

UNIVERSITY OF CAPE COAST

DETERMINANTS OF EXPORT DIVERSIFICATION IN GHANA

BY

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## **DECLARATION**

### **Candidate's Declaration**

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

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### **Supervisors' Declaration**

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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## **ABSTRACT**

The present study examines the determinants of export diversification in Ghana. For this purpose, Theil index is used to estimate the degree of export diversification. The study used annual time series data from 1983 to 2016 to estimate the structural, economic/policy and macroeconomic determinants of export diversification within the Auto Regressive Distributed Lag (ARDL) framework. The results of this study indicated that GDP per capita, real effective exchange rate, trade openness, foreign direct investment and infrastructure, improve export diversification in both the long-run and short-run while terms of trade enhances specialisation. Based on the findings of this study, the study recommended that government should take advantage of the fall in Cedi value by exporting more products to markets with high demand. The Ministry of Trade and Industry should also develop a competitive capacity for trade in order to eliminate principal domestic barriers to international business development, increase its investment in basic and trade-related infrastructure. It is also recommended that the government through the Ghana Investment Promotion Center should invest in promoting a broader variety of FDI opportunities to investors, while also developing other sectors of the economy in order to boost diversification.

## **KEY WORDS**

Export diversification

Auto regressive distributed lag (ARDL)

GDP per capita

Real effective exchange rate

Trade openness

Foreign direct investment

Infrastructure

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## **DEDICATION**

To my family and friends with love and gratitude

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## LIST OF ACRONYMS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
ARDL	Auto Regressive Distributed Lag
ASI	Aggregate Specialisation Index
CSTI	Commodity Specific Traditionality Index
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Squares of Recursive Residuals
DOLS	Dynamic Ordinary Least Squares
DOTS	Data on Trade and Statistics
ECM	Error Correction Model
ECT	Error Correction Term
ELGH	Export-Led Growth Hypothesis
EP	Export Promotion
ERP	Economic Recovery Programme
EU	European Union
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment

FGLS	Feasible Generalized Least Squares
GDP	Gross Domestic Product
GEPA	Ghana Export Promotion Authority
GEPC	Ghana Export Promotion Council
GFZB	Ghana Free Zones Board
GMM	Generalized Method of Moments
GSS	Ghana Statistical Service
HHI	Herfindahl-Hirschman Index
IMF	International Monetary Fund
IS	Import Substitution
LDCs	Least Developed Countries
MNCs	Multinational Corporations
MOTI	Ministry Of Trade and Industry
NARDL	Non-Linear Auto Regressive Distributed Lag
NES	National Export Strategy
N-H	Normalized-Hirschman
NTEs	Non-Traditional Exports
PP	Phillips-Perron

SAP	Structural Adjustment Programme
SBC	Schwartz-Bayesian Criterion
SIC	Schwarz Information Criterion
SITC	Standard International Trade Classification
SSA	Sub-Saharan Africa
TEs	Traditional Exports
TOT	Terms of Trade
UN	United Nations
UNCTAD	United Nations Commission for Trade and Development
US\$	United States Dollar
WB	World Bank
WDI	World Development Indicators
WTO	World Trade Organisation

## CHAPTER ONE

### INTRODUCTION

#### **Background to the study**

For decades, analysis on how export diversification can help improve economic growth and reduce a country's vulnerability to external shocks has been persistent in both international and development economics. Historically, the subject of export diversification as a means to achieve growth and development gained momentum in the development literature in the 1950s, when the international community began to view the dependence on primary products as detrimental to the development prospects of developing countries due to extremely volatile prices and low income elasticity of demand (Bartz, 2010).

While the classical trade theory proposes that it is beneficial for countries to specialise in those exports in which they have a comparative advantage, theoretical trade literature in favour of export diversification by comparison has increased significantly in recent years (Bertinelli, 2009; Cadot, Carrere, & Strauss-Kahn, 2011). Moreover, export diversification is believed to be the only way a less developed country can transform itself into a modern economy that can produce and export goods that richer countries export.

In spite of the several benefits exports generate for growth and development, many developing countries have been left vulnerable to external shocks due to the heavy dependence on a narrow range of exports. According to the Prebisch-Singer hypothesis, developing countries face perpetual terms of trade problems basically due to this heavy reliance on primary commodities. On the other hand, export diversification has been found to have a positive impact on



productivity and economic growth. Additionally, the portfolio effect from the finance literature, suggests that export diversification implied less volatility in export earnings. Less volatile exports also indicate a lower variance of GDP growth. With commodity prices expected to stay low for long (IMF, 2017), the need for export diversification in commodity-dependent countries has become more urgent. Motivated by the desire to spread risks, raising capacity utilization and increasing total export proceeds, export diversification has become a major concern for most developing countries.

Diversification essentially refers to the change in the structure of a country's existing export product mix or export destination or as the spread of production over several sectors (Campi, Duenas, & Wu, 2017). As part of an export led growth strategy for most developing economies, export diversification is considered as the evolution from traditional to non-traditional exports (Samen, 2010). Export diversification can be horizontal or vertical. Horizontal diversification entails the process of increasing the number of products by introducing new products to an already existing export base within the same broad category of products. Thus, horizontal diversification takes place within the same sector (Aberg, 2014). For instance, if a country specialised in exporting cocoa also begins to export pineapples, horizontal diversification can be said to have taken place. On the other hand, vertical export diversification involves the process of moving from the export of primary products to the export of manufactured products (Agosin, 2007).

Generally, the need for export diversification is essential to mitigate all kinds of risks associated with high level of export concentration. These risks

include economic risks such as commodity price volatility, instability in foreign exchange earnings which have negative effects on macroeconomic factors, secular and unpredictable decreasing terms of trade performance. Political risks include worsening governance and risk of civil war in fragile states. A recent study by Collier (2002) revealed that dependence on primary products is related to various dimensions of poor governance and the risk of conflict is highly related to level of growth and income.

Another reason why a country diversifies its exports is to reduce dependence on just one or a limited number of geographical destinations for its exports. Diversification can focus on increasing opportunities for export and improvement of backward and forward linkages to domestic inputs and services (Samen, 2010). The literature also suggests that to strengthen resilience to shocks and achieve a higher sustainable rate of growth, small states should pursue policies to diversify their economies and reduce their dependence on a narrow range of exports (McIntyre, Li, Wang, & Yun, 2018).

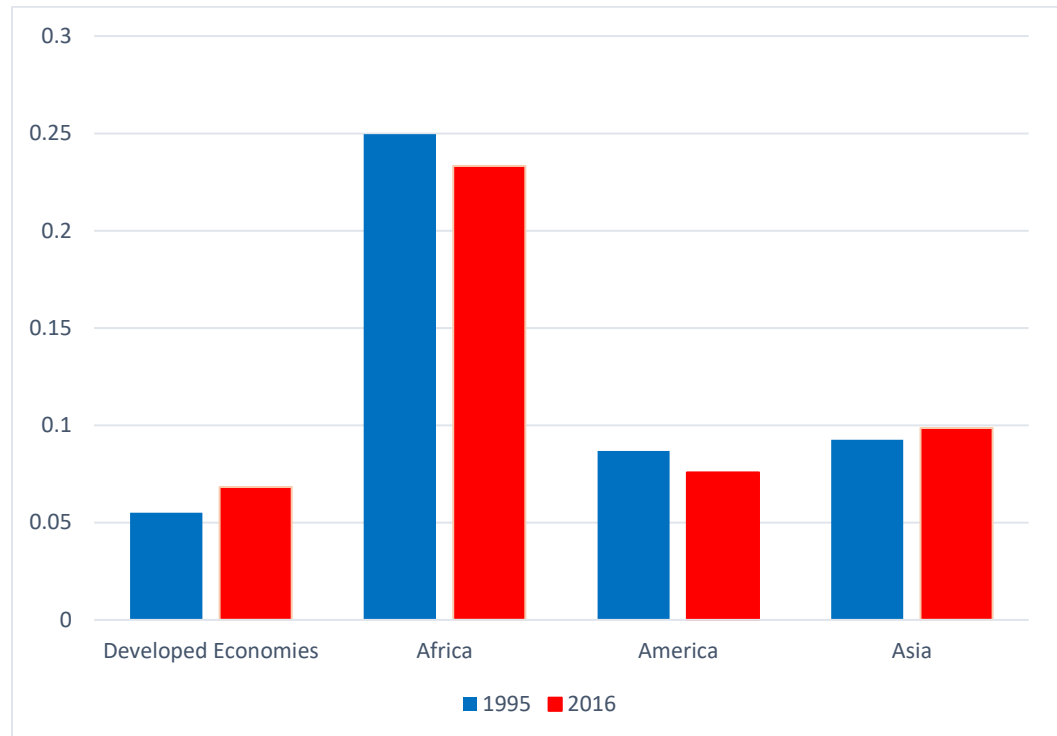
Countries also diversify exports because of export instability which is akin to the portfolio effect in finance [Hesse, 2008]. This is mainly due to the fact that commodities are often subject to very volatile market prices so that countries that are dependent on these commodities often suffer from export instability. This could discourage needed investments in the economy by risk-averse firms, increase macroeconomic uncertainty, and be damaging to long-term economic growth. Export diversification could therefore help to stabilize export earnings in the long run (Hesse, 2008).

Similarly, diversification ensures that risk associated with investment is spread over a wider portfolio and thus helps countries to hedge against negative terms of trade shocks and thereby ensuring stability in export revenues (FAO, 2004; Acemoglu & Zilibotti, 1997). Economic advancement and structural transformation hugely depend on the kinds products that are being traded in the international commodity market. By implication, an economy's growth towards the production and exportation of refined commodities which contributes to economic growth rests on export diversification (Hausmann & Klinger, 2006; Hwang, 2006).

Diversification plays a crucial role in helping countries to achieve its macroeconomic goals of sustainable economic growth, suitable balanced of payment conditions, employment and redistribution of income (Sannasse, 2014). Osakwe (2007) finds that diversification into new primary export products or manufactured goods is generally linked with dynamic spillover effects since it leads to economic growth and more stable export earnings, job creation, alleviating poverty and development of new skills and infrastructure that would facilitate the development or discovery of new export products.

The need for developing countries to get the best out of commodities for industrialization, growth, jobs and economic transformation has been the focus of recent studies. The Economic Report on Africa (2013) indicates that Africa depends extremely on primary commodity exports, which makes it difficult to create decent jobs. Compared with both Asian and Latin American commodity exporters, Africa shows significantly higher commodity dependence, obviously enhanced by the commodity price boom. The report also reveals that since 1995 Africa's average

concentration index has increased and even though Africa has diversified its export markets in the past two decades, there has been little change in its export composition and it remains highly dependent on primary commodity exports (Figure 1). In view of this, many developing countries, especially in Africa, have been left vulnerable to external commodity shocks.



*Figure 1- Export concentration index by regions/economies*

Source: Author's construction using data from UNCTAD

World trade in other primary commodities that account for an important proportion of total exports of Africa, particularly agricultural products such as coffee, cocoa, cotton and sugar, has been sluggish, with the average growth of trade in such products in the past two decades barely reaching one-third of the growth rate of world trade in all products (UNCTAD, 2003). World prices for many of the commodities that Africa exports declined between 1990 and 2000: cocoa, cotton,

sugar and copper by over 25%, coffee by 9% and minerals overall declined by 14% (WTO, 2001). As noted by Ng and Yeats (2002), one-half of traditional products in SSA experience average price changes of 50 % or more during the 1990s. Recent studies also suggest that Africa has lost market shares for some of its traditional exports (Osakwe, 2007).

Governments and policy makers in developing countries have often expressed concern about the vulnerability that arises from export concentration. Volatility in export prices, the sudden closure of export markets caused by regulatory changes, entry of new competitors, supply shocks in the home market, which are part of the normal course of event in international markets, has a devastating impact when exports are concentrated (Cadot et al., 2011).

It is not uncommon that a peculiar characteristic of most developing countries, especially African countries is the persistent volatility in growth patterns. Studies have shown that this problem is mainly as a result of the lack of structural diversification and the dependence on a narrow array of primary products. In view of this, periods of global financial crisis, expressing itself through commodity price shocks often leave these countries vulnerable (Ndulu, Connell, Bates, Collier, & Soludo, 2008).

