruption and lowering institutional quality (Hodler, 2006), especially in non-democratic countries (Bhattacharya & Hodler, 2010). Additionally, in the case of high resource rents and easy access to the resources, there is an additional risk of conflict (Isham et al., 2005).

Moreover, resource booms might lead to political conflicts (Tornell & Lane, 1998) and in excessive cases to civil wars, as they incentives political leaders to compete in order to possess these specific resources. This can be disastrous for the economy as it destroys the rule of law and redirects funds from productive and socially constructive practices towards unproductive uses (Gylfason & Zoega, 2006). De Soysa (2000) found however, that the onset of civil war is predominantly affected by the level of non-renewable resources. Especially in cases of little government accountability, the revenues from resources are used by influential political players in order to advance their leadership (Collier & Goderis, 2009), which is specifically important in countries with valuable natural resources. Governments then may lose sight of creating wealth as the focus is more on extracting wealth from the ground (Gylfason, 2001).

2.4.1.2 Democracy

While empirical evidence is mixed on whether democracy is beneficial for economic growth (Barro, 1996), it has been suggested, that economic growth is beneficial for democracy (Frankel, 2010). Yet, natural resource dependence deters a democratic regime or the transition to a democratic regime as it incentivizes and strengthens the power of the leaders (Badeed et al., 2017). According to Ross (2001), resource dependency, especially based on minerals and oil, is negatively related to democracy. This is an empirically established link where resource endowment has a negative effect on the democratic accountability of governments (Ross, 2001). The reason is that autocratic leaders have fewer personal restraints towards using some sort of repression to ensure maintaining power. These autocratic leaders benefit from resource rents, instead of having to rely on revenues stemming from taxes, enabling them to reinforce their own position as it weakens 'public demand for democratic accountability' (McPherson, 2010). This indicates that resource wealth is highly important for democratic accountability (Badeed et al., 2017). Whether resources negatively correlate with democracy depends on the case of the difficulty a leader has to appropriate resource rents (Ross, 2012). Additional to institutions, linkages are an important channel for economic growth in rich-endowed countries

2.4.2 Linkages

The theory of economic linkages developed by Hirschman (1958), focuses on both forward and backward linkages and is a rather dynamic concept (Bloch & Owusu, 2012). According to Hirschman (1958), the theory comprises 'the linkage effects of a given product line as investment generating forces that are set in motion, through input-output relations, when productive facilities that supply inputs to that line or utilise its outputs are inadequate or non-existent. Backward linkages lead to new investment in input-supplying facilities and forward linkages to investment in output-using facilities (Hirschman, 1981, pp. 65)'. Decades later two linkages are added specifically for stable production, namely fiscal linkages regarding taxation and consumption linkages (Nelson & Behar, 2008).

Agricultural production affects other sectors and industries through multiple linkages, both upstream and downstream, as well as consumption linkages (Irz et al., 2001). These various linkages are highly affected by factors such as technical change, population density, tradability of output and infrastructure (Irz et al., 2001). Backward linkages focus on demand for the agricultural sector stemming from intermediate goods, while forward linkages are the supplies of the agricultural sector to the processing industry (Harris, 1987). Based on the transfer of resources flowing from agriculture to other sectors in the economy, an increase in agricultural output causes higher economic development. (Irz et al., 2001).

The commodities sector on the other hand usually uses lower-level technology, therefore little spill-overs exists to other sectors in the economy (Morris et al., 2012). Linkages for the extractive industries are either forward linkages such as the processing of resources or backward linkages which are the inputs for extractions (Figueiredo & Piana, 2016). However, given that commodity extraction is often referred to as having an enclave character and while Morris et al. (2012) argue that linkages can surge in the commodity sector, there are little existing linkages visible in resource dependent countries. This is mainly due to the fact that extractive industries have limited linkages to both domestic consumption and production as most extractive resources are exported raw (Stevens & Dietsche, 2008), therefore show little positive spill-overs to other sectors (Sachs & Warner, 1999; Hirschman, 1958; Baldwin, 1965). Consumption linkages in which the benefits from resource extraction are reinvested in the national economy stimulates economic development (Bloch & Owusu, 2012), however, due to poor institutions and high corruption more often than not this does not happen (Ross, 2001).

Based on the resource curse literature, stating the adverse effect non-renewable resources have on institutions and linkages, there might be a difference in type of resources for its effect on economic growth. Consequently, the following hypothesis will be:

Hypothesis 3 – Renewable resource dependence is less deterrent to economic growth than non-renewable resource dependence.

3. Data

3.1 Sample

This paper considers a sample of Sub-Saharan Africa and Latin America countries for the empirical analysis. These regions are chosen as most countries are largely lagging behind compared to the rest of the world, are relatively resource rich, and have little industrialisation. Subsequently, the countries that have overcome or avoided the resource curse, such as Norway or Canada, are not taken into consideration, as well as the oil states in the Middle East. The main reason for this sampling decision is the comparability of the countries located in Latin America and Sub-Saharan Africa, together with the diversity of the resource type. For example, including the Middle Eastern countries would create a high diversification of types of countries in the sample, in which the non-renewable resource dependent countries would predominantly be dependent on oil. Therefore, Latin American and Sub-Saharan countries are taken into consideration, in order to create a focus in the study. While this can be seen as cherry picking the countries in order to test the relationship, the results stemming from the analysis will be more specific. Subsequently, the results from analysing resource dependence on this sample might give different implications important for creating policies suited for this specific selection of countries.

The time period in the sample is 1995 – 2016. This time period is chosen both because of data availability and to determine the current effect of resource dependence, instead of the often-researched resource dependence in the years 1970 and 1980. This particular period was right after independence in Sub-Saharan Africa, known as the 'lost-decades', characterised by economic stagnation together with political instability (Bates et al., 2006). For Latin America, the same period was represented by economic crisis (Bértola & Ocampo, 2012). It is therefore perhaps unsurprising that previous studies found negative relationships of natural resources on economic growth in a time period of economic downturns. In the time period studied in this thesis, namely 1995-2016, Latin America and especially Sub-Saharan Africa have seen unprecedented growth rates, partly due to a commodity boom. As this has created a different economic environment compared to the economic circumstances in 1970 and 80s, it is highly relevant and interesting to analyse the effect of natural resources for this specific time period.

The total sample contains of 97 countries. Out of these 97 countries, some are dropped due to lack of data. Subsequently, the countries are tested for the extent of their resource dependence, identifying 63 resource dependent countries. The countries in the sample that are not resource dependent in Latin America are primarily small tourist islands and Mexico, while for Sub-Saharan Africa only Mauritius is dropped. Mauritius is an interesting case, given that while it is dropped in this analysis as it is according to the specification of Auty (1993) not resource dependent, in 1960 98 percent of its exports was sugar (Auty, 2017). Mauritius managed this shift through structural change by moving from a high dependence on a renewable resource to adopting policy driven export manufacturing, creating sustained economic growth through

export diversification (Auty, 2017). Table 1 shows the remaining countries in the sample. Since there are some missing data points, this panel dataset is unbalanced, showing a smaller number of observations in several cases, however, as these missing data points are distributed over the whole sample and not clustered around a couple countries, this will not be problematic, therefore there is no detected missing variable bias.

Moreover, all of the data is taken from reputable international data sources, yet the accuracy of the data cannot be fully guaranteed. This is a large limitation, as argued by Jerven (2013). He illustrates that the quality of the statistics depends on a country's system, which in poor countries might be inadequate. Consequently, he asserts that even a basic metric as GDP 'should not be treated as an objective number but rather as a number that is a product of a process in which a range of arbitrary and controversial assumptions are made'. Given that this research uses more specific data than GDP, as well as the fact that the world's poorest countries are included in the sample, this is a limitation. However, while acknowledging this reliability issue, there are no other options to improve the data reliability or to perform the regressions in a different way.

Table 1 - Resource Dependent Countries

Country	Years of Resource Dependence	Country	Years of Resource Dependence
Angola	1995 – 2016	Jamaica	1995 – 1999
Argentina	2002 – 2014	Kenya	1995 – 2016
Burundi	1995 – 2016	Liberia	1995, 1996, 2000, 2008, 2010 – 2016
Benin	1995 – 2016	Madagascar	1995 – 2007, 2009 - 2016
Burkina Faso	1995 – 2016	Mali	1995 – 2016
Belize	1995 – 2007, 2009 – 2016	Mozambique	1995 – 2016
Bolivia	1995 – 2016	Mauritania	1995 – 2016
Brazil	2003 – 2008, 2010 – 2013	Malawi	1995 – 2016
Botswana	2006 – 2009	Namibia	1995 – 2012, 2014 - 2016
Central African Republic	1995 – 2016	Niger	1995 – 2016
Chile	1995 – 2016	Nigeria	1995 – 2016
Côte d'Ivoire	1995 – 2016	Nicaragua	1995 – 2016
Cameroon	1995 – 2016	Peru	1995 – 2016
Democratic Republic of Congo	1995 – 2016	Paraguay	1995 – 2016
Congo	1995 – 2016	Rwanda	1995 – 2016
Colombia	1995 – 2016	Senegal	1995 – 2016
Comoros	1995 – 2005, 2008 – 2016	Sierra Leone	1995 – 1999, 2001 – 2016
Cabo Verde	1997, 1998, 2000, 2005 – 2007, 2009, 2012 – 2015	El Salvador	1995 – 1997
Costa Rica	1995 – 1998	Sao Tome and Principe[1]	2000 – 2016
Dominica	1995 – 2002, 2004 – 2009	Suriname	1995 – 2016
Ecuador	1995 – 2016	Eswatini	1995 – 2001, 2006, 2008 – 2010
Eritrea	1995 – 2002, 2004 – 2006, 2008, 2009, 2011	Chad	1995 – 2016
Ethiopia	1995 – 2016	Togo	1995 – 2016
Gabon	1995 – 2016	Trinidad and Tobago	1995 – 1996, 1998 – 2015
Ghana	1995 – 2016	Tanzania	1995 – 2016
Guinea	1995 – 2016	Uganda	1995 – 2016
Gambia	1995 – 2016	Uruguay	1995, 1996, 2003 – 2009, 2011, 2012
Guinea-Bissau	1995 – 2016	Venezuela	1995 – 2014
Equatorial Guinea	1995 – 1999, 2006 – 2016	South Africa	2007, 2008, 2010 – 2013
Guatemala	1995 – 2016	Zambia	1995 – 2016
Guyana	1995 – 2016	Zimbabwe	1995 – 2016
Honduras	1995 – 1998, 2006 – 2016		

[1] Missing data up to 2000

3.2 Measuring the Dependent Variable

The dependent variable in the first model is GDP per capita, used to measure economic growth. This GDP data is taken from the World Bank (2018) and expressed in constant 2010 US$ in order for it to be more comparable across countries. GDP per capita is used as it more accurately represents economic growth than total GDP as it takes population growth into consideration.

The dependent variable in the second model is manufacturing value-added as a measure to capture industrialisation. This value is measured in constant US$ and the industries belonging to this sector are based on the ISIC divisions 15-37 (World Bank, 2018), therefore it does not contain mining.

3.3 Measuring the Independent Variable

The various forms of resource dependence are expressed as resource exports as a share of GDP. Given that GDP is presented in constant 2010 US$ (World Bank, 2018) and resource exports are presented in annual US$, an inflation converter (World Bank, 2018) is taken into consideration in order to accurately calculate resource dependence.

To determine whether a country can be classified as resource dependent, the approach set out by Auty (1993) is used. A more common measure of assessing whether a country is resource dependent is determined by the IMF, which classifies a country as resource dependent in the case that at least 20 percent of a countries total exports are stemming from non-renewable natural resources (Venables, 2016, IMF, 2012). However, while being a more typical way to classify countries as resource dependent, this measurement only includes non-renewable natural resources. Since this paper focuses on both renewable and non-renewable resources, the approach established by Auty (1993) will be used. He argues that a country can be seen as resource dependent if 8 percent of total GDP and 40 percent of total exports are based on resources. Resource dependence as a share of GDP is determined using World Bank (2018) data, by adding the rents of oil, minerals, coal and gas as a share of GDP together with value-added in agriculture, forestry and fishing as a share of GDP. To determine natural resource exports, UNCTAD (2018) exports data is used. Following Auty (1993), the resource dependent countries for Latin America and Sub-Saharan Africa can be determined and classified based on the number of years the resource dependence holds. This resource dependence is calculated for each year and every country in Sub-Saharan Africa and Latin America. Table 1 shows the resource dependent countries and the years they were resource dependent out of the whole sample, which is a total of 63 countries. Subsequently, total resource dependence is measured as the total resource exports divided by the country's GDP.

For the model capturing the effect of resource dependence on industrialisation, the classification of exports by Lall (2000) is used, which only includes resources and fully excludes manufacturing. Given that some small parts of the extractive sector include industry, mostly in the form of processing, it is crucial that Lall's measure is used to accurately remove industry from the predictor variable, preventing potential endogeneity. This independent variable is

measured as exports in annual US$, therefore it is multiplied with an inflation factor, in order to accurately calculate this resource dependence as a share of GDP.

Furthermore, in order to test whether the resource curse differs for various types of commodities, a new categorisation is created in this paper. Different types of commodities are classified into multiple categories to enable testing whether there exists a measurable different effect of particular commodity categories on economic growth. While hypothesis 3 is focused on renewable and non-renewable resources, these are further divided into specific sub-categories. These sub-categories are more specific than either renewable or non-renewable, therefore contribute to the existing literature in a more precise manner.

UNCTAD (2018) provides highly specific export data for all sectors and sub-sectors, based on SITC coding, enabling the distinction between the different types of resources. These exports data are taken and classified into both renewable and non-renewable resources and their subcategories following SITC coding for each country and year. The total exports of each category then accrue to the overall natural resource exports of the corresponding country and year. Since the resource dependent countries have already been established previously, following Auty's (1993) classification, each country can be classified to be dependent on one of these specific categories of either renewable or non-renewable resources. This is done by creating a period average for the resource dependence of each classification for every single country. The decision of which country is dependent on which type of resource is made through examining each countries' highest relative categorical resource dependence share. This relative resource dependence share is calculated as the exports per category as a share of the total natural resources exports. Following, countries are being clustered by the resource category they have been most dependent on in the sample period. Appendix A shows the relative resource dependence share per country.

