The Impact of Natural Resources on Financial Development: The Global Perspective

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ABSTRACT

Using a time series approach, this thesis investigates how natural resources impact financial development from a global perspective for the period 1980-2019. Johansen cointegration test has revealed that the variables are in a long-run equilibrium relationship. The vector error correction model (VECM) has estimated the coefficient of the error correction term (ECT) which suggests that the short-run values of natural resources, economic growth, trade openness, population growth, and investments contribute to financial development converging to its long-run equilibrium level by a 23.63% speed of adjustment every year. The estimated coefficients suggest that global natural resource rent has a statistically-significant negative impact on global financial development in the long-run, but not in the short-run. Causality test results imply that neither global natural resource rent nor global financial development Granger-causes each other.

Keywords: financial development, resource curse hypothesis, time series analysis, global perspective.

ÖZ

Bir zaman serisi yaklaşımı kullanan bu tez, 1980-2019 dönemi için doğal kaynakların finansal gelişmeyi nasıl etkilediğini küresel bir perspektiften incelemektedir. Johansen eşbütünleşme testi, değişkenlerin uzun dönemli bir denge ilişkisi içinde olduğunu ortaya koymuştur. Vektör hata düzeltme modeli, doğal kaynakların, ekonomik büyümenin, ticari açıklığın, nüfus artışının ve yatırımların kısa vadeli değerlerinin uzun vadeli ayarlamaya katkıda bulunduğunu öne süren hata düzeltme terim katsayısını tahmin etti. Finansal gelişme, yıllık %23,63 oranında uzun vadeli değerine göre ayarlanır. Tahmini katsayılar, küresel doğal kaynak rantının kısa vadede değil, uzun vadede küresel finansal gelişme üzerinde istatistiksel olarak anlamlı bir olumsuz etkiye sahip olduğunu göstermektedir. Nedensellik testi sonuçları, küresel doğal kaynak kirası ile küresel finansal gelişme arasında nedensellik olmadığını göstermektedir.

Anahtar Sözcükler: finansal gelişme, kaynak laneti hipotezi, zaman serisi analizi, küresel bakış açısı.

DEDICATION

To My Late Grand Mother, Mama Oben Rebecca Bate

(May her gentle soul RIP)

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller Unit Root Test
AIC	Akaike Information Criterion
AR	Autoregressive
ARDL	Autoregressive Distributed Lag
CCR	Canonical Cointegration Regression
CD	Cross-Section Dependence
CE	Cointegrating Equation
Cup-FM	Continuously Updated Fully Modified
DOLS	Dynamic Ordinary Least Squares
DPD	Dynamic Panel Data
ECT	Error Correction Term
FD	Financial Development Index
FDI	Foreign Direct Investments
FMOLS	Fully Modified Ordinary Least Square Method
FPE	Final Prediction Error
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GLM	Generalized Linear Model
GMM	Generalized Method Of Moments
HQ	Hannan-Quinn Information Criterion
IMF	International Monetary Fund
I (1)	Integrated Of Order One
JB	Jarque-Bera

KPSS	Kwiatkowski Et Al. Stationarity Test
LM	Lagrange Multiplier
MAX	Maximum Value
MENA	Middle East And North Africa
MIN	Minimum Value
M2	Money Supply Measure
NA	Not Applicable
NR	Natural Resources Rents
OECD	Organization For Economic Co-operation And Development
OLS	Ordinary Least Squares
POP	Population Growth
PP	Phillips-Perron Unit Root Test
QARDL	Quantile Autoregressive Distributed Lag
QQ	Quantile On Quantile
R&D	Research And Development
SC	Schwarz Information Criterion
S.D	Standard Deviation
SEE	Standard Error Of Estimate
SSA	Sub-Saharan Africa
SUR	Seemingly Unrelated Regression
TFP	Total Factor Productivity
TR	Trade Openness
UCDP	Uppsala Conflict Data Program
USA	United States Of America
VAR	Vector Autoregression

VEC	Vector Error Correction
VECM	Vector Error Correction Model
WDI	World Development Indicator

Chapter 1

INTRODUCTION

1.1 Contextual Background

Financial development involves improving how much of the services delivered by financial intermediaries, and how well they deliver these services (Zainudin & Nordin, 2017). Benyah (2010) defined financial development as the process whereby the allocation of financial resources and the monitoring of capital projects are done efficiently by increasing competition and rendering the financial system more important. Many studies have investigated the indicators of financial development (for example: Voghouei, Azali, & Jamali, 2011; Raza, Shahzadi, & Akram, 2014; Ibrahim & Sare, 2018; Khalfaoui, 2015).

One factor which may bring about financial development or hinder it, is the availability of natural resources. According to Garside (2021), natural resources, which can be biotic (living materials) or abiotic (non-living materials), are natural in existence, independent from human actions. Examples of natural resources are oil, natural gas, mineral, coal, and forest (Mignamissi & Kuete, 2020).

So many scholarly articles and papers have aimed to look at the significance of natural resources. Interestingly, there is no unanimous consensus as to whether or not nations benefit from having numerous valuable natural resources. The debate on this aspect continuous in the literature. For example, while Mignamissi and Kuete (2020) and

Papyrakis and Gerlagh (2004) found evidence for the natural resource curse, Herb (2005) found evidence against it. In fact, Havranek, Horvath, and Zeynalov (2016) confirmed the absence of consensus by stating that while about 40% of empirical papers in the literature found a negative influence of natural resources on economic growth, roughly 40% discovered no impact, and approximately 20% found a positive connection.

This thesis aims to find out whether or not natural resource-rich countries necessarily have developed financial sectors and if there is relatively less financial development in countries which have limited natural resources.

The influence of natural resources on subjective wellbeing depends on the political system in place in a particular country, as well as on the level of democracy (Mignamissi & Kuete, 2020). In that light, in order to avoid having biased results, this research will be carried out from a global perspective, rather than limiting it to a sample of countries.

1.2 Historical Background

The role of natural resources in an economy has evolved over time. It will normally be expected that countries will benefit from having an abundance of valuable natural resources. Due to this belief, prior to the second half of the 20^{th} century, little or no efforts were made to explore the possible adverse effect of natural resources on an economy (Kaznacheev, 2017). This view, which was also asserted by Adam Smith and David Ricardo, was supported by many economists well into the 1970s (Badeeb, Lean, & Clark, 2016).

Even though debates in the 1950s and 1960s began surfacing the idea that natural resources might bring more harm than good (Aljarallah & Angus, 2020), it is only by the early 1980s that serious consideration was given to the possibility of natural resources being more of a curse than a blessing. This was as a result of the Dutch disease (Badeeb et al., 2016).

In 1998, Alan Gelb established that oil economies faced more economic problems than their non-oil counterparts (Badeeb et al., 2016). However, the term “natural resource curse” was initially used in 1993 by Richard Auty in an attempt to explain how resource-rich countries suffered from poorly developed economies (Vahabi, 2017; Mittelman, 2017). Sachs and Warner (1995) confirmed the existence of the resource curse by providing empirical evidence. Thereafter, many scholars and researchers have carried out studies over the last three decades, and have contributed to the literature, with some confirming the resource curse hypothesis, while others have challenged it.

In a very great amount, oil is the main natural resource through which the curse is manifested (Ross, 2012). In fact, right from when there was an oil boom in the 1970s, the contribution of natural resources (oil in particular) in an economy has been discussed quite often (Mukoyama, 2019). During the 1973-1986 period, the oil boom was a mix of a curse and blessing to Arab oil-producing countries – significantly more revenues were generated from exporting oil to foreign countries (blessing), while the rate of inflation also increased (curse) (Aljarallah & Angus, 2020).

There are many countries in history – including Angola, Nigeria, Congo, Bolivia, Sierra Leone, Venezuela and Sudan – which have underperformed economically despite their riches in natural resources (Mittelman, 2017; Arezki & van der Ploeg, 2010). From 1971 to 1989, relatively slower growths were observed amongst economies with the highest exports of commodities (Mittelman, 2017), albeit Norway and Botswana are notable exceptions (Arezki & van der Ploeg, 2010).

Manifestations of the natural resource curse has evolved over time, from deteriorating terms of trade in the 1950s and 1960s to the oil shocks in the 1970s to the "Dutch disease" in the 1980s to how natural resource projects affected government behavior in the 1990s (Stevens, 2005).

1.3 Theoretical Background

Theoretically, there are many advantages of having an abundance of natural resources. Firstly, countries with abundant natural resources can generate massive revenues by exporting these resources to other countries as raw materials. They can also use the resources in their domestic manufacturing industries to produce semi-finished and finished goods which can be sold both domestically and internationally. Again, Asiedu (2005) and Hayat (2014) highlight that natural resource-rich countries can attract large amounts of foreign direct investments (FDI). The revenues generated from natural resources can be used in developing the financial systems.

Considering the aforementioned, it could be expected, at least theoretically, that natural resources will positively impact economic growth and, hence, financial development. On the contrary, many countries have been found to underperform economically over the long run and have poorly developed financial sectors, despite being home to valuable natural resources. This is typical in Africa and in the Middle East (Badeeb et al., 2016).

As first mentioned by Richard Auty in 1993, the "natural resource curse" is a situation whereby resource-rich countries have less economic growth and development than nations with limited natural resources (Cavalcanti, Mohaddes, & Raissi, 2009), especially if the resources are point-source resources (Arezki & van der Ploeg, 2010). This resource-trap phenomenon is also called the paradox of plenty (Mehlum, Moene, & Torvik, 2006a). Angola, Congo, Nigeria and Venezuela are examples of resource-rich nations which have low or negative economic growths (Badeeb et al., 2016).

This resource curse which has been well documented in the literature (Mignamissi & Kuete, 2020; Asiedu, 2013; Van der Ploeg, 2010; Robinson, Torvik, & Verdier, 2006; Papyrakis & Gerlagh, 2004; Ross, 2003; Sachs & Warner, 2001; Gylfason, Herbertsson, & Zoega, 1999), clearly highlights the adverse role natural resources play in an economy.

There are many theoretical explanations of the natural resource curse. Firstly, volatility in commodity prices is a serious problem (Van der Ploeg, 2010). This is because nations which are wealthy in natural resources tend to concentrate too much of their capital and labor force in just a few industries which depend on natural resources. As a result, they do not invest adequately in other sectors of the economy. Their economies therefore overly become resource dependent, and, hence, they become vulnerable to declines in commodity prices. A sharp decline in the price of commodities badly hurts such economies. Van der Ploeg (2010) also highlighted real exchange rate appreciation, deindustrialization, low savings, and civil conflict as reasons why the resource curse is felt in resource-wealthy nations. Next, government corruption, especially in the developing economies, is a big issue (Standing, 2007). Corrupt rulers tend to abuse public office for their selfish private interests. If a country is rich in valuable natural resources, this may encourage corrupt government officials to exploit the resources and take decisions for their personal benefits, rather than for the general benefit of all citizens. Such actions stifle economic growth. Also, Sachs and Warner (2001) noted that nations with abundant resources have slower growths than nations with limited resources because the resource-abundant nations miss out on export-led growth since prices are generally high in these countries. Moreover, Papyrakis and Gerlagh (2004) noted that when a natural resource is discovered, it leads to a sudden rise in income, causing countries to falsely feel secured, thereby not encouraging them to invest and manage their economy well. Furthermore, the crowding out of manufacturing, poor institutions and bad governance also cause resource-abundant economies to suffer from the curse of natural resources (Busse & Gröning, 2011).

1.3.1 The Dutch Disease Theory

The term "Dutch Disease" initially surfaced in the late 1970s in explaining how the discovery of natural gas in the Holland led to the fall of Dutch manufacturing (Badeeb et al., 2016). As the Dutch massively exported oil to foreign countries, it resulted to a rise in the value of the Dutch currency, making other Dutch exports less competitive in the global market. Eventually, there was very high unemployment and the Dutch economy was badly affected (Corden, 1984).

The Dutch disease is a situation where an increase in natural resource revenue causes real exchange rate appreciation, and this negatively affects the profitability of the service and manufacturing sectors, since resources are re-allocated from the high-skilled manufacturing sectors to the low-skilled resource-dependent sector, thereby inhibiting the growth of the economy (Cavalcanti et al., 2009).

Since then, the term "Dutch Disease" has been used to describe situations where the presence or discovery of natural resources eventually harms a country's economy (Van Wijnbergen, 1984). Not only with natural gas in Holland, but the Dutch disease has also been experienced in many other countries such as with minerals in Australia and with oil in the United Kingdom (Corden & Neary, 1982).

1.3.2 Other Theories

The Dutch disease is not the only theory that explains the natural resource curse, as there are other theories such as the institutional theory, the staples theory of economic growth, and the theory of rent curse (Mignamissi & Kuete, 2020).

The staple theory is a framework used in analyzing how natural resources contribute to development. It is a theory based on economic growth induced by the export of staple products. Gunton (2015) defines staple products as products resulting from the extraction of natural resources, and which require little or no processing before being exported abroad for manufacturing purposes. The staple thesis argues that economic development depends on the degree to which countries rely on the export of staples, and the staple trap model explains that resource-wealthy economies are more reliant on primary exports and for longer periods than similar-size resource-poor nations (Auty, 2000).

The rent-seeking theory implies that an abundance of natural resources encourages non-productive behavior from agents, and provides incentives for the provision of fewer public goods by governments (Cavalcanti et al., 2009). Rent-seeking harms development (Mehlum et al., 2006a).

1.4 Statement of the Problem

The 2007-2008 global financial crisis was a necessary eye-opener. The infamous collapse of Lehman Brothers, the international banking crisis, and the collapse of the global financial system – which all happened in the face of the worldwide economic crisis – and the severe economic ramifications that resulted, all reveal the significance of the financial sector, and how crucial financial development is to all stakeholders in society.