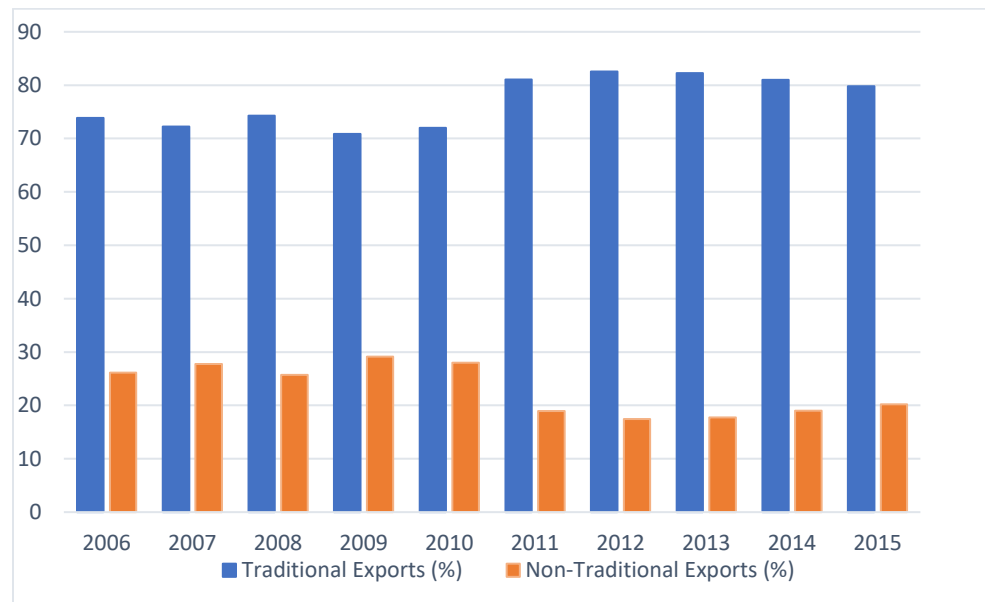
Ghana is no exception to this economic phenomenon as commodity price fluctuations have been the primary cause of instability in Ghana's export earnings (Ackah, Aryeetey, & Aryeetey, 2009). According to the World Bank (2007), between 1998 and 2000, cocoa price decline by almost 50 percent. This was accompanied by a drop real GDP growth by 20 percent.

Attaining middle-income status in 2010 is not an end in itself. It is important to note that sustaining growth and inclusive development should be the ultimate objective. It is evident that for the past decades, Ghana has faced a continued decline in growth. The inability of Ghana to ensure sustainability of its growth impetus is a major worry. Reports by the Ghana Statistical Service reveal that Ghana achieved a record high GDP growth of 14% in 2011 but could not sustain this record for the subsequent years recording 4% in 2014 against the target rate of 7.1% and far below the rate achieved in 2011, 2013 (7.3%) and 2012 (9.3%).

Like other developing economies, Ghana has pursued a number of strategies to diversify its economy from production and exports of traditional to non – traditional exports. For instance, Ghana in 1983 carried out the Economic Recovery Programme with the support of the IMF and World Bank. One of the major focuses of this policy was to diversify export through a policy framework geared toward non – traditional export promotion and as a channel for mitigating the current account deficit. In addition, a number of incentives that included import and export tax exemptions were introduced. The Ghana Export Promotion Council (GEPC) also was established to promote NTEs. However, the policies initiated by the council as a means of diversifying exports have yielded somewhat little success as the country continues to rely heavily on unprocessed primary products (Obeng, 2018).

Ghana has improved its position in international trade over the last 30 years, recording a considerable growth with both traditional and non-traditional exports. Imports on the other hand has increased significantly more than exports. Export

performance figures revealed by reports indicate that Ghana’s exports increased from US\$ 2.8 billion in 2005 to US\$ 4.2 billion in 2007 dropping to US\$ 2.34 billion in 2009. Apparently, the growth of non – traditional exports (NTEs) has been increasing at rates ranging from 15% to 25% per annum. Despite several attempts to diversify exports, the export structure of Ghana has remained virtually unchanged since the colonial era with the traditional exports being cocoa, gold and timber accounting for about 70% of total exports asserting their dominance (MOTI, 2012).



*Figure 2- NTE Earnings vs TE Earnings*

Source: Author’s construct (2018)

From Figure 2, it can be deduced that despite an improvement in the growth of non – traditional exports for the past ten years, the percentage contribution of NTEs to total export revenue for the past few years has been inconsistent. The percentage contributions in 2009, 2010, 2011, 2012, 2013, 2014 and 2015 were 29.1%, 27.98%, 18.95%, 17.46%, 17.7%, 19.02% and 20.2% respectively. On the

other hand, earnings from the traditional exports accounted for 70.89%, 72.02%, 81.04%, 70.9%, 72%, 82.2%, 80.9% and 79.7% within the same period. The decline in the contribution of NTEs to total export revenue in 2011, 2012 and 2013 were due primarily to the following factors: Substantial increases in gold, cocoa beans and oil exports. The drop in cocoa paste, canned tuna and cashew nut exports (GEPA, 2015). Countries that depend on a few ranges of exports generally face sharp decline in GDP growth rates. In situations when the prices of the few commodities they depend on decline, these countries are left vulnerable to shocks as result of unfavourable trade.

### **Statement of the Problem**

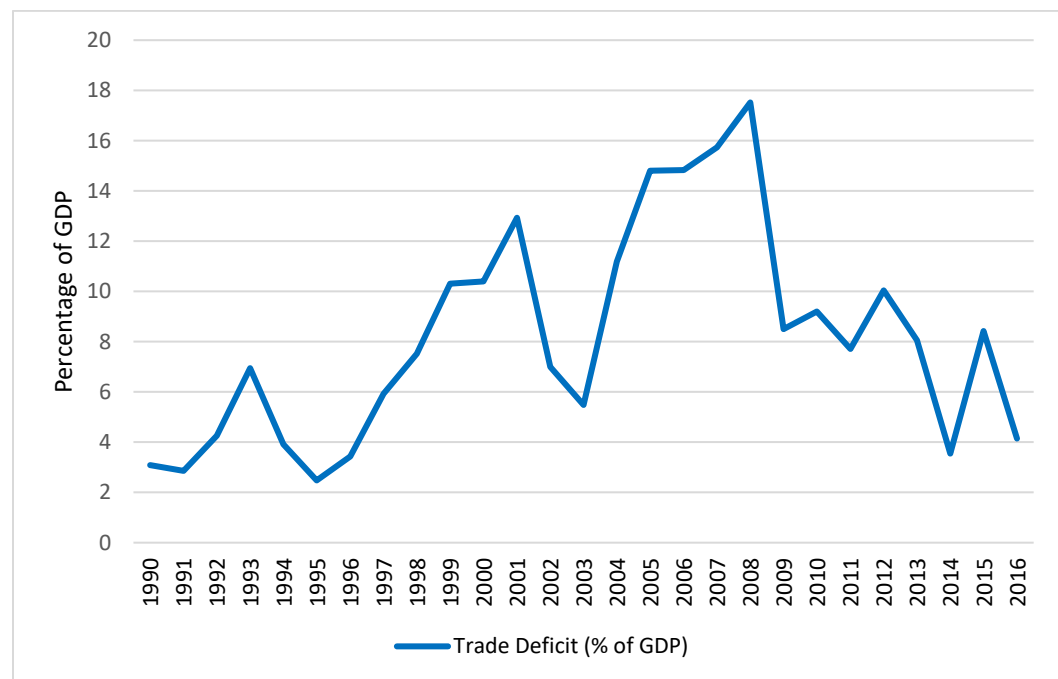
The cost of successfully specialising could pose serious problems to the health of an economy. For a country to specialise effectively and efficiently, it must regulate and restructure its financial, personal and social costs which include loss of government revenue, a decline of some industries as they are unable to face increased competition from imports and rise of other industries, elimination of some sectors and devastation of some regions, relocation of employment, family disruption and loss of industry skills in the declining sectors (Samen, 2010).

Moreover, the capacity to shift production and exports from traditional goods to more dynamic ones is considered a key factor in breaking the vicious cycle of dependence and turning it into a virtuous cycle of dynamism and development. This can be achieved in a stable economic atmosphere at the macro level plus an



international trading system and drive of entrepreneurs at the micro level which are necessary conditions that need to be met (Aberg, 2014).

According to the Ministry of Trade and Industry (2012), Ghana continues to run a large balance of trade deficit as a share of its GDP. This is offset by a current account surplus largely from unrequited transfers, so that the balance of payments is not normally a cause for worry about. However, the experience in 2008, when the country's foreign reserves came to represent less than two months' imports cover indicates that there is little room for complacency (Figure 3). This provides the basis for a national export strategy to provide the strategic direction and roadmap to achieve sustained significant increase in exports and lay the foundation for export diversification and structural transformation.



*Figure 3-* Evolution of Ghana's trade deficit (1990-2016)

Source: Author's construction using data from UNCTAD

Several studies on export diversification in the literature mainly focus either on the effects of export diversification or on policy response regarding the diversification process. While the majority of studies find that export diversification increases economic growth (Hesse, 2008; Bartz, 2010; Hodey, 2013; Sannassee, Seetanah & Lamport, 2014; Elhiraika & Mbate, 2014) the expected question is what determines export diversification? By comparison, empirical studies on the determinants of export diversification are few. The lack of a systematic theoretical framework could serve as a possible explanation for the scarcity of empirical investigation (Balavac, 2012).

The studies on the determinants of export diversification show that there are numerous determinants of export diversification. Nonetheless, these studies have produced mixed results for the determinants of export diversification in developing countries (Alaya, 2012; Ferdous, 2011; Agosin et al., 2012; Elhiraika & Mbate, 2014; Obeng, 2018). The reason being that firstly; most of these empirical studies on the determinants of export diversification are mainly cross-country studies and secondly; a number of these studies use different measures of export diversification and hence different conclusions.

The present study, therefore aims to examine the determinants of export diversification in similar fashion as Hong, Long and Anh-Dao (2015); Agosin et al. (2012) and using the Theil entropy index as the preferred measure of export diversification in Ghana.

## **Purpose of the Study**

The main purpose of this study is to examine the factors that determine export diversification in Ghana.

## **Research Objectives**

Specifically, the study aims to:

- examine the long-run relationship between export diversification and its determinants.
- examine the short-run relationship between export diversification and its determinants.
- analyze the trends of export diversification in Ghana.

## **Hypotheses of the study**

The study seeks to test the following hypotheses;

- $H_0$ : There is no long-run relationship between export diversification and its determinants.  
 $H_1$ : There is a long-run relationship between export diversification and its determinants.
- $H_0$ : There is no short-run relationship between export diversification and its determinants.  
 $H_1$ : There is a short-run relationship between export diversification and its determinants.

## **Significance of the Study**

Export diversification is regarded as a key component of structural transformation of an economy. An increase in export variety can lead to output growth and help reduce exposure to external shocks and reducing macroeconomic volatility. While studies on the relationship between export diversification and income per capita has increased recently, studies on factors that determine export diversification remain sparse. Against this background, the current study will contribute to the understanding of what factors drive Ghana's export diversification so as to help government make specific policies.

Secondly, this study is timely because most policy makers in SSA (including Ghana) and UN agencies (the IMF) in their reports, such as the Regional Economic Outlook (2017) presented the theme "Sub – Saharan Africa - Fiscal Adjustment and Economic Diversification". In the report, it was indicated that diversification is a necessary condition for achieving high levels of growth and development in the region. Accordingly, the capacity of smoothing shocks highly depends on the ability of African policy makers to diversify their economies. That is why the economic report on Africa (2007) presents the theme of diversification as a new paradigm for Africa's development and the report argues that diversification is a prerequisite to achieving positive development in the continent of which Ghana is no exception.

## **Delimitation**

This study examines determinants of export diversification in Ghana using annual time series data set from 1983 to 2016. The choice of the period is as a result of data availability. The study employs seven variables: The Theil index as a measure of export concentration (diversification), GDP per capita growth, real effective exchange rate, trade openness, terms of trade, infrastructure (proxied by fixed telephone subscription per 100 people) and foreign direct investment. The study also employs the Autoregressive Distributed Lag (ARDL) model for the analysis of relationship among the variables.

## **Limitations of the Study**

The setbacks encountered in this study mainly involve data availability. There were not enough data points for all variables included in the study, thereby restricting the sample period of 1983 - 2016. The study also did not consider exports in the service sector due to the measurement of export diversification (concentration). Finally, potential determinants of export diversification involve other factors such as political and geographic factors that are not captured in this study. This therefore shows that the study did not model with all the possible explanatory variables of export diversification.

## **Organisation of the Study**

The study is divided into six chapters with each chapter divided into sections. Chapter one focuses on the introductory chapter of the study and outlines the background, problem statement, the purpose and objectives of the study, the

hypothesis to be tested, significance, delimitation and the limitations of the study. An overview of Ghana's export sector as well as trend analysis of variables used in the study is discussed in chapter two. Chapter three focuses on the review of related literature by first looking at the theoretical literature review and then the empirical literature review. Chapter four presents the methodological framework and techniques used in conducting the study as well as the sources of data collection. Chapter five reports on the econometric estimation results and discusses in relation to the model specified in chapter four. Finally, chapter six then presents the summary, conclusion, policy recommendations and direction for future research.