The specific categories, based on the SITC coding, are the following:

- Renewable resources:
    1. Food and beverages[2]
        2. Food basic[3]
        3. Coffee, tea, cocoa and spices[4]
        4. Beverages and tobacco[5]
    5. Agriculture raw materials[6]

[2] 1 = SITC 0 + 1 + 22 + 4 , this category includes live animals; meat and meat preparations; dairy products and birds' eggs; fish, crustaceans, molluscs and preparations thereof; cereals and cereal preparations; vegetables and fruits; sugar, sugar preparations and honey; coffee, tea, cocoa, spices; feedstuff for animals; miscellaneous edible products; beverages; tobacco; oil seeds and oleaginous fruits; animal and vegetable oils; fats and waxes; fixed vegetable oils and fats; crude; refined or fractionated; processed animal and vegetable oils and fats.
[3] 2 = SITC 0 + 22 + 4 less 07, this category is the same as category 1 without coffee, tea, cocoa and spices and beverages and tobacco.
[4] 3 = SITC 07, this category includes coffee, tea, cocoa and spices.
[5] 4 = SITC 1, this category includes beverages and tobacco.
[6] 5 = SITC 2 less 22, 27 and 28, this category includes hides, skins and fur skins, raw; crude rubber; cork and wood; pulp and waste paper; textiles fibres and their wastes; crude animal and vegetable materials.

- Non-renewable resources:
  6. Ores and metals[7]
  7. Mineral fuels, lubricants and related materials[8]
  8. Pearls, precious and semi-precious stones[9]

Category 2, 3 and 4 are sub-categories that in total sums up category 1. Table 2 shows which countries are dependent on which commodity category. There is a limitation to this approach, since sometimes a country is classified as being dependent on one resource, despite exporting another type of resource to a lower extent. However, this manner of clustering is the only way in order to distinguish categorical resource dependence. The categories are measured as exports in annual US$, however, in order to make them comparable and calculate exports as a share of GDP, inflation has to be taken into account, given that GDP is measured in constant 2010 US$. Out of the sample 26 countries are dependent on non-renewable resources, while 37 are dependent on renewable resources as can be seen in Table 2. Both Sub-Saharan African and Latin American countries are proportionally divided among the categories on which these are dependent.

Table 2 - Resource Dependent Countries per Category

Renewable Resources				**Non-Renewable Resources**		
Food, basic	**Coffee, tea, cocoa, spices**	**Beverages and Tobacco**	**Agricultural raw materials**	**Ores and metals**	**Mineral fuels, lubricants and related materials**	**Pearls, precious and semi-precious stones**
Argentina	Burundi	Malawi	Benin	Chile	Angola	Botswana
Belize	Côte d'Ivoire	Zimbabwe	Burkina Faso	Democratic Republic of Congo	Bolivia	Sierra Leone
Brazil	Comoros		Central African Republic	Guinea	Cameroon	
Cabo Verde	Ethiopia		Liberia	Jamaica	Congo	
Costa Rica	Ghana		Mali	Mozambique	Colombia	
Dominica	Kenya			Mauritania	Ecuador	
Eritrea	Rwanda			Niger	Gabon	
Gambia	El Salvador			Peru	Equatorial-Guinea	
Guinea-Bissau	Sao Tome and Principe			Suriname	Nigeria	
Guatemala	Uganda			Togo	Chad	
Guyana				South Africa	Trinidad and Tobago	
Honduras				Zambia	Venezuela	
Madagascar						
Namibia						
Nicaragua						
Paraguay						
Senegal						
Eswatini						
Tanzania						
Uruguay						

[7] 6 = SITC 27 + 28 + 68, this category includes crude fertilisers and crude minerals; metalliferous ores and metal scrap; non-ferrous metals (e.g. copper, aluminium, tin etc.)
[8] 7 = SITC 3, this category includes coal, coke and briquettes; petroleum, petroleum products and related materials; gas natural and manufactured; electric current
[9] 8 = SITC 667.

3.4 Control Variables

The control variables used in the analysis are derived from multiple scholars and are summarised in Table 3. It is crucial to carefully pick the control variables, especially in the case of GDP per capita as the dependent variable, given that a multitude of factors can have an influence here. The controls used are categorised according to demographic controls and trade controls, which are in accordance with controls used by Sachs and Warner (1995, 1999). Additionally, institutional variables are included following Isham et al. (2005).

First of all, various demographic controls are adopted in the model, namely population growth, life expectancy, human capital and agricultural land. Population growth is an important demographic control. While GDP per capita does take population growth into consideration it is one of the demographic factors highly influencing economic development, as high population growth slows down economic development (Wesley & Peterson, 2017). Population growth is taken from the World Bank (2018) and is measured as a percentage. Life expectancy is an important control as it often shows the stage of development of a country. There exists a clear link between growing life expectancy and economic development, as for example the human development index takes life expectancy complimentarily to growth. Therefore, life expectancy can be used as a proxy for the stage of development and is a relevant control on GDP per capita. Here it is measured as life expectancy at birth in total years, taken from World Bank (2018) data. Human capital is measured using the Penn World Tables (Feenstra et al., 2018) which is based on average years of schooling (Barro & Lee, 2013) and the return to education (Psacharopoulos, 1994). Human capital has a large positive influence on GDP per capita and is an essential control. Agricultural land is used as a control, which is especially important for renewable resources as these resources are highly dependent on the availability of agricultural land. This variable is measured as the share of land that is used for agriculture out of total land area, taken from the World Bank (2018).

Secondly, trade controls are added to the analysis given that trade indicators have a large influence on economic growth, as a positive environment facilitating trade is expected to have a positive effect on economic growth. Therefore, an essential control is trade openness. Trade openness measures total exports and imports as a percentage of GDP, and data is taken from the World Bank (2018). Moreover, it is argued that export diversification is beneficial for economic growth (Cadot et al., 2011) thus export diversification is used as a control. Export diversification data is taken from IMF (2017), where this measurement calculated using an extensive and intensive margin based on Theil indices, therefore higher values indicate lower export diversification. Additionally, manufacturing value-added (World Bank, 2018) is used as a proxy for industrialisation. Lastly, commodity prices are taken into consideration, as price volatility might influence the timing of export and production of renewable resources. IMF (2018) documents commodity prices as an index, specifying different commodity groups based on the SITC coding. In the model where total resource dependence is the independent variable, the overall commodity price index is used, whereas in the case the categorical resource dependence is measured, price volatility is also split up into the same categories as the categories for resource dependence

Subsequently, institutional controls are included in the model. Three controls for institutional quality are used, given that institutional quality cannot be measured as such. Democracy, corruption and rule of law are used as proxies to give an indication of institutional quality. Democracy is measured using data from OWID (2018), which classifies political regime from full democracy to autocracy and gives these values ranging from -10 for a full autocracy and 10 for a full democracy. According to this measure, a country can be seen as a democracy if the value is higher than 5, therefore a dummy is created to control for democracy instead of regime. Corruption and rule of laws are additional controls for political regime and governance. These are taken from Worldwide Governance Indicators and have a value between -2.5 and 2.5. Corruption 'reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests' (WGI, 2018). Rule of law reflects 'perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence' (WGI, 2018).

Table 3 shows the descriptive statistics included in the analysis. For the models the log ratios of GDP per capita, exports and manufacturing value added are used. This has been done as it gives a smoother distribution of the data (Hill et al., 2012). However, given that these logged values would not give any indication of the data, the actual values are reported instead.

Table 3 - Summary Statistics

	Mean	Std. Dev.	Minimum	Maximum
GDP per capita	5,155.12	6,633.32	170.58	42491.45
Exports Resource Dependence	5,696,490	1.60e+7	0	1.67e+8
Exports Lall	3,825,932	1.13e+7	0	1.15e+8
Exports Food, basic	1,310,576	5,473,007	0	7.27e+7
Exports, Coffee, tea, cocoa, spices	217,495.6	694,035.3	0	9455276
Exports Beverages and Tobacco	133,257	445,530.4	0	5879454
Exports Agricultural raw materials	236,033.1	771,678.2	0	1.02e+7
Exports Ores and metals	1,017,861	4,488,141	0	5.10e+7
Exports Mineral fuels	2,467,740	9,599,428	0	1.19e+8
Exports Pearls & precious stones	108,246.2	498,854.9	0	6625508
Manufacturing value added	1.13e+10	3.96e+10	6753827	2.89e+11
Agricultural land	40.12	21.62	0.45	85.49
Population Growth	1.92	1.21	-4.08	7.85
Life expectancy	63.15	10.24	31.98	82.19
Export Diversification Index	3.83	1.16	0	6.33
Trade	78.95	51.12	14.77	860.8
Commodity Price Index	102.97	44.67	48.04	182.70
Democracy	0.33	0.47	0	1
Corruption	-0.30	0.80	-1.87	1.72
Rule of Law	-0.40	0.81	-2.61	1.67
Human Capital	1.99	0.54	1.05	3.53

4. Methodology

This study performs multiple analyses to test all three hypotheses. First, the base model of economic growth is tested in order to establish the relationship between natural resources and economic growth as stated in hypothesis 1. Subsequently, a similar model tests hypothesis 2 through the relationship between natural resources and industrialisation. Next, the model of economic growth is used to test the effect of different types of commodities on economic growth, in order to examine hypothesis 3.

4.1 Empirical Model

4.1.1 Economic Growth

The model to test hypothesis 1 over the effect of resource dependence on economic growth is the following:

(1) $$ECONOMIC\ GROWTH_{it} = \beta_0 + \beta_1 RESDEP_{it} + \sum \beta^k x_{it}^k + \mu_i + \mu_t + \varepsilon$$

In this model, ECONOMIC GROWTH is determined by GDP per capita, β_0 is the constant, resource dependence is measured by RESDEP and $\sum \beta^k x_t^k$ are the control variables, including demographic variables such as agricultural land, industry, population growth, life expectancy and human capital, trade variables such as export diversification, trade openness and commodity prices and institutional variables such as democracy, corruption, rule of law. μ_i and μ_t are both country and year fixed effects. This model is based on panel data of 63 countries (*i*) over 23 years (*t*).

The base model to use is the ordinary least square model, however, this model has many limitations including the limited manner of including the panel data (Hill et al., 2011). Therefore, the fixed effect model is used to control for unobserved variables that could have an effect (Hill et al., 2011). Next to the fixed effects model another option would be to use the random effects model. In the random effects model time-invariant variables are acknowledged as explanatory variables due to the assumption of uncorrelated predictors with the entity's error term (Hill et al., 2011). The Hausman test was used to test whether to apply the fixed or random effects model and indicated to use the fixed effect model. Additionally, heteroscedasticity was tested and present, which led to the need for using robust standard errors in the model.

4.1.2 Industrialisation

The following model tests hypothesis 2 to examine the effect of resource dependence on industrialisation.

(2) $$INDUSTRY_{it} = \beta_0 + \beta_1 RESDEP(Lall)_{it} + \sum \beta^k x_{it}^k + \mu_i + \mu_t + \varepsilon$$

In this model, INDUSTRY as determined by manufacturing value added is used to measure the extent of industrialisation. RESDEP (Lall) refers to resource dependence according to the Lall (2000) classification. Similarly, to the previous model, the Hausman test indicated to use fixed effects. The variable industry only includes the non-extractive industries, while resource dependence fully excludes this industry in order to make sure there is no endogeneity.

4.2 Renewable and Non-Renewable Resources

In order to test whether various types of commodities have a different effect on economic growth, resource dependence is classified into multiple categories. These different categories are tested in the model in two different ways, first by clustering the countries based on the previously distinguished categories of resource dependence and running separate regressions for each of these categories. Second, by measuring the effect of these categories in separate regressions, however, while including all countries. Hereby both country and year fixed effects are used, as well as robust standard errors and the full set of controls as in the previous two models. Multiple scholars point towards the difference of diffuse and point-source resources in their effect on economic growth (e.g. Van der Ploeg, 2012; Isham et al., 2005; Leite & Weidmann, 1999). While the previously mentioned scholars point towards this difference, they use different specifications for categories of resource dependence and furthermore their analyses are not along the lines of the original model of Sachs and Warner (1999) and instead mainly focus on institutions. Additionally, the time period studied in those papers are similar to the original Sachs and Warner study, whereas this research tests the relationship in a different economic environment. Consequently, the specific categories tested over this time period has not been applied in previous literature.

In order to test hypothesis 3 and analyse whether there is a substantially different effect between renewable and non-renewable resources on economic growth, the countries are clustered based on the categorical resource dependence as shown previously in Table 2. This way total resource dependence is calculated, but the categories are measured on a country level, therefore predicting the specific effect of each commodity category on economic growth. The model looks the same as equation 1, however, it is measured per specific category. Additionally, the categorical commodity price volatility is taken into account. This is especially important, as for example prices for oil might have a higher volatility than prices for coffee, which is not reflected in the overall price volatility index. Therefore, this is an essential and accurate control for this model.
Subsequently, while the different categories show the specific and detailed effect on economic growth per sector, in order to fully test hypothesis 3, these classifications need to be summed up according to renewable and non-renewable resources specifications as shown in Table 2. Therefore, the same model as before will be tested, but instead of the specific categories renewable and non-renewable resource dependence will be included.

Second, an additional test will be performed to analyse the specific effect of the type of resources. In this regression, the countries are not clustered per type of commodity. This way

only the categorical resource is measured for the full set of resource dependent. Therefore, it does not take into account whether the country is dependent on the specific resource, only what kind of effect the type of resource has on economic growth. Again, the model looks the same as equation 1, however, instead of taking total resource dependence it measures the categorical resource, to address for the difference in a country's extend of categorical resource dependence. This model takes the categorical commodity price volatility into consideration as well.

4.3 Expected Relationships

The expected sign for resource dependence in all variant forms on industrialisation and economic growth is hypothesised to be negative, following the model of Sachs and Warner. However, due to the commodity boom that is included in the time period, this expected relationship might be contradicting. Subsequently, it is expected that renewable resources have a less negative effect on economic growth than non-renewable resources, but only in the cases where a country is dependent on that specific resource. This is due to non-renewable resources making a country prone to corruption and showing little linkages to the rest of the economy, therefore having little positive spill-over effects. These little linkages cause the non-renewable resource sector to be largely affected by growth spurts, but also highly vulnerable to shrinking. Without taking resource dependence into consideration, renewable resources are expected to have a positive effect on economic growth.

Table 4 exhibits the expected relationships for all variables used in the model, according to literature and the linkages described in section 3.4. In short, the trade controls are expected to have a positive effect on both economic growth and industrialisation. The institutional factors are expected to have an ambiguous effect for democracy, negative for corruption and positive for rule of law. Commodity prices are also expected to be ambiguous as these are volatile and are dependent on the specific commodities whether they would have a positive or negative effect on economic growth.

Table 4 - Expected Relationship

Variable	Economic Growth	Industrialisation
Exports resource Dependence		-
Exports Lall	-	
Exports food, basic		-
Exports coffee, tea, cocoa, spices		-
Exports beverages and tobacco		-
Exports agricultural raw materials		-
Exports ores and metals		-
Exports mineral fuels		-
Exports pearls & precious stones		-
Manufacturing value added		+
Agricultural land	-	-
Population growth	+	+
Life expectancy	+	+/-
Export diversification index	+	+
Trade	+	+
Commodity price index	+/-	
Democracy	+/-	+/-
Corruption	-	+/-
Rule of law	+	+/-
Human capital	+	+

5. Empirical Analysis

This section analyses the results stemming from the regressions, in order to test the hypotheses. First, the data preparation is discussed, based on tests for normality, heteroscedasticity, multicollinearity and outliers. Subsequently, the results are stated followed by the interpretation and the discussion of the results. Additionally, two small case studies are included after the discussion, given that these create interesting implications with regards to the results.