If the financial sector (financial institutions, financial instruments, and financial markets) in all economies are significantly developed, financial crises will rarely occur; and even if one occurs, it will not be as severe and systemic as that of 2007-2008. Besides, other than preventing financial crises, financial development begets economic growth (Elhannani, Boussalem, & Benbouziane, 2016) and reduces poverty (Benyah, 2010). Nawaz et al. (2019) suggested that economic activity is stimulated by an efficient and sound financial system. Moreover, according to Khalfaoui (2015), financial development does not only allow for the restructuring and modernization of banks, but it also ensures resources are optimally allocated, risks are properly diversified away, and financial liberalization results.

Therefore, very significant attention has to be given to the financial sector, and various ways of developing and improving the sector have to be considered. It is therefore incumbent on researchers and scholars to thoroughly look at as many possible determinants of financial development as possible. Ideally, players in the financial sector will benefit from the availability of much information on the various possible indicators of financial development, including natural resources.

The contribution of natural resources is widely discussed in the literature. Unfortunately, in spite of the significance of the financial sector, the literature is scarce when it concerns the resource-finance nexus (Khan et al., 2020; Dwumfour & Ntow-Gyamfi, 2018). Most studies have dwelled on the resource-growth nexus (Ross, 2014; Dwumfour & Ntow-Gyamfi, 2018; Badeeb et al., 2016), with little attention being attached to the resource-finance nexus. To the best of my knowledge, only Gylfason and Zoega (2001) made a major contribution in the resource-finance nexus research area prior to 2010. This is quite surprising considering the significance of financial development, and the financial sector can also be susceptible to the natural resource curse. Also, of all the studies that investigated the "determinants of financial development", only Badeeb and Lean (2017) used natural resources as an independent variable.

If this critical issue is not addressed, then countries which are rich in natural resources will remain ignorant on how these resources can possibly promote or retard the development of their financial sectors. If countries are aware of the influence of natural resources on the development of their financial sectors, then they will be able to act accordingly, depending on if the impact is positive or negative.

This thesis aims to bridge this existing knowledge gap by providing empirical evidence of the connection that natural resources have with financial development. This research will not just contribute to the literature, but it will be a significant academic addition in an area which is currently under-researched.

Besides, of the few papers and articles that have investigated how natural resources influence financial development, no consensus has been arrived at. For instance, while some studies found a positive connection (Shahbaz et al., 2017; Zaidi et al., 2019; Gokmenoglu & Rustamov, 2019; Yıldırım et al., 2020; Dogan, Altinoz, & Tzeremes, 2020), other studies revealed a negative relationship (Dwumfour & Ntow-Gyamfi, 2018; Khan et al., 2020; Badeeb & Lean, 2017; Gylfason & Zoega, 2001; Beck, 2010; Yuxiang & Chen, 2010; Asif et al., 2019; Adetutu et al., 2019; Gaies, 2021; Li et al., 2021). This inconclusive debate implies the need for further research on the subject. This research aims to achieve exactly that.

1.5 Aim of the Thesis

The African continent is rich in natural resources (Nwonwu, 2016; Xiaoman et al., 2021), yet there is very little financial development in the continent (Gwama, 2014). Conversely, many European economies have well developed financial sectors (Zoli, 2007) despite the limited presence of natural resources in Europe (Engerer & Horn, 2009). This thesis will investigate if this is merely a coincidence or if natural resources and financial development have any significant correlations between them.

In line with my research topic, my overarching research aim is to investigate the impact of natural resources on financial development from a global perspective. Achieving my research aim will form the basis for the inductive approach of this research (Gabriel, 2013; Dudovskiy, n.d.).

1.6 Research Gap and Significance of the Thesis

Many studies have looked at how natural resources affect an economy, and whether the resource curse is justifiable or it is merely a myth (see for example: Gylfason et al., 1999; Kronenberg, 2002; Bravo-Ortega & De Gregorio, 2005; Mideksa, 2012; Gunton, 2015; Venables, 2016; Zallé, 2018; Nawaz et al., 2019; Haseeb et al., 2020).

However, very little focus has been given to how natural resources affect financial development.

The significance of this thesis cannot be over-emphasized. Firstly, as mentioned in section 1.4, this is an area which is currently under-researched – the literature is very scarce when it concerns the resource-finance nexus. So, this research is necessary because it will bridge the knowledge gap by contributing to the literature and adding new knowledge to the field. Broadly, this will improve the understanding of the contribution of natural resources in financial sector development. The thesis adds to the literature on both the contribution of natural resources and the determinants of financial development. To the best of my knowledge, of all the studies in the literature that examined the "determinants of financial development", only Badeeb and Lean (2017) considered natural resources as a potential determinant of financial development. Again, it is only by 2019 that many researchers started adding considerably to the resource-finance literature. This thesis intends to bridge this knowledge gap.

Secondly, the contribution of natural resources may vary from nation to nation. Majority of the few studies which examined how natural resources influence financial development limited their scopes to just some particular countries or continents. By looking at the subject from a global perspective, this research will provide empirical evidence from a universal viewpoint.

Again, the findings of this thesis directly benefits resource-wealthy countries, as they will be able to better plan for the allocation of the resources, depending on what impact it has on the development of their respective financial sectors. For example, it may encourage countries to concentrate more capital and labor in exploiting those particular natural resources (if any) which positively impact financial development.

Moreover, financial institutions will benefit from the results of this research. For instance, banks may be encouraged to give out loans to aid in the exploitation of those particular natural resources which will be found to positively impact financial sector development, while limiting loans to projects concerned with resources which adversely impact financial development.

In addition, this research will be beneficial to the society in that, it will enable the community to better appreciate the contribution of natural resources on another important subject (financial development) other than economic growth (which is widely documented in the literature).

Furthermore, this thesis will aid future studies in the field. By adding to the literature, researchers, academicians and scholars will be able to draw on it when they carry out future related researches.

Last but not least, this thesis will encourage further research in the field, as it highlights how important financial development is for long-run sustainable growth, and the subsequent availability of new data and better research techniques will urge researchers to further explore the subject. Considering the rationale of the thesis, this research is worth conducting.

1.7 Data, Methodology and Results

A time series approach has been applied in the thesis for the period 1980-2019. An index for financial development has been obtained from the IMF database, while total natural resources rents (% of GDP) has been used as a measure for natural resources. Other indicators of financial development are included in the model as control variables. All the variables have been log-transformed. Firstly, unit root tests have revealed that all the variables are generally I (1). The Johansen's 3-step procedure has therefore been followed. In the first step of the Johansen's technique, an unrestricted vector autoregressive (VAR) model which satisfies the stability condition has been estimated, with the optimal lag length being found to be 3. The Johansen cointegration test has been performed next, revealing that one cointegrating equation is present. In the final step of the Johansen's method, a vector error correction model (VECM) has been estimated, and the coefficient of the error correction term (ECT) has been found to be negative and statistically significant. The cointegrating coefficients from the VECM validate the natural resource curse, as a statistically significant negative connection has been found between global natural resources and global financial development in the long-run. Causality analysis showed that global natural resources does not Granger-cause global financial development, neither does global financial development Granger-cause global natural resources.

1.8 Structure of the Thesis

The rest of this research is structured as follows: the relevant literatures related to the topic are reviewed in chapter 2; the data, empirical modelling and methodology used in the thesis are described in chapter 3; the empirical findings are presented, discussed, critically analyzed and evaluated, and the research hypotheses are tested in chapter 4; while conclusions, suggestions and recommendations are provided in chapter 5.

Chapter 2

LITERATURE REVIEW

Many researchers have used various data sets and econometric methodologies in attempts to explore the contribution of natural resources in an economy. Theoretically, the natural resource curse hypothesis has been widely investigated in several papers and scholarly articles, and several empirical results have validated the resource curse, even though some studies concluded that it is merely a myth, while other studies found inconclusive results. This chapter reviews the existing literature relevant to the determinants of financial development, the contribution of natural resources in general, and the impact of natural resources on financial development.

2.1 The Determinants of Financial Development

Financial development is very important for the growth of a country's economy (Calderon & Liu, 2003; Ayadi et al., 2014; King & Levine, 1993; De Gregorio & Guidotti, 1995). After the 2007-2008 global financial crisis, many researchers were encouraged to intensively investigate the potential indicators of financial development.

Law and Habibullah (2009) investigated the factors that determine financial development in 27 countries from the G-7 (Canada, France, Germany, Italy, Japan, UK, and USA), Europe, East Asia, and Latin America, using panel data for the period 1980-2001. Their analyses revealed that per capita real income, the quality of institutions, trade openness, and financial liberalization all promote financial development.

In Africa, trade openness has a significantly positive impact on financial development, financial openness has a significantly negative effect on financial development, and the influence of GDP growth rate on financial development is statistically insignificant (Benyah, 2010). Benyah (2010) used both cross-sectional and panel data regression techniques in the study, on data for the period 1975-2006 gotten from the World Bank and the United Nations.

Voghouei et al. (2011) carried out a survey by reviewing the most important studies which have assessed the indicators of financial development. They found that political economy, institutions, trade openness, and legal tradition significantly determine financial development.

Ayadi et al. (2014) looked at what determines financial development across the southern and eastern Mediterranean countries using time-series data from 1985 to 2009. Their empirical findings showed that financial development is positively impacted when there is a collective presence of firm legal institutions, sound democracy, and proper implementation of financial reforms. The study also provided evidences of the negative impacts of inflation and government debt on financial sector development.

Khalfaoui (2015) provided empirical evidence of the factors that indicate financial development from 15 developed and 23 developing countries over the 1997-2013 period, using multiple panel data regression. The study showed that while economic and human development determine financial development in all the countries; macroeconomic stability, and legal and institutional frameworks significantly impact financial development only in the developed world. The paper also proved that nonperforming loans, liquidity rate in the economy, market capitalization, and trade openness significantly determine financial development.

Using a time series approach, Elsherif (2015) studied the factors that determine financial development in Egypt over the 1974-2012 period. Multiple econometric models were applied in the study, including the ADF test, the ARDL, and the Johansen Test for Cointegration. Results showed that while economic growth, trade openness, investment, education, human capital, and per capita GDP all have significantly positive impacts on financial development in Egypt, inflation negatively impacts financial development in the North African nation.

Cherif and Dreger (2016) used panel econometric techniques to study the institutional factors that indicate financial development in the MENA countries, and they found that institutional factors, such as corruption (negative impact) and law and order (positive impact), have relevant effects on financial development.

In their study, Badeeb and Lean (2017) found that the main factors that indicate financial development in the Republic of Yemen are economic growth (positive impact), natural resource dependence (negative impact), trade openness (positive impact), and inflation (impacts depends on the proxy used for financial development).

Ibrahim and Sare (2018) tested the factors which determine financial development in Africa by using the system GMM. Their study relied on panel data from 46 African countries over the 1980-2015 time period, taken from the WDI of the World Bank. Their findings proved that in Africa, both human capital and trade openness, as well as the interaction between them, have strong positive impacts on financial development, albeit trade openness greatly impacts private credit than domestic credit, while the reverse is true for human capital. Their paper also indicated the significantly positive impacts of real GDP per capita and government expenditure on financial development.

Aluko and Ibrahim (2019) estimated the macroeconomic factors that determine financial development in SSA, using balanced panel data of 32 countries over the 1985-2015 time period. They employed the two-step system GMM dynamic panel estimation technique to produce heteroscedasticity-and-autocorrelation-consistent estimates, to control for unobserved time-invariant country-specific effects, and to eliminate endogeneity of any form from the panel model. Their empirical results identified the positive impacts of trade openness, income, and government expenditure on financial development; and the negative effects of inflation on financial development.

But for Badeeb and Lean (2017), it is very evident from the literature that almost no researcher has thought of natural resource rents as a potential determinant of financial development. There is a very significant research gap with respect to the resource-finance nexus, and it is an under-statement, therefore, to conclude that the exploration of natural resources as a possible indicator of financial development, is currently critically under-researched.

2.2 The Role of Natural Resources in an Economy

Natural resources are unevenly distributed globally – while some countries have abundant natural resources, other countries have limited natural resources. Natural resources have a role to play in an economy. Several researchers have tried to confirm if the natural resource curse hypothesis truly exist or if it is merely a myth. According to Collier and Goderis (2008), the natural resource curse hypothesis implies that resource-wealthy nations have slower growths than economies which have limited natural resources. This remains a great area of debate in the literature.

2.2.1 The "Curse" of Natural Resources

A plethora of studies supported the natural resource curse theory and found negative impacts of natural resources in an economy.

2.2.1.1 Negative Impact on Economic Growth and Development

Richard Auty first made mention of the term "natural resource curse" in 1993 (Vahabi, 2017; Mittelman, 2017), but the first empirical confirmation of the negative effect of natural resources on economic growth was done by Sachs and Warner (1995). Since then, many more studies have confirmed the findings of Sachs and Warner (1995).

Gylfason et al. (1999) studied how natural resources are connected to economic growth by relying on cross-sectional and panel data for 125 countries from 1960 to 1992. Empirical results confirmed that the size of the primary sector negatively impacts economic growth by causing real currency appreciation, thereby inhibiting the development of the secondary sector.

Gylfason (2000) used regression analysis to provide empirical evidence of how natural resources negatively influence per capita economic growth across 90 countries from 1965 to 1998. According to the paper, one of the reasons why resource-wealthy nations witness slower economic growths than nations with limited resources, is because nations which are blessed with abundant natural resources tend to feel very confident and have a false sense of security such that they overlook the need for good education and the accumulation of human capital.

The economic performances of more than 70 developing countries over the 1960-1997 period were summarized and analyzed by Auty (2000). In particular, the staple trap model was highlighted. The paper reiterated the adverse influence of natural resources on economic growth, and it was argued that the poor quality of governance in the resource-wealthy countries contributed to this.