## **CHAPTER TWO**

### **OVERVIEW OF GHANA'S EXPORT SECTOR**

#### **Introduction**

This chapter presents an overview of Ghana's export sector. Specifically, the chapter starts off by providing a brief overview of Ghana's trade policy. This is followed by a brief description of both the performance of traditional and non-traditional export sectors, policy measures to promote export diversification in Ghana, the Ghana Export Promotion Authority (GEPA) and its role in promoting NTEs. Finally, this chapter presents a trend analysis of all variables used in the study.

#### **Ghana's Trade Policy**

Trade policy occupies a unique place among other policy domains in shaping the environment in which companies establish and operate their businesses. Whether local industries are protected or are left to the mercy of severe and unfair competition is attributable to trade policy (MOTI, 2012).

Since 1983, Ghana as part of the Economic Recovery Programme adopted a more liberalized trade system. Ghana's outward-oriented trade and development policies have since fostered both free-trade and free movement of capital and labour. Ghana's trade policy is established within the framework of the country's long-term strategic vision of achieving middle income status by the year 2020 and becoming a leading agro – industrial country in Africa. The fundamental principle underlying this policy is that the private sector is the engine of growth while the government provides the stable macroeconomic environment to induce the

initiatives of the former. Therefore, in order to maximize synergies between policies and the strategy, trade policy should not only work in tandem with the export strategy; it must reinforce it to permit trade and export to play their recognized role as an engine of economic growth. Currently, Ghana's trade liberalization is extensive. Protection for infant industries is very limited, leading to the collapse of many industries (MOTI, 2012).

The evolution to a more liberalized, specialized and export-oriented economy may have increased Ghana's exposure to risk. Undeniably, despite efforts to reinforce other sectors of the economy and diversify its export base, Ghana remains heavily dependent on export receipts that derive from a limited number of commodities and countries. Unexpected changes in exchange rates lead to revenue uncertainty. In this case, decision theory suggests that to avoid losses, export firms will not be willing to make investments such as adopting new technologies, diversifying their productions or expanding their operations (Pujula & Zapata, 2013).

### **Ghana's Export Sector**

The external sector is characterized by growth in export, increasing terms of trade as a result of higher gold and cocoa prices, new flows of foreign capital because of liberalization of the capital account and reduction of external debt through tax relief. Nonetheless, the economy is characterized by persistent current account deficits (as a per cent of GDP), declining international reserves and the depreciation of the currency (Agyapong, 2012).



A significant aspect of the Economic Recovery Program (ERP) under the guidance of the World Bank (WB) and International Monetary Fund (IMF) was to reduce Ghana's debts and to improve its trading position in the global economy. The government of Ghana adopted an export-led strategy for its development through implementation of aggressive investment and export promotion. Ghana's export sector, mainly consists of the traditional and non-traditional sectors. In December 2010 when oil exploration of the Jubilee Field commenced, the country added a third sector – the oil sector.

### **Traditional Export Sector (TES)**

According to the Ghana Import – Export Act of 1995 (Act 503), traditional exports mainly comprise of primary products such as cocoa beans, logs and lumber, timber, electricity, unprocessed minerals (gold, diamond, bauxite and manganese). The traditional export sector is highly dominated by cocoa beans, gold and timber. These three commodities have maintained their dominance of the export landscape since the colonial era. Over the last four years 2006-2009 the three commodities accounted for an average of 75.2% of total exports. Over the same period cocoa contributed an average of 31.3%, gold 35.5% and timber 8.4%. The bulk of the cocoa is exported in a raw form as beans (MOTI, 2012).

Since 1983, a common trait of several government regimes has been the promotion of Ghana's foreign trade in order to restore the economy. One key feature of the Economic Recovery Programme introduced in 1983 was the adoption of outward – oriented development policy with a clear prominence given to export

expansion as the means to eradicate current account problems (Jebuni, Oduro, Asante, & Tsikata, 1992). The dependence of Ghana on traditional exports since independence as a major source of foreign exchange earnings amidst persistent fluctuations in commodity prices on the world market has proven to be risky and hence the need for export diversification (Sraha, 2016).

The traditional exports of cocoa and gold have been the two most dominant export commodities in Ghana over the years. However, the continuous decline in the contribution of timber to export earnings can be attributed to deforestation and the lack of proper afforestation measures to sufficiently cater or replace harvested trees. Earnings from Gold in percentage rose steadily from a low of 17% in 1986 to a high point of 45% in 1995. Nevertheless, it started declining, from 33% in 2002 and then shot up again to a record high of 48.2% of total exports in 2010. Earnings from cocoa have dominated the export sector of Ghana. However, the dominance of cocoa continuous to diminish even though Ghana's export base expands. The share of export earnings from cocoa declined steadily from 67% in 1986 to 20% in 2001. It rose again to 38% in 2004 and then declined again to 23% in 2011 (Tetteh, 2015).

### **Non – Traditional Export Sector (NTES)**

Non – traditional exports (NTEs) refer to all products such as handicrafts, aluminum products, textiles, beverages fishery products and horticulture products. Similarly, non – traditional exports have been defined by the Export and Import Act, 1995 to include products except the traditional exports of cocoa beans, timber, unprocessed gold and other minerals and electricity (GEPA, 2015).

The Ghana Export Promotion Authority was established by Act 396 in 1969 as an autonomous body under the initiative of the Ministry of Trade and Industry (MOTI) with the responsibility of developing and promoting Ghanaian exports through diversification of Ghana's export base from traditional exports (primary products) such as cocoa beans, timber and minerals. Diversification into non – traditional exports has proven to be a step in the right direction given the recent increase of Ghana's non – traditional exports (NTEs) on the international market. The introduction of NTE diversification was both in quantity and quality and serve as a way of cushioning Ghana's economy against price instability in exports, help address trade imbalance, reduce poverty and increase employment opportunities.

Ghana's non – traditional sector is basically made of almost 500 products classified under three main sub-sectors, namely; agriculture, handicrafts and processed/semi-processed (GEPA, 2015). Agricultural products, mostly consist of horticultural products, fish products, fresh fruits like pineapples and mangoes, medicinal seeds and plants as well as tropical flowers and vegetables such as okra, tuna and marrow. Other agricultural NTEs include cotton seeds, yam, kola nuts, natural rubber, maize, coconuts assorted fruits and lobsters, shrimps and prawns. Processed/Semi – processed consist of processed foods such as canned tuna, cocoa and shea butter products, pharmaceuticals, electrical cables and aluminium products, canned foods and beverages, and other processed products. Woodcrafts, weaving products, baskets, ornamentals such as beads, jewelry, Kente products fall under the handicraft category. Non -traditional export services comprise of medicinal tourism, financial services and education (GEPA, 2013). Like Ghana,

export diversification, market liberalization and export-oriented industrialization have been identified as crucial measures taken by developing countries to keep up with rapid change in the international trade environment (Sraha, 2016).

Non-traditional exports amounted to \$2.522 billion (GH¢9. 210 billion) in 2015 representing an increase of 0.32% over the year 2014 (GH¢ 7.291 billion). The year 2014 however recorded an increase of 3.20% over the total earnings of US\$2. 436 billion (GH¢4. 757 billion) in 2013 (GEPA, 2015).

On the other hand, export earnings of non-traditional products have shown a remarkable increase in many aspects. Over the past ten years, the sector grew steadily from US\$893 million in 2006 to US\$1, 340 million in 2008. The highest growth rate (30.4%) occurred in 2007. In 2009 there was a fall of about -9.38%, amounting to US\$1, 215 million. This is because of the global economic downturn, a drop in Ghana's competitiveness due to increased cost of production and low production volumes experienced within the period. In 2010 and 2011, earnings from the sector increased by 34.1% and 48.74% to US\$1. 629 billion and US\$2. 423 billion, respectively. In 2012 there was a decline in earnings by 2.24% to US\$2. 364 billion. (GEPA, 2015).

### **Ghana's Export Destinations**

Ghana is regarded as one of the few countries in Sub-Sahara Africa that has an intensive liberalized trade system due to the pace and extent with which trade liberalisation was carried out during the structural adjustment programme in 1983 (Tetteh, 2015). Trade openness which followed a downward trend between 1970

and 1982, begun to increase after the liberalization policies of 1983. The trade intensity of 46.4% in 1984 had increased significantly to 128.9% by the end of 1999 and stood at 110.32% in 2009 (Ocran, Osei, & Adjasi, 2009). Despite the fact that Ghana's trade liberalization started in the mid-1980s, the pace of the liberalization continued into the 1990s (Jebuni et al., 1994). In early 1990s, Ghana continued to trade primarily with the European community, particularly Britain and Germany. Britain continued to be the principal market for Ghanaian cocoa beans, absorbing approximately 50% of all cocoa beans exported. In 1992, Germany was the single most important market for Ghana's exports, accumulating about 19% of all exports. Britain was the next, accounting for about 12%; followed by the United States, 9% and Japan, 5%.

For years, Europe has been the leading destination of Ghanaian exports. Trade has mostly been in cocoa and other non-traditional exports. Between the period of 2006-2007 and first half of 2008, the top two importers of Ghanaian products were the Netherlands and UK. Netherlands imported 14% of the total exports of Ghana and the UK imported 9.2% of Ghanaian exports. Cocoa, gold and timber constituted 75% of Ghana's commodity exports in 2008 (IMF, 2008). The major export partners of Ghana in 2010 were the EU27 with a total volume of Ghanaian products of €1,3175 million representing 38.7% of total export from Ghana. This was followed by the USA with a total of €1940 million representing 5.7% of total exports from Ghana. Within the EU27, the Netherlands had the highest share of 11.7%, followed by UKs share of 7% and then that of France by 5.7%. The EU share of total exports in volume from Ghana increased to €3,134

million, representing 51.5% of total exports from Ghana and then reduced to €2,987 million, representing 42.5% of total exports from Ghana in 2011 and 2012 respectively (IMF; DOTS, 2013).

Table 1- *Export Structure of Ghana by main region of destination*

Year	Volume of trade (millions of US\$)	EU (%)	Africa (%)	Asia (%)	Developed Economies (%)	Developing Economies (%)
1980	1206	42.4	0.7	3.4	76.3	4.5
1990	1235	63.7	2.6	4.3	84.4	7.8
1995	1488	57.5	7.1	8.7	77.3	16.8
2000	1561	50.3	10.2	7.2	68.9	19
2001	1556	49.1	10.9	7.5	66.9	20.1
2002	1648	52.2	10.8	8	66.3	19.9
2003	2009	51.4	12.1	7.8	64.1	22.6
2004	2327	50.6	10	10.2	62.2	21.4
2005	2364	45.9	9	13.8	58.6	24.8
2008	4175	39.7	9.3	13.4	49.3	24.2
2009	3465	39.9	10.7	16.1	49.4	28.6
2010	4547	38.4	11.4	16.1	50	29
2011	12700	50.7	14.1	17	63.2	32.2
2012	13000	56.4	14.9	25.8	54.5	42.3
2013	13752	45.6	16.4	26.7	52.6	44.8
2014	12151	37.4	16.7	31.1	47.7	49.8

Source: UNCTAD Handbook of Statistics, various years.

### **Destination of Non – traditional exports**

The performance of the NTE sector of the markets showed that the European Union and ECOWAS markets absorbed 35.84% and 31.59% respectively of NTES and these two markets continue to be the leading markets for Ghana's NTE products. Other African countries, other Developed countries as well as other

countries absorbed 3.62%, 7.52%, 21.43% respectively of NTEs from Ghana. This is shown in Figure 4.