5.1 Results

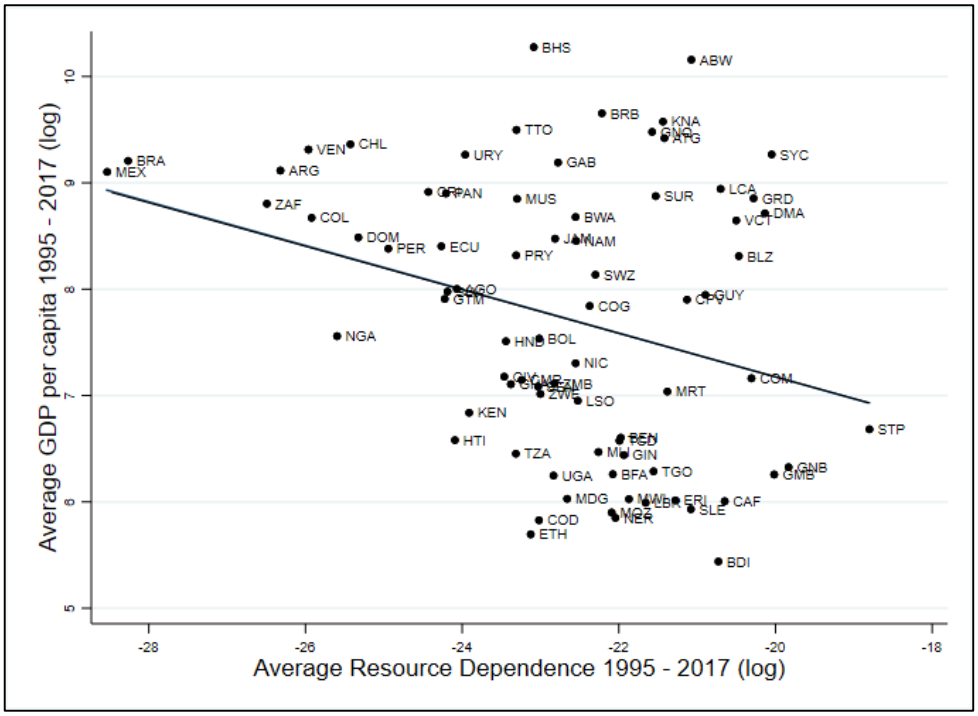

Figure 2 - Scatterplot Resource Dependence and GDP per capita

5.1.1 Data Preparation

In order to run the regressions testing the hypotheses, there are a number of tests to run on the dependent variables, independent variable and control variables. First, the dependent variable GDP per capita and Industry are tested based on normality and heteroscedasticity. Using the Jarque Bera test the assumption of normality cannot be rejected for both GDP and Industry with respectively $\rho = .0000$ and $\rho = .0001$. Heteroscedasticity is tested using the Breusch-Pagan test with GDP per capita and Industry having a low ρ-value, namely $\rho = .0169$ and $\rho = .0766$ respectively. For GDP per capita, the data appears to be heteroskedastic, thus robust standard errors will be used. For Industry, the assumption that the variance of the residuals is homogenous (Hill et al., 2012) cannot be rejected, therefore there is no need for robust standard errors. Multicollinearity is tested, based on a correlation matrix and variation inflation factors (VIF), where life expectancy in both models has a high VIF (Appendix B), therefore it is excluded from the models. Lastly, there are a few data points that are clear outliers and might

skew the results, therefore these are excluded from the model. These are observations for different countries over different years, thus, excluding these observations does not create any bias in the model.

There is a possible endogeneity and reverse causality problem present in the model, in such a way that economic growth influences resource dependence instead of the other way around and that there might be a correlation between resource dependence and the error term (Hill et al., 2012). However, while this might skew the results, following the approach set out by Sachs and Warner (1999), this is not taken into consideration in the upcoming model.

5.1.2. Results Economic Growth

Hypothesis 1 is tested by using a regression of total resource dependence on economic growth. These results are given in Table 5. The first model shows the basic relationship between resource dependence and economic growth, not controlling for any other factors. Model two adds demographic controls, model three adds sectoral controls, model four adds trade controls and lastly model five adds institutional controls, therefore shows the full model. The relationship between resource dependence and economic growth is significant and negative. While the effect diminishes after including multiple controls, the significance remains the same. Moderately surprising, these results are in line with Sachs and Warner (1999), as there is a strong negative effect in which an increase of resource dependence with 1 percent decreases GDP per capita by 0.32 percent, as shown in model 5. Therefore, hypothesis 1 can be confirmed. Moreover, even though the effect of resource dependence on economic growth is both negative and significant at the 1 percent level, the effect is less strong in Latin America than it is in Sub-Saharan Africa.

There is a positive significant effect of trade openness, export diversification and rule of law on economic growth. Thus, an increase in trade openness and export diversification increases economic growth as it fosters trade. For example, increasing trade openness with 1 percent increases GDP per capita with 0.117 percent. The same goes for rule of law as a higher quality rule of law fosters more confidence in a country, therefore more investments (Staats & Biglaiser, 2012). For Latin America, there is an additional significant positive effect of population growth, agricultural land and manufacturing. The overall predictive power of the full model is stronger in Latin America compared to Sub-Saharan Africa as indicated by R^2, therefore in Sub-Saharan Africa there might be more additional factors explaining GDP per capita than indicated in the model in comparison to Latin America. However, for both the predictive power is relatively high. All in all, based on the results it can be confidently stated that resource dependence has a negative effect on economic growth.

Table 5 - Effect of Resource Dependence on Economic Growth

	Dependent Variable: GDP per capita						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1	2	3	4	Full Model	LA	SSA
Resource Dependence	-0.432***	-0.410***	-0.351***	-0.338***	-0.322***	-0.123***	-0.392***
	(0.0136)	(0.0150)	(0.0162)	(0.0161)	(0.0610)	(0.0178)	(0.0205)
Population Growth		-0.0125*	-0.0150**	-0.00333	0.000351	0.0795***	0.00808
		(0.00712)	(0.00745)	(0.00741)	(0.0198)	(0.0173)	(0.00955)
Human Capital		0.103***	-0.0356	-0.00674	0.0274	-0.0253	-0.0857
		(0.0384)	(0.0397)	(0.0434)	(0.132)	(0.0408)	(0.0650)
Agricultural Land			0.00100	0.00193	6.66e-05	0.00227*	0.00165
			(0.00135)	(0.00137)	(0.00306)	(0.00128)	(0.00199)
Manufacturing			0.0715***	0.0648***	0.00871	0.306***	0.0114
			(0.0139)	(0.0139)	(0.0810)	(0.0252)	(0.0181)
Commodity Price Index			-0.00300***	-0.000326	0.000540	0.00169***	-0.000248
			(0.000762)	(0.000277)	(0.000700)	(0.000222)	(0.000400)
Trade Openness				0.000989***	0.00117**	-0.000348	0.000914***
				(0.000244)	(0.000510)	(0.000290)	(0.000325)
Export Diversification				0.0323***	0.0337***	0.0844***	0.0306***
				(0.00471)	(0.00769)	(0.00792)	(0.00552)
Democracy					-0.0190	0.00598	0.0104
					(0.0303)	(0.0128)	(0.0200)
Corruption					0.0386	-0.0371**	0.0138
					(0.0324)	(0.0159)	(0.0242)
Rule of Law					0.122***	0.115***	0.174***
					(0.0349)	(0.0140)	(0.0238)
Constant	-2.381***	-2.206***	-1.926***	-1.898***	-0.342	-2.012***	-2.111***
	(0.303)	(0.355)	(0.360)	(0.397)	(1.678)	(0.496)	(0.553)
n	1,418	1,177	982	875	796	321	475
R^2	0.681	0.726	0.756	0.738	0.762	0.930	0.765

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
LA stands for Latin America and SSA stands for Sub-Saharan Africa.

5.1.3 Results Industrialisation

Hypothesis 2 is tested using a regression of resource dependence and industry as shown in Table 6. Using only the dependent and independent variable, resource dependence shows a significant negative effect on industry, however, adding demographic controls (model 2), trade controls (model 3) and institutional controls (model 4) causes the significance to vanish. Therefore, using the full sample hypothesis 2 cannot be confirmed. However, this is only for the full model (model 4) using the full sample. When splitting the sample up in regions it shows that the effect for Latin America becomes positive and significant, while for Sub-Saharan Africa the effect remains insignificant. Therefore hypothesis 2 can be rejected when focusing on the region Latin America, while no supporting evidence was found for Sub-Saharan Africa. For Latin America, resource dependence does not necessarily crowd out the industry sector as an increase in resource dependence by 1 percent increases industry by 0.075 percent, which is relatively small. Agricultural land, trade openness and rule of law have a significant negative effect, while human capital, democracy and corruption have a positive effect on industrialisation. The difference between both regions might be due to the fact that the industry sector is more prevalent in Latin America than in Sub-Saharan Africa. Consequently, while industrialisation

is important for economic growth, it cannot be concluded that resource dependence has a significant negative effect on industrialisation according to this analysis.

Table 6 – Effect of Resource Dependence on Industrialisation

	Dependent Variable: Industry					
	(1)	(2)	(3)	(4) Full Controls	(5) Latin America	(6) Sub-Saharan Africa
Resource Dependence (Lall)	-0.0411** (0.0187)	-0.00410 (0.0179)	0.0178 (0.0195)	-0.0174 (0.0196)	0.0749*** (0.0261)	0.00130 (0.0262)
GDP per capita Growth		-0.000182 (0.00173)	0.000475 (0.00183)	-0.00154 (0.00188)	0.00223 (0.00228)	-0.00125 (0.00250)
Population Growth		0.0149 (0.0184)	-0.00235 (0.0197)	0.0133 (0.0213)	-0.0516 (0.0476)	0.00230 (0.0274)
Human Capital		0.240** (0.0995)	0.216* (0.116)	0.353*** (0.118)	0.0500 (0.124)	0.601*** (0.181)
Agricultural Land		-0.0171*** (0.00321)	-0.0161*** (0.00347)	-0.0157*** (0.00355)	0.00174 (0.00357)	-0.0216*** (0.00525)
Trade Openness			-0.00168*** (0.000648)	-0.00122* (0.000649)	-6.47e-05 (0.000808)	-0.00137 (0.000869)
Export Diversification			-0.0251** (0.0127)	-0.0113 (0.0128)	-0.195*** (0.0229)	0.00540 (0.0158)
Democracy				0.0716** (0.0354)	0.108*** (0.0352)	-0.0324 (0.0515)
Rule of Law				-0.0989** (0.0436)	-0.00237 (0.0397)	-0.224*** (0.0672)
Corruption				0.0960** (0.0441)	0.0699 (0.0452)	0.150** (0.0641)
Constant	1.999*** (0.177)	2.660*** (0.299)	3.119*** (0.360)	2.354*** (0.376)	3.901*** (0.518)	2.313*** (0.508)
n	1,295	1,050	933	850	321	529
R^2	0.047	0.097	0.094	0.118	0.448	0.153

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5.1.4 Results Renewable and Non-Renewable Resources Effect

Hypothesis 3 is tested in two ways. Table 7 shows the results when countries are clustered based on their resource dependence per category as explained in Table 2. Category 4 (Beverages & Tobacco) and category 8 (Pearls, precious and semi-precious stones) cannot be tested due to limited observations. The results indicate that no matter which resource a country is dependent on, if a country is resource dependent it has a negative effect for economic growth. This goes for the whole food and beverage sector in total, but specifically for the basic food category. Being dependent on that category has a significantly negative effect on economic growth. The same goes for being dependent on agricultural raw materials and mineral fuels. According to hypothesis 3, renewable resources are less detriment for economic growth than non-renewable resources. These results give an indication towards confirming hypothesis 3, as is explained through the following numerical example. Being dependent on the renewable resource sector of food and beverages, an increase in resource dependence in this sector by 1 percent leads to a decrease in GDP per capita of 0.150 percent. For agricultural raw materials a similar effect is

visible, where an increase in resource dependence in this sector by 1 percent leads to a decrease in GDP by 0.267 percent. As hypothesis 3 predicts, renewable resource dependence is detrimental for economic growth, but less so than non-renewable resource dependence. Being dependent on mineral fuels has the largest negative effect on economic growth, namely increasing the dependence in this sector by 1 percent leads to a decrease in GDP per capita by 0.683. The results hold up when splitting the sample up per region (Appendix C) where additionally for Latin America the category ores and metals has a negative effect with a correlation of -0.336 at the 1 percent significance level. For Sub-Saharan Africa, this is not the case, however, the negative correlation between mineral fuels and GDP per capita is large, namely -0.886.

Table 7 - Effect of Renewable and Non-Renewable Resources on Economic Growth, countries clustered by category

	Dependent Variable: GDP per capita					
	Renewable Resources				Non-Renewable Resources	
	(1) Food & Beverages	(2) Food, basic	(3) Coffee, Tea, Cocoa & Spices	(4) Agricultural Raw Materials	(5) Ores and Metals	(6) Mineral Fuels
Resource Dependence	-0.150***	-0.117***	-0.158	-0.267*	-0.118	-0.683***
	(0.0376)	(0.0327)	(0.111)	(0.0943)	(0.116)	(0.121)
Population Growth	-0.0461	0.00624	-0.0194	0.0771	0.0458	-0.129
	(0.0349)	(0.0232)	(0.0252)	(0.0483)	(0.0838)	(0.0724)
Human Capital	-0.107	0.00273	-0.170	0.219	0.0844	0.301
	(0.208)	(0.112)	(0.383)	(0.657)	(0.136)	(0.199)
Agricultural Land	-0.00256	0.00155	-0.00978*	0.00604	-0.00346	-0.000587
	(0.00295)	(0.00371)	(0.00480)	(0.0139)	(0.00924)	(0.00348)
Manufacturing	0.316***	0.201**	0.362***	0.179	0.188***	-0.0635
	(0.0582)	(0.0688)	(0.0409)	(0.153)	(0.0487)	(0.0516)
Commodity Price Index	0.000554	0.00147*	0.000887	-0.000191	0.00119*	-0.00311*
	(0.000886)	(0.000789)	(0.00115)	(0.00157)	(0.000559)	(0.00140)
Trade Openness	-0.000443	5.86e-05	0.00164**	-0.000740	0.00207	0.00156**
	(0.000417)	(0.000359)	(0.000627)	(0.000885)	(0.00111)	(0.000587)
Export Diversification	0.00860	0.0229*	-0.00979	-0.00626	0.0242	0.0746**
	(0.0146)	(0.0120)	(0.0157)	(0.0317)	(0.0469)	(0.0300)
Democracy	-0.0743***		-0.0760***	-0.111	0.0622	0.0338
	(0.0131)		(0.0173)	(0.140)	(0.0363)	(0.0518)
Corruption	0.0503*	0.0193	0.0528	-0.0250	0.00469	0.00556
	(0.0246)	(0.0520)	(0.0340)	(0.0872)	(0.0866)	(0.0584)
Rule of Law	0.110**	0.129**	0.00359	0.174	0.289*	0.0657
	(0.0465)	(0.0472)	(0.0460)	(0.119)	(0.137)	(0.0574)
Constant	-2.161	0.658	-3.606	-3.391	0.283	-7.297*
	(1.442)	(1.407)	(1.879)	(2.612)	(2.542)	(3.378)
n	385	255	92	68	142	163
i	23	14	7	4	8	9
R^2	0.871	0.886	0.977	0.818	0.875	0.911

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note: The Democracy variable is missing in model 2. Additionally, every model has a different number of countries, as specified in Table 2.