Gylfason and Zoega (2001) researched on how natural resources are related to economic growth through saving and investment. Using an 85-country sample, data gotten from the World Bank for 1965 to 1998 are used to estimate three separate models by the seemingly unrelated regression (SUR) procedure. The empirical findings illustrated that high endowment of natural resources inhibits economic growth, since the abundant natural capital crowds out physical capital on average.

Gylfason (2001) reviewed how natural resources are connected to economic growth. The paper emphasized the adverse effect of natural resources on economic growth, owing to the fact that natural capital crowds out other forms of capital. Relatively less trade and foreign investment, more corruption, less education, and less domestic investment in the resource-wealthy economies, were attached as reasons for the natural resource curse.

Kronenberg (2002) investigated role of natural resources in the former Soviet Union member states and the former European communist economies. The study validated the natural resource curse, and this was hugely attributed to the intense corruption in these nations.

In an attempt to analyze the influence of China's reliance on Africa's natural resources on the governance and development in Africa, Alden and Alves (2009) explain that, despite the fact that China provides billions of dollars of resource-backed loans to African countries for infrastructural development, it has proven difficult for the countries to transform this into economic development due to poor governance.

In an attempt to investigate why it has proven so hard for resource-wealthy countries to generally thrive economically, Venables (2016) blamed weak governance in those countries and the incapability of handling resource revenues as the main reasons for the unfortunate situation.

2.2.1.2 Negative Impact on Income

Torvik (2001) explored how natural resources are connected to income. The study applied a model which suggested that, natural resources induce more rent-seeking behavior than productive activities, and this causes a fall in income which exceeds the increase in income generated by the natural resources.

Arezki and van der Ploeg (2010) showed empirically that natural resources negatively impact income per capita, irrespective of whether resource abundance or resource dependence is used as the measure of natural resources.

2.2.1.3 Negative Impact on Welfare and Happiness

From a global perspective, Mignamissi and Kuete (2020) had a look at how natural resource rents influence the subjective wellbeing. They applied the OLS estimation technique on cross-sectional data for 149 countries in the study. Empirical findings from the parametric approaches showed that resource rents adversely impact happiness, with the effects being worst in less developed and less democratic countries.

2.2.1.4 Negative Impact on Foreign Direct Investment (FDI)

Asiedu (2013) researched on how natural resources affect FDI by relying on data for 99 developing countries from 1984 to 2011 averaged over three-year periods, and using the systems GMM estimator to estimate a DPD model. Empirical results validated the FDI-resource curse.

2.2.1.5 Initiation and / or Prolongation of Armed Conflicts and Civil Wars

Herbst (2000) reviewed the various incentives used by rebel leaders in Sub-Saharan Africa in motivating their followers to fight in wars. The paper noted that natural resources are one of such incentives. In particular, the cause of the conflict in Sierra Leone has been attributed to the presence of diamond in the country.

Le Billon (2001) examined how natural resources are connected to armed conflicts. He emphasized the contribution of natural resources in the financing and motivation of armed conflicts.

Ross (2003) summarized the contribution of natural resources in promoting civil wars. The paper noted that by slowing down the economic growth of a country, by making a country's government very corrupt and less accountable, by encouraging inhabitants of resource-wealthy regions to form independent states, and by financing the movements of rebels and secessionists; natural resources cause conflicts, especially in Sub-Saharan Africa.

Ross (2004a) reviewed both quantitative (econometric) and qualitative studies on how natural resources are connected to civil war. It was reported that oil and mineral dependence increases the possibility of conflict, especially separatist conflict; while gemstones, opium, coca, and cannabis tend to cause existing conflicts to last longer.

Ross (2004b) provided evidence of how natural resources are connected to civil wars by looking at 13 civil war cases. He reported that there is a causal connection between natural resource wealth and civil conflicts.

Humphreys (2005) also carried out econometric tests on the impacts of natural resources on conflicts. He found that past natural resource production is more likely to initiate conflicts than is the potential for future production.

Mildner, Lauster and Wodni (2011) also reviewed literatures on the resource-conflict nexus. They also confirmed the presence of weak empirical evidence to support the adverse effects of resource scarcity on peace. Similarly, they also noted the contribution of resource abundance plays in triggering conflicts.

Rustad and Binningsbø (2012) relied on the UCDP data in studying how natural resources relate to post-conflict peace / conflict recurrence. All internal armed conflicts from 1946 to 2006 were coded in the study, and their hypotheses were tested using a piecewise exponential survival model. It was argued that natural resources can cause the recurrence of armed conflicts through disagreements over how the resources are distributed, and if the resources are a main source of funds.

Basedau and Wegenast (2013) studied the connections between ethnicity, natural resources and armed conflict. In their quantitative analysis, they employed logit models for pooled time-series and cross-sectional data. Evidence was found that natural resources (especially oil) increase the possibility of armed conflicts occurring in fractionalized countries.

Koubi et al. (2013) reviewed literatures on the relevance of natural resources in interstate and intrastate armed conflicts. In particular, they noted that even though there is only weak empirical evidence in the literature to support the hypothesis that resource scarcity leads to conflicts, there are more concrete evidences in support of the argument that resource abundance is associated with conflicts.

2.2.1.6 Negative Impact on the Environment / Ecological Footprint

In their exploration of the environmental influence of extracting and exploiting natural resources in Nigeria, Gutti, Aji and Magaji (2012) highlighted the environmental damages that result.

Ahmad et al. (2020) used second-generation panel cointegration methodologies in studying how natural resources impact the ecological footprint, relying on 1984-2016 data. According to their study, natural resources increases the ecological footprint in the long run.

2.2.1.7 Negative Impact on Governance and Institutional Quality

If natural resources deteriorate the quality of institutions, then the countries involved suffer from a double resource curse, since weak institutions strengthen the adverse effect of natural resources on economic growth (Mehlum et al., 2006a).

Using panel data for 124 countries over the 1980-2004 period, Bhattacharyya and Hodler (2009) studied how natural resources connect to corruption. They posited that natural resource rents cause an increase in the level of corruption in the presence of weak democracy. They recommended democratization as a solution for reducing corruption.

2.2.1.8 Negative Impact on Fiscal Policy (Government Expenditure)

Cockx and Francken (2016) verified the influence of natural resources on education spending. In the study, they used a global panel dataset for 140 countries over the 1995-2009 period. The paper clearly reported a negative correlation between resource dependence and public spending on education. This curse on education spending mainly relates to point-source natural resources.

2.2.1.9 Criticisms of the Natural Resource Curse Theory

Sachs and Warner (1995; 2001) and many other researchers have validated the natural resource curse. However, there have been widespread criticisms related to the concept. Daniele (2011) suggested that the resource curse concept is misleading, since it hides the reality that most resource-wealthy economies suffer from the curse of natural resources, not because of the natural resources themselves, but because of the poor governance in these countries. Similarly, contrary to the claims of Sachs and Warner that institutions are irrelevant when it concerns the contribution of natural resources to economic growth, Mehlum et al. (2006a; 2006b) and Arezki and van der Ploeg (2010) posited that the natural resource curse is not universal, since the influence of natural resources on economic growth depends on the quality of institutions. Also, the concept of the resource curse is a red herring since most of the studies that support the theory used resource dependence (instead of resource abundance) as a measure of natural resources, and according to Brunnschweiler and Bulte (2008), resource dependence is not an appropriate exogenous variable. Again, in most of the empirical studies which validated the resource curse, the results are biased since the effects of key parameters such as institutional quality are ignored (Brunnschweiler & Bulte, 2008; Arezki & van der Ploeg, 2010; Mignamissi & Kuete, 2020). Moreover, using Chad and Mauritania as case studies, Auty (2006) illustrated that, natural resources could be a blessing after all if there are good policies in place for the sound management of the resources, and there are many empirical studies in the literature which found natural resources to be a "blessing" rather than a "curse".

2.2.2 The "Blessing" of Natural Resources

Contrary to the consensus that natural resources are a "curse", many empirical studies actually revealed positive correlations.

2.2.2.1 Positive Impact on Economic Growth and Development

In trying to find out what the economic impacts of natural resources were, Mideksa (2012) studied the case of Norway quantitatively. From the pool of OECD countries which are not "blessed" with oil, a synthetic economy – whose per capita GDP prior to the discovery of oil is very similar to that of Norway during the 1953-1971 period, and which is different from the post-oil discovery Norwegian GDP per capita – was estimated. The findings of the paper revealed that petroleum endowment has a very significantly large positive economic impact in the country – approximately 20% of the increase in GDP per capita since 1974 is as a result of the petroleum endowment in Norway.

Unlike a plethora of studies which have focused on cross-country investigations of the resource curse hypothesis, Ji, Magnus and Wang (2013) examined the phenomenon from a within-country perspective in China over the 1990-2008 period, considering 28 mainland provinces in the country. Various econometric approaches were employed, and resource abundance was found to positively affect economic growth.

Many theorists have debated whether natural resources impede or expedite development. Gunton (2015) looked into the contribution of natural resources to the development process by integrating both the dependency analysis and the comparative-advantage analysis into the same framework. The study suggested that the resource sector is capable of providing a significant comparative advantage relative to other economic sectors, since it generates resource rents, albeit there are many risks involved with resource-led growth which are largely caused by poor resource management.

Haseeb et al. (2020) quantified how natural resources influence economic growth in a sample of 5 top economies having the most natural resources in Asia. By using time series data over the 1970-2018 period, and by applying a quantile-on-quantile (QQ) regression methodology, the findings were against the resource curse-economic growth hypothesis.

2.2.2.2 Positive Impact on Income

In their exploration of how natural resources impact income, Cavalcanti et al. (2009) developed a theoretically-derived econometric model, used the Cross-section Dependence (CD) test and a non-stationary panel approach, and applied a fully modified OLS technique on data for 53 countries from 1980 to 2006. Their heterogeneous panel analysis revealed that oil abundance is a blessing since it positively impacts real income.

2.2.2.3 Positive Impact on Welfare and Happiness

Bravo-Ortega and De Gregorio (2005) suggested that natural resources positively impact the level of income in a country, which is good for the welfare of the inhabitants in the country.

2.2.2.4 Positive Impact on FDI

The contribution that natural resources make to FDI in Africa was studied by Asiedu (2005) using panel data for 22 SSA countries over the 1984-2000 period collected from the WDI of the World Bank. Results revealed that natural resources are a positive determinant of FDI.

2.2.2.5 Reduction of the Possibility of the Onset of Armed Conflicts

Brunnschweiler and Bulte (2009) ran three separate regressions – resource dependence, income, and conflict – on a panel dataset of nine five-year periods from 1960 to 2004, in an attempt to examine the influence of natural resources on violent conflicts. They argue that, contrary to numerous conventional claims in the literature, natural resources rather reduce the probability of having conflicts and wars.

2.2.2.6 Positive Impact on Ecological Environment

Zafar et al. (2019) applied the Zivot-Andrews unit root method and the ARDL approach on US data from 1970 to 2015 to investigate how natural resources influence the ecological footprint. Their study revealed that natural resources reduce the ecological footprint.

Khan, Hou and Le (2020) used data for USA from 1971 to 2016 to study what impacts natural resources have on the ecological environment. They applied the structural break Zivot-Andrews and Breakpoint ADF unit-roots tests, the GMM, the GLM, and the robust least-squares in their study. They found that, over the long run, natural resources improve the environmental quality.

2.2.2.7 Positive Impact on Governance and Institutional Quality

Using resource abundance as a measure for natural resources, Brunnschweiler and Bulte (2008) found that natural resources positively affect both economic growth and institutional quality.

Tsani (2012) explored how resource funds connect to governance and institutional quality in 27 resource-wealthy nations. Regression analysis was carried out on pooled time-series and cross-sectional aggregate (country level) data. Empirical results suggested that resource funds combat the resource curse by improving governance and institutional quality, and the results were robust to different samples and assumptions on the error properties of the model used in the study.

2.2.3 Mixed Results on the Contribution of Natural Resources

Some studies did not settle on whether natural resources are a curse or a blessing, as mixed results were reported.

2.2.3.1 Impact on Economic Growth and Development

Gerelmaa and Kotani (2016) showed that the influence of natural resources on economic growth varied over different time periods. In particular, their empirical results suggested that over the 1970-1990 period, the natural resource curse hypothesis and the Dutch disease theory were valid; but from 1990 to 2010, natural resource-wealthy countries had faster economic growths than nations with limited natural resources.

In their meta-analysis of how natural resources impact economic growth, Havranek et al. (2016) quantitatively surveyed 402 different regression specifications which were reported in 33 econometric studies done over two decades. The study noted that roughly 67% of previous studies used per capita GDP measures as dependent variable, the ratio of natural resource exports to GDP was often used as the proxy for natural resources, about 25% of the primary studies focused on oil and ignored other fuels or minerals, approximately 80% of regression specifications relied on cross-sectional data, and about 67% of the studies used the Ordinary Least Squares (OLS) technique as estimation method. Putting all the literatures together, they reported that, overall, if the potential publication bias and method of heterogeneity are taken into consideration, then there is only, at best, weak evidence in support of the resource curse hypothesis

– that is, even though natural resources were found to typically have a negative mean effect on economic growth (-2.14), the standard error of estimate (SEE) was also found to be very large (1.56). In a nutshell, the meta-analysis revealed mixed results with respect to the resource-growth nexus.

2.2.3.2 Impact on Income

Hodler (2005) developed a theoretical model to explain the contribution of natural resources in various countries – and in particular why countries like Angola and Nigeria are "cursed" by natural resources while countries like Botswana and Norway are "blessed" by natural resources. It was postulated that natural resources are a curse (they negatively impact incomes) in heavily fractionalized countries – countries with many rivalling groups like Nigeria – since they cause rent-seeking behavior and fighting among the different rivals, thereby weakening property rights and reducing productive activities by a proportion which is higher than the positive effect the natural resources have on income. Conversely, in less fractionalized economies like Norway, natural resources are rather a blessing (they have a positive effect on incomes), since they cause little or no fighting activities, and, hence, property rights are effective, and the positive influence of natural resources on income is dominant.