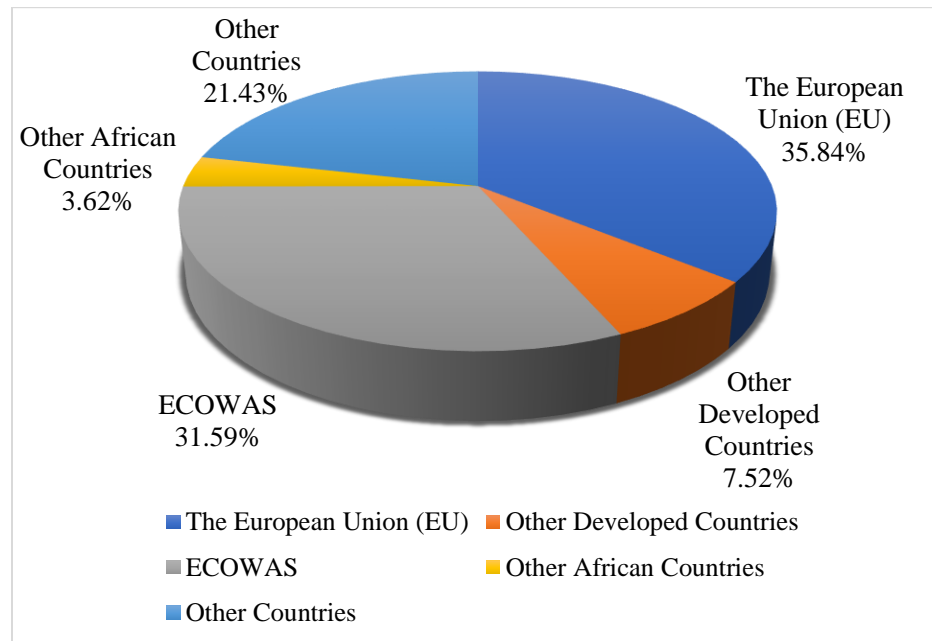


Figure 4- Share of NTEs by region of destination

Source: Ghana Export Promotion Authority (2015)

### Measures to Promote Export Diversification in Ghana

Diversification policy must include a more dynamic, high-valued added commodities such as fruits, vegetables, fish and seafood as well as temperate products such as grains and meats that are not related to traditional exports so as to achieve a balance between commodities prone to persistent external shocks and short-lived shocks. It is therefore important that all bottlenecks to diversification be removed to ensure the success of diversification programmes. For instance, there should not be a binding constraint on agricultural production. The productivity of labor force could be enhanced by adequate training and conducting research in

agriculture and by more intensive and appropriate use of biotechnology (UNCTAD, 2003).

Moreover, diversification into manufactured products increases the coordinated access of new, export-oriented firms usually facilitated by preferential access to the European Market. Diversification, specifically on the vertical dimension can be achieved by the provision of state-supported institutions to enable quality and technological upgrading through promotion of linkages with foreign markets. Diversification programmes must therefore be consistent with current development in international commodity trade (UNCTAD, 2003).

Since Ghana attained independence in 1957, successive governments have pursued with varying degree of policies, programmes and projects to accelerate the growth of the Ghanaian export sector to raise its competitiveness level in the international market. Moreover, diversification of the export base has been recognized as an important means to reduce the trade deficit and ensure sustained growth in the Ghanaian economy.

On one hand, diversification policies in the colonial era were characterized by diversification within the agricultural sector. Nonetheless, in the post-colonial period, diversification involved the industry as well as the service sector. A typical example was the seven-year plan for 1963/64 to 1969/70, which aimed at increasing the value of exports through the processing of raw materials and the sale of manufactured goods. However, it was not until the year 1969 that precise measures were initiated to promote non-traditional exports. In order to encourage the production and export of manufactured goods, the government of Ghana in line



with the objective in the Two-Year Plan between the period 1968/69 to 1969/70 introduced an incentive package in response to the poor performance of non – traditional export products.

This incentive package led to the formation of the then Ghana Export Promotion Council (GEPC) in 1969. The main objective of the council was to focus on the non-traditional sector by promoting, assisting and developing exports based on the prudent discretion of the council. The council was also tasked with the role of advising exporters and the government on export issues, marketing and promotion through the provision of insurance facilities and providing relevant information to exporters on new export and market developments (GEPA, 2015).

A notable export-led programme to facilitate the inclusion of both small and large firms and to speed up the development of non – traditional exports was the ERP and SAP in 1983. These programmes were highly supported by the IMF and the World Bank. The implementation of the Economic Recovery Programme was a major plan by the government to recover the economy. A key objective of the programme among others was the rehabilitation of infrastructure to improve conditions for the production and export of products. (GEPA, 2015).

Having introduced a flexible exchange rate under the Economic Recovery Programme, in the mid-1980s, the Ghanaian economy realized an increase in export volume averaging a rate of 10% between 1983 and 1990 (Tetteh, 2015). The implementation of the Economic Recovery Programme was thus justified as the many sectors of the economy and external sector were restored by the early 1990s. Growth in the traditional export sector was realized as cocoa and gold products

regained their dominance. For instance, in 1993, cocoa earned US\$280 million, gold earned US\$416 million and US\$140 million was realized from timber exports. Similarly, non-traditional exports also expanded significantly by triple since 1993 accumulating US\$403 million in 1999. Although the adoption of the flexible exchange rate system resulted in significant improvement in many sectors of the Ghanaian economy throughout the 1990s, diversification was limited as Ghana continuously rely heavily on the traditional exports as the main source of foreign exchange earnings.

Nevertheless, critics of the ERP argued that the programme bias towards the export of minerals and cocoa at the expense of other agricultural and industrial sectors (Meng, 2004). In response to that, the government attempted to ensure diversification in the agricultural sector by supporting traditional export industries especially cocoa and gold. The government also encouraged non-traditional exports in fishing by offering to refund 95% of import duties on goods intended to be re-exported and went further to cancel sales taxes on manufactured exports.

That said, much of the accelerated growth in NTEs achieved in the early 1990s was due to periodic investment in agro – processing activities like cocoa processing, canned tuna and palm oil which appeared to have preferential access to European Union markets. Consequently, an act of parliament in 1995 – that is, the Import/Export Act, 503 was passed and this led to a change in the classification of NTEs. Coffee, cocoa butter, cocoa cake, cocoa powder and cocoa liquor were classified under NTEs. This is what resulted in the rapid growth of NTEs and enhanced foreign exchange earnings in the 1990s.

There were also other programmes designed to boost export diversification, which included the implementation of US\$41million credit in 1994 as the Private Enterprise and Export Development (PEED) programme, the creation of the Ghana Free Zones Board (GFZB) and the Export Processing Zones (EPZs) in 1995. The GFZB programme was designed to encourage processing and manufacturing of goods through the establishment of EPZs. Through the GFZB, Ghana became accessible to potential investors both locally and abroad, who had the opportunity to use the free zones as central points to produce goods for foreign markets; the restructuring of the Ghana Export Promotion Authority. The main objective of the Ghana Export Promotion Authority was to promote exports from Ghana. However, due to the import substitution policy of the government at the time, it was less resourced from the 1980s until the year 2000, when it finally became fully resourced and independent (Whitfield, 2011).

In August 2013, the Government of Ghana launched the National Export Strategy with the purpose of raising the level of export proceeds from the non-traditional export sector to US\$5 billion in five years. The strategy is yet to take-off due to lack of funding. Should implementation of the strategy start in 2016 as now planned, non-traditional exports for the year is expected to increase by 3% from the current level of US\$2. 522 earned in 2015 (GEPA, 2015).

### **The Ghana Export Promotion Authority (GEPA)**

Basically, export promotion may be referred to as any effort aimed at increasing the exports of a country (Tetteh, 2015). This is considered a relevant tool

in any sustainable long-term development effort. Various researchers observed that Ghana relied heavily on cocoa exports and some other traditional exports, especially in the late 1960s and early 1970s. They indicated that if the country continued to depend on a limited range of products, the economy will not flourish or withstand competitive global trends (GEPA, 2014). Therefore, to enable the country's economy and help it meet the challenging global trends, the then Ghana Export Promotion Council (currently Authority) established in 1969. The GEPA is a national export trade support institution that facilitates development and promotion of Ghanaian exports. Its primary focus has been to diversify Ghana's export base from the traditional cocoa beans, gold and other unprocessed minerals, timber logs and lumber. Currently, there are over 400 different NTE products categorized as Agricultural, Processed/Semi Processed products and Handicrafts. Export trade in services is a new and recent addition to the Ghanaian portfolio.

Another major responsibility of the GEPA is to support producers to export by providing information on international markets. The GEPA is thus charged with task of ensuring that export trade plays a role in aiding socio-economic development of the country. The council performs this task by concentrating on marketing non-conventional products using some strategic and aggressive marketing.

In order to meet its objectives, the council has a wide-ranging scope of activities, which include the following (GEPA, 2014):

- ✓ Create awareness about export in the country.

- ✓ Identify products suitable for export and locate appropriate markets for them.
- ✓ Organise exhibitions and trade fairs in and outside the country and to create goodwill for products made in Ghana.
- ✓ Provide Ghanaian exporters with all the required help, so that they can enter competitive markets abroad.
- ✓ Organize market missions to facilitate meetings between exporters and prospective buyers from abroad.
- ✓ Offer advice to exporters on export marketing.
- ✓ Train exporters and staff from export institutions to enhance their export marketing skills.
- ✓ Recommend to the government the assistance and/or incentives that Ghanaian exporters need.
- ✓ Provide businessmen and exporters travelling overseas from Ghana with relevant information and knowledge about target markets.

The Ghana Export Promotion Authority in association with the Ministry of Trade and Industry provides many export incentives to Ghanaian exporters, such as giving discounts on corporate tax, offering competitive forex rates to exporters to change all the proceeds from the export, giving a customs duty drawback of up to 100 percent on imported materials that are used to produce the export product.

Nevertheless, in order to achieve much on the international market, the export authority and other stakeholders must diligently pursue the necessary and sufficient strategies. This is due to the fact that a considerable number of products

that are being exported are still in their raw unprocessed form. Apparently, one of the most important contributions of export promotion (especially the promotion of NTEs) is the creation employment opportunities in rural communities. It is anticipated that, as more markets are created for different products and more exporters come on board, output in the economy (GDP) will increase.

Although the NTE sector has seen rapid growth over the past few years, the sector has been underperforming because of a number of challenges that they face. In other words, the share of the NTE sector to the country's GDP can be multiplied manifold if sufficient effort is deployed by the government and the private operators to address the many constraints that the operators face.

### **Export Diversification**

The aggregate concentration index measures the long run structural change in the composition of the export mix. The index is inversely related to the degree of diversification. By construction, lower index values indicate higher levels of export diversification and vice-versa. Thus, larger values of the specialization index indicate specialisation of the export portfolios whereas smaller values are a reflection of diversification.

Although Ghana has experienced some degree of diversification, export diversification has not undergone any significant change during the study period (Figure 5). Over the study period, export concentration as measured by Theil index averaged about 4.1. The concentration/specialisation index began to decrease owing to the implementation of the ERP in 1983. The concentration index

decreased from 4.8 in 1984 to 4.6 in 1985 and thus improve diversification. Then further decreased to approximately 4.5 in 1986 and has maintained similar level during the following years under study.

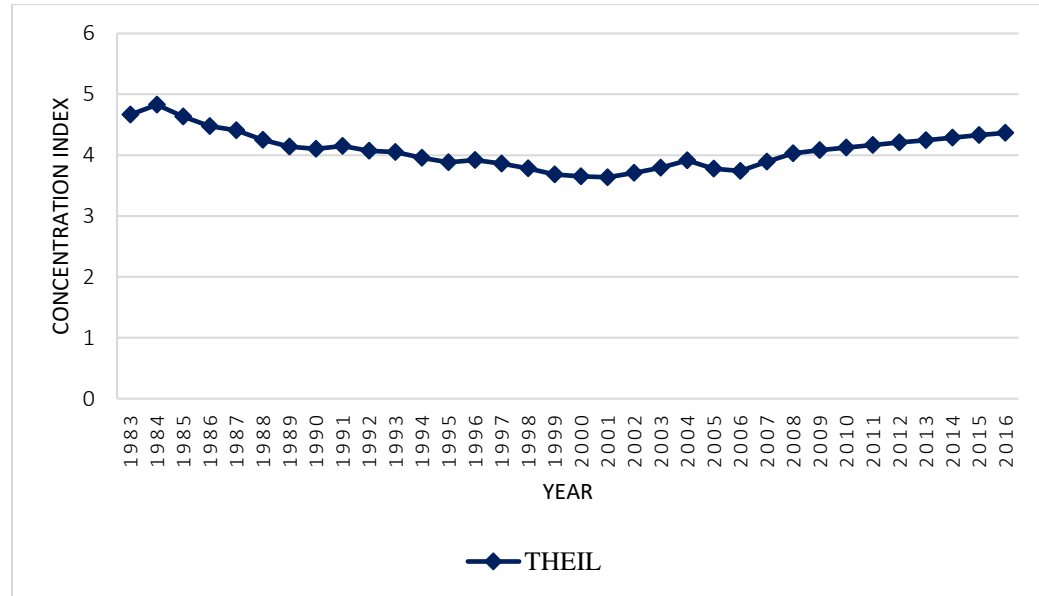


Figure 5- Evolution of Concentration Index (1983-2016)

Source: Author’s construct (2018)

### Trend Analysis of Explanatory Variables

It is common knowledge that an economy cannot function properly in an unsuitable macroeconomic environment. Achieving a stable and sound macroeconomic environment is a crucial objective for every economy seeking to grow in other aspects of the economy. There is evidence that supports the fact that a good macroeconomic atmosphere is essential for successful diversification. For years the IMF and the World Bank have devised strategies to help developing countries design macroeconomic policies that will sustain export diversification

and thus tackle balance of payment problems and accelerate economic growth (Addo & Marshall, 2000).