Additionally, Table 8 shows the regression performed in order to fully test hypothesis 3 based on renewable and non-renewable resource dependence. As shown in table 8 both renewable and non-renewable resource dependence have a negative effect on economic growth. Given that the

size of the coefficient of renewable resource dependence is smaller than the coefficient of non-renewable resource dependence, it can be indicated that renewable resources are less detrimental for economic growth than non-renewable resources. However, in order to confidently confirm hypothesis 3, an additional test needs to be performed to analyse whether the results are significantly different from each other. A t-test is performed to compare the coefficients of renewable and non-renewable resource dependence. This test indicates at the 1 percent significance level ($\rho = .0001$) that renewable resource dependence is statistically different than non-renewable resource dependence, hence increasing renewable resource dependence does not have the same effect as increasing non-renewable resource dependence. Therefore, largely in line with van der Ploeg (2011), Isham et al. (2005) and Leite and Weidmann (1999), non-renewable resources have a more harmful effect on economic growth than renewable resources.

Table 8 - Effect of Renewable and Non-Renewable Resources on Economic Growth, Countries Clustered per Category

	Dependent Variable: GDP per capita
	Full Model, Robust Standard Errors
Renewable Resource Dependence	-0.157***
	(0.033)
Non-Renewable Resource Dependence	-0.313***
	(0.065)
Population Growth	-0.003
	(0.019)
Human Capital	0.006
	(0.132)
Agricultural Land	0.001
	(0.003)
Manufacturing	-0.000
	(0.079)
Commodity Price Volatility	0.001
	(0.001)
Trade Openness	0.001*
	(0.001)
Export Diversification	0.032***
	(0.008)
Democracy	-0.027
	(0.032)
Corruption	0.034
	(0.034)
Rule of Law	0.125***
	(0.041)
Constant	0.331
	(1.664)
n	796
R^2	0.752

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Lastly, Table 9 does not cluster the countries per category, but shows the effect of the specific resource on economic growth not taking into consideration whether a country is necessarily dependent on that specific resource. Besides the renewable resource food that has a significant positive effect on GDP per capita, all other results are insignificant. In comparison with the previous model the difference is that resource dependence is not taken into consideration. Subsequently, if a country exports products out of the category basic foods it has a positive effect on economic growth as shown in Table 9. This effect only grows negative in case a country is dependent on this resource. Moreover, all other results are insignificant. Thus, comparing these results with Table 7, it can be concluded that resources, both renewable and non-renewable resources themselves are not necessarily detrimental for a country's economic growth and rather that resource dependency is the culprit.

All in all, hypothesis 3 can be confirmed, given that the results largely indicate a more deteriorating effect for non-renewable resource dependence on economic growth than renewable resources.

Table 9 - The Effect of Renewable and Non-Renewable Resources on Economic Growth

	(1) Food & Beverages	(2) Food, basic	(3) Coffee, Tea, Cocoa & Spices	(4) Tobacco & Beverages	(5) Agricultural Raw Materials	(6) Ores and Metals	(7) Mineral Fuels	(8) Precious Metals
Resource Dependence	-0.00318	0.0228*	-0.0115	0.00903	-0.0130	0.00839	0.000865	2.41e-05
	(0.0218)	(0.0115)	(0.0117)	(0.0101)	(0.0136)	(0.00761)	(0.00591)	(0.00535)
Population Growth	-0.00850	-0.00770	-0.00424	-0.0147	-0.00631	-0.00923	-0.0109	-0.00871
	(0.0297)	(0.0301)	(0.0309)	(0.0259)	(0.0296)	(0.0301)	(0.0317)	(0.0295)
Human Capital	-0.103	-0.129	-0.102	-0.116	-0.105	-0.0953	-0.106	-0.120
	(0.179)	(0.184)	(0.183)	(0.181)	(0.188)	(0.186)	(0.186)	(0.198)
Agricultural Land	0.00545	0.00406	0.00556	0.00532	0.00594*	0.00444	0.00537	0.00493
	(0.00360)	(0.00323)	(0.00340)	(0.00340)	(0.00328)	(0.00347)	(0.00335)	(0.00328)
Manufacturing	0.0870	0.0891	0.0921	0.0774	0.0842	0.0841	0.0871	0.0863
	(0.119)	(0.121)	(0.116)	(0.121)	(0.120)	(0.121)	(0.121)	(0.132)
Commodity Price Index	0.00667***	0.00667***	0.00692***	0.00699***	0.0156***	0.00288**	0.00177***	
	(0.00237)	(0.00240)	(0.00245)	(0.00251)	(0.00562)	(0.00109)	(0.000641)	
Trade Openness	0.000901	0.000756	0.000930	0.000875	0.000943	0.000796	0.000874	0.000750
	(0.000964)	(0.000942)	(0.000911)	(0.000956)	(0.000952)	(0.000909)	(0.000911)	(0.000953)
Export Diversification	0.0266***	0.0284***	0.0266***	0.0257***	0.0263***	0.0276***	0.0266***	0.0266***
	(0.00881)	(0.00915)	(0.00882)	(0.00863)	(0.00875)	(0.00922)	(0.00896)	(0.00893)
Democracy	-0.0446	-0.0483	-0.0449	-0.0436	-0.0409	-0.0474	-0.0449	-0.0422
	(0.0476)	(0.0480)	(0.0469)	(0.0479)	(0.0484)	(0.0486)	(0.0483)	(0.0519)
Corruption	0.0523	0.0338	0.0509	0.0466	0.0534	0.0513	0.0508	0.0560
	(0.0474)	(0.0485)	(0.0491)	(0.0512)	(0.0492)	(0.0484)	(0.0484)	(0.0538)
Rule of Law	0.148**	0.143**	0.149***	0.142**	0.148**	0.148**	0.149**	0.147**
	(0.0573)	(0.0580)	(0.0554)	(0.0574)	(0.0560)	(0.0577)	(0.0591)	(0.0617)
Constant	5.017**	5.342**	4.800**	5.433**	3.964*	5.621**	5.490**	5.604*
	(2.241)	(2.477)	(2.287)	(2.417)	(2.184)	(2.595)	(2.603)	(2.941)
n	796	796	796	789	794	796	795	732
i	46	46	46	46	46	46	46	46
R^2	0.630	0.634	0.632	0.628	0.631	0.632	0.630	0.625

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5.1.5 Robustness tests

Multiple robustness tests are performed in order to assess the reliability of the results. First of all, an interaction term with categorical commodity price volatility and categorical resource dependence is used in order to provide a more nuanced view on the effect of resource dependence on economic growth. The interaction is used as the time period studied includes a commodity boom, therefore, it is an important factor to give some special attention to. Especially for hypothesis 3, price volatility plays a crucial role, since the index of overall, accrued commodity price volatility is likely not severely affected by specific fluctuations of any one of the commodity types. Therefore, this robustness test interacts resource dependence and commodity price volatility which will only be performed for hypothesis 3, given that this is the only model where specific commodity price volatility can be taken into account for the different commodity categories. The results of this robustness test indicate robust results, given that overall the main results stay significant and negative. This is shown in Appendix D, Table 18.

Second, in the previous regressions, the sample contains only resource dependent countries, which can be seen as cherry picking the sample in order to create favourable results. Therefore, a robustness test with the whole sample is used. Unfortunately, this is not possible for the different resource categories applied for hypothesis 3, as these are based on resource dependency. For the model testing hypothesis 1, the results do not significantly differ aside from a slight change in size of the coefficients (Appendix D, Table 19), indicating that the results are robust. However, for the model testing hypothesis 2, the results for the full model become significant and negative (Appendix D, Table 20). This would indicate that resource dependence does crowd out the industry sector when taking into account those countries that are not resource dependent. The reason for this change in results due to the difference in sampling might be that most resource dependent countries have not yet showed much industrialisation. Therefore, the non-extractive industry sector in these resource dependent countries might be too underdeveloped in order to be crowded out by resources.

Third, a robustness test is performed using a complementary indicator of human development. Therefore, instead of having GDP per capita as the dependent variable, life expectancy is used as a different proxy for human development. According to the human development indicator, development is based on life expectancy, human capital and income; therefore, it would be interesting to assess whether the results hold when an alternative measure of human development other than GDP per capita is used. These results can be seen in Appendix D, Table 21 and 22, indicating that with an alternative measure of development, life expectancy, the results mainly hold. Testing the effect of natural resource dependence on life expectancy indicates for the full model, that an increase of resource dependence with 1 percent, lowers life expectancy by 1.45 years as shown in Table 21. This means that not only does resource dependence lead to lower overall economic output. Furthermore, potentially through its effect on GDP, does it have negative implications for human development in general. Thus overall, one may conclude that countries that are more resource dependent seem to be generally, and not solely economically, less developed than their non-resource dependent counterparts.

5.2 Discussion

The established negative relationship between natural resource dependence and economic growth has multiple implications. Even though this relationship has been established by many influential scholars before, those were mainly focused on the era of economic crisis in Latin America and the so-called 'lost decades' in Sub-Saharan Africa. Subsequently, it might be considered surprising that these results still hold for the time period used in this study, given that it is characterised by a commodity boom. While this commodity boom creates a large inflow of funds, according to the Prebish and Singer hypothesis these prices will diminish eventually (Boel, 2017). Subsequently, as argued by Humpreys et al. (2007) a commodity boom stimulates richly endowed countries to borrow abroad, therefore worsen the downfall in case that the commodity prices drop. This might explain the similarity of the results found in this paper, compared to the results found by Sachs and Warner (1995), despite the difference in economic environment in the different time periods studied.

In addition, it became clear that resource dependence has a less strong effect in Latin America than in Sub-Saharan Africa. This might be for numerous reasons, among others the fact that Latin America is less resource dependent, its industrial sector has been built to a stronger extent, and most Latin America countries are in a higher stage of economic development than Sub-Saharan countries. Moreover, trade openness and export diversification have a positive effect on GDP per capita, as has been established in the model. Since resource dependence is measured as resource exports as a share of GDP, this would mean that the trade environment that fosters international trade, stimulating exports and potentially deepening a countries' resource dependence. The channels that this negative relationship runs through, as established in previous literature, the quality of institutions, the limited linkages and the lack of industrialisation.

The adverse effect of natural resources creates the implication for the need to diversify a resource dependent country's economy. After all, Cadot et al. (2011) found that countries have higher incomes in the case of diversified production. This can be done by following the traditional pathway to economic growth towards the non-extractive industry sector (Rodrik, 2014). However, industrialisation for countries especially located in Sub-Saharan Africa is considered by various scholars to be coming too late (e.g. Hillbom, 2011). Alternatively, many developing countries opt to move into a focus on the service sector as a tool for increasing productivity and economic growth. Following structural change into the service sector is however ambiguous for a country's development, as it brings along many uncertainties given that this has not led to successful long-run growth before for a country (Rodrik, 2016). Additionally, the service sector is not necessarily highly productive, as most high-productive service jobs require high-skilled labour (Rodrik, 2016). While contested by scholars such as Ghani and O'Connel (2014), who argue that service-led growth is possible, there are not many economies that have followed a sustained growth pattern driven by services. Consequently, structural change towards the service sector might in the end not contribute in a constructive and sustainable way to the economy. Another option aside from focusing on the non-extractive

industry sector is resource-led growth. However, similarly to service-led growth, resource-led growth has not enabled many countries to create sustained growth so far, the reason being mainly its high capital-intensive nature creating few jobs (Rodrik, 2016). Additionally, focusing on resource-led growth leads to uncertainties, since non-renewable natural resources eventually run dry. Given that most developed countries have reached their high-income status by following the structural change path, through industrialisation and especially following the recent success of the Asian economies, this all points towards the importance of the industry sector.

The effect of resource dependence on industrialisation is found to be insignificant. Yet, this relationship has been important in previous literature. Given that industrialisation is seen by economists as the pathway for economic growth, for resource dependence to crowd this out limits a country's possibilities for economic growth. For Latin America industrialisation and resource dependence was found to be positively reinforcing each other, implying that resource dependence can stimulate industrialisation and increase economic development. This indicates that resource can actually play a positive role in these countries' development. For Sub-Saharan Africa, the positive relationship between natural resources and industrialisation has not been found. This might be due to the fact that the economies in Latin America are resource dependent to a lesser extent. Additionally, the industry sector is further developed in comparison to Sub-Saharan Africa, where industrialisation has barely been embarked upon. Subsequently, for Sub-Saharan Africa, it is important to find a growth path in which natural resources can stimulate the non-extractive industry sector, in order to create sustained growth.

Moreover, while both dependence on renewable and non-renewable resources shows to be detrimental for economic growth, the magnitude of the former is lower than that of the latter, indicating that reliance on renewable resources is less detrimental for growth than reliance on non-renewables. This has been argued to be due to poor institutions, corruption and fluctuations in commodity prices. As has been established by scholars such as Isham et al. (2012), Mehlum et al. (2006) and Ross (2001), institutions are an important channel in the relationship between natural resources and economic growth. In the case of sufficiently good institutions, countries can overcome the resource curse, as proven by the success of countries such as Norway or Canada. These countries have developed based on natural resources, which was possible due to a high quality of institutions (Holden, 2013). However, natural resources, especially valuable resources such as non-renewable resources, open ways for elite corruption (Hodler, 2006). It strengthens the position of autocratic leaders, who predominantly use the gains from the resource sector for unproductive uses (McPherson, 2010) and can lead to an increase in conflict in a country, while lowering the possibility of establishing a democracy (Ross, 2003). Given that renewable resources are overall less valuable and subsequently profitable, reliance on them does not open up many ways for corruption.

Fluctuations in commodity prices are also an important factor that establishes the difference between renewable resources and non-renewable resources. As seen in Table 9, the specific commodity prices in the model can mitigate the effect of resource dependence. Commodity prices fluctuate heavily, especially for valuable non-renewable resources. This makes it difficult

to build sustained growth based on non-renewable resources, as these are more prone to price fluctuations. Moreover, since there are little linkages associated with the extractive non-renewable resource sector, the countries being dependent on these kinds of resources are both prone to growth spurts, but at the same time highly vulnerable to economic shrinking if the commodity prices drop. This is evident in the finding that an increase in the price for mineral fuels has a significant negative effect on GDP per capita. While this appears to be highly contradicting, as a higher price would stimulate supply indicating an increase in income. Given the deterring effect the mineral fuel sector can have on a country, due to the limited linkages and the negative effect on institutions, a price rise in the sector appears to not necessarily lead to economic growth.