2.2.3.3 Impact on Human Capital and Human Development

Cabrales and Hauk (2010) tried to explain how natural resources shape the behavior of politicians and the quality of political institutions. In their paper, they built a theoretical political model to explain the concept of the natural resource curse. They clarified that natural resources negatively impact human capital in nations where the institutional quality is weak, while the relationship is positive in economies with high institutional quality.

Daniele (2011) carried out a research on how natural resources affect human development. Mixed findings resulted – while resource dependence (metals and ores) was found to be negatively correlated with human development, resource abundance (subsoil assets) positively impacts human development. However, these effects are not universal and they depend on the quality of the institutions, as case studies for Botswana, Democratic Republic of Congo and Equatorial Guinea proved.

2.2.3.4 Impact on the Relationship Between Democracy and FDI

Asiedu and Lien (2010) examined how natural resources affect the relationship between democracy and foreign direct investment. Using data for 112 developing countries from 1982 to 2007 averaged over four-year periods, the study estimated a linear dynamic panel-data (DPD) model and found that the influence of democracy on FDI is not dependent on the type of natural resources, but on the size and importance of the resources. Specifically, it was reported that democracy promotes FDI in 90 countries with a low ratio of natural resources to total exports, while democracy negatively affects FDI in 22 countries with higher shares of natural resources in total exports.

2.3 The Impact of Natural Resources on Financial Development

The financial sector can also be vulnerable to the natural resource curse. Thus, although the literature is scarce, some studies also focused on the resource-finance nexus. Prior to 2010, the literature was virtually non-existent when it concerns the resource-finance nexus, with only Gylfason and Zoega (2001) making a major contribution in the area. Not until 2019 did many researchers begin adding considerably to the literature. In fact, to the best of my knowledge, only Gylfason and Zoega (2001), Beck (2010), Yuxiang and Chen (2010), Hattendorff (2013; 2014), Hassan (2013), Bhattacharyya and Hodler (2014), Kurronen (2015), Badeeb and Lean

(2017), Shahbaz et al. (2017) and Dwumfour and Ntow-Gyamfi (2018) attempted to directly investigate how natural resources affects the development of the financial sector prior to 2019.

Gylfason and Zoega (2001) postulated that natural resources lead to slow financial development, thereby indirectly hurting saving and investment.

Beck (2010) suggested the existence of the financial resource curse since resource-based countries were found to have less developed financial systems, smaller banking systems, less income-elastic financial deepening, and less liquid stock markets.

Yuxiang and Chen (2010) used provincial panel data of China to empirically provide evidence of how mineral resources negatively affects financial development.

Hattendorff (2013) looked at the natural resource curse from a financial perspective. The paper proved the presence of less developed financial systems in resource-wealthy economies. Using cross-sectional and panel analysis, the study further suggested that the financial resource curse is due to poor economic diversity, rather than the credit demand of the resource sector firms.

Hassan (2013) examined how natural resource dependence and abundance impact financial development in MENA countries during the 1980-2009 period. A fixed-effect estimator was used in the study. Efficiency and stability were included as extra measures (in addition to the conventional ones) of financial development. The findings pointed that natural resource (especially oil) dependence adversely affects financial development, with the negative effect being higher on banking size (private credit and M2) than on financial efficiency and stability.

By relying on cross-sectional and panel data for 93 countries from 1970 to 2007, Hattendorff (2014) empirically provided an explanation for the financial resource curse. The paper showed that export concentration weakens private credit to GDP. It was posited that volatility and high interest rates may cause a reduction in the size of the financial systems in resource-abundant economies, since they most probably have concentrated export structures.

Bhattacharyya and Hodler (2014) postulated that resource revenues adversely impact contract enforcement and, hence, financial development in nations where the institutional quality is weak. A panel dataset sample of 133 countries was used in the study, covering the 1970-2005 period.

Kurronen (2015) highlighted that resource-dependent economies tend to have relatively smaller banking sectors than non-resource-dependent countries. The study relied on panel data for 128 countries over the 1995-2009 period. After a very low threshold level, the domestic banking sector size becomes negatively correlated with the share of resource export.

Badeeb and Lean (2017) applied the ARDL approach for cointegration and the Granger causality test in their study, and they revealed a negative connection between financial development and oil dependence in the Republic of Yemen.

More recently, a plethora of studies have focused on this area of research. Zaidi et al. (2019) verified the influence of natural resources on financial development in 31 selected OECD countries over the 1990-2016 period. Second-generation econometric techniques were applied, and Cup-FM OLS suggested that natural resources positively impact financial development.

Asif et al. (2019) investigated if the resource curse hypothesis holds true for the financial sector in Pakistan over the 1975-2017 period. Domestic credit to private sector, M2, and market capitalization were used as measures of financial development. ARDL-Bounds testing approach and VAR decomposition analysis were applied in the study. Results showed that forest rents and oil rents positively impact financial development in the short term; while over the long run, coal rents, forest rents, natural gas rents, and oil rents are all inversely related to domestic credit to private sector. In addition, coal rents and oil rents were also found to decrease broad money supply, while natural gas rents decrease market capitalization.

Adetutu et al. (2019) studied how oil booms affect bank-level productivity in Kazakhstan. Monthly microdata on the banking sector from January 2008 to October 2017 obtained from National Bank of Kazakhstan and the Energy Information Administration, were relied upon in the research. It was confirmed that natural resource endowment hinders financial development. More specifically, the study found that there is a significant decline in the total factor productivity (TFP) of banks during oil booms.

Mlachila and Ouedraogo (2019) used data for 68 commodity-rich developing countries from 1980 to 2014 in investigating the validity of the financial resource curse. They empirically found that commodity price shocks negatively impact financial development in resource-abundance economies, with the effect being less in countries with sound institutions.

Gokmenoglu and Rustamov (2019) showed that in the long run, natural resources have a positive influence on financial development in Kazakhstan, Azerbaijan, Russia, and Turkmenistan.

Using nine different measures of financial development and applying quantile regression analysis, Dogan, Madaleno and Altinoz (2020) empirically validated the financial resource curse hypothesis in resource-wealthy countries. They found that natural resources rent negatively impacts both financial markets and financial institutions, with the negative impact on financial markets being the greater.

Guan et al. (2020) employed the Bayer and Hanck cointegration, the ARDL bounds cointegration, and robust econometric techniques (like FMOLS, DOLS, CCR, and the Breitung-Candelon spectral Granger causality testing) in exploring how natural resources link to financial development in China during the 1971-2017 period. As per the empirical findings, natural resources negatively impact financial development in China.

In their attempt to investigate the financial resource curse hypothesis, Dogan, Altinoz and Tzeremes (2020) studied how financial development is linked to four different natural resource revenues (oil rents, coal rents, forest rents, and natural gas rents) in some developed nations. They applied the quantile-regression-with-fixed-effects approach. Empirical results revealed that all the rents are a blessing – they each positively impact financial development – thereby nullifying the financial resource curse hypothesis.

Kassouri, Altıntaş and Bilgili (2020) used a panel of 21 oil-exporting countries from 1984 to 2016 to test their argument that the influence of natural resources on financial development depends on the quality of institutions. They applied panel threshold models in the study, and their argument was validated empirically.

The influence of natural resources on financial development in the emerging seven (E−7) countries from 1990 to 2017 was examined by Sun et al. (2020). Westerlund Panel Cointegration and Augmented Mean Group tests were applied in the research, and it was confirmed that natural resources rent adversely affect financial development.

Umar et al. (2021) assessed the influence of natural resources on the banking sector of oil-dependent countries. Firm-level data was used from quarter one of 2001 to quarter four of 2019 for commercial banks from 12 different oil-producing countries whose oil rent (% of GDP) was at least 20%. A multifaced methodology based on panel regressions was employed in the study, and it was shown that during the oil price boom, the resource trap causes a decline in banking efficiency, credit infections worsens, and there is an increase in the probability of default. The study thus validates the financial resource curse.

Jiang et al. (2021) examined the quantile behavior of the natural resource-financial development relationship in China over the 1981-2018 period. GDP, GFCF, and trade openness were included in the model as control independent variables. A QARDL model was employed in the study, and it was confirmed that the relationship of the variables is quantile-dependent. It was also proven that in China, natural resource rent negatively impacts financial development.

Dellepiane-Avellaneda, Hardiman and Heras (2021) contradicted the argument of Kassouri, Altıntaş and Bilgili (2020) by showing empirically that the financial resource curse can still be manifested even in the presence of good governance and sound institutions.

The existence of the financial resource curse in Nigeria and Ghana was also confirmed by Shobande and Enemona (2021).

Using data from quarter 1 of 2002 to quarter 4 of 2018, Ali, Ramakrishnan and Faisal (2021) explored the influence of natural resources on the stock market sector and the banking sector for the case of Malaysia. The Fourier ADF unit root test, single Fourier and cumulative Fourier Causality, Bootstrapped ARDL, the Fourier ARDL, and Dynamic Ordinary Least Square techniques were applied in the study. Empirical findings revealed a positive and negative connection between natural resources and the stock market sector and the banking sector, respectively.

Li et al. (2021) revisited the resource curse hypothesis, with the intention of investigating the resource-finance nexus in G7 countries from 1980 to 2018. Results showed that over the long run, natural resources are a blessing to G7 economies, albeit the blessings are concerned only through financial market development. With respect to financial institutions, natural resource abundance and utilization were found to induce hemorrhaging. During the short run, natural resources negatively impact financial markets and, hence, financial development.

Chapter 3

DATA AND METHODOLOGY

In this chapter, the data used in the thesis are defined, the main characteristics of the data are described, the empirical model is specified, and the econometric methodology applied in the research is discussed.

3.1 Definition of Data

Table 1: Definition Of Data

Variable	Measure	Definition	Source
Financial Development	Financial Development Index	This is an overall index which is gotten by combining nine different indices which summarize the development of the financial sector in terms of the depth, access, and efficiency of the financial markets and institutions.	IMF (2022)
Natural Resources	Total Natural Resources Rents (% of GDP)	This is the total of all rents from oil, natural gas, coal, minerals, and forest products.	The World Bank (2022)
Economic Growth	GDP per capita (constant 2015 US$)	This is the total value of all the finished goods and services, as a share of midyear population.	The World Bank (2022)
Trade Openness	Trade (% of GDP)	This is the total of all goods and services which are imported and exported, divided by the gross domestic product.	The World Bank (2022)
Population Growth	Population Growth (annual %)	This is the rate at which the midyear population grows exponentially year-on-year, expressed as a percentage.	The World Bank (2022)
Investments	Gross Fixed Capital Formation (% of GDP)	This relates to investments in the form of purchases of property, plant, and equipment; land improvements; roads and railways constructions; and constructions of buildings	The World Bank (2022)

	(schools, hospitals, offices, private residences, commercial and industrial buildings)

This thesis relies on annual data for all countries in the world over the period 1980-2019. Table 1 shows the proxies and definitions of the variables, as well as the data sources. All the data are world aggregates. Financial Development is the dependent variable, Natural Resources is the independent variable of interest, while Economic Growth, Trade Openness, Population Growth, and Investments are potential determinants of financial development which are used as control variables.

The control variables have been selected based on the evidence from the existing literature. Trade openness clearly impacts financial development positively (Law & Habibullah, 2009; Benyah, 2010; Voghouei et al., 2011; Takyi & Obeng, 2013; Raza et al., 2014; Khalfaoui, 2015; Elsherif, 2015; Badeeb & Lean, 2017; Ibrahim & Sare, 2018; Aluko & Ibrahim, 2019); while population growth (Raza et al., 2014), economic growth (Raza et al., 2014; Khalfaoui, 2015; Elsherif, 2015; Badeeb & Lean, 2017; Ibrahim & Sare, 2018), and investments (Huang, 2011; Elsherif, 2015) are also indicators of financial development. Jiang et al. (2021) also used GDP, GFCF, and trade openness as control independent variables in their study of the influence of natural resources on financial development in China. These control variables help limit the omitted variable bias.

There are many other measures of financial development such as domestic credit to the private sector (% of GDP) (Raza et al., 2014; Badeeb & Lean, 2017; Asif et al., 2019), M2 as the share of GDP (Badeeb & Lean, 2017; Asif et al., 2019), the size of deposits relative to GDP (Badeeb & Lean, 2017), market capitalization (Asif et al., 2019), financial system depth (Emenalo et al., 2017), and financial system access (Emenalo et al., 2017). However, an index sourced from the IMF database has been used as a measure for financial development in this thesis.

As a measure for natural resources, some studies used natural resource abundance (Yuxiang & Chen, 2010; Hassan, 2013; Hattendorff, 2014; Shahbaz et al., 2017; Gokmenoglu & Rustamov, 2019; Li et al., 2021), while others used natural resource dependence (Gylfason & Zoega, 2001; Hassan, 2013; Kurronen, 2015; Badeeb & Lean, 2017). Consistent, however, with the works of Asif et al. (2019); Yıldırım et al. (2020); Dogan, Altinoz and Tzeremes (2020); Sun et al. (2020); Mignamissi and Kuete (2020); and Jiang et al. (2021), resource rents have been used in this thesis as a measure for natural resources.