### **GDP per capita**

Growth of GDP per capita in Ghana has been observed to be unstable between 1983 and 2016. According to Osakwe (2007), the volatile growth trend can be associated with the reliance on primary products for export earnings. Ghana's effort to diversify over the years has been a notable policy by various government regimes. Although the economic prospects of the country look bright, Ghana remains vulnerable to persistent commodity price volatility in the international market as the country continues to rely on traditional exports.

As shown in Figure 6, Ghana's GDP per capita has seen an appreciable rise during the period under review, increasing from about 2.5 units in 1983 to about 3.5 units the following year. This was followed by an increase in GDP per capita growth to about 4.3 units in 1985. The years following have witnessed an upward trend in GDP per capita, averaging about 1303 units from the early 1990s to date. This upward trend indicates the potential in Ghana's GDP per capita as increasing income inequality continues to be a serious economic challenge for policy makers.



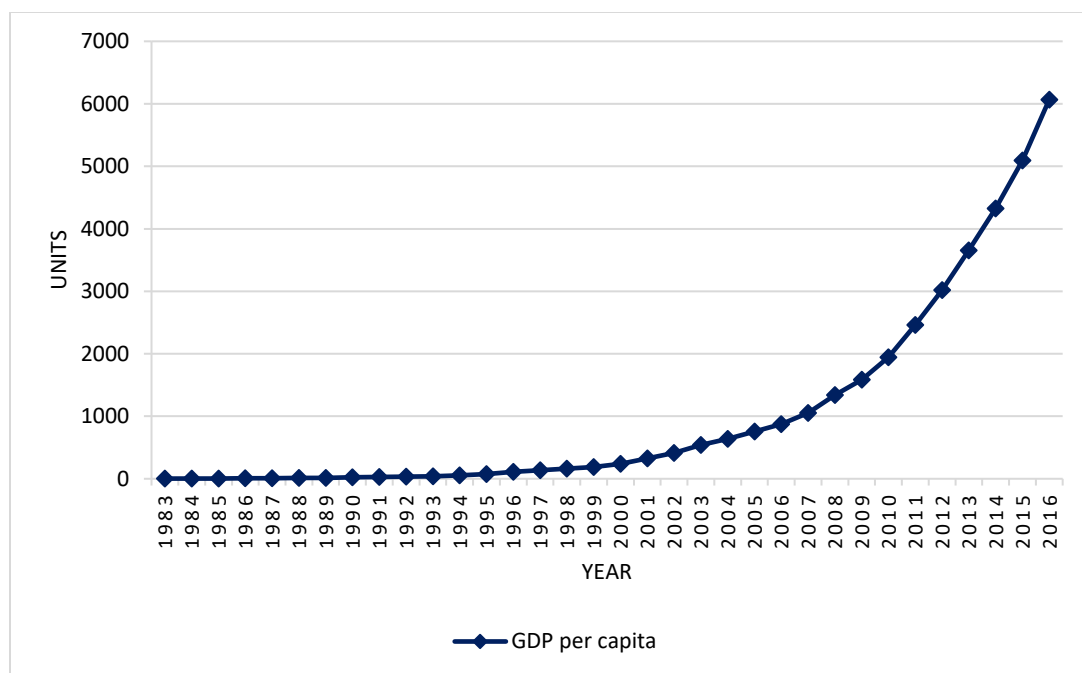


Figure 6- Trend of GDP per capita (1983-2016)

Source: Author’s construct (2018)

### Trade openness

With the implementation of export oriented trade policies, Ghana has since 1988 adopted a liberal tariff policy which has resulted in a more simplified tariff structure and a reduction in tariff levels (Akwetey, 2002). Currently, Ghana’s trade liberalization is extensive. Protection to infant industries is very limited, leading to the collapse of many industries (MOTI, 2012). The upward trend in Ghana’s degree of openness as shown in Figure 7 indicates how extensive the country’s degree of openness is. There is a reduction in export concentration in the years following the trade reforms under ERP and SAP with some reversal after 25 years of trade reforms. Nonetheless, the subsequent reversal is not strong enough to completely offset the initial decline

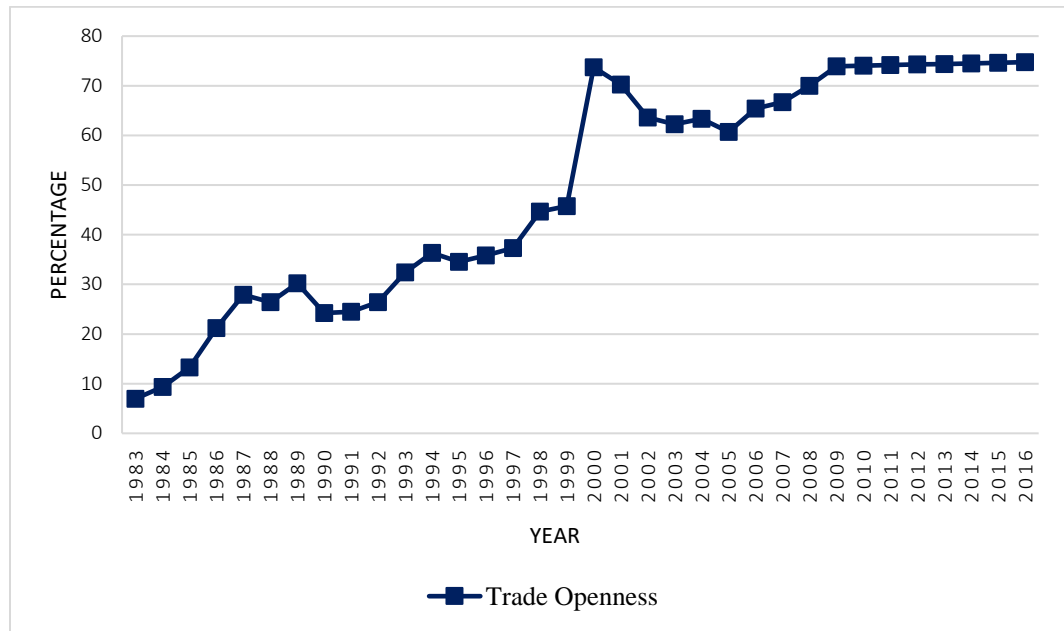


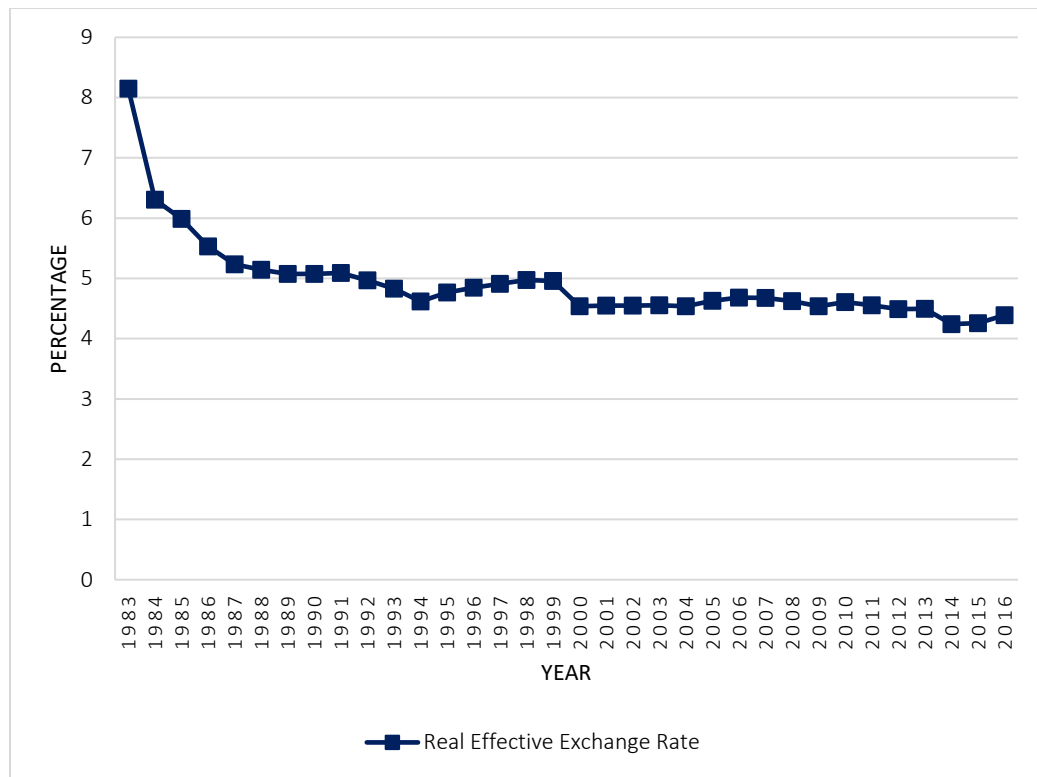
Figure 7-Trend of Trade openness (1983-2016)

Source: Author's construct (2018)

### Real Effective Exchange Rate

The Ghana Cedi has persistently depreciated under the floating exchange rate system against the major currencies especially the US Dollar (US\$). Even though, not monotonic, the Ghana Cedi however was fairly stable between 2002 and 2007. Nonetheless, since the redenomination of the cedi in July, 2007, the Ghana cedi depreciated and by the end of July 2009, a Ghana Cedi was worth US\$ 0.67 (Bank of Ghana, 2009).

The trend of real effective exchange rate over the study period is depicted in Figure 8. From Figure 8, it is observed that there has been some persistent appreciation and depreciation of the cedi especially in 2000s. The average real effective exchange rate remained about 4.6 percent during the period.



*Figure 8-* Trend of Real Effective Exchange Rate (1983-2016)

Source: Author’s construct (2018)

### **Foreign Direct Investment**

The trend of FDI to Ghana has seen a steady increase over the year despite the fact that very minimal to Africa and the rest of the world (Agyapong, 2012). Ghana for instance in 2008 was ranked 34th, 12th in 2009 and 11th in 2010 in terms of inward FDI performance. From Figure 9, it is clear that FDI inflows to Ghana have experienced some fluctuations over the years. Between 1983 and 1992, FDI as a percentage of GDP was well below 1 percent averaging about 0.2 percent. However, there was a sharp increase in FDI inflows of about 2.1 percent and 4.3 percent in 1993 and 1994 respectively. This was followed by a decrease in FDI inflows to approximately 1.6% percent in 1995.

Ghana continued to experience low FDI inflows through the early 2000s until 2006. The year 2006 was followed by an increase in FDI inflows. FDI inflows as a percentage of GDP has since consistently increased attaining a record high of 9.5 percent in 2008 and decreasing slightly to 9.1 percent in 2009 and then decreasing again to about 7.9 percent in 2010 and 6.8 percent in 2013. Ghana received a boost in attracting FDI inflows as the figure rose again to 8.7 percent in 2014 and then dropping slightly again to 8.1 percent in 2016.

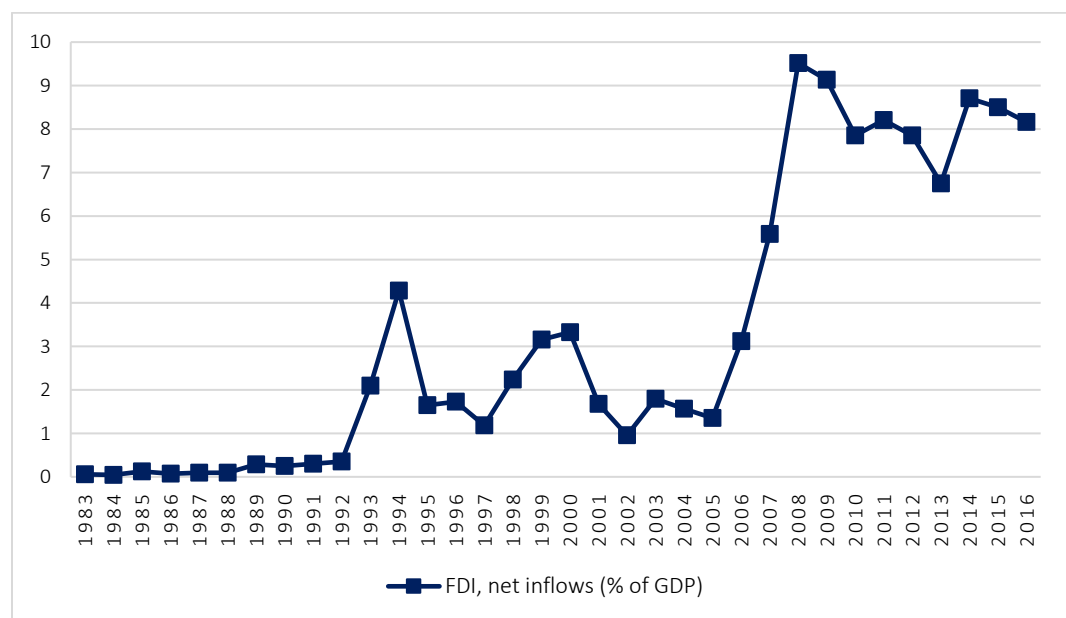


Figure 9- Trend of FDI inflows (% of GDP) (1983-2016)

Source: Author’s construct (2018)

### Terms of Trade

Basically, terms of trade (TOT) represents the ratio between a country's export prices and its import prices. An improvement in a country's terms of trade for every unit of export that a country sells implies that it can purchase more

imported goods. When the TOT increases, it may also have a positive impact on domestic cost-push inflation because the increase is indicative of falling import prices in relation to export prices. On the other hand, the country's export volumes could fall to the detriment of balance of payments. Terms of trade is measured by export price index divided by import price index. Figure 10 depicts the trend of Ghana's terms of trade for the period under study.