Additionally, even though resource dependence has a negative effect on economic growth, generally possessing resources does not automatically lead to decreased growth. This is an important distinction to be made, since it was found that exporting basic foods has a positive effect on growth. However, if a country is actually dependent on this basic food sector, then it becomes a negative factor for economic growth, indicating a distinction between possessing natural resources and being dependent on them.

5.3 Case Study

Based on the previously found results, two small case studies are presented next to shed more light on the implications of the findings of this paper. The first examines specific countries located in Sub-Saharan Africa, which experienced unprecedented growth levels. This case is evaluated as it stands in contrast to the results found in this study. The second case study analyses a type of commodity that could not be tested in the regressions, namely the category pearls, precious and semi-precious stones. This provides interesting insights as the two countries dependent on this resource category, namely Botswana and Sierra Leone, have endured a highly different economic growth experience.

5.3.1 Economic Growth in Sub-Saharan Africa

Sub-Saharan Africa, shows an interesting development pattern where, even though the region is the poorest in the world, six out of ten highest growing economies are located in this region. This is highly surprising given the results in this paper. Hence, these countries should be examined more closely. These six high growing countries are Ghana, Ethiopia, Ivory Coast, Djibouti, Senegal and Tanzania. Their GDP per capita is portrayed in Figure 3 for the time period studied in this paper. The patterns shown in the graph clearly emphasise the economic growth path these countries have embarked upon. This is an interesting development, given that all these countries are resource dependent, besides Djibouti which was dropped because of lack of data. Subsequently, the question to evaluate is how it is possible that these countries have shown incredible economic growth over the recent years, despite being resource dependent.

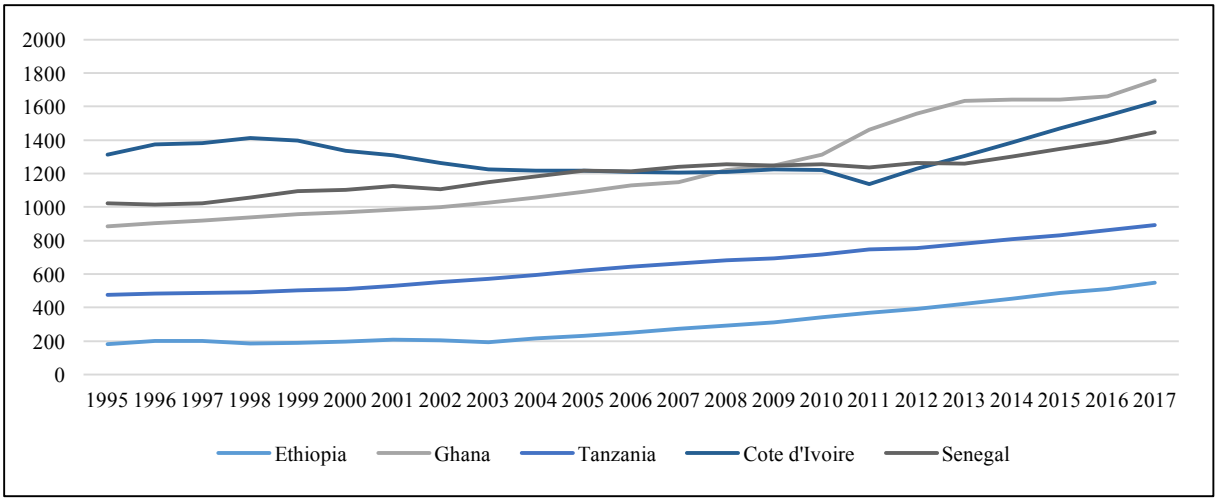

Figure 3 - GDP per Capita (Constant 2010 US$), Source: World Bank

There are multiple internal and external factors contributing to the spectacular economic growth these countries have endured. The quality of governance has improved through providing more inclusive growth and the focus on stimulating structural transformation (Thorbecke & Ouyang, 2016). Moreover, in terms of the external factors, African countries have benefited from a favourable external environment (Rodrik, 2016). Additionally, the growth of China has stimulated inward FDI in African countries (Rodrik, 2016) and these countries were not affected by the financial crisis in 2008. Another important factor is that global commodity prices are high together with low interest rates (Rodrik, 2016). These factors all contributed to the economic boom in these previously mentioned African countries.

Consequently, this growth boom does not necessarily have to be contradicting to the found negative relationship between resource dependence and economic growth, as the important factor here is to examine whether these countries experience sustained growth. According to Rodrik (2013; 2016 & 2017), a country can only follow on a sustained growth path through structural transformation and investments in the fundamentals, such as institutions and human capital. If both these criteria are met, then sustained growth is likely. This might, however, not be the case in Africa as industrialisation has not picked up yet. Economic growth is based on external factors which makes it highly vulnerable to external shocks (Thorbecke & Ouyang, 2016). Based on the Prebish and Singer hypothesis, 'real commodity price trends decline over time and consequently, those countries that are dependent on commodities will experience a slower development than those who add value to these raw materials through manufactured goods' (Boel, 2017, Pp 3). This indicates that since Africa's growth is largely based on increasing commodity prices, these will likely not hold. Hence the economic growth experiences in Africa can be merely considered as an economic growth boom and not sustained growth, since there is no structural change (McMillan & Rodrik, 2014). Therefore, the seemingly contradicting situation of the countries showing economic growth while being resource dependent, does not necessarily need to be contradictory as the economic growth in Africa might not sustainable.

5.3.2 Diamonds Botswana and Sierra Leone

Another interesting finding to investigate further is the two countries in the sample that are dependent on diamonds, namely Botswana and Sierra Leone. Since there is need for a higher number of countries in order to perform a regression to test the effect of the pearls and precious and semi-precious stone category to which diamonds belong, the effect of this resource on economic growth cannot be measured in the way the other sectors have been measured. Therefore, these countries alongside this sector will be examined more closely. The confirmation of hypothesis 3 indicates that there is a difference between the types of commodities for its effect on economic growth. Therefore, examining the two countries in Sub-Saharan Africa that are both dependent on the same type of resources, yet show a completely different pattern of economic development, indicates that the type of resource endowment might not be the only factor influencing a countries' economic growth.

Botswana has been thriving over the past years showing high levels of economic growth, while Sierra Leone has been lagging behind being divided by poor institutions, economic and human development and civil war (Boel, 2017). These large differences are portrayed in Table 10 based on multiple development indicators. As can be seen in terms of GDP per capita, Botswana is 15 times richer than Sierra Leone, and while it does have a high inequality rate, its poverty rate is significantly lower given that 94.7 percent of the population in Sierra Leone live below an income of 5.50 US$ a day.

Table 10 - Development Indicators Botswana and Sierra Leone, Source: World Bank Development Indicators (2018)

	Botswana	Sierra Leone
GDP per capita	7073.34 US$	469.21 US$
GDP growth	5.3%	5.4%
Poverty headcount ratio at $1.90 a day	16.1%	52.25
Poverty headcount ratio at $3.20 a day	38.5%	81.3%
Poverty headcount ratio at $5.50 a day	60.4%	94.7%
Life expectancy at birth (years)	63.5	50.2
Infant Mortality (per 1.000 births)	35.5	96.1
Inequality (Gini)	53.3	34
Literacy rate (%)	87.7%	32.4%

Therefore, given that both countries are dependent on diamonds, the question to evaluate is why Botswana is doing so much better than Sierra Leone, especially since Botswana shows a higher dependence on diamonds than Sierra Leone? One explanation might be that the value of a diamond is dependent on multiple factors, as these stones have a symbolic underlying value, different ways of mining that lead to different revenue opportunities and the political and economic stability that plays an important role (Boel, 2017). These factors may be responsible for the fact that while the quality of diamonds in Sierra Leone is higher than in Botswana, the diamonds from Botswana are more valuable (Boel, 2017). Isham et al. (2005) argue that resource revenues are risky in cases where these are easy to get a hold of and can be taken from a specific place. This situation applies to the difference of diamond mining in Botswana and Sierra Leone, as diamonds in Sierra Leone are dispersed in glass, sand and gravel, therefore

making them easy to grab (Davies & Dessy, 2012), while within Botswana deep-mining is required, therefore lowering the opportunity for illicit mining activities to take place (Boel, 2017). While these previously mentioned reasons play a role in the difference between Botswana and Sierra Leone, the main factor differentiating the two is the quality of institutions. Diamonds in Sierra Leone are considered to be a 'double-edged sword' (Machonachie & Binns, 2007). While the country is endowed with a valuable resource, these revenues have fuelled conflict, civil wars and corruption, causing the country to remain among the poorest in the world (Machonachie & Binns, 2007). Botswana on the other hand, discovered the diamonds post-independence, and consequently set up a joint venture between the independent government and a multinational company (Le Billon, 2008). This caused Botswana to enable good policies and consequently show spectacular economic growth (Acemoglu et al., 2001).

As shown by countries that escaped or overcame the resource curse good institutions are required for this. However, one may contest the claim that this is really the case for Botswana. While Botswana is argued to be a growth miracle, it has not yet established sustained long-run growth (Hillbom, 2008). So far, the government used the diamond revenues to invest in infrastructure, education and health, and moreover, Botswana has a stable political environment (Boel, 2017). These factors contribute to the so-called Botswana miracle of large economic growth, despite the country being resource dependent. However, even though Botswana has shown economic growth and created sensible institutional policies, it cannot be considered as a developmental state (Hillbom, 2011). AIDS rates are high with around 25 percent of the population being HIV positive (Hillbom, 2008), showing that the policies and investments in health have not yet proven to be fully effective. While this high occurrence of AIDS will not lead to a collapse in the diamond sector, given that it provides very little employment opportunities (Hillbom, 2008), it is highly detrimental to the country's economic and societal development. Moreover, industrialisation has not picked up in the country, diversification policies have been unsuccessful thus far, and inequality is extremely high (Hillbom, 2011).

Thus, while Botswana is doing better than Sierra Leone based on institutional quality and is further considered to be an economic miracle, it cannot be concluded that the country has overcome the resource curse yet. Given that the diamond reserve will run out eventually, in order for Botswana to develop it should follow a pathway of sustained growth.

6. Conclusion

This research is a continuation of the resource curse theory developed by Sachs & Warner (1995) and Auty (1993). The question analysed is what the effect of resource dependence on economic growth is and whether this differs between renewable and non-renewable resources. Additionally, it is examined in which way industrialisation is affected by resource dependence. The research aims at providing an explanation for the fact that most developing countries have not been able to benefit from economic backwardness.

First, in the recent decades of economic development in the developing economies, the resource curse is still prevalent. This might be seen as surprising since many of the resource dependent countries have shown economic growth over the past decades. However, this economic growth has predominantly been based on an increase in commodity prices and inflows of FDI, and not on sustained economic growth. Especially due to this increase in commodity prices, the prevalence of the resource curse might be seen as remarkable, however, it can be explained through the price volatility of natural resources where a commodity boom worsens the downturn.

Second, industrialisation is seen as the pathway towards economic development stressing the importance of structural change. Therefore, it is important what effect resource dependence has on industrialisation, given that resource dependent countries focus on their comparative advantage, namely their rich endowments in natural resources. However, based on this analysis it cannot be proven that the resource dependent sector crowds out the industry sector, since most results are insignificant. For Latin America, it is even found that, contrary to expectations, resource dependence and industrialisation reinforce each other, enabling those countries to develop a structural change path on the foundation of resource dependence. This is an important development that indicates many possibilities for economic growth in Latin America. However, this positive relationship between resource dependence and industrialisation is not found for Sub-Saharan Africa, causing the countries located in this continent to have a less optimistic perspective on economic growth.

Third, non-renewable resources are more deterring for economic growth than renewable resources. This is indicated by the different countries being dependent on different sectors of resources. Institutions are highly important for a resource dependent country, given that these are considered to be a large determining factor indicating whether richly endowed countries are able to overcome the resource curse. Institutional quality is worse in countries with valuable resources as their corruption increases and the political stability worsens. Valuable resources are mostly non-renewable, therefore non-renewable resource dependence is considered to be worse for economic growth than renewable resource dependence. Another reason for this assumption is the few opportunities for economic linkages in the extractive sectors. Most non-renewable resources have few positive spill-over effects as it creates little employment, are highly capital intensive and its production is exported directly without being processed in their

own country. This is different for renewable as, even though these are less valuable, these products are processed domestically, creating positive spill-over effects and economic linkages in both production and consumption.

These results create the conclusion that the future for both continents is not too encouraging. Countries in Latin America suffer from premature de-industrialisation while countries in Sub-Saharan Africa have not been able to pick up institutionalisation yet. Subsequently, in order to create sustained long-run growth, it is necessary for them to move away from a dependence on resources and instead follow the path of structural change. Given that is unlikely that resource dependent countries are able to develop sustained growth without structural change, it is necessary to invest in the industry sector. Theoretically it would be possible to move towards service-led growth, however, this may be accompanied by many insecurities and thus far has not led to sustained growth. Therefore, structural change into services might not necessarily be productivity enhancing, since high-productive service jobs need high-skilled labour.

Morris et al. (2012) argue that it is possible to create linkages for the extractive industries. This would be possible in the cases where the countries do not export the commodities in raw form, but rather process them domestically. This might be an option to explore for the resource dependent countries, as it combines a resource-led growth path with building up a non-extractive industry sector. However, it further brings along multiple insecurities as well, since thus far it has not been a successful path in achieving sustained growth before. The reason for that is that resource-led growth is problematic due to the price vulnerability of commodities and low demand for labour. This vulnerability is visible in the occurrence of a 'presource curse', which occurs in times of increased borrowing by countries due to the expectations of finding a resource, most commonly for oil. In case the finding of oil is disappointing, the country falls into an economic crisis such as happened in Ghana in 2011 (Economist, 2019). Additionally, building the industry sector and subsequently economic growth based on resource dependence brings along another risk, namely the fact that the non-renewable resources will run out eventually. This may not happen in the immediate future, but eventually it will create uncertainty and risks.

All in all, many developing countries have not benefitted yet from economic backwardness, which can be largely linked to their resource dependence. Even though there are noticeable differences between a dependence on renewable resources or on non-renewable resources, where the former is less deteriorating for economic growth than the latter, the presence of a resource dependent economy creates an adverse effect on economic growth.

This paper has multiple limitations. First, it is difficult to measure the effect of natural resources on industrialisation, since a part of the extractive industry is considered in the data to belong to the industrial sector. While the measurement used in this paper distinguishes between industry and non-industry extractive activities, it gives a broad view of the issue and is not specific. Second, there is the issue of possible endogeneity and reverse causality, which might be present in the model in such a way that economic growth can influence resource dependence instead of the reverse and that there might be a correlation between resource dependence and the error

term. In order to solve this issue, an instrumental variable could have been considered. Given the difficulties of finding an instrumental variable for testing the relationship between natural resources and economic growth, this is beyond the scope of this research. However, future research could pursue a similar analysis as in this paper, while using a sufficient instrument, which may lead to different and more reliable results from the ones found in this paper.