3.2 Descriptive Statistics

Table 2: Descriptive Statistics

Variable	Number of observations	Mean	S.D	Min	Max	JB
lnFD	40	-1.424654	0.266668	-1.965113	-1.137093	4.067793
lnNR	40	0.856153	0.459664	-0.072383	1.816429	1.628248
lnGDP	40	8.968727	0.197142	8.674179	9.307410	2.819982
lnTR	40	3.838336	0.198701	3.534866	4.106579	4.286072
lnPOP	40	0.342855	0.168787	0.064472	0.588059	3.940216
lnGFCF	40	3.190834	0.036810	3.119751	3.284855	0.935943

NOTE: Author's construction. FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015

US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). The variables are all log-transformed.

The main characteristics of the data are shown in Table 2. In logarithmic form, the mean values of the global financial development index, total natural resources rents (% of GDP), gross domestic product per capita (constant 2015 US$), trade (% of GDP), population growth (annual %), and gross fixed capital formation (% of GDP) are -1.42, 0.86%, $8.97, 3.84%, 0.34%, and 3.19%, respectively. The respective standard deviations are 0.27, 0.46%, $0.20, 0.20%, 0.17% and 0.04%, implying that the GFCF data have the least variation (they are closest to their mean value on average), while the NR data are furthest from their mean value on average. This is reflected by the fact that the GFCF dataset has the smallest range (maximum value – minimum value) of 0.17, while the NR has the widest range (span) of 1.89.

With respect to the distribution of the data, the probability values of the JB test statistic of all the variables are greater than 10%. Hence, for all the variables, even at 10% level of significance, we are not able to reject the null hypothesis that the data are normally distributed. Hence, normality is plausible in the data of all the variables. The time span is not small, as 40 years of observation is sufficient for the establishment of long-run relationships among the variables. The time series data covers the 1980-2019 period for all global countries.

3.3 Model Specification

In order to empirically investigate the impact of natural resources on financial development, a model is specified where financial development is a linear function of natural resources and some other determinants of financial development which are introduced into the model as control variables (economic growth, trade openness, population growth, and investment). The linear function is:

$lnFD_t = f\,(lnNR_t, lnGDP_t, lnTR_t, lnPOP_t, lnGFCF_t)$ (1)

From equation (1), the following empirical model is specified:

$lnFD_t = ß_0 + ß_1(lnNR_t) + ß_2(lnGDP_t) + ß_3(lnTR_t) + ß_4(lnPOP_t) + ß_5(lnGFCF_t) + u_t$ (2)

where FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015 US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). FD is the dependent variable (regressand); NR is the independent variable (regressor) of interest; and GDP, TR, POP and GFCF are control independent variables. The variables are all log-transformed. $ß_0$ is the intercept (constant term); $ß_1$, $ß_2$ … $ß_5$ are the partial coefficients of the independent variables; t is the time period; and u_t is the stochastic error term. The model is linear both in the variables and in the parameters.

3.4 Methodology

In the literature, many different methodologies have been used to examine the effect of natural resources on financial development. For example, Yuxiang and Chen (2010); Bhattacharyya and Hodler (2014); Kurronen (2015); Dwumfour and Ntow-Gyamfi (2018); Kassouri, Altıntaş and Bilgili (2020); Sun et al. (2020); Umar et al. (2021); and Gaies (2021) all applied panel data techniques in their study, while Hattendorff (2013) and Hattendorff (2014) used cross-sectional analysis. Consistent with the time-series methodologies applied in the works of Badeeb and Lean (2017), Shahbaz et al. (2017), Asif et al. (2019), Guan et al. (2020), Khan et al. (2020), and Ali et al. (2021), a time series approach has also been applied in this thesis. Time series data which spans from 1980 to 2019 for all countries in the world (global perspective) has been used to empirically study the impact of natural resources on financial development. The analyses have been done in the following order: unit root and stationarity tests, VAR model, Johansen test for cointegration, VECM, Granger causality test, and diagnostic checks.

3.4.1 Unit Root and Stationarity Tests

In time series analysis, the initial step is always to check whether or not the variables are stationary. This is because the non-stationarity of the variables may result to spurious regressions, unreliable hypothesis test results (since t ratios will not follow t distributions and F statistics will not follow F distributions), and shocks to the system will remain persistent. There are many unit root tests, but the most common conventional ones – the ADF and PP unit root tests – as well as the KPSS stationarity test have been applied in checking whether or not the variables are stationary, and in determining the order of integration of the variables. All three models (trend and intercept, intercept, and none) have been included in both the ADF and PP non-stationarity tests; while in the KPSS stationarity test, both the trend and intercept model and the intercept-only model have been included. Generally, all the variables have been found to be I (1), since majority of the tests confirmed them to be stationary at their first differences, rather than at their level forms.

3.4.2 Vector Autoregressive (VAR) Model

Since all the variables are I (1), the Johansen's procedure (Johansen, 1991; 1995) has been followed. In the first step of the Johansen's procedure, an unrestricted Vector Autoregressive (VAR) model has been estimated to determine the optimal lag length to use in the Johansen cointegration test and in estimating the VECM. Based on the AIC, the SC, and the HQ, the optimal lag length has been established to be three. Thereafter, in order to trust the VAR's suggestion of the optimal lag length, the stability of the VAR has been checked by looking at both the autoregressive roots table and autoregressive roots graph to be sure that none of the roots lie outside the unit circle. The VAR has been found to satisfy the stability condition.

3.4.3 Cointegration Test

Since the variables are generally I (1), it means that stationarity is induced by taking the first differences. By differencing, the long-run properties of the variables are being compromised. Hence, it is necessary to run cointegration tests to check if the variables are in a long-run relationship. Cointegrating relationship (s) exist if there is a stationary linear combination of non-stationary variables (Engle & Granger, 1987); and in order to run cointegration tests, all the variables have to be integrated of the same order. In the second step of the Johansen's procedure, the Johansen cointegration test has been used to check if the variables are in a long-run relationship, and to find out how many cointegrating equations are present. In order to determine the exact number of cointegrating equations present, the null hypotheses of no cointegrating equation, not more than one cointegrating equation, not more than two cointegrating equation, and so on, have been tested sequentially until a point has been reached where the null hypothesis can no longer be rejected. Two test statistics – the trace statistic and the maximum eigen value – have been used in testing these hypotheses.

3.4.4 Vector Error Correction Model (VECM)

Since pure first difference models do not have a long-run solution, it is essential to estimate a VECM which uses combinations of first differenced and lagged levels of the variables as follows:

$$\Delta lnFD_t = ß_1\Delta lnNR_t + ß_2\Delta lnGDP_t + ß_3\Delta lnTR_t + ß_4\Delta lnPOP_t + ß_5\Delta lnGFCF_t + ß_6(lnFD_{t-1} - \gamma_1 lnNR_{t-1} - \gamma_2 lnGDP_{t-1} - \gamma_3 lnTR_{t-1} - \gamma_4 lnPOP_{t-1} - \gamma_5 lnGFCF_{t-1}) + u_t \quad (3)$$

where $lnFD_{t-1} – γ_1lnNR_{t-1} – γ_2lnGDP_{t-1} – γ_3lnTR_{t-1} – γ_4lnPOP_{t-1} – γ_5lnGFCF_{t-1}$ is the ECT; $ß_6$ is the coefficient of the ECT; $γ_1, γ_2, …, γ_5$ are the cointegrating coefficients of the independent variables; and $ß_1, ß_2, …, ß_5$ are the short-run coefficients of the independent variables.

In the third step of the Johansen's procedure, using a lag interval corresponding to the optimal lag length minus one (as a rule of thumb), the aforementioned VECM has been estimated with the deterministic trend assumption where cointegration was found. The coefficient of the ECT shows the speed of adjustment of the global financial development towards its long-run equilibrium value, following a short-run shock. The VECM has corrected for any previous-year deviation from the long-run equilibrium value of the global financial development, and it is appropriate for examining long-run relationships since the coefficient of the ECT has been found to be negative and statistically significant.

3.4.5 Granger Causality Test

Granger causality tests under the block exogeneity Wald tests of the VECM have been applied to estimate the directions of the relationships between the variables. That is, to determine if there are any unidirectional or bi-directional causalities from any of the variables to others.

3.4.6 Diagnostic Checks

Diagnostic checks have also been done to ensure that the residuals are free from serial correlation, heteroscedasticity and non-normality. In particular, the Portmanteau autocorrelation test, the autocorrelation LM test, the normality tests, and the residual heteroscedasticity test (Levels and Squares) were performed.

Chapter 4

RESULTS AND ANALYSES

In this chapter, the findings are presented and analyzed. Firstly, a priori expectations (research hypotheses) are set based on the graphs of the variables and the information gathered from the existing literature. Thereafter, the empirical results are discussed and compared to the a priori expectations (research hypotheses).

4.1 Preliminary Evidence and Research Hypotheses

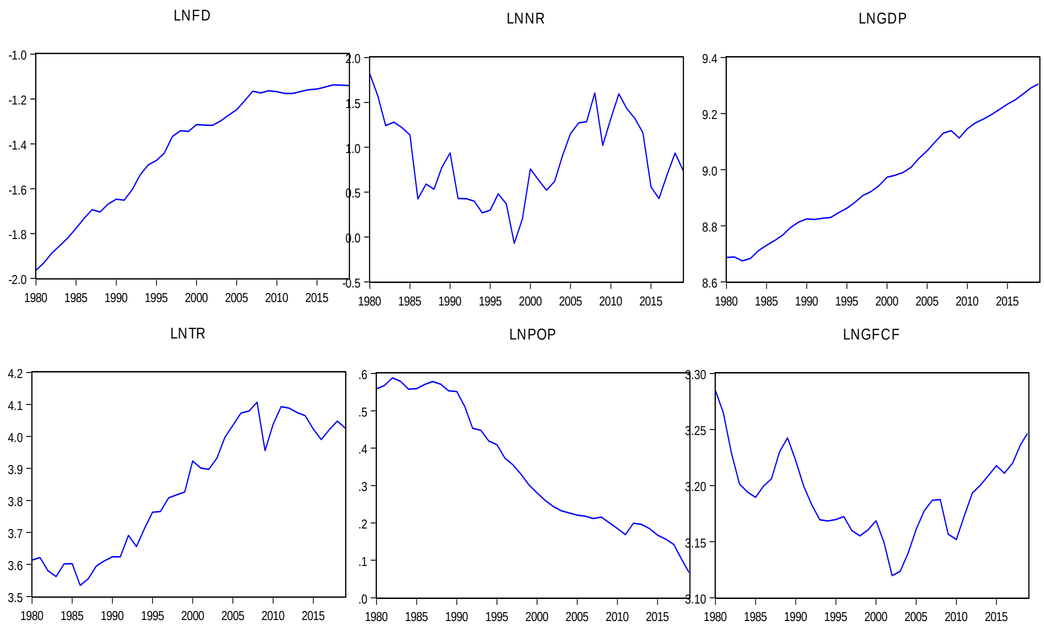

Figure 2: Line Graphs of lnFD, lnNR, lnGDP, lnTR, lnPOP, and lnGFCF. Source: Author's construction using the data collected from the IMF and World Bank

Looking at the graphs in Figure 1, we see that there are fluctuations in the lnNR graph, while the lnFD graph has a steady upward trend. From 1980 till about 1998, there was a negative relationship between lnNR and lnFD – a decrease in lnNR caused an increase in lnFD, on average. From 1998 till about 2007-2008 when there was a global financial crisis, natural resources were seen to be positively connected to financial development, as an increase in natural resources led to an increase in global financial development, on average. After 2010, the negative correlation has again been apparent. Based on this, and coupled with the evidences from the literature (Gylfason & Zoega, 2001; Beck, 2010; Yuxiang & Chen, 2010; Hattendorff, 2013; Hassan, 2013; Hattendorff, 2014; Bhattacharyya & Hodler, 2014; Kurronen, 2015; Badeeb & Lean, 2017; Dwumfour & Ntow-Gyamfi, 2018; Adetutu et al., 2019; Dogan, Madaleno & Altinoz, 2020; Guan et al., 2020; Sun et al., 2020; Khan et al., 2020**;** Umar et al., 2021; Jiang et al., 2021; Shobande & Enemona, 2021), the sign of the coefficient of lnNR is expected to be negative. That is, the natural resource curse is expected to be validated and to also apply to the development of the financial sector.

From the graphs, a positive long-run relationship is observed between lnGDP and lnFD and between lnTR and lnFD. On average, from 1980 to 2019, an increase in lnGDP led to an increase in lnFD, and an increase in lnTR also led to an increase in lnFD. These are consistent with many studies in the literature which revealed that trade openness is positively connected to financial development (Law & Habibullah, 2009; Benyah, 2010; Voghouei et al., 2011; Takyi & Obeng, 2013; Raza et al., 2014; Khalfaoui, 2015; Elsherif, 2015; Badeeb & Lean, 2017; Ibrahim & Sare, 2018; Aluko & Ibrahim, 2019) and economic growth is positively connected to financial development (Raza et al., 2014; Elsherif, 2015; Badeeb & Lean, 2017; Ibrahim & Sare, 2018). A negative long-run relationship is observed between lnPOP and lnFD. On average, from 1980 to 2019, a decrease in lnPOP led to an increase in lnFD. Similar to the lnNR graph, there are lots of fluctuations in the lnGFCF graph. From 1980 till about 2002, a negative relationship (on average) was observed between lnGFCF and lnFD, while a positive relationship (on average) was observed thereafter. Based on these, the signs of the coefficients of lnGDP, lnTR, lnPOP and lnGFCF are expected to be positive, positive, negative and positive, respectively. Huang (2011) and Elsherif (2015) also found investments to positively impact financial development. The a priori expectations (research hypotheses) are summarized in table 3.

As seen in Figure 1, the graphs of lnFD, lnGDP, and lnPOP clearly look like a trend-stationary process (deterministic non-stationarity), the graph of lnTR slightly looks like a random walk process (stochastic non-stationarity), and structural breaks can visually be seen from the graphs of lnNR and lnGFCF.