Terms of trade in Ghana has experienced some up and downs under the study period. Increase in Ghana's terms of trade could somewhat be associated with the commodity price boom. On one hand, the improvement indicates the tendency of Ghana to continue to rely on primary commodity for export. However, the past few years which shows a downward trend of terms of trade suggests the possibility of Ghana to diversify into new areas of trade as export commodity prices are expected to stay low (IMF, 2017).

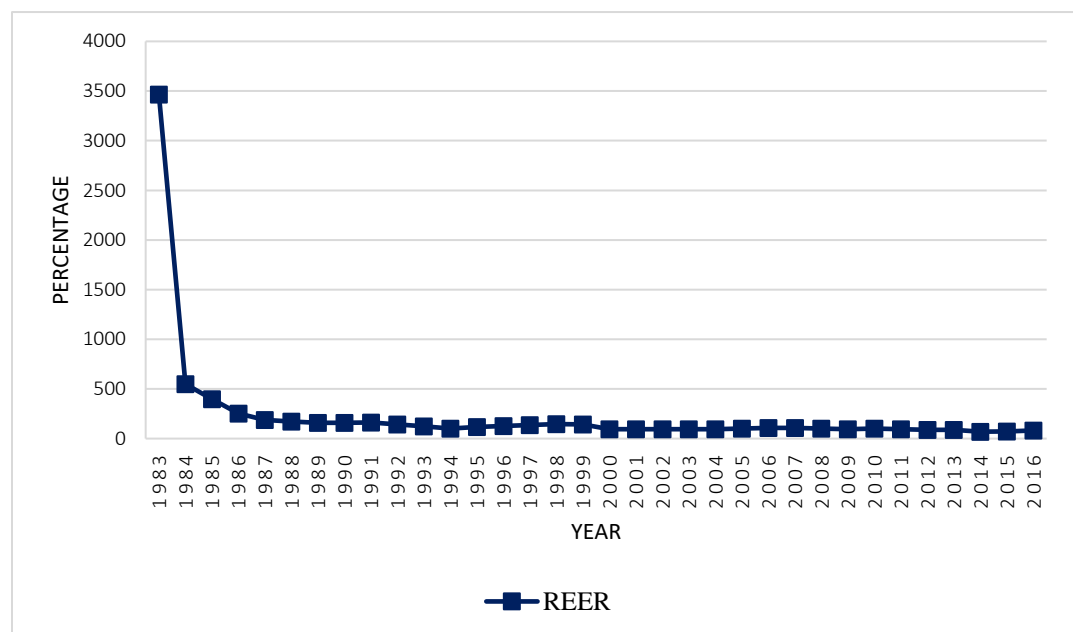


Figure 10- Trend of Terms of Trade (1983-2016)

Source: Author's construct (2018)

## **Infrastructure**

According to Sachs, Mc Arthur, Schmidt, Traub, Kruc, Bahadur, Faye and McCord, (2004), the combined effects of low investment levels and poor infrastructure, together with dependence on primary commodities in SSA, has led to very low productivity levels and a correspondingly low level of capital accumulation that has been insufficient to trigger a sizable manufacturing activity. Figure 11 shows the trend of infrastructure development (proxied by number of telephone lines per 100 people). The period from 1983 to 1994 marked a linear trend of infrastructure and then followed by an upward from 1995 to 2007 where the level of infrastructure development reached about 1.7. The period was followed by a significant drop in level of infrastructure to 0.62 in 2008. Then again, this may be attributed to the global financial crisis in 2008. The level then followed by a continued decrease in the subsequent years.

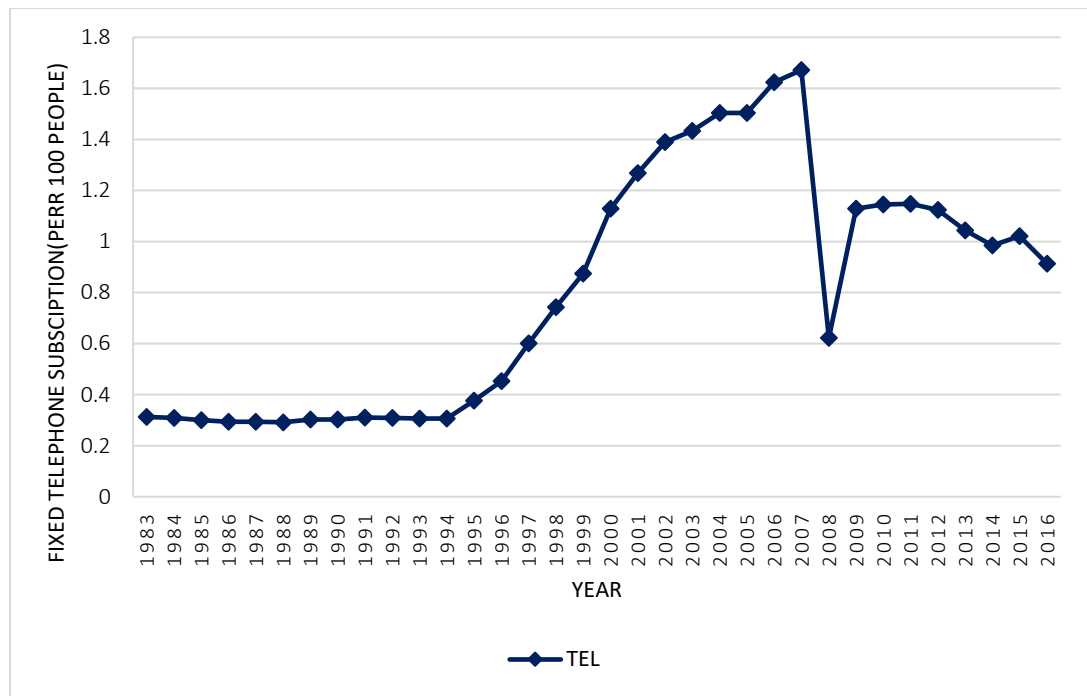


Figure 11- Trend of infrastructure development (1983-2016)

Source: Author's construct (2018)

### Chapter Summary

This chapter presented an overview of Ghana's export sector. In addition to that, the chapter provided trends in the performance of variables used in the study. From the analysis, it is observed that although there has been some improvement in Ghana's non-traditional exports over the past few years, non-traditional exports have a smaller share in the exports of Ghana to the European Union, Ghana's leading market export market. The analysis also showed that the overall concentration index (Theil index), the proxy for diversification has not undergone any significant change during the study period. The chapter also presented trend of all the explanatory variables to analyse the performance of the variables over the study period.

## **CHAPTER THREE**

### **LITERATURE REVIEW**

#### **Introduction**

The objective of this chapter is to present a review of relevant literature about the determinants of export diversification. It is organised into two main sections. The first section presents theoretical literature based on conceptual issues and the theories that explain export diversification. Specifically, the conceptual issues focus on definition of export diversification, measurement of export diversification, types of export diversification. The second section presents the empirical literature review. It reviews empirical studies on the determinants of export diversification.

#### **Theoretical Literature Review**

##### **Conceptual issues**

It is important to elaborate on the various concepts related to the subject in order to appreciate the subject under discussion. This section, thus discusses the various definitions, measures of export diversification and types of export diversification.

##### **Definition of export diversification**

Export diversification has been variously defined as the change in the composition of a country's existing export product mix or export destination (Ali, Alwang & Siegel, 1991), or as the spread of production over many sectors



(Berthelemy & Chauvin, 2000). Similarly, export diversification is often defined as a broadening of the range of products that a country exports (Dennis & Shepherd, 2007) or as an increase in the number of destination markets (Bacchetta et al., 2012). In addition, diversification is sometimes associated with a more even distribution of value across an exporter's goods (Starosta de Waldemar, 2010).

According to Balavac (2012), the conceptual definition of diversification is derived from the way diversification is measured. The concentration indices measure the extent to which country's export is diversified. The concentration indices measure whether a majority of country's export earnings come from a small range of export products (indication of export concentration) or the source of export earnings are more evenly spread across a given range of export goods (indication of export diversification).

Export can grow at the intensive (the growth in the value of existing products) and extensive margin (the increase in the number of export lines). Accordingly, export diversification can be captured along the margins: a more even spread of the export basket is an indication of diversifying at the intensive margin, while the greater number of export lines indicates diversification at the extensive margin (Cadot et al., 2011).

### **Measurement of overall diversification**

The concentration and inequality indices (specifically the Herfindhal, Gini and Theil indices) appear to be the most commonly used measures of export diversification. All these indices are highly correlated and have been shown to provide similar ranking in terms of export concentration. Concentration indices

measure changes in a country's export structure, defined at any level of aggregation. Conversely, Cadot et al. (2011) suggests that the greater level of disaggregation of data, the better is the measure. Indices are cumulative or summary measures of concentration as they explain the entire size distribution of exports and allow the value of the index to be influenced by changes in every part of the distribution (Balavac, 2012).

Theil entropy index is the preferred measure of export diversification in this study. The concept of entropy was originally developed in thermodynamic and statistical mechanics as a measure of disorder. Based on a probabilistic interpretation of entropy in information theory, Theil (1967, 1972) applies the concept of entropy in economics as a measure of diversification. It indicates the diversity or the spread of a distribution. Following Cadot et al. (2011), Balavac (2012), IMF (2017), the mathematical representation of the theil index of export diversification can be expressed as;

$$Theil\ Index = \frac{1}{n} \sum_i^n \frac{Export\ Value_i}{Average\ Export\ Value} \cdot \ln \frac{Export\ Value_i}{Average\ Export\ Value}$$

Where  $i$  is the product index and  $n$  is the total number of products. The index is inversely related to the degree of diversification. By construction, lower index values indicate higher levels of export diversification and vice-versa. The decomposability property is reckoned to be the main advantage of the Theil index over alternative measures of diversification (Balavac, 2012). The “between” Theil index measures the extensive margin of diversification that is how many goods a

country export. The “within” Theil component captures the intensive margin, that is how concentrated a county’s export base is (IMF, 2017).

### **Types of export diversification**

Export diversification has been identified to take several dimensions in the trade literature and can be analyzed at different levels. There are two well-known forms of export diversification: horizontal and vertical.

#### ***Horizontal diversification***

Horizontal diversification takes place within the same sector (primary, secondary or tertiary), and entails adjustment in the country’s export mix by adding new products on existing export baskets within the same sector, with the hope to mitigate adverse economic (to counter international price instability or decline) and political risks (Samen, 2010).

#### ***Vertical diversification***

Vertical diversification generally entails moving up the value chain. Structural transformation, during which production gradually shifts from agricultural activities into manufacturing, is an example of vertical diversification (Aberg, 2014). According to Alemu (2009), vertical diversification involves a radical modification in export structure and further uses of existing and new innovative export products by means of value-added ventures such as processing and marketing.

## **Models of International Trade**

The foundation of the traditional trade theories developed by Adam Smith (1776), David Ricardo (1817) and Heckscher-Ohlin-Samuelson (HOS) was the concept of division of labour, comparative advantage and specialisation as a means to economic growth and development.

Contrary to the classical and neoclassical theories of foreign trade, export diversification theory reached to the forefront in the second half of the twentieth century (Vahálík, 2015). It should be noted that although the benefits accruing to a diversified export base have been well-pronounced in the literature, there exists no unified theoretical framework explaining the main determinants of export diversification at the macroeconomic level (Bebczuk & Berrettoni, 2006; Hodey, 2013).