These limitations indicate that for future research an instrumental variable should be taken into consideration in order to implement a more accurate test and therefore higher reliability of the results. Another interesting option for future research is to test all relationships based on a broader sample, either including all resource dependent countries in the world or including developing countries that are not resource dependent as well. This would further test the resource curse and give implications of the importance of the industry sector. Lastly, the commodity categories in this paper are still broad. For future research, it would be highly interesting to divide the commodities into different categories, based for example on the manner of extraction. Moreover, it would be appealing to test the effects of highly specific commodities such as certain types of food (e.g. corn, bananas or wheat) or minerals (e.g. copper, aluminium), on economic growth, in order to specify the effect of these types of commodities and see whether there are significant differences between them.

Furthermore, this paper gives opportunities for numerous policy implications. It stresses the need for export diversification, since the results indicate that resource dependence is not beneficial for economic growth, therefore making it essential for economies to diversify and focus on multiple types of exports. The results further show that there is no ‘one size fits all’ policy approach, as there are substantial differences in the implications of resource dependence between Latin America and Sub-Saharan Africa. Therefore, even though an industrialisation path is considered by multiple scholars to be coming too late, especially for Sub-Saharan African countries, the results and the literature show that there is need for countries to focus on structural change if they want to embark on a long-run growth path.

References

Abramovitz, M. (1986). Catching up, forging ahead and falling behind. *Journal of Economic History,* Vol. 46(2), pp. 385-406.

Acemoglu, D., Johnson, S. & Robinson, J. (2001). An African Success Story: Botswana. *Working Paper*

Alexeev, M. & Conrad, R. (2009). The Elusive Curse of Oil. *The Review of Economic and Statistics.* Vol. 91(3). Pp. 586-598.

Andersson, M. & Axelsson, T. (2016). *Diverse Development Paths and Structural Transformation in the Escape from Poverty.* Oxford: Oxford University Press.

Arezki, R. & Gylfason, T. (2011). Commodity Price Volatility, Democracy and Economic Growth. *CESifo Working Paper No. 3619.*

Auty, R. (1993). *Sustaining Development in Mineral Economies - The Resource Thesis.* Routledge. London.

Auty, R. (2001). Resource Abundance and Economic Development. Oxford: Oxford University Press.

Auty, R. (2017). Natural Resources and Small Island Economies: Mauritius and Trinidad and Tobago. The Journal of Development Studies. Vol. 53(2). Pp. 264-277.

Badeed, R., Lean, H. & Clark, J. (2017). The Evolution of the Natural Resource Curse Thesis: A Critical Literature Survey. *Resources Policy.* Vol. 51. Pp. 123-134.

Baldwin, R. (1966). *Economic Development and Export Growth: A Study of Northern Rhodesia, 1920-1960.* University of California Press. Berkeley and Los Angeles.

Barro, R. J. & Lee, J.-W. (2013).A New Data Set of Educational Attainment in the World, 1950–2010, Journal of development economics, vol. 104, no. 184-198

Barro, R. J. (1996). Determinants of Economic Growth: A Cross-Country Empirical Study

Bates, R., Coatsworth, J. & Williamson, J. (2006). Lost Decades: Lessons from Post-Independence Latin America for Today's Africa. NBER Working Paper Series 02138. National Bureau of Economic Research.

Bértola, L. & Ocampo, J. (2012). *The Economic Development of Latin America since Independence.* Oxford Scholarship Online.

Bhattacharyya, S, & Hodler, R. (2010), Natural Resources, Democracy and Corruption. *European Economic Review.* Vol. 54 (4). Pp. 608-621

Biellschowsky, R. (2016). Eclac Thinking – Selected Texts (1948-1998). *United Nations.*

Bloch, R & Owusu, G. (2012). Linkages in Ghana's Gold Mining Industry: Challenging the Enclave Thesis. *Resources Policy.* Vol 37. Pp 434-443

Boel, T. (2017). Diamond Exports from Botswana and Sierra Leone: The Role of Institutions in Mitigating the Impact of Commodity Dependence on Human Development. *United National Conference on Trade and Development (UNCTAD).* Palais des Nations.

Brunnschweiler, N. C., Bulte, H. E. (2008). Linking Natural Resources to Slow Growth and More Conflict, *Science*, vol.320

Cadot, O., Carrere, C. & Strauss-Kahn, V. (2011). Export Diversification: What's behind the Hump? *Review of Economics and Statistics*. Vol. 93(2). Pp. 590-605.

Collier, P. & Goderis, B. (2009). Commodity Prices, Growth and the Natural Resource Curse: Reconciling a Conundrum.

Collin, D. (2010). Agricultural Productivity and Economic Growth. *Handbook of Agricultural Economics.* Vol 4. Chapter 73.

Davies, V. & Dessy, S. (2012). The Political Economy of Government Revenues in Post-Conflict Resource-Rich Africa: Liberia and Sierra Leone. *NBER Working Paper Series No. 18539.* National Bureau of Economic Research

Davis, G. & Tilton, J. (2005). The Resource Curse. *A United Nations Sustainable Development Journal.* Vol. 29(3). Pp. 233-242

De Soysa, I. (2000). The Resource Curse: Are Civil Wars Driven by Rapacity or Paucity?, in Berdal, Mats; & David Malone, eds, Greed and Grievance: Economic Agendas in Civil Wars. Boulder, CO: Lynne Rienner Publishers.

Diao, X., Harttgen, K., & McMillan, M. (2017). The Changing Structure of Africa's Economies. *NBER Working Paper no. 23021*

Diao, X., McMillan, M., & Rodrik. (2017). The Recent Growth Boom in Developing Economies: A Structural Change Perspective. *National Bureau of Economic Research.* Working Paper 23132

Feenstra, R. C., Inklaar, R. & Timmer, M. P. (2015). The Next Generation of the Penn World Table. in*:* Review, A. E. (ed.) 9 ed.

Figueiredo, P. & Piana, J. (2016). When "One Thing (Almost) Leads to Another": A Micro-Level Exploration of Learning Linkages in Brazil's Mining Industry. *Resources Policy.* Vol 49. Pp 405-414

Frankel, J. & Romer, D. (1999). Does Trade Cause Growth? *The American Economic Review.* Vol. 89(3). Pp. 379-399

Frankel, J. (2010). The Natural Resource Curse: A Survey. *NBER Working Paper 15836.* Cambridge

Gallup, J., Sachs, J. & Mellinger, A. (1998). Geography and Economic Development. *NBER Working Paper no. 6849.*

Ghani, E. & O'Connell, S. D. (2014). Can Service Be a Growth Escalator in Low-Income Countries? *The World Bank.*

Gylfason, T. & Zoega, G. (2006). Natural Resources and Economic Growth: The Role of Investment. *The World Economy.* Vol. 29(8). Pp. 1091-1115.

Gylfason, T. (2000). Resources, Agriculture and Economic Growth in Economies in Transition. *KYKLOS.* Vol. 53(4). Pp. 545-580.

Gylfason, T. (2001). Natural Resources, Education, and Economic Development. *European Economic Review.* Vol. 35. Pp. 847-859.

Harris, B. (1987). Regional Growth Linkages from Agriculture and Resource Flows in Non-Farm Economy. *Economic and Political Weekly.* Vol. 22(1). Pp 31-46

Hausmann, R., Hwang, J. & Rodrik, D. (2007) What you Export Matters. *Journal of Economic Growth.* Vol. 12(1). Pp. 1-25

Hechscher, E. & Ohlin, B. (1991). Heckscher-Ohlin Trade Theory Translated, Edited and Introduced by Harry Flam and June Flanders, Cambridge, MIT Press.

Hill, R., Griffiths, W., & Lim, G. (2012). *Principles of econometrics*. Hoboken, NJ: Wiley.

Hillbom, E. (2008). Diamonds or Development? A Structural Assessment of Botswana's Forty Years of Succes. *Journal of Modern African Studies.* Vol. 46(2). Pp. 191-214

Hillbom, E. (2011). Botswana: A Development-Oriented Gate-Keeping State. *African Affairs*. Vol. 111. Pp. 67-89

Hirschman, A. (1958). *The strategy of Economic Development.* Yale University Press. New Haven.

Hirschman, A. (1981). A generalised linkage approach to development with special reference to staples, Essays in Trespassing: Economics to Politics and Beyond. Cambridge University Press.

Hodler, R. (2006). The Curse of Natural Resources in Fractionalised Countries. *European Economic Review.* Vol. 50(6). Pp. 1367-1386

Holden, S. (2013). Avoiding the Resource Curse the Case of Norway. Energy Policy. Vol. 63. Pp. 870-876.

Humphreys, M., Sachs, J. & Stiligtz, J. (2007). *Escaping the Resource Curse.* Columbia University Press.

International Monetary Fund (IMF). (2012b). Macroeconomic Policy Frameworks for Resource- Rich Developing Countries - Background Paper 1 - Supplement 1. Washington, DC.

International Monetary Fund (IMF). (2017). Export Diversification

International Monetary Fund (IMF). (2018). Primary Commodity Price System, Commodity Price Data.

Irz, X., Lin, L., Thirtle, C. & Wiggins, S. (2001). Agricultural Productivity Growth and Poverty Alleviation. *Development Policy Review.* Vol. 19(4). Pp. 449-466.

Isham, J., Woolcock, M., Pritchett, L. & Busby, G. (2005). The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth. *The World Bank Economic Review.* Vol. 19(2). Pp. 141-174.

Jerven, M. (2013). *Poor Numbers - How We Are Misled by African Development Statistics and What to Do about It.* Cornell University Press.

Johnston B. & Mellor, J. (1961). The Role of Agriculture in Economic Development. *The American Economic Review.* Vol. 51(4). Pp. 566-593

Kwai Fosu, A. (1990). Exports and Economic Growth: The African Case. *World Development.* Vol. 18(6). Pp. 831-835

Lall, S. (2000). The Technological Structure and Performance of Developing Country Manufactured Exports, 1985-98. *Oxford Development Studies.* Vol. 28(3). Pp. 337-369.

Le Billon, P. (2008). Diamond Wars? Conflict Diamonds and Geographies of Resource Wars. *Annals of the Association of America Geographers.* Vol. 98(2). Pp. 345-372.

Leite, C. & Weidmann, J., (1999) Does mother nature corrupt? Natural resources, corruption, and economic growth. In: Abed, G., Gupta, S. (Eds.), Governance, Corruption, and Economic Performance. IMF, Washington, DC, pp. 159–196.

Machonachie, R. & Binns, T. (2007). Beyond the Resource Curse? Diamond Mining, Development and Post-Conflict Reconstruction in Sierra Leone. Resources Policy. Vol. 32. Pp. 104-115.

McMillan, M. & Rodrik, D. (2014). Globalisation, Structural Change and Productivity Growth, with an Update on Africa. *World Development.* Vol. 63. Pp. 11-32

McMillan, M., & D. Rodrik. (2011). Globalization, Structural Change, and Productivity Growth. *In Making Globalization Socially Sustainable*, edited by M. Bachetta and M. Jansen. Geneva: International Labour Organization and World Trade Organization.

McMillan, M., & Harttgen, K. (2014). What is Driving the 'African Growth Miracle'? *National Bureau of Economic Research.* Working Paper 20077. Cambridge

McPherson, C. (2010). *"State Participation in the Natural Resource Sectors: Evolution, Issues and Outlook."* In the Taxation of Petroleum and Minerals: Principles, Problems and Practice, edited by Philip Daniel, Michael Keen, and Charles McPherson. London and New York: Routledge and IMF

Mehlum, H., Moene, K. & Torvik, R. (2006). Institutions and the Resource Curse. *The Economic Journal.* Vol. 116. Pp.1-20.

Morris, M., Kaplinsky, R. & Kaplan, D. (2012). "One Thing Leads to Another" – Commodities, Linkages and Industrial Development. *Resources Policy.* Vol 37. Pp. 408-416.

Nelson, B. & Behar, A. (2008). Natural Resources, Growth and Spatially-Based Development: A View of the Literature. World Development Report: Reshaping Economic Geography Background Paper. The World Bank.

Olajide, O., Akinlabi, B. & Tijani, A. (2012). Agriculture Resource and Economic Growth in Nigeria. *European Scientific Journal.* Vol. 8(22).

Our World in Data (OWID). (2016). Political Regime.

Page, J. (2012). Can Africa Industrialise? *Journal of African Economies.* Vol. 21. AERC Supplement 2. pp. ii86-ii125

Psacharopoulos, G. (1994). Returns to Investment in Education: A Global Update, *World development,* vol. 22, no. 9**,** pp 1325-1343

Rodrik, D. (2013). The Past, Present and Future of Economic Growth. *Global Citizen Foundation.* Working Paper 1

Rodrik, D. (2014). An African Growth Miracle. *National Bureau of Economic Research.* Working Paper 20188. Cambridge

Rodrik, D. (2014). Why an African Growth Miracle is Unlikely? *The Milken Institute Review.* Fourth Quarter 2014.

Rodrik, D. (2016). An African Growth Miracle. *Oxford University Press.* Pp. 1-18.

Rodrik, D. (2016). Premature deindustrialisation. *Journal of Economic Growth.* Vol. 21. Pp. 1-33

Ross, M. (2001). Does Oil Hinder Democracy? *World Politics.* Vol. 53(3). Pp. 325-361

Ross, M. (2003) 'Oil, Drugs and Diamonds: The Varying Role of Natural Resources in Civil War', in K. Ballentine and J. Sherman (eds), The Political Economy of Armed Conflict: Beyond Greed and Grievance, Boulder: Lynne Reiner Publishers: 47–70

Ross, Michael L. 2012. *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations.* Princeton: Princeton University Press.

Sachs, J. & Warner, A. (1995). Natural Resource Abundance and Economic Growth. *Working Paper 5398.* Cambridge.

Sachs, J. & Warner, A. (1999). The Big Push, Natural Resource Booms and Growth, *Journal of Development Economics.* Vol. 59. Pp. 43-76.

Sachs, J. & Warner, A. (2001). Natural Resources and Economic Development – The Curse of Natural Resources. *European Economic Review.* Vol. 45. Pp. 827-838.

Sajuán-López, A. & Dawson, P. (2010). Agricultural Exports and Economic Growth in Developing Countries: A Panel Cointegration Approach. *Journal of Agricultural Economics.* Vol. 61(3). Pp. 565-583.

Sarmidi, T., Law, S. & Jafari, Y. (2014). Resource Curse: New Evidence on the Role of Institutions. *International Economic Journal*. Vol. 28(1). Pp. 191-206

Staats, J. & Biglaiser, G. (2012). Foreign Direct Investment in Latin America: The Importance of Judicial Strength and Rule of Law. *International Studies Quarterly.* Vol. 56(1). Pp. 193-202.