Table 3: A Priori Expectations

Variable	Expected Impact on lnFD
lnNR	Negative (-)
lnGDP	Positive (+)
lnTR	Positive (+)
lnPOP	Negative (-)
lnGFCF	Positive (+)

NOTE: Author's construction. FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015 US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). The variables are all log-transformed.

These a priori expectations (research hypotheses) will be tested by comparing them with the actual empirical findings, and these will form the basis for the deductive approach of this research (Gabriel 2013; Dudovskiy n.d.).

4.2 Empirical Findings

4.2.1 Unit Root and Stationarity Tests

Table 4 shows the results of the unit root and stationarity tests which have been performed to check the stationarity of the variables and their respective order of integration. For the non-stationarity (unit root) tests (ADF and PP), the null hypothesis is that the variable has a unit root (variable is non-stationary). For the stationarity test (KPSS confirmatory test), the null hypothesis is that the variable is stationary.

Table 4: Non-Stationarity (Unit Root) And Stationarity Test Results

Level Form	lnFD	lnNR	lnGDP	lnTR	LnPOP	lnGFCF
τT (ADF)	-0.18	-2.69	-2.99	-1.83	-1.72	-1.01
τμ (ADF)	-2.57	-1.89	1.06	-0.84	0.58	-1.43
τ (ADF)	-0.47	-1.23	8.25	1.42	-3.65*	0.17
τT (PP)	-0.30	-2.65	-3.08	-1.73	-2.02	-1.84
τμ (PP)	-1.79	-2.56	1.21	-0.76	0.28	-2.29
τ (PP)	-5.85*	-1.76***	8.19	1.70	-2.77*	-0.32
τT (KPSS)	0.20**	NA	NA	NA	NA	NA
τμ (KPSS)	0.74*	NA	NA	NA	NA	NA
First Difference	**Δ** lnFD	**Δ** lnNR	**Δ** lnGDP	**Δ** lnTR	**Δ** lnPOP	**Δ** lnGFCF
τT (ADF)	-4.00**	-5.49*	-4.82*	-6.82*	-4.09**	-5.32*
τμ (ADF)	-3.80*	-5.53*	-4.81*	-6.91*	-4.10*	-4.88*
τ (ADF)	-1.50	-5.57*	-2.34**	-6.58*	-2.81*	-4.98*
τT (PP)	-4.99*	-6.19*	-4.86*	-6.83*	-4.09**	-3.34***
τμ (PP)	-3.77*	-6.24*	-4.80*	-6.92*	-4.10*	-2.83***
τ (PP)	-2.47**	-6.31*	-2.34**	-6.59*	-2.65*	-2.93*
τT (KPSS)	NA	NA	NA	NA	NA	0.08
τμ (KPSS)	NA	NA	NA	NA	NA	0.47**

Note: Author's construction. ADF is the Augmented Dickey-Fuller unit root test; PP is the Phillips-Perron unit root test; KPSS is the Kwiatkowski et al. stationarity test; τT stands for the intercept and trend model; τμ stands for the intercept-only model; and τ stands for the none model. NA means it was not necessary to perform the confirmatory test. Numbers in brackets show the optimum lag length. *, **, *** show that the null hypothesis is being rejected at the 1%, 5%, and 10% significance levels, respectively.

For the lnFD variable, with the exception of the most restricted model (the none model) under the PP test, both the ADF and PP unit root tests shows that for all the other models, the variable is non-stationary at its level form, since we are not able to reject the null hypothesis of non-stationarity at 5% level of significance. The KPSS stationarity test also confirmed the non-stationarity of the lnFD variable at its level form. Both models of the KPSS test indicate that the null hypothesis that the variable is stationary at its level form is rejected at the 5% significance level. With the exception of the none model (the model without intercept and trend) under the ADF test, with all the other models under both ADF and PP unit root tests, we are able to reject the null hypothesis that the lnFD variable is non-stationary at its first difference, at 5% level of significance. The none model is the most restricted model, so its result on its own is not too important. Hence, it was not necessary to perform the KPSS confirmatory test in this case. We therefore conclude that the lnFD variable has a unit root at level form, and it is stationary at its first difference. Thus, lnFD is integrated of order 1.

For the lnNR variable, both the ADF and PP unit root tests show that based on all three models (intercept and trend model, intercept model, none model), the null hypothesis that the variable has a unit root at its level form cannot be rejected at the 5% significance level. Hence, the lnNR variable is clearly non-stationary at its level form, and performing the KPSS confirmatory test was not necessary. Both the ADF and PP unit root tests also show that based on all three models, the null hypothesis that the lnNR variable has a unit root at its first difference is rejected at the 5% significance level. Again, the KPSS stationarity test was not necessary here, since the ADF and PP unit root tests did not give conflicting results. Hence, lnNR is non-stationary at level form, and it is stationary at its first difference. We therefore conclude that lnNR is integrated of order 1.

For the lnGDP variable, both the ADF and PP unit root tests show that based on all three models (intercept and trend model, intercept model, none model), the null hypothesis that the variable has a unit root at its level form cannot be rejected at the 5% significance level. Hence, the lnGDP variable is clearly non-stationary at its level form, and performing the KPSS confirmatory test was not necessary. Both the ADF and PP unit root tests also show that based on all three models, null hypothesis that the lnGDP variable has a unit root at its first difference is rejected at the 5% significance level. Again, the KPSS stationarity test was not necessary here, since the ADF and PP unit root tests did not give conflicting results. Hence, lnGDP is non-stationary at level form, and it is stationary at its first difference. We therefore conclude that lnGDP is integrated of order 1.

For the lnTR variable, both the ADF and PP unit root tests indicate that based on all three models (intercept and trend model, intercept model, none model), at the 5% level of significance, we cannot reject the null hypothesis that the variable has a unit root at its level form. Hence, the lnTR variable is clearly non-stationary at its level form, and performing the KPSS confirmatory test was not necessary. Both the ADF and PP unit root tests also show that based on all three models, at the 5% level of significance, we reject the null hypothesis that the lnTR variable has a unit root at its first difference. Again, the KPSS stationarity test was not necessary here, since the ADF and PP unit root tests did not give conflicting results. Hence, lnTR is non-stationary at level form, and it is stationary at its first difference. We therefore conclude that lnTR is integrated of order 1.

For the lnPOP variable, with the exception of the none model in both the ADF and PP unit root tests, all the other models indicate that the null hypothesis that the variable has a unit root at its level form cannot be rejected at the 5% significance level. The none model is the most restricted model, so its result on its own is not too important. Hence, it was not necessary to perform the KPSS confirmatory test in this case, and we conclude that the lnPOP variable has a unit root at its level form. Both the ADF and PP unit root tests also show that based on all three models (intercept and trend model, intercept model, none model), the null hypothesis that the lnPOP variable has a unit root at its first difference is rejected at the 5% significance level. Again, the

KPSS stationarity test was not necessary here, since the ADF and PP unit root tests did not give conflicting results. Hence, lnPOP is non-stationary at level form, and it is stationary at its first difference. We therefore conclude that lnPOP is integrated of order 1.

For the lnGFCF variable, both the ADF and PP unit root tests indicate that based on all three models (intercept and trend model, intercept model, none model), the null hypothesis that the variable has a unit root at its level form cannot be rejected at the 5% significance level. Hence, the lnGFCF variable is clearly non-stationary at its level form, and performing the KPSS confirmatory test was not necessary. Four out of the six models of the ADF and PP unit root tests show that the null hypothesis that the lnGFCF variable has a unit root at its first difference is rejected at the 5% significance level. In order to be sure of the result, the KPSS confirmatory test was performed, and the least restricted model of the test (the intercept and trend model) indicated that the null hypothesis that the lnGFCF variable is stationary at its first difference cannot be rejected at the 5% significance level. Hence, lnGFCF is non-stationary at level form, and it is stationary at its first difference. We therefore conclude that lnGFCF is integrated of order 1.

Generally, all the variables are I (1). We therefore proceed by following the three-step Johansen's procedure (Johansen, 1991; 1995). The three-step Johansen's technique involves estimating an unrestricted standard vector autoregressive (VAR) model, performing the Johansen cointegration test, and then estimating a VECM to determine the cointegrating and short-run coefficients, as well as the coefficient of the ECT.

4.2.2 Vector Autoregressive (VAR) Model

In the first step of the Johansen's procedure, a Vector Autoregressive (VAR) model is estimated to establish the optimal lag length to be used in the Johansen cointegration test and in estimating the VECM. The standard VAR is estimated using a lag interval of one-to-one for endogenous variables (lnFD, lnNR, lnGDP, lnTR, lnPOP, lnGFCF). An exogenous variable (a constant) is also included. In establishing the optimal lag length, 3 lags have been included in the lag specification. The selection of the optimal lag length based on various information criteria is provided in Table 5.

Table 5: Optimal Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	310.1566	NA	2.92e-15	-16.44090	-16.17967	-16.34880
1	552.4316	392.8784	4.31e-20	-27.59090	-25.76229*	-26.94623
2	597.8781	58.95756*	3.04e-20	-28.10152	-24.70553	-26.90427
3	646.9868	47.78145	2.37e-20*	-28.81010*	-23.84673	-27.06028*

NOTE: Author's construction. LR is sequential modified LR test statistic (each test at 5% level); FPE is Final prediction error; AIC is Akaike information criterion; SC is Schwarz information criterion; and HQ is Hannan-Quinn information criterion. * shows the lag order selected by the criterion.

As can be seen from Table 5; based on LR, the lag order is 2; based on FPE, the lag order is 3; based on AIC, the lag order is 3; based on SC, the lag order is 1; and based on HQ, the lag order is 3. Lag order 3 is not only selected by the AIC, but it is also selected the highest number of times amongst AIC, SC, and HQ; and amongst all 5 criteria. Hence, the optimal lag length is 3.

Now, in order to trust the VAR's suggestion of the optimal lag length, the stability of the VAR is checked by looking at both the autoregressive (AR) roots graph and the autoregressive roots (AR) table, and the results are presented in Figure 2 and Table 6, respectively.

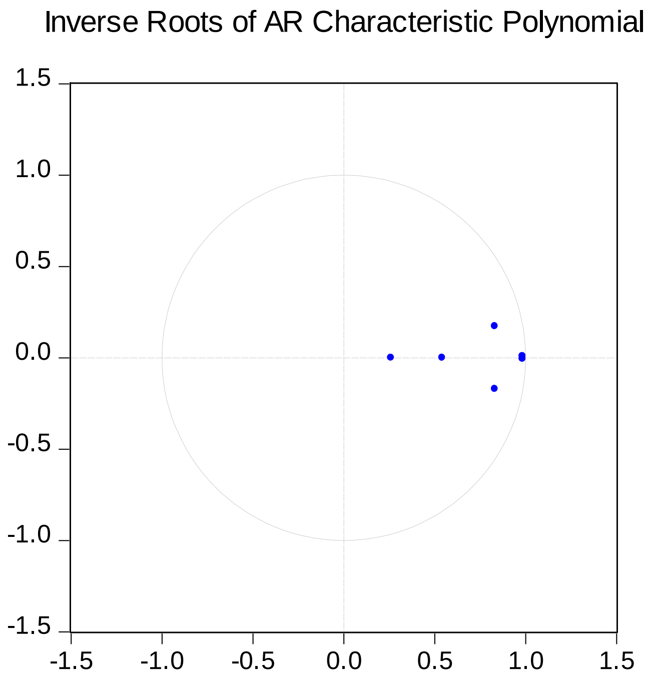

Figure 2: AR Roots Graph. Source: Author's construction using the data collected from the IMF and World Bank

Table 6: Moduli Of AR Roots

Root	Modulus
0.984670 - 0.007726i	0.984700
0.984670 + 0.007726i	0.984700
0.832839 - 0.172309i	0.850477
0.832839 + 0.172309i	0.850477
0.542673	0.542673
0.260418	0.260418

NOTE: Author's construction. The endogenous variables are lnFD, lnNR, lnGDP, lnTR, lnPOP, and lnGFCF. The constant term is the exogenous variable. The lag specification is one-to-one.

Looking at the AR roots graph in Figure 2, all the roots lie within the unit circle. Also, as seen from the AR roots table (Table 6), the moduli of all the roots are less than one. Thus, the VAR satisfies the stability condition. Since the VAR is stable and the optimal lag length is established, we then proceed to step 2 of the Johansen's technique, which is to perform the Johansen cointegration test to check whether or not there is a long-run relationship between the variables, and to find out how many cointegrating equations are present (if any).

4.2.3 Cointegration Test

With the Johansen test for cointegration, two test statistics – the Trace statistic and the maximum Eigenvalue – are used in making the decision. The hypotheses for the test are as follows:

H_0: Zero cointegrating equation present ($r = 0$)

H_1: At least one cointegrating equation present.

H_0: Not more than one cointegrating equation present ($r < 1$)

H_1: At least two cointegrating equations present.

H_0: Not more than two cointegrating equations present ($r < 2$)

H_1: At least three cointegrating equations present.

H_0: Not more than three cointegrating equations present ($r < 3$)

H_1: At least four cointegrating equations present.

H_0: Not more than four cointegrating equations present ($r < 4$)

H_1: At least five cointegrating equations present.

H_0: Not more than five cointegrating equations present ($r < 5$)

H_1: At least six cointegrating equations present.

The null hypotheses are tested sequentially until a point is reached where the null hypothesis can no longer be rejected. At this point, the exact number of cointegrating equations is determined.

With the deterministic trend assumption of *intercept and trend in CE – no intercept in VAR*, with a lag length of 1 (lag interval of 1 to 1) for differenced endogenous variables, with MHM critical values, with a 1% test size, and with no exogenous variables included, cointegration was found. The results of the tests are shown in Table 7.