The acceleration of global trade in the latter part of the 20th century reveals trade patterns contrary to those predicted by classical trade theories. Recent studies have shown that countries tend to diversify in terms of production and exports as they progress. The conventional argument for export diversification is basically founded on the idea that export diversification plays a key role in minimizing export earnings instability caused by constant fluctuation in international commodity prices.

### **Prebisch – Singer Hypothesis**

The Prebisch-Singer hypothesis generally refers to the proposition that the relative price of primary products (raw materials) in terms of manufactures shows

a long-run downward trend which causes terms of trade problems for primary commodity dependent countries. The Prebisch-Singer thesis was fundamentally based on the general issue of a rising per capita income gap between industrialized and developing countries and its relationship to international trade.

The hypothesis offers three main stylized facts: first, developing countries were indeed highly specialized in the production and export of primary commodities; second, technical progress was concentrated mainly in industry; and third, the relative price of primary commodities in terms of manufactures had fallen steadily since the late 19th Century. These facts, all together implied that because of their specialisation in primary commodities, developing countries had obtained little benefit from industrial technical progress, either directly, through higher productivity, or indirectly, through improved terms of trade (Cuddington, Ludema, & Jayasuriya, 2002).

### **New Trade Theory**

The new trade theory combines imperfect competition and increasing returns and argues that increases in the number of products (extensive margin) drive trade growth. Krugman's theory offers an interesting scenario that replaces the classical trade with modern economic realities of consumer's thirst and variety, product differentiation, brand monopoly, similar factor, monopolistic competition, increasing returns, active government and industrial thrust among other assumptions.

The new trade models emphasize the extensive margin of trade and are better suited for understanding the determinants of export diversification. Krugman (1979) presents the workhorse model of trade with a monopolistic competitive market structure. He emphasizes on the extensive margin of trade, with countries in equilibrium producing an endogenous number of varieties. The number of varieties produced in a country is proportional to the size of the economy, with each country (conditional on exporting a particular variety) exporting that variety to all other countries. Evennett & Venables (2002) found that a third of the growth of exports of developing countries between 1970 and 1997 can be attributed to the expansion of the extensive margin.

### **New Economic Geography Models**

The New Economic Geography models (Krugman & Venables, 1990, 1995; Amiti & Venables 2002; Venables & Limão 2002) propose that transport costs and distance affect the level of specialisation of a country. According to the models, a lower distance to the main world markets, access to the sea and overall lower transport costs determine the ease with which a country can increase the variety of products exported to the world markets. The models also suggest that trade liberalization in a context where economies of scale and transport costs play a significant role is likely to improve product diversification. Melitz (2003) found that trade liberalization can induce export diversification through an increase in the number of exporters in those sectors facing improved export opportunities. On the other hand, the New Economic Geography models also emphasize that a decrease

in transaction costs resulting from trade liberalization may lead to a decrease in export diversification especially in peripheral economies (Cabral, & Veiga, 2010).

### **Endogenous Growth Theory**

Recent arguments emanating from the endogenous growth theory indicate that export diversification plays a key role in curbing export earnings uncertainties and has the capacity of inducing the gains of comparative advantage of an economy's production structure. The basic idea underlying the endogenous growth theory is that export diversification affects long term growth. This usually results from increasing returns to scale and dynamic spillover effects as a result of new methods of production, management or marketing practices which potentially helps other industries and enhances growth in the long run – that is, backward and forward linkages. Export diversification under the endogenous growth includes various elements such as changes in demand and supply, industry capability, risk aversion, environmental considerations and changes in commercial policies (Ssemogerere et al., 1994).

Another modification of endogenous growth models such as Matsuyama (1992) emphasize the importance of learning-by-doing in the manufacturing sector for sustained growth. In relation to export diversification, there could be knowledge spillovers from new techniques of production, new management, or marketing practices, potentially benefiting other industries (Piñeres, & Ferrantino, 1997).

## **The Structuralist Tradition**

A major intuition of the structuralist is the fact that diversification of the production structure matters for macroeconomic stability. Thus, the structuralist links product diversification to the degree of macroeconomic stability. According to Agu and Caliari (2013), the lack of diversified production is a direct cause of the degree of macroeconomic volatility such as variability of the terms of trade. Similarly, the lack of a productive diversification makes for instance volatility in terms of trade become a direct fundamental variable that affect the external sector.

Paredes (1988) develops a behavioural model of export supply under uncertainty that formally justifies the inclusion of expected real exchange rate and real exchange risk as a determinant of manufactured export supply in developing. The model assumes that firms maximize profits under uncertainty proxied by exchange rate variability. Devaluation in the real exchange rate of a country increases the external demand of a country's tradable goods. This increases the opportunities of producing and exporting new goods and expanding the production of existing exports. Real exchange rate and its volatility affect the production of exportable goods. Real devaluations in the exchange rate have become an important factor in the diversification of the export supply (Rodrik, 1998 and Krugman, 1987).

## **Modern Portfolio theory**

It was based on the popular saying "Don't put all your eggs in the same basket", that the Nobel Prize Winner Professor Harry Markowitz developed the concept of diversification with the modern theory of portfolio selection. The



diversification theory advocated by Markowitz (1952) asserts that the optimal diversification strategy is a function of the means, variances, and pair-wise correlations of risky assets. Inspired by the modern theory of portfolio selection, the idea of diversification has been recognized as a way of minimizing a country's reliance on a particular product or a very limited range of unprocessed primary exports.

Accordingly, studies have shown that many developing countries characterized by high dependence on a few primary products for trade would profit from diversifying. The portfolio theory can be applied to measure diversification benefits for an economy by selecting export portfolios that optimize market risks against anticipated returns (Samen, 2010; Love, 1983). Also, because export forms a big percentage of foreign exchange, by increasing the number of export sectors, countries can curtail the risk of export instability. This implies a country relying on just some few commodities for export faces significant risk in front of high elasticity of demand and commodity price uncertainty in the international market. The argument that increasing the number of export sectors contributes to growth in the long run by stabilizing export earnings is commonly known as the "portfolio-effect" of diversification (Iwamoto & Nabeshima, 2012).

### **The Concept of Self Discovery**

Contemporary economic literature associates export diversification to the process of "self-discovery" or innovation which indicates the unearthing of new export products by firms or country. It underscores the role of externalities related

to the process of discovering new exports or those related to coordination failures in taking the required measures to increase sector-wide productivity. It can thus be inferred from the self-discovery literature that export diversification can be shaped by Government policies and that an appropriate mix of microeconomic interventions in specifically addressing the market failures is important in the development process at different development levels (Hausmann & Rodrik, 2003; Klinger & Lederman, 2004; Rodriguez-Clare, 2005; Samen, 2010).

### **Empirical literature Review**

Identifying the main factors of export diversification is difficult as there is no available extensive theoretical or empirical structure to cover all potential factors (Shabana & Zafar, 2016).

Eneje and Ikpor (2017) studied the determinants of export in West Africa sub-region. The study adopted fixed effect model to analyze the data sourced from 17 West African countries from year 1995 to 2015. The results suggest that per capital income, human capital, investment, geographical location and good governance are significant drivers of export diversification, while terms of trade and population have negative relationship with export diversification in Africa.

Ifeakachukwu and Alao (2018) examined the extent to which monetary policy has influenced export diversification in Nigeria for the period 1962 to 2014. The study employed descriptive and ordinary least squares techniques. The regression estimate showed that monetary policy is insignificant in influencing

export diversification in Nigeria. The study concluded that monetary policy has not played a fundamental role in enhancing export diversification in Nigeria.

Ali (2017) contributed to literature on determinants of export diversification by introducing related variety (RV) and unrelated variety (UV) in the analysis in addition to the traditional entropy-based measure at three-digit Standard International Trade Classification (SITC) level, overall variety (OV). He used system GMM to estimate data on manufacturing sector exports for 130 countries from 1996 to 2011. The study identified the determinants of export diversification with primary focus on foreign direct investment as an external source of knowledge and a stimulus to entrepreneurship and human capital as a measure of productive capabilities. Findings of the study showed that some of the determinants of diversification affect RV, UV and OV differently. Foreign direct investment (FDI) negatively affects RV while it has no significant relationship with OV and UV. Moreover, interaction of human capital with FDI was found to be positive and significant for UV and RV while interaction of human capital with trade openness is significant and positive for RV only.

Shabana and Zafar (2016) examined the role played by country-specific factors in the determination of export product diversification process. The paper constructed a time series data for export diversification using the Herfindahl index. It then applied the fully modified OLS co-integration model to a panel of selected ASEAN and SAARC countries to find out the main determinants of export product diversification. Their analysis showed that foreign direct investment, domestic investment, competitiveness, real depreciation of domestic currency, financial

sector development and institutional strength are significantly and positively related to export product diversification in both regions.

Altowaim (2016) investigated the impact of financial development on export diversification in resource-rich developing countries. The study used a sample of 38 resource rich developing countries for the period 1995 to 2013 and employed two methods: panel Fixed Effect and panel cointegration estimations (using the Dynamic Ordinary Least Square (DOLS) estimator). In the first method, the study found that financial development has no significant impact on export concentration. While in the second method, the results suggested that financial development has a significant positive impact on export concentration. The findings of this contrast with the results of Shabana and Zafar (2016).

Mubeen and Ahmad (2016) explored the determinants and degree of export diversification using Gini Hirschman (GHI) to estimate the degree of export diversification in Pakistan. The study observed determinants of export diversification by taking time series data of 1980 to 2015. The study applied Auto Regressive Distributive Lag approach to observe long run relationship in underlying variables. The findings of the study indicated that geographic concentration of exports enhances product concentration in exports and reduces export diversification, while foreign direct investment, world income and real effective exchange rate play significant role in enhancing export diversification. On the other hand, trade openness improves export concentration.

Agosin et al. (2012) used 40 years data on 130 countries to estimate the determinants of export diversification around the world. They used two-step GMM

estimation on three groups of explanatory variables. The first group of variables included reform related ones like trade openness and financial sector developments. The second group of variables included structural determinants of exports like factor endowments and distance. The third group consisted of macro-economic factors that affect exports like exchange rate volatility, terms of trade, interaction of human capital with terms of trade. They found that trade openness encourages specialisation and therefore is negatively related to export diversification. On the other hand, financial development and higher schooling have a positive relation while exchange rate overvaluation and terms of trade improvement have a negative impact. This study is robust as it explored a number of measures and methods to estimate the determinants.

Pacheco and Pierola (2007) also contributed to the export diversification literature by analyzing new stylized facts on the differences in diversification patterns between developed and developing countries. Their study showed that growth in export is mostly explained by the growth at the intensive margin for all countries especially for developed countries where the extensive margin of trade is small at this stage of disaggregation. In fact, the extensive margin of trade is not trivial for some developing countries, and in particular, when they analyzed two different dimensions of export diversification (product and geographical) they found that geographical diversification showed more dynamism than product diversification.

Additionally, by using a highly disaggregated trade data to examine geographic and product diversification patterns across a group of developing

nations for the period, 1990 to 2005, the econometric investigation showed that the gravity equation fits the observed differences in diversification across nations. The authors concluded that exports at the intensive margin account for the most important share of overall trade growth. At the extensive margin, geographic diversification is more important than product diversification, especially for developing countries. Taking part in Free Trade Agreements, reducing trade costs, and trading with countries in the North were also found to have positive impacts on export diversification for developing countries.

Manuel and Veiga, (2010) studied the political and economic determinants of successful export diversification and export sophistication strategies of 48 sub-Saharan African countries for a period spanning from 1960 to 2005. Their findings pointed out better governance as an important determinant for export diversification and sophistication strategies in SSA. Their study further revealed that limitation or expansion of the scope of export diversification or sophistication level specifically depends on the level of corruption, transparency and accountability in sub-Saharan Africa.

Elhiraika and Mbate (2014) assessed the long-run determinants of export diversification. The study employed system GMM to estimate a cross country regression model using a panel of 53 African countries for a period spanning from 1995-2011. They identified per capita income, infrastructure, public investment, human capital and the institutional framework as key drivers of export diversification.

Balavac (2012) investigated the determinants of export diversification in transition economies. The study estimated dynamic panel model using system GMM. The results of the analysis revealed that overall diversification is significantly determined by both, entry and trade costs. The study also found that aid for productive capacity supports export diversification at the extensive margin in transition economies. Aid has lagged effect on diversification at both margins. The second lag of aid enter significantly in all regressions, but sign on coefficient suggest that aid discourages diversification.

Using a panel of 116 countries over 35 years, Makhlouf, Kellard and Vinogradov (2015) found that openness can be positively associated with both specialisation and diversification, depending on the measure used. Moreover, for developing countries in the sample, the effect of openness on trade structure depends on the type of political regime: in autocracies openness is linked with specialisation, whilst in democracies it is related to diversification via export sophistication.