Stevens, P. & Dietsche, E. (2008). Resource Curse: An Analysis of Causes, Experiences and Possible Ways Forward. *Energy Policy.* Vol. 36. Pp 56-65

The Economist. (2019). Uganda Tries to Dodge the 'Presource Curse'

Thorbecke, E &. Ouyang, Y. (2016). Is Sub-Saharan Africa Finally Catching Up? in: Andersson, M. & Axelsson, T. (eds.) *Diverse Development Paths and Structural Transformation in the Escape from Poverty.* Oxford: Oxford University Press. pp. 236-265.

Tornell, A. & Lane, P. (1998). Are Windfalls a Curse? A Non-Representative Agent Model of the Current Account. *Journal of International Economics.* Vol. 44(1). Pp. 83-112.

Torvik, R. (2009). Why do some Resource-Abundant Countries Succeed while others do not? *Oxford Review of Economic Policy.* Vol. 25(2). Pp. 241-256

United Nation Conference on Trade and Development (UNCTAD). (2018). Merchandise Trade Matrix.

United Nation Conference on Trade and Development (UNCTAD). (2018). UNCTAD STAT Standard International Trade Classification (SITC) Revision 3.

Van der Ploeg, F. (2011). Natural resources: curse or blessing? Journal of Economic Literature, 49(2), 366- 420

Venables, A. (2016). Using Natural Resources for Development: Why Has It Proven So Difficult? *The Journal of Economic Perspectives*. Vol. 30(1). Pp. 161-183

Weiss, J. (2005). Export Growth and Industrial Policy: Lessons from the East Asian Miracle Experience, *ADB Institute Discussion Paper No. 26*

Wesley, E. & Peterson, F. (2017). The Role of Population in Economic Growth. *SAGE Online.* Vol. 7(4).

World Bank (2018). World Development Indicators 2018: World Bank Publications.

Worldwide Governance Indicators (WGI). (2018). Corruption & Rule of Law. *World Bank Group*

Appendix

Appendix A

Table 11 - Percentages Resource Dependence, used for Categorisation

	Food & Beverages	Food, basic	Coffee, Tea, Cocoa & Spices	Tobacco & Beverages	Agricultural Raw Materials	Ores and Metals	Mineral Fuels	Pearls, Precious and Semi-Precious Stones
Angola	0.40%	0.37%	0.04%	0.00%	0.02%	0.99%	**95.29%**	3.30%
Argentina	**74.82%**	**71.79%**	0.74%	2.29%	2.48%	4.73%	16.00%	0.00%
Burundi	**70.92%**	2.77%	**66.03%**	2.12%	3.14%	3.75%	0.55%	1.13%
Benin	26.32%	23.29%	0.07%	2.96%	**46.39%**	4.29%	16.46%	0.12%
Burkina Faso	17.89%	16.10%	0.08%	1.71%	**54.84%**	0.89%	2.32%	0.01%
Belize	**84.29%**	**82.91%**	0.25%	1.13%	1.63%	0.68%	12.88%	0.20%
Bolivia	26.71%	25.69%	0.89%	0.13%	3.94%	25.00%	**38.16%**	0.06%
Brazil	**57.40%**	**46.46%**	7.31%	3.63%	7.98%	22.55%	10.29%	0.25%
Botswana	3.58%	3.42%	0.01%	0.16%	0.27%	12.95%	0.25%	**82.27%**
Central African Republic	9.32%	3.59%	4.90%	0.82%	**49.23%**	7.21%	0.22%	33.43%
Chile	26.40%	22.91%	0.28%	3.21%	9.50%	**60.81%**	1.49%	0.00%
Côte d'Ivoire	**60.38%**	12.94%	**46.96%**	0.48%	12.00%	0.31%	24.90%	0.00%
Cameroon	23.05%	8.12%	14.45%	0.48%	23.82%	4.44%	**47.49%**	0.04%
D.R. of the Congo	2.79%	0.59%	1.85%	0.35%	4.51%	**45.95%**	12.64%	33.77%
Congo	1.15%	0.69%	0.35%	0.11%	5.61%	5.68%	**84.90%**	2.28%
Colombia	25.69%	12.22%	12.99%	0.48%	6.16%	1.65%	**61.67%**	1.06%
Comoros	**95.05%**	4.90%	**90.06%**	0.08%	0.92%	1.49%	0.06%	0.04%
Cabo Verde	**53.91%**	**49.56%**	1.08%	3.27%	3.81%	3.86%	38.35%	0.00%
Costa Rica	**89.29%**	**78.05%**	10.49%	0.75%	6.84%	2.37%	0.88%	0.02%
Dominica	**82.84%**	**76.97%**	1.97%	3.90%	0.32%	16.79%	0.05%	0.00%
Ecuador	42.62%	38.17%	4.19%	0.27%	4.91%	0.53%	**50.80%**	0.00%
Eritrea	**47.64%**	**44.98%**	2.03%	0.62%	17.31%	13.36%	0.07%	0.12%
Ethiopia	**74.33%**	31.04%	**43.20%**	0.09%	17.75%	1.04%	1.19%	0.08%
Gabon	1.13%	0.46%	0.34%	0.34%	11.72%	5.25%	**81.88%**	0.00%
Ghana	**48.40%**	11.09%	**37.06%**	0.26%	7.00%	9.41%	10.88%	3.04%
Guinea	8.15%	4.67%	3.31%	0.17%	2.48%	**57.77%**	13.12%	5.22%
Gambia	**64.87%**	**62.98%**	1.07%	0.82%	13.31%	6.94%	1.69%	12.15%
Guinea-Bissau	**84.49%**	**83.91%**	0.42%	0.16%	2.51%	0.31%	12.58%	0.09%
Equatorial Guinea	2.61%	1.22%	0.66%	0.73%	8.27%	0.02%	**89.04%**	0.00%
Guatemala	**80.22%**	**51.00%**	25.61%	3.61%	6.43%	4.03%	7.54%	0.00%
Guyana	**44.94%**	**42.56%**	0.07%	2.31%	4.33%	14.67%	0.05%	3.28%
Honduras	**83.59%**	**49.44%**	29.00%	5.14%	4.12%	5.77%	2.47%	0.04%
Jamaica	25.24%	16.26%	2.98%	6.00%	0.20%	**62.82%**	11.45%	0.00%

Kenya	**66.29%**	24.23%	**38.16%**	3.89%	17.14%	3.62%	10.98%	0.20%
Liberia	3.56%	0.96%	2.44%	0.15%	**43.12%**	11.29%	15.32%	20.57%
Madagascar	**69.35%**	**37.50%**	31.64%	0.21%	6.66%	13.94%	4.81%	2.06%
Mali	7.50%	7.23%	0.06%	0.21%	**42.81%**	0.41%	1.47%	0.24%
Mozambique	34.35%	28.03%	0.21%	6.12%	7.94%	**37.79%**	18.47%	0.96%
Mauritania	41.85%	41.81%	0.02%	0.02%	0.18%	**49.18%**	5.08%	0.01%
Malawi	**93.89%**	18.40%	9.96%	**65.52%**	4.21%	1.42%	0.21%	0.02%
Namibia	**41.57%**	**35.72%**	0.11%	5.74%	1.07%	24.95%	1.74%	28.30%
Niger	26.75%	22.83%	0.52%	3.39%	3.90%	**34.78%**	28.89%	0.01%
Nigeria	2.16%	0.88%	1.19%	0.09%	0.97%	0.44%	**96.29%**	0.02%
Nicaragua	**85.88%**	**58.55%**	21.76%	5.58%	2.64%	1.32%	1.94%	0.01%
Peru	23.70%	19.74%	3.85%	0.12%	1.93%	**44.81%**	8.98%	0.01%
Paraguay	**63.28%**	**62.21%**	0.13%	0.94%	8.62%	0.62%	27.29%	0.00%
Rwanda	**49.80%**	4.47%	**44.00%**	1.34%	3.26%	28.28%	12.98%	0.12%
Senegal	**52.90%**	**49.91%**	0.26%	2.73%	3.76%	8.68%	28.63%	0.07%
Sierra Leone	30.17%	12.15%	16.93%	1.09%	2.02%	26.57%	1.85%	**38.65%**
El Salvador	**83.21%**	**47.44%**	29.84%	5.93%	2.20%	5.71%	7.18%	0.00%
Sao Tome and Principe	**92.16%**	10.65%	**80.84%**	0.67%	1.56%	1.90%	4.16%	0.02%
Suriname	15.21%	13.82%	0.09%	1.29%	1.59%	**44.77%**	9.32%	0.02%
Eswatini	**65.35%**	**61.90%**	1.73%	1.72%	26.45%	2.74%	3.02%	0.05%
Chad	1.44%	0.75%	0.05%	0.64%	41.31%	0.30%	**55.59%**	0.00%
Togo	**28.77%**	**13.74%**	13.03%	2.00%	19.72%	22.25%	19.56%	0.55%
Trinidad and Tobago	8.34%	4.89%	0.29%	3.16%	0.11%	1.82%	**89.71%**	0.00%
U.R. of Tanzania:	**49.31%**	**28.27%**	12.28%	8.76%	11.03%	10.29%	2.17%	3.51%
Uganda	**81.17%**	28.45%	**44.55%**	8.16%	9.78%	1.75%	1.32%	0.11%
Uruguay	**79.31%**	**77.22%**	0.16%	1.94%	15.94%	0.70%	2.55%	0.16%
Venezuela	1.66%	1.08%	0.15%	0.43%	0.16%	4.27%	**93.49%**	0.03%
South Africa	17.83%	14.12%	0.40%	3.31%	5.24%	**42.47%**	20.05%	8.49%
Zambia	12.11%	7.99%	0.60%	3.52%	4.54%	**79.35%**	1.33%	1.89%
Zimbabwe	**48.72%**	13.38%	1.95%	**33.39%**	13.53%	24.82%	3.20%	3.06%

Appendix B

Table 12 - VIF, Model Economic Growth

Variable	VIF
Resource Dependence (Lall)	155.18
Land	8.19
Human Capital	50.46
Population Growth	10.24
Life Expectancy	99.15
Trade Openness	6.12
Export Diversification	15.60
Democracy	3.47
Rule of Law	8.63
Corruption	8.32

Table 13 - Correlation Matrix, Model Economic Growth

	Resource Dependence (Lall)	Land	Human Capital	Population Growth	Life Expectancy	Trade Openness	Export Diversification	Democracy	Rule of Law	Corruption
Resource Dependence (Lall)	1.00									
Land	-0.061	1.00								
Human Capital	-0.440	-0.261	1.00							
Population Growth	0.412	-0.050	-0.586	1.00						
Life Expectancy	-0.529	-0.191	0.708	-0.549	1.00					
Trade Openness	0.227	-0.106	0.204	-0.042	0.086	1.00				
Export Diversification	0.316	-0.123	-0.348	0.354	-0.380	0.091	1.00			
Democracy	-0.377	0.017	0.361	-0.367	0.525	0.023	-0.324	1.00		
Rule of Law	-0.102	0.011	0.441	-0.355	0.404	0.119	-0.361	0.376	1.00	
Corruption	-0.140	0.068	0.463	-0.460	0.402	0.090	-0.403	0.328	0.896	1.00

Table 14 - VIF, Model Industrialisation

Variable	VIF
Resource Dependence (Lall)	39.05
GDP per capita	5.34
Land	7.53
Human Capital	33.07
Population Growth	8.30
Life Expectancy	89.30
Trade Openness	6.08
Export Diversification	14.54
Democracy	3.91
Rule of Law	8.83
Corruption	8.71

Table 15 - Correlation Matrix, Model Industrialisation

	Resource Dependence (Lall)	GDP per capita	Land	Human Capital	Population Growth	Life Expectancy	Trade Openness	Export Diversification	Democracy	Rule of Law	Corruption
Resource Dependence (Lall)	1.00										
GDP per capita	-0.022	1.00									
Land	-0.154	-0.174	1.00								
Human Capital	0.082	0.712	-0.261	1.00							
Population Growth	0.247	-0.588	-0.050	-0.586	1.00						
Life Expectancy	-0.010	0.663	-0.191	0.708	-0.549	1.00					
Trade Openness	0.128	0.049	-0.106	0.204	-0.042	0.086	1.00				
Export Diversification	0.258	-0.274	-0.123	-0.348	0.354	-0.380	0.091	1.00			
Democracy	-0.088	0.253	0.017	0.361	-0.367	0.525	0.023	-0.324	1.00		
Rule of Law	-0.190	0.526	0.011	0.441	-0.355	0.404	0.119	-0.361	0.376	1.00	
Corruption	-0.211	0.574	0.068	0.463	-0.460	0.402	0.090	-0.403	0.328	0.896	1.00

Appendix C

Table 16 - Hypothesis 3, Sub-Saharan Africa

	(1) Food & Beverages	(2) Food, basic	(3) Coffee, Tea, Cocoa & Spices	(5) Agricultural Raw Materials	(6) Ores and Metals	(7) Mineral Fuels
Resource Dependence	-0.348***	-0.169	-0.386	-0.267*	-0.135	-0.886***
	(0.0705)	(0.121)	(0.265)	(0.0943)	(0.127)	(0.0645)
Population Growth	-0.0178	-0.00230	-0.0141	0.0771	0.133	-0.0601***
	(0.0219)	(0.0374)	(0.0283)	(0.0483)	(0.0641)	(0.0128)
Human Capital	-0.209*	-0.260*	-0.181	0.219	0.545	0.453*
	(0.115)	(0.121)	(0.338)	(0.657)	(0.352)	(0.167)
Agricultural Land	-0.00406	0.00268	-0.0152*	0.00604	0.00432	-0.00181
	(0.00368)	(0.00636)	(0.00629)	(0.0139)	(0.00970)	(0.00781)
Manufacturing	0.277***	0.342***	0.307**	0.179	0.241**	-0.0590
	(0.0525)	(0.0349)	(0.108)	(0.153)	(0.0743)	(0.0291)
Commodity Price Volatility	-0.00108	1.31e-05	-7.29e-05	-0.000191	-0.00210	-0.00568***
	(0.000885)	(0.00121)	(0.00107)	(0.00157)	(0.00231)	(0.000856)
Trade Openness	-0.00112	-0.000356	0.00179*	-0.000740	0.00471**	0.000537
	(0.000667)	(0.000747)	(0.000757)	(0.000885)	(0.00124)	(0.000351)
Exports Diversification	0.00379	0.00346	0.0305	-0.00626	-0.00929	0.0460*
	(0.0113)	(0.00697)	(0.0293)	(0.0317)	(0.0459)	(0.0205)
Democracy	-0.0425**		-0.115**	-0.111	0.0868	
	(0.0182)		(0.0316)	(0.140)	(0.0412)	
Corruption	0.00885	-0.0110	0.0851**	-0.0250	0.0563	-0.0971
	(0.0351)	(0.0695)	(0.0221)	(0.0872)	(0.0836)	(0.0494)
Rule of Law	0.0990**	0.191*	-0.0570	0.174	0.166	0.0588
	(0.0345)	(0.0714)	(0.0746)	(0.119)	(0.167)	(0.0387)
Constant	-5.819***	-3.030	-7.697	-3.391	-2.916	-12.06***
	(1.285)	(2.403)	(4.019)	(2.612)	(2.666)	(1.625)
N	195	84	73	68	85	89
R^2	0.937	0.922	0.981	0.818	0.888	0.972