Table 7: Johansen Cointegration Test Statistics

Trace						Maximum Eigenvalue					
r = 0	r < 1	r < 2	r < 3	r < 4	r < 5	r = 0	r < 1	r < 2	r < 3	r < 4	r < 5
140.28*	89.29	52.06	31.42	17.55	5.76	50.99*	37.23	20.64	13.87	11.80	5.76

NOTE: Author's construction. r = 0, r < 1, r < 2, r < 3, r < 4, and r < 5 are null hypotheses indicating no cointegrating equation, not more than one cointegrating equation, not more than two cointegrating equations, not more than three cointegrating equations, not more than four cointegrating equations and not more than five cointegrating equations, respectively. * shows that the null hypothesis is being rejected at the 1% level of significance.

At the 1% level of significance, we reject the null hypothesis that there is no cointegrating vector present (r = 0), since both the trace statistic and the max-eigen statistic are greater than the respective critical values, and the respective p-values are less than 1%. We therefore accept the alternative hypothesis that there is at least one cointegrating vector present. Since the r = 0 null hypothesis is rejected, the r < 1 null hypothesis is then tested.

At the 1% level of significance, we are not able to reject the null hypothesis that there is at most one cointegrating vector present (r < 1), since both the trace statistic and the max-eigen statistic are less than the respective critical values, and the respective p-values are greater than 1%. Hence, just one cointegrating vector is present. Since we have found a cointegrating vector, we thus conclude that our variables are cointegrated (they are in a long-run relationship).

Since cointegration has been found, we therefore move to the third step of the Johansen's procedure, which is to estimate a VECM in order to determine the long-run (cointegrating) and short-run coefficients of the variables, as well as the speed of adjustment of financial development towards its long-run equilibrium – depicted by the coefficient of the ECT.

4.2.4 Vector Error Correction Model (VECM)

The VECM is estimated using a lag interval of 1 to 2 for differenced endogenous variables, which is equivalent to the optimal lag length (lag 3) minus 1 (as a rule of thumb). No exogenous variables are included. With a deterministic trend specification of *intercept and trend in CE – no trend in VAR* and with a rank of one cointegrating equation (as determined by the Johansen cointegration test), the results of the VECM are obtained, as shown in Tables 8, 9 and 10.

The short-run and cointegrating (long-run) coefficients of the variables as estimated by the VECM are shown in Tables 8 and 9, respectively.

Table 8: Short Run Coefficients Of Variables

Dependent variable	Regressors D(lnFD(-1))	D(lnNR(-1))	D(lnGDP(-1))	D(lnTR(-1))	D(lnPOP(-1))	D(lnGFCF(-1))
D(lnFD)	0.183340	0.017567	0.383843	-0.394586	-0.590938	0.489392
	[1.14266]	[0.97221]	[0.78208]	[2.06558]	[-2.56948]	[1.27263]

NOTE: Author's construction. FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015 US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). The variables are all log-transformed. Numbers in square brackets are t-statistics of each coefficient

Table 9: Long Run Coefficients Of Variables

Dependent variable	Regressors lnNR	lnGDP	lnTR	LnPOP	lnGFCF
lnFD	0.121858 [4.04841]	3.557347 [5.74053]	-2.269914 [-8.50019]	-1.229030 [-3.40638]	-0.900810 [-2.58183]

NOTE: Author's construction. FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015 US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). The variables are all log-transformed. Numbers in square brackets are t-statistics of each coefficient.

Table 8 shows the short-run coefficients of the variables. With the exception of D(lnTR(-1)) and D(lnPOP(-1)) whose respective t-statistics are greater than 2 in absolute value, the short-run coefficients of all the other variables are statistically insignificant since, following the rule of thumb, their respective t-statistics are less than 2 in absolute value, meaning that the null hypothesis of no-significance cannot be rejected. Thus, over the short-run, global natural resources, global economic growth and global investments have no statistically significant impact on the global financial development. In interpreting the short-run impacts of global trade openness and population growth on financial development, the signs of the coefficients are reversed. A 1% rise in the global trade openness causes a 0.39% increase in the global financial development on average over the short-run, provided the effects of the global natural resources, global economic growth, global population growth and global investments are held constant. Also, a 1% rise in the global population growth causes a 0.59% increase in the global financial development on average over the short-run, provided the effects of the global natural resources, global economic growth, global trade openness and global investments are held constant.

As can be seen from Table 9, the long-run (cointegrating) coefficients of the variables are all statistically significant since, following the rule of thumb, the t-statistics of all the long-run coefficients are greater than 2 in absolute value, implying that we can reject the null hypothesis of no-significance. In writing the long-run equation and / or interpreting the coefficients, the signs of the coefficients are reversed. The estimated long-run equation is shown below:

$$lnFD_t = 17.40 - 0.12(lnNR_t) - 3.56(lnGDP_t) + 2.27(lnTR_t) + 1.23(lnPOP_t) + 0.90(lnGFCF_t) \quad (4)$$

As shown in equation 4, a 1% rise in the global natural resource rents causes a 0.12% decrease in the global financial development on average over the long-run, provided the effects of the global economic growth, global trade openness, global population growth and global investments are held constant. This finding of a negative connection is consistent with most of the studies in the literature (Gylfason & Zoega, 2001; Beck, 2010; Yuxiang & Chen, 2010; Hattendorff, 2013; Hassan, 2013; Hattendorff, 2014; Bhattacharyya & Hodler, 2014; Kurronen, 2015; Badeeb & Lean, 2017; Dwumfour & Ntow-Gyamfi, 2018; Adetutu et al., 2019; Dogan, Madaleno & Altinoz, 2020; Guan et al., 2020; Sun et al., 2020; Khan et al., 2020**;** Umar et al., 2021; Jiang et al., 2021; Shobande & Enemona, 2021) and with the a priori expectations set earlier in this chapter. Hence, the natural resource curse is validated in the long-run.

The signs of the coefficients of the trade openness and investments variables are logical and consistent with the literature. A 1% rise in the global trade openness causes a 2.27% increase in the global financial development on average over the long-run, provided the effects of the global natural resources, global economic growth, global population growth and global investments are held constant. Law and Habibullah (2009), Benyah (2010), Voghouei et al. (2011), Takyi and Obeng (2013), Raza et al. (2014), Khalfaoui (2015), Elsherif (2015), Badeeb and Lean (2017), Ibrahim and Sare (2018), and Aluko and Ibrahim (2019) also found trade openness to have a statistically significant positive impact on financial development in the long-run.

A 1% rise in the global investment causes a 0.90% increase in the global financial development on average over the long-run, provided the effects of the global natural resources, global economic growth, global trade openness and global population growth are held constant. Huang (2011) and Elsherif (2015) also found investments to have a statistically significant positive impact on financial development in the long-run.

The sign of the coefficient of the economic growth variable is inconsistent with most of the studies in the literature, as Raza et al. (2014), Elsherif (2015), Badeeb and Lean (2017), and Ibrahim and Sare (2018) rather found that economic growth is positively connected to financial development. Equation 4 above shows that a 1% rise in the global economic growth causes a 3.56% decrease in the global financial development over the long-run on average, provided the effects of the global natural resources, global trade openness, global population growth and global investments are held constant.

The sign of the coefficient of the population growth variable is not compatible with the a priori expectation set earlier in this chapter. Equation 4 above shows that a 1% rise in the global population growth causes a 1.23% increase in the global financial development over the long-run on average, provided the effects of the global natural resources, global economic growth, global trade openness and global investments are held constant.

The compatibility between the a priori expectations (the research hypotheses) and the empirical findings is shown in Table 10.

Table 10: Compatibility Of A Priori Expectations Of Long Run Relationships With Empirical Findings

	IMPACT ON FINANCIAL DEVELOPMENT (lnFD)		
	A PRIORI EXPECTATIONS (A)	EMPIRICAL FINDINGS (B)	COMPATIBILITY BETWEEN A AND B?
Natural Resources (lnNR)	Negative (-)	Negative (-)	Yes
Economic Growth (lnGDP)	Positive (+)	Negative (-)	No
Trade Openness (lnTR)	Positive (+)	Positive (+)	Yes
Population Growth (lnPOP)	Negative (-)	Positive (+)	No
Investments (lnGFCF)	Positive (+)	Positive (+)	Yes

NOTE: Author's construction. FD represents financial development index; NR represents total natural resources rents (% of GDP); GDP represents gross domestic product per capita (constant 2015 US$); TR represents trade (% of GDP); POP represents population growth (annual %); and GFCF represents gross fixed capital formation (% of GDP). The variables are all log-transformed.

Table 10 shows us that the signs of the coefficients of lnNR, lnTR and lnGFCF are logical and consistent with many of the studies in the existing literature. On the other hand, the sign of the coefficient of lnGDP is inconsistent with the literature, and the empirical finding of the impact of population growth on financial development is not compatible with the a priori expectation set based on the preliminary evidence from the graphs.

All the aforementioned results and interpretations of the cointegrating coefficients of the variables are valid, since the VECM worked well and is therefore appropriate for examining long-run relationships. This is because the coefficient of the ECT was found to be both negative and statistically significant, as shown in Table 11.

Table 11: Vector Error Correction

Coefficient of ECT	t-statistic
-0.236312	-3.18006*

NOTE: Author's construction. ECT represents Error Correction Term. * denotes the statistical significance of the t-statistic

As seen in Table 11, the coefficient of the ECT is negative and statistically significant (since, following the rule of thumb, the t-statistic of the coefficient is greater than 2 in absolute value, meaning that the null hypothesis of no-significance can be rejected). Hence, the VECM has worked well, and it is therefore appropriate for examining long-run relationships. One possible reason why the VECM worked well is because potential financial development indicators were added to the model as control variables, thereby limiting the omitted variable bias. This coefficient (-0.236312) of the ECT shows the speed of adjustment of the global financial development towards long-run equilibrium following a short-run shock, and it indicates that the short-run values of lnNR, lnGDP, lnTR, lnPOP and lnGFCF contributed to the long-run equilibrium level of lnFD at a speed of about 23.63% every year. The estimated vector error correction model (VECM) is shown in equation 5 below:

$$\Delta lnFD_t = -0.02\Delta lnNR_t - 0.38\Delta lnGDP_t + 0.39\Delta lnTR_t + 0.59\Delta lnPOP_t - 0.49\Delta lnGFCF_t - 0.24(lnFD_{t-1} + 0.12lnNR_{t-1} + 3.56lnGDP_{t-1} - 2.27lnTR_{t-1} - 1.23lnPOP_{t-1} - 0.90lnGFCF_{t-1}) \quad (5)$$

4.2.5 Granger Causality Test

Next, causality analysis was performed. In particular, Granger causality tests under the block exogeneity Wald tests of the VECM was applied to estimate the directions of the long-run and short-run relationships between the variables. The results are shown in Table 12.

Table 12: Granger Causality Test Results Under The VECM

	Dependent variable					
Regressors	D(lnFD)	D(lnNR)	D(lnGDP)	D(lnTR)	D(lnPOP)	D(lnGFCF)
D(lnFD)	-	0.0005	1.3625	1.4098	7.1085**	0.8268
D(lnNR)	1.0314	-	2.3462	1.6698	0.8646	10.862*
D(lnGDP)	0.6485	4.9112***	-	9.0437**	2.4285	4.8039***
D(lnTR)	6.5520**	7.5212**	11.174*	-	0.8886	8.9267**
D(lnPOP)	6.6884**	3.8084	3.0141	3.1795	-	11.947*
D(lnGFCF)	2.1267	0.5113	1.0246	0.9825	4.2017	-
All	15.213	11.428	18.397**	17.568***	15.061	18.994**

NOTE: Author's construction. "All" shows long-run causality, while "D(variable)" shows short-run causality. *, **, *** show that the null hypothesis is being rejected at the 1%, 5%, and 10% significance levels, respectively.

For the Granger causality tests, the null hypothesis is that "a variable doesn't Granger-cause", while the alternative hypothesis is that "a variable Granger-causes". As shown in Table 12, global trade openness Granger-causes global financial development in the short-run, and global population growth also Granger-causes global financial development over the short-run. This is because for both the global trade openness and global population growth variables, we are able to reject the null hypothesis that the variable does not Granger-cause the global financial development at the 5% level of significance. Therefore, over the short-run, a change in the global trade openness will cause a change in the global financial development, and the short-run values of the global population growth series provide statistically significant information that can be used in forecasting the future values of the global financial development over the short-run. There are no other short-run causalities running from any of the other variables to global financial development, and all the variables do not Granger-cause global financial development in the long-run, since the null hypothesis of no Granger causality cannot be rejected at the 5% significance level.

Also, at the 5% level of significance, global trade openness Granger-causes global natural resources in the short-run; global trade openness Granger-causes global economic growth in the short-run; global economic growth Granger-causes global trade openness in the short-run; global financial development Granger-causes global population growth in the short-run; global natural resources Granger-causes global investments in the short-run; global trade openness Granger-causes global investments in the short-run; global population growth Granger-causes global investments in the short-run; global financial development, natural resources, trade openness, population growth and investments all Granger-cause global economic growth in the long-run; and global financial development, natural resources, economic growth, trade openness, and population growth all Granger-cause global investments in the long-run.

Hence, over the short-run, there are bi-directional causalities between global financial development and global population growth, and between global economic growth and global trade openness; while there are unidirectional causalities running from global trade openness to global financial development, global trade openness to global natural resources, global natural resources to global investments, global trade openness to global investments, and global population growth to global investments.

With respect to the research question of this thesis, in both the long-run and short-run, there are no causalities running from global natural resources to global financial development, or from global financial development to global natural resources.

4.2.6 Diagnostic Checks

In order to ensure that the residuals of the VECM are normally distributed, they have a constant variance (are homoscedastic), and they show no pattern or trend over time (there is no autocorrelation), diagnostic checks have been done and the results are shown in Table 13.