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 17 - Hypothesis 3, Latin America

	(1) Food & Beverages	(2) Food, basic	(7) Agricultural Raw Materials	(8) Mineral Fuels
Resource Dependence	-0.0787**	-0.0900**	-0.336*	-0.479*
	(0.0285)	(0.0327)	(0.106)	(0.181)
Population Growth	0.0447	0.0433	0.0611	-0.0367
	(0.0454)	(0.0490)	(0.162)	(0.120)
Human Capital	-0.0475	-0.0548	0.0264	-0.232
	(0.0713)	(0.0746)	(0.113)	(0.111)
Agricultural Land	0.00116	0.00305	0.00424	0.00274
	(0.00278)	(0.00273)	(0.00816)	(0.00145)
Manufacturing	0.264***	0.268**	0.383	0.194**
	(0.0795)	(0.0966)	(0.179)	(0.0337)
Commodity Price Volatility	0.00200***	0.00201**	0.00118	-0.000110
	(0.000557)	(0.000627)	(0.000746)	(0.00146)
Trade Openness	-0.000449	-0.000424	-0.000787	0.000846
	(0.000639)	(0.000686)	(0.000752)	(0.000776)
Exports Diversification	0.0875***	0.0899**	0.0920**	0.105***
	(0.0223)	(0.0276)	(0.0184)	(0.0123)
Democracy	-0.0230	-0.0236	-0.0775	-0.0266
	(0.0455)	(0.0444)	(0.0396)	(0.0348)
Corruption	0.111**	0.134**	-0.0447	0.0963**
	(0.0433)	(0.0474)	(0.0373)	(0.0197)
Rule of Law			-0.0402	-0.0143
			(0.0182)	(0.0282)
Constant	0.160	-0.232	-8.814**	-7.723
	(1.796)	(2.056)	(1.096)	(3.325)
N	190	171	57	74
R^2	0.925	0.929	0.993	0.981

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix D

Table 18 - Robustness Test, Interaction Commodity Price Volatility

	(1) Food & Beverages	(2) Food, basic	(3) Coffee, Tea, Cocoa & Spices	(5) Agricultural Raw Materials	(6) Ores and Metals	(7) Mineral Fuels
Resource Dependence	-0.107***	-0.0765***	-0.187	-0.148	-0.134	-0.594***
	(0.0347)	(0.0251)	(0.109)	(0.193)	(0.112)	(0.112)
Commodity Price Index	-0.0136***	-0.00967***	0.0249*	-0.0344	-0.00887**	-0.00841***
	(0.00242)	(0.00303)	(0.0119)	(0.0414)	(0.00292)	(0.00224)
Interaction Res. Dep. & Comm. Price Vol.	-0.000644***	-0.000559***	0.000786*	-0.00136	-0.000496**	-0.000307**
	(8.82e-05)	(0.000114)	(0.000369)	(0.00142)	(0.000146)	(9.77e-05)
Population Growth	-0.0433	-0.00415	-0.0226	0.0473	0.162	-0.0676
	(0.0289)	(0.0147)	(0.0231)	(0.0738)	(0.0893)	(0.0542)
Human Capital	-0.207	-0.116*	-0.471	0.121	-0.334**	-0.0572
	(0.127)	(0.0602)	(0.435)	(0.556)	(0.111)	(0.182)
Agricultural Land	-0.00132	0.00131	-0.00675	0.00543	0.00301	0.000991
	(0.00255)	(0.00268)	(0.00405)	(0.0139)	(0.00612)	(0.00356)
Manufacturing	0.336***	0.235***	0.366***	0.306	0.0964***	-0.0243
	(0.0524)	(0.0342)	(0.0443)	(0.287)	(0.0275)	(0.0423)
Trade Openness	-0.000421	-2.60e-06	0.00153**	-0.000608	0.00199*	0.00194***
	(0.000416)	(0.000205)	(0.000416)	(0.00102)	(0.000860)	(0.000560)
Export Diversification	0.00303	0.0146	-0.0152	-0.0192	0.0157	0.0830**
	(0.0118)	(0.00947)	(0.0165)	(0.0416)	(0.0460)	(0.0284)
Democracy	-0.0702***		-0.0576***	-0.143	0.0651*	0.0512
	(0.0118)		(0.0101)	(0.145)	(0.0313)	(0.0495)
Corruption	0.0543*	0.0256	0.0173	-0.0247	0.00506	0.0448
	(0.0277)	(0.0411)	(0.0393)	(0.0920)	(0.0635)	(0.0462)
Rule of Law	0.0871***	0.0858***	-0.0331	0.146	0.242	-0.000465
	(0.0252)	(0.0192)	(0.0600)	(0.103)	(0.133)	(0.0455)
Constant	-1.545	0.998	-4.508*	-2.505	2.125	-5.760*
	(1.082)	(0.865)	(2.097)	(1.923)	(2.879)	(3.092)
N	385	255	92	68	142	163
R^2	0.901	0.921	0.981	0.826	0.911	0.923
I	23	14	7	4	8	9

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 19 - Robustness Test, Whole Sample Economic Growth

	Dependent Variable: GDP per Capita						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1	2	3	4	Full Model	LA	SSA
Resource Dependence	-0.276***	-0.257***	-0.212***	-0.260***	-0.251***	-0.123***	-0.275***
	(0.0113)	(0.0133)	(0.0134)	(0.0148)	(0.0539)	(0.0178)	(0.0182)
Population Growth		-0.0113	-0.0120	-0.00607	-0.00803	0.0795***	-0.00751
		(0.00798)	(0.00817)	(0.00807)	(0.0244)	(0.0173)	(0.0107)
Human Capital		0.00832	-0.120***	0.0170	0.0769	-0.0253	-0.000864
		(0.0388)	(0.0394)	(0.0461)	(0.143)	(0.0408)	(0.0684)
Agricultural Land			-0.00254**	-0.00315**	-0.00414	0.00227*	-0.0060***
			(0.00128)	(0.00133)	(0.00362)	(0.00128)	(0.00179)
Manufacturing			0.125***	0.0860***	0.0354	0.306***	0.0189
			(0.0140)	(0.0145)	(0.0930)	(0.0252)	(0.0186)
Commodity Price Volatility			0.0020***	0.000596**	0.00109	0.00169***	0.00106***
			(0.000692)	(0.000275)	(0.000722)	(0.000222)	(0.000369)
Trade Openness				-3.51e-05	2.11e-05	-0.000348	-0.000524
				(0.000255)	(0.000664)	(0.000290)	(0.000343)
Export Diversification				0.0125**	0.0153	0.0844***	0.00575
				(0.00506)	(0.0100)	(0.00792)	(0.00614)
Democracy					0.0100	0.00598	0.0377*
					(0.0402)	(0.0128)	(0.0207)
Corruption					0.0192	-0.0371**	-0.00623
					(0.0381)	(0.0159)	(0.0260)
Rule of Law					0.131***	0.115***	0.198***
					(0.0422)	(0.0140)	(0.0261)
Constant	1.385***	1.497***	0.201	-0.244	0.989	-2.012***	0.862*
	(0.252)	(0.313)	(0.348)	(0.391)	(1.818)	(0.496)	(0.506)
N	1,763	1,338	1,136	1,003	918	321	597
R^2	0.591	0.653	0.697	0.681	0.707	0.930	0.673
I	78	59	55	55	53	17	36

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 20 - Robustness Test, Whole Sample Industrialisation

	Dependent Variable: Industrialisation						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1	2	3	4	Full Model	LA	SSA
Resource Dependence (Lall)	-0.0171	-0.00282	-0.00907	-0.0413**	-0.0413*	0.0749***	-0.0371
	(0.0146)	(0.0166)	(0.0181)	(0.0180)	(0.0230)	(0.0261)	(0.0229)
GDP per capita		0.000873	0.00163	-0.000761	-0.000761	0.00223	-0.000999
		(0.00169)	(0.00176)	(0.00181)	(0.00231)	(0.00228)	(0.00233)
Population Growth		0.0108	0.00487	0.0208	0.0208	-0.0516	0.0283
		(0.0182)	(0.0192)	(0.0207)	(0.0741)	(0.0476)	(0.0255)
Human Capital		0.278***	0.309***	0.442***	0.442	0.0500	0.665***
		(0.0890)	(0.109)	(0.110)	(0.412)	(0.124)	(0.159)
Agricultural Land		-0.0097***	-0.0088***	-0.0080***	-0.00799	0.00174	-0.00662
		(0.00274)	(0.00301)	(0.00304)	(0.00661)	(0.00357)	(0.00402)
Trade Openness			-0.000726	-0.000348	-0.000348	-6.47e-05	-0.000517
			(0.000604)	(0.000601)	(0.00107)	(0.000808)	(0.000776)
Export Diversification			-0.00739	0.00755	0.00755	-0.195***	0.0307**
			(0.0122)	(0.0122)	(0.0220)	(0.0229)	(0.0146)
Democracy				0.0696**	0.0696	0.108***	0.000605
				(0.0329)	(0.0554)	(0.0352)	(0.0452)
Rule of Law				-0.102**	-0.102	-0.00237	-0.194***
				(0.0417)	(0.0822)	(0.0397)	(0.0620)
Corruption				0.100**	0.100	0.0699	0.123**
				(0.0419)	(0.0766)	(0.0452)	(0.0583)
Constant	2.156***	2.333***	2.292***	1.523***	1.523*	3.901***	0.984**
	(0.142)	(0.263)	(0.325)	(0.335)	(0.869)	(0.518)	(0.422)
N	1,631	1,204	1,061	972	972	321	651
R^2	0.068	0.112	0.108	0.139	0.139	0.448	0.157
I	76	58	57	55	55	17	38

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 21 - Robustness Test, Life Expectancy as Dependent Variable

	Dependent Variable: Life Expectancy						
	(1)	(2)	(3)	(4)	(6)	(7)	(8)
	1	2	3	4	Full Model	LA RSE	SSA RSE
Resource Dependence	-1.935**	-3.219***	-1.778	-1.488	-1.450*	0.606	-1.743
	(0.863)	(1.174)	(1.149)	(0.962)	(0.804)	(0.543)	(1.068)
Population Growth		2.286***	2.009***	1.770***	1.524**	0.869	1.121*
		(0.599)	(0.674)	(0.626)	(0.656)	(0.622)	(0.551)
Human Capital		0.207	-0.217	0.0254	1.559	2.029	1.624
		(2.909)	(2.816)	(3.121)	(2.791)	(1.843)	(4.984)
Agricultural Land			0.272***	0.255***	0.224***	-0.0289	0.255**
			(0.0827)	(0.0803)	(0.0828)	(0.0456)	(0.124)
Manufacturing			2.130	1.763	0.948	-0.0283	0.454
			(1.408)	(1.334)	(1.120)	(0.847)	(1.166)
Commodity Price Volatility			0.105**	0.0461***	0.0521***	0.0463***	0.0616***
			(0.0410)	(0.0139)	(0.0114)	(0.00878)	(0.0182)
Trade Openness				0.0147	0.0150	0.0300***	0.00296
				(0.00892)	(0.00910)	(0.0102)	(0.0123)
Export Diversification				-0.466	-0.277	0.0512	-0.283
				(0.324)	(0.266)	(0.411)	(0.257)
Democracy					1.694**	0.912**	1.487*
					(0.797)	(0.428)	(0.849)
Corruption					1.318	0.766	2.523**
					(1.021)	(0.509)	(1.157)
Rule of Law					1.467	-0.186	1.700
					(0.958)	(0.871)	(1.174)
Constant	14.01	-21.34	-48.66*	-29.30	-13.57	74.73***	-15.42
	(19.54)	(28.95)	(27.82)	(29.77)	(23.18)	(11.05)	(27.19)
N	1,337	1,126	982	875	796	321	475
R^2	0.661	0.739	0.765	0.739	0.777	0.890	0.839

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 22 - Robustness Test, Life Expectancy as Dependent Variable

	Dependent Variable: Life Expectancy					
	(1) Food & Beverages	(2) Food, basic	(3) Coffee, Tea, Cocoa & Spices	(5) Agricultural Raw Materials	(6) Ores and Metals	(7) Mineral Fuels
Resource Dependence	-0.0778	-0.649	-0.0378	-0.407	-0.265	-5.702***
	(1.209)	(0.920)	(2.967)	(0.349)	(1.697)	(1.466)
Population Growth	3.200***	3.426***	-0.329	-0.0771	11.30**	-0.262
	(0.944)	(0.394)	(0.628)	(0.184)	(3.706)	(1.072)
Human Capital	6.022	5.571*	-7.643	-18.22**	-1.984	-10.82***
	(3.706)	(2.801)	(15.37)	(3.287)	(2.717)	(2.358)
Agricultural Land	0.211**	0.0715	-0.00318	0.415	-0.0184	0.0930
	(0.0970)	(0.0899)	(0.235)	(0.178)	(0.0623)	(0.0607)
Manufacturing	3.559**	2.179	12.29***	-0.0267	-2.139	1.287*
	(1.537)	(2.291)	(2.869)	(0.827)	(2.140)	(0.590)
Commodity Price Index	0.0397**	0.0363**	0.0496	0.0815***	0.126***	0.0637***
	(0.0154)	(0.0166)	(0.0403)	(0.00792)	(0.0268)	(0.0156)
Trade Openness	0.00385	0.00544	-0.103*	0.00982	0.0107	-0.00111
	(0.0103)	(0.00724)	(0.0449)	(0.00780)	(0.0142)	(0.0134)
Export Diversification	-0.585	-0.457	0.0127	0.0244	0.374	0.693
	(0.345)	(0.268)	(0.609)	(0.0843)	(0.399)	(0.460)
Democracy	1.893**		2.326*	2.584	1.580**	2.653***
	(0.723)		(1.187)	(1.151)	(0.637)	(0.452)
Corruption	-0.579	-0.0383	-0.782	0.286	5.104**	0.199
	(0.804)	(0.648)	(1.610)	(0.489)	(2.127)	(0.797)
Rule of Law	3.886***	1.499**	5.542**	0.347	-4.544*	-2.115**
	(1.346)	(0.675)	(1.548)	(0.905)	(2.069)	(0.752)
Constant	-46.25*	-19.27	-186.6**	51.05	67.65	-97.30**
	(25.33)	(53.45)	(69.15)	(22.23)	(46.11)	(38.55)
N	385	255	92	68	142	163
R^2	0.840	0.853	0.951	0.984	0.878	0.931
I	23	14	7	4	8	9

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1