Table 13: Diagnostic Checks

VEC Residual Portmanteau Tests for Autocorrelations		
H_0: No autocorrelations up to lag h		
	Test Statistic	Lag
Q-Stat	76.80079	3
Adj Q-Stat	81.70772	3
VEC Residual Serial Correlation LM Tests		
H_0: No serial correlation at lag h		
	Test Statistic	Lag
LRE stat	34.51275	1
LRE stat	39.02404	2
LRE stat	39.62950	3
Rao F-stat	0.939902	1
Rao F-stat	1.099243	2
Rao F-stat	1.121393	3
H_0: No serial correlation at lag 1 to h		
	Test Statistic	Lag
LRE stat	34.51275	1
LRE stat	84.71742	2
LRE stat	506.3997*	3
Rao F-stat	0.939902	1
Rao F-stat	1.158276	2
Rao F-stat	299.9750*	3
VEC Residual Heteroscedasticity Tests (Levels and Squares) – Joint Test		
H_0: No heteroscedasticity		
	Test Statistic	

Chi-sq	554.3247
VEC Residual Normality Tests	
H_0: Residuals are multivariate normal	
Test Type	Chi-sq Test Statistic
Cholesky (Lutkepohl) – Joint JB Test	11.40528
Residual Correlation (Doornik-Hansen) – Joint JB Test	15.50473
Residual Covariance (Urzua) – Joint JB Test	149.3137

NOTE: Author's construction. VEC represents Vector Error Correction. *, **, *** show that the null hypothesis is being rejected at the 1%, 5%, and 10% significance levels, respectively.

Table 13 shows the results of the residual diagnostic tests. In order to check whether the residuals of the VECM are autocorrelated, both the VEC residual Portmanteau and the VEC residual LM tests were carried out. For the Portmanteau test, the null hypothesis is that there are no autocorrelations in the residuals up to the given lag. This test is valid only for lags which are larger than the lag length used in estimating the VECM. Since the VECM was estimated using a lag interval of one-to-two, the test is only valid as from lag 3. For both the Q-Stat and the Adj Q-Stat test statistics, we are not able to reject the null hypothesis at 5% significance level, since the respective probability values are greater than 5%. Hence, based on the Portmanteau test, it is concluded that there are no autocorrelations in the residuals up to lag 3.

Similarly, for the LM test for autocorrelation, there are two null hypotheses: no serial correlation at the given lag, and no serial correlation at lag 1 to the given lag. With respect to the first null hypothesis (no serial correlation at the given lag), using both the LRE stat and the Rao F-stat test statistics, we are not able to reject the null hypothesis at 5% level of significance for each of lags 1, 2 and 3, since the respective probability values are greater than 5%. Hence, there is no serial correlation at either of lag 1, lag 2 or lag 3. With respect to the second null hypothesis (no serial correlation at lag 1 to the given lag), using both the LRE stat and the Rao F-stat test statistics, we are not able to reject the null hypothesis at 5% level of significance for both lag 1 to 1 and lag 1 to 2, since the respective probability values are greater than 5%. Hence, there is no serial correlation at either lag 1 to 1 or lag 1 to 2. For lag 1 to 3, using both the LRE stat and the Rao F-stat test statistics, we reject the null hypothesis at 5% significance level, since the probability value is less than 5%. Thus, serial correlation is detected in the residuals at lag 1 to 3. However, the VECM was estimated using a lag interval of 1 to 2; so, the residuals of the VECM are not autocorrelated. Overall, considering both the Portmanteau test for autocorrelation and the LM test for serial correlation, it is clear that the residuals are free from autocorrelation.

In order to check whether the variance of the residuals of the VECM is constant, the VEC residual heteroscedasticity test (Levels and Squares) was performed. For this test, the null hypothesis is that the residuals are homoscedastic (that is, they have a constant variance). In the joint test, the probability value of the Chi-square test statistic is greater than 5%. Also, looking at the individual components (results not shown in Table 13), all the probability values for both the F and Chi-square test statistics are greater than 5%. Hence, the null hypothesis cannot be rejected at the 5% significance level, and it is therefore concluded that there is no heteroscedasticity.

In order to check whether or not the residuals are normally distributed, three separate VEC residual normality tests were performed – the Cholesky (Lutkepohl) test, the Residual Correlation (Doornik-Hansen), and the Residual Covariance (Urzua) test. For these tests, the null hypothesis is that the residuals are multivariate normal. In each of the normality tests, the joint JB test was considered. In all the tests, the probability values of the Chi-square test statistic are greater than 5%, implying that we are unable to reject the null hypothesis at 5% level of significance. Hence, the VEC residuals are normally distributed.

Since all assumptions are valid (the VEC residuals are normally distributed, they are homoscedastic, and they are not autocorrelated), the lag structure therefore holds, and we trust the optimal lag length chosen to perform the Johansen cointegration test and estimate the VECM.

Chapter 5

CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS

5.1 Conclusion

The aim of this thesis was to empirically verify if the natural resource curse also applied to the financial sector from a global perspective over the 1980-2019 period. The contribution of natural resources in an economy has been well discussed in the literature. So many studies have dwelled on how natural resources affect economic growth and development, income, welfare and happiness, foreign direct investments (FDIs), environment / ecological footprint, governance and institutional quality, fiscal policy / government expenditure, and human capital / human development. Despite the fact that one will normally expect countries to benefit from having an abundance of natural resources, many of these studies have revealed the negative effects of natural resources in what is now generally known as the natural resource curse. The term “natural resource curse” was first mentioned by Richard Auty in 1993. In an attempt to explain this natural resource curse, so many theories have been put forth such as the Dutch Disease theory, the institutional theory, the staples theory of economic growth, and the theory of rent curse.

When it concerns the resource-finance nexus, the literature has been scarce, with only Gylfason and Zoega (2001) making a major contribution in the resource-finance nexus research area prior to 2010. This is quite surprising, considering how important the financial sector is in a country. Also, many of the studies in the literature had limited scopes, rather than exploring how natural resources influence financial development from a global perspective. This research was aimed at bridging this knowledge gap, and also contributing to the literature on both the determinants of financial development and the impact of natural resources on financial development. As evidenced by the 2007-2008 global financial crisis, the significance of financial sector development cannot be over-emphasized. In this research, the effect of natural resources on financial development has been investigated from a global perspective over the 1980-2019 period.

A time series approach was applied in this thesis for the period 1980-2019. An index for financial development was obtained from the IMF database, while total natural resources rents (% of GDP) – collected from the WDI database of the World Bank – was used as a measure for natural resources. Other financial development indicators (economic growth, trade openness, population growth, and investments) – all collected from the WDI database of the World Bank and proxied by GDP per capita (constant 2015 US$), Trade (% of GDP), Population Growth (annual %) and Gross Fixed Capital Formation (% of GDP), respectively – were included in the model as control variables. All the variables were log-transformed. The descriptive statistics of the data showed that the Gross Fixed Capital Formation (% of GDP) data have the least variation from their mean value, while the total natural resources rents (% of GDP) data are furthest from their mean value. The JB test also revealed that the data of all the variables are normally distributed.

Firstly, the ADF and the PP unit root tests and the KPSS stationarity (confirmatory) test revealed that all the variables used in this thesis are I (1), since they are generally non-stationary at their level forms and stationary at their first differences. The Johansen's 3-step procedure was therefore followed. In the first step of the Johansen's technique, an unrestricted standard vector autoregressive (VAR) model – which satisfies the stability condition – was estimated, and the optimal lag length was established to be three. In the second step of the Johansen's method, the Johansen cointegration test was performed, and one cointegrating vector was found present, indicating that the variables are in a long-run relationship. In the final step of the Johansen's procedure, a VECM was estimated. The coefficient (-0.236312) of the ECT indicates that the short-run values of lnNR, lnGDP, lnTR, lnPOP and lnGFCF contributed to the long-run equilibrium level of lnFD at a speed of about 23.63% every year.

The cointegrating coefficients from the VECM validated the natural resource curse, as a statistically significant negative relationship was found between global natural resources and global financial development in the long-run. This long-run adverse effect of natural resources is consistent with the findings of most of the studies in the existing literature (Gylfason & Zoega, 2001; Beck, 2010; Yuxiang & Chen, 2010; Hattendorff, 2013; Hassan, 2013; Hattendorff, 2014; Bhattacharyya & Hodler, 2014; Kurronen, 2015; Badeeb & Lean, 2017; Dwumfour & Ntow-Gyamfi, 2018; Adetutu et al., 2019; Dogan, Madaleno & Altinoz, 2020; Guan et al., 2020; Sun et al., 2020; Khan et al., 2020**;** Umar et al., 2021; Jiang et al., 2021; Shobande & Enemona, 2021). This negative relationship is observable in reality since, for example, many countries in Africa have poorly developed financial sectors despite the natural resource riches in the continent, while many countries in western Europe are financially developed, despite having limited natural resources. Most of these resource-wealthy countries tend to over-depend on their natural resources by investing so much resources in a few resource-dependent sectors, while neglecting the financial sector and other sectors. As a result, they become vulnerable to changes in the prices of the products from their resource-dependent sectors, and the development of their financial sector suffers.

The short-run coefficient of the global natural resources was found to be statistically insignificant, indicating that natural resources have no impact on financial development over the short-run. Regarding the control variables, economic growth, trade openness, population growth and investments were found to have a negative (inconsistent with the literature), positive (consistent with the literature), positive (inconsistent with a priori expectation), and positive (consistent with the literature) impact, respectively, on financial development in the long-run.

Economic growth leads to an increase in the demand for goods and services, including an increase in the demand for financial services. Increased demand for financial services will encourage the creation of more financial institutions, and this will increase the competition in the market, thereby causing an improvement in the quality of financial services. Also, economic growth is associated with increased productivity and technological advancement which leads to innovative ways of delivering financial services. Through these channels, economic growth, theoretically at least, is normally expected to have a positive impact on financial development. Empirically, many studies also revealed the positive connection of economic growth with financial development (Elsherif, 2015; Raza et al., 2014; Badeeb & Lean, 2017; Ibrahim & Sare, 2018). Hence, the finding of this thesis (negative relationship between economic growth and financial development) is not consistent with the literature.

Intuitively, one will expect investment to have a positive impact on financial development. This is because according to Keynesian theory, an increase in investments results to an increase in income, and higher incomes mean more financial ability to promote financial development. Also, an increase in investment in Research and Development (R&D) in particular, enables the discovery of more cost-effective ways of delivering top-quality financial services, thereby developing the financial sector. Huang (2011) and Elsherif (2015) also found a statistically-significant positive relationship between investments and financial development. So, the positive long-run relationship between investments and financial development, which has been found in this thesis, is consistent with the literature.

Causality analysis showed that in both the long-run and short-run, global natural resources does not Granger-cause global financial development, neither does global financial development Granger-cause global natural resources. Also, over the short-run, bi-directional causalities were found between global financial development and global population growth, and between global economic growth and global trade openness; while unidirectional causalities were found running from global trade openness to global financial development, global trade openness to global natural resources, global natural resources to global investments, global trade openness to global investments, and global population growth to global investments.

In order to ensure that the residuals of the VECM are normally distributed, they have a constant variance (are homoscedastic), and they show no pattern or trend over time (there is no autocorrelation), diagnostic checks were carried out. Both the VEC residual Portmanteau and the VEC residual LM tests confirmed that there are no autocorrelations (serial correlations) in the VEC residuals. The VEC residual heteroscedasticity test (Levels and Squares) revealed that the VEC residuals are homoscedastic. Three separate VEC residual normality tests (the Cholesky (Lutkepohl) test, the Residual Correlation (Doornik-Hansen), and the Residual Covariance (Urzua) test) confirmed that the VEC residuals are normally distributed (they are multivariate normal).

5.2 Recommendations

Based on the findings of this research, the financial resource curse is validated. The following recommendations are therefore put forth. Firstly, resource-rich countries should reduce their dependence on natural resource rents by not over concentrating too much of their capital and labor force in just a few resource-dependent industries. They should strive to increase investments in other sectors, so that their economies would not be vulnerable to declines in commodity prices. The importance of economic diversification cannot be over-emphasized here!

Secondly, the law-makers of resource-wealthy countries should enact laws which promote democracy, and fight against corruption and bad governance. This will prevent corrupt government officials from exploiting these natural resources and taking decisions for their selfish personal interests, rather than for the general benefit of all citizens.

Also, nations which are wealthy in natural resources usually miss out on export-led growth because they are generally high-price economies (Sachs & Warner, 2001). Thus, such countries should adopt a fixed or managed float exchange rate regime, rather than a freely floating (flexible) exchange rate regime. By so doing, they can easily devalue their currencies to make their goods and services cheaper for exporters, thereby resulting to export-led growth.

5.3 Limitations

The main limitation of this thesis is that it has relied on world aggregate data. Aggregation of data at times leads to a loss of information, and it may cause misleading results.

5.4 Suggestions

In order to further verify the validity of the financial resource curse hypothesis from a global perspective, further research is required. The following suggestions for further research in the area are made. Firstly, panel data techniques should be applied to explore the impact of natural resources on financial development in all countries in the world over a given time period. The countries should then be grouped based on the results, to appreciate if the financial resource curse is universal or if it depends on, say, the level of democracy and / or development in a particular country. Secondly, rather than using total natural resource rents, the impact of different natural resource rents such as oil rents, coal rents, mineral rents, natural gas rents, and forest rents should individually be tested to see if the effect of global natural resources on global financial development depends on the type of natural resource. Thirdly, rather than using world aggregate data as I have used in this thesis, the data can further be disaggregated into, for example, regions or income level. Fourthly, rather than estimating just one model which includes natural resources and four different determinants of financial development as control independent variables like I have done in this research, it will be helpful to estimate different models where the control variables are added one after the other to the model and with different combinations of the control variables, to see if these will cause a change in the results.

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