Long, Hong and Anho-Dao (2015), employed a panel Granger causality test to examine the relationship between real exchange rate and export diversification in the middle-income countries of Asia and Latin America over the period from 1995 to 2015. The study also examined the effects of two financial crises on the causal relationship, namely the East Asian financial crisis of 1997 and the global crisis of 2008. Their study found a bidirectional causality between the real exchange rate and export diversification. The study also revealed that while most countries in the sample were unaffected by the financial crises, the link running from export

diversification to real exchange rate was disturbed by the crises in almost eight individual countries.

Mather (2017) analysed the determinants of export diversification in Ecuador using Ecuadorian export trade flows to the world's 50 largest GDPs at the level of six digits in the HS coding system between 1991 and 2015. The study employed a gravity model of trade, an initial Probit estimation was also used to test the determinants of market entry for Ecuadorian firms. A novel approach was used at both stages of the Heckman method to measure diversification along its extensive and intensive margins. The results from the study showed that free trade agreements and measures of macroeconomic stability are consistently associated with greater diversification along the extensive and intensive margins, while the “*revolución ciudadana*” and broader policies were associated with lesser diversification along both margins.

Aberg (2014) conducted an empirical investigation on the impact of corruption on export diversification. The author made use of a panel data covering the period 2002 – 2012 for 157 economies at different development levels. Also, by employing the Poisson-pseudo-maximum-likelihood estimator for the baseline regression, she found that corruption has a significant and negative impact on export diversification. Additionally, her findings even though less robust, reveal that the magnitude of the effect or impact varies depending on the exporter's level of income and that corruption may pose problems to the development prospects of sub-Saharan Africa.



Ahmadov (2012) investigated the political and institutional factors that enhance or hinder export diversification in the resource-rich developing world between 1962 and 2010. The study employed the random effects with generalised least squares least (GLS) for the estimation. Results from the study showed that ethnic fractionalization (with or without actual conflict), dependence on petroleum, have strong negative impact on diversification while impact of institutional origin may have more to do with extractive-nonextractive divide than identity of coloniser. It was also found that different resources have different effects on diversification. Abundance of specific resource does not have; oil reserves, demographic and geographic factors and policy-amendable economic variables were found to have no impact on diversification.

Liu and Zhang (2015) examined the relationship between export diversification and exchange-rate regimes for a group of seventy-two countries. Employing panel ordinary least square technique, the study observed that diversification of export products has a positive but insignificant effect on the choice of fixed exchange-rate regimes. When export diversification is decomposed into the extensive and intensive margins, evidences of the paper showed that higher level of product diversification at the extensive margin has a statistically positive effect on exchange-rate regime choices while the intensive margin has a negative but insignificant impact on the choice exchange-rate regime.

Kamuganga (2012) sought to answer the question; what drives export diversification in Africa? He used conditional logit technique and a highly disaggregated bilateral trade flows at HS 6-digit level for African countries for 1995

to 2009 and found that intra-Africa regional trade cooperation enhances the likelihood of an African nation exporting across the new-product and new-market margin. Secondly, he found that both product and market experience increase the prospect of African exporters exporting on new product and new market margins. Further, the study proved that infrastructure related trade frictions such as export costs; time to export; procedures to export as well as weak export supporting institutions have a negative effect on African export diversification. Likewise, macroeconomic developments particularly exchange rate volatility, financial underdevelopments and inappropriate foreign direct investments harm African nation's chances to diversify its exports.

Parteka and Tamberi (2008) assessed the role played by country specific factors as determinants of exports' diversification process. By using a panel data-set for 60 countries and twenty years (1985-2004) they confirm that even after clearing out differences in income per capita, cross section variability in the degree of exports' diversification is significant. In general, apart from per capita income, variables influencing the size of accessible markets (domestic and foreign) are the most relevant and robust determinants of the export diversification process. Diversification opportunities grow if countries are large, not located far from economic core areas and when barriers to trade are restricted.

By employing the dynamic panel data model based on system GMM for 175 countries from 1980 to 2007, Iwamoto and Nabeshima (2014) investigated the impact of FDI inflow and stock on the level of export diversification. They argued that FDI promotes export diversification and sophistication of host countries

through export activities by MNCs and transfer of productive capabilities from multinational companies (MNCs) to local firms. They also found that these positive impacts of FDI exist only in developing countries.

Habiyaremye and Ziesemer (2006) examined the extent to which dependence on primary commodities in Sub-Saharan African (SSA) countries can be explained by low levels of absorptive capacity (the ability to acquire, internalize and utilize knowledge developed elsewhere). They analysed individual and the combined effects of various indicators of absorptive capacity on export diversification. The study found that the association between higher levels human capital and basic infrastructure; the two important components of absorptive capacity with higher export diversification is subject to threshold level effects. On the other hand, the abundance of natural resources was found to inhibit diversification in SSA.

Alemu (2009) analyzed the main determinants of vertical and horizontal export diversification based on a balanced panel data for 41 countries from SSA and East Asia over the period 1975-2004; using FGLS estimation methods with corrected heteroskedasticity and autocorrelation. The study found that education, health, income per capita, population size, infrastructural development, openness, arable land ratio, depreciating exchange rate are the most significant and positive determinants to induce vertical and horizontal export diversification. FDI was found to be a key factor to speed-up vertical and horizontal export diversification in East Asia, but only for vertical diversification in SSA.

The study further concluded that domestic investment plays a vital role to boost vertical as well as horizontal export diversification for East Asia, while it only stimulates horizontal diversification for SSA. ‘Arable land’ resource was found to have a positive and significant effect on vertical and horizontal diversification but ‘oil’ wealth was found to be negatively associated with export diversification. Whereas inflation, exchange rate, and foreign aid variables have a mixed effect on vertical and horizontal export diversification, political instability has a strong adverse effect on export diversification; especially for SSA (Alemu, 2009).

Contrary to the findings of Iwamoto and Nabeshima (2012), empirical results of Arawomo et al., (2014) show that foreign direct investment (FDI) among other factors such as exchange rate and democratic accountability are other factors that discourage export diversification in Nigeria. By utilizing the Generalized Method of Moments (GMM) the authors analysed their model and found no evidence on the impact of trade openness on export which supports the result of (Agosin et al., 2012). They also found no evidence of the impact of per capita GDP, and natural resource on export diversification.

Ferdous (2011) studied the determinants of export diversification in East Asian Countries. The study took eight years and eight countries panel data of the region. The explanatory variables used included, official exchange rate, trade openness indicators like tariff, and GDP. Fixed effects estimation was used to estimate the equation. The study focused on relating regional trade integration and export diversification. The results indicated that greater integration promotes export

diversification. Devaluation of the exchange rate also helps diversification by encouraging exporters from other sectors.

Jayaweera (2009) sought to understand whether increased foreign direct investment (FDI) can help low income nations to diversify their export bases. The study used panel dataset of 29 low income nations from 1990 to 2006 and employed an instrumented variables estimation technique using differenced data to test the link between FDI and export diversification. The results of the study showed a positive association between increases in FDI and increases in export diversification. The study also found that this effect is reversed for nations which export a high proportion of oil and mineral resources.

Tadesse and Shukraha (2011) examined the effect of FDI on horizontal export diversification of 131 countries with the number of products exported for respective countries. By using a parametric (quantile) and semi – parametric econometric techniques to calculate the effects, found that an increase in the stock of FDI increases horizontal export diversification. Moreover, they showed that the actual magnitude of the effect hugely differs across countries depending on the existing stock of FDI and the phase of diversification, leading to an almost inverted U – shaped relationship.

Alaya (2012) assessed the key factors that drive export diversification in Middle East and North Africa. The study employed an empirical model with the help of panel data for 12 MENA countries over the period from 1984 to 2009. The author used instrumental variables in order to tackle the problem of endogeneity of explanatory variables. The study found a U - shaped relationship between economic

development and diversification. Additionally, results of the study show that natural resource endowment explains the export concentration in the region. On the other hand, openness and physical capital accumulation (foreign and domestic) increase the rate of export diversification.

Mehta and Felipe (n.d) used a panel of 111 countries and 1,240 products from 1995-2010 to investigate whether education played an important role in reducing this path dependence, and if so, how. They found that the main way in which education facilitates export diversification is by facilitating more rapid movement from existing products into proximate ones. In contrast, the study found that there is relatively little evidence to support the prediction that education permits countries to teleport through product space directly to sophisticated products.

Furthermore, their analysis showed a negative relationship between the level of primary and agricultural exports and earnings stability.

Secondly, Obeng (2018) investigated whether the effect of exchange rate volatility on export diversification is symmetric or asymmetric by employing the Linear Autoregressive Distributed Lag (ARDL) and Nonlinear Autoregressive Distributed Lag (NARDL) and adopting Normalized Hirschman index (N-H) as the preferred measure of export diversification for the period 1983 to 2015. The results of his study revealed that exchange rate volatility has asymmetric relationship with export diversification in Ghana. The study also revealed that income, investment, infrastructure, openness, and inflation are the other drivers of export diversification in Ghana.

## **Chapter Summary**

This chapter provided literature (both theoretical and empirical) on the determinants of export diversification and other concepts focusing on export diversification. The available literature indicate that export diversification is significantly influenced by several factors and these factors have different influence on export diversification among countries. These factors are categorized into three namely; structural factors, economic/policy reforms and macroeconomic factors.

Empirical works on the export diversification show that there are numerous determinants of export diversification. Nonetheless, these studies have produced mixed results for the determinants of export diversification in developing countries (Alaya, 2012; Ferdous, 2011; Agosin et al., 2012; Elhiraika & Mbate, 2014; Obeng, 2018).

The mixture of results as indicated in the literature could be attributed to political and socio-economic disparities among countries as well as the measurement of export diversification (concentration). Secondly, empirical studies on the determinants of export diversification in Ghana remain scarce. The study therefore aims to contribute to existing literature understanding the determinants of export diversification in Ghana using the Theil index in contrast to the Normalized-Hirschman index (N-H) adopted by Obeng (2018). The next chapter present the methodology adopted for the study.

## **CHAPTER FOUR**

### **RESEARCH METHODS**

#### **Introduction**

This chapter first explains measurement of export diversification. It also presents a detailed overview of theoretical framework and statistical techniques employed for the study. The explanatory variables are described with their expected signs as well as data sources.

#### **Research Design**

Research design may reflect the totality of research process which involves conceptualising a problem to the literature review, research questions, methodology of a study as well as conclusions (Harwell, 2011). Nonetheless, in another study, research design refers only to the methodology of a study (for example, data collection and analysis). Possibly not surprisingly, due to variation within and between methodologies in how research design is defined. But this variation does not affect an examination of the role of research design in promoting rigorous study of promising ideas (Harwell, 2011).

The current study adapts the positivist philosophy and derives support from the neo-classical school of thought (Levin, 1988). Positivist philosophy allows the researcher to study social processes in an objective manner as well as explain relationships between variables. In addition, positivist philosophy is suitable for the development of mathematical models to investigate the relationship between quantitative measurements.



The research design adopted in this study for data analysis follows the quantitative approach. The quantitative approach to research is founded on the assumptions and biases to guarantee objectivity in the conduct of the study and the inferences that are drawn. Moreover, the quantitative approach is often described as deductive in nature, due to the fact that conclusions from tests of statistical hypotheses lead to general inferences about characteristics of a population. Quantitative methods are also frequently characterized as assuming that there is a single “truth” that exists, independent of human perception (Lincoln & Guba, 1985).

### **Theoretical Underpinnings for the Determinants of Export Diversification**

For many years, trade theory has been founded on the classical premise of specialisation and comparative advantage. However, critics of this theory have encouraged a strategy of diversification into non-traditional, manufactured goods. Having relied on critics, diversification of exports has been a success for many policy makers especially in Asian countries. Although the benefits of export diversification are noticeable in the literature, there exists no unified theoretical outline explaining the determinants of export diversification at the macroeconomic level (Bebczuk & Berrettoni, 2006; Hodey, 2013). Classical trade theory has little insight to offer on the potential determinants of export diversification (Cadot et al., 2011).

Accordingly, the idea underlying diversification originates from a structural change which is multidimensional and based on a deep economic transformation

along the development paths in relation to a strong interlinked and mutual dependence among its many sides. Structural change theory stresses on the process by which underdeveloped economies change their domestic economic structures from a heavy dependence on traditional subsistence agriculture to a more modern, more urbanized, and more industrially diverse manufacturing and service economy (Todaro & Smith, 2011). Matsuyama (2005) reiterate that the issue of diversification is not just a complicated but an interconnected phenomenon in which the growth patterns and other characteristics that accompanies structural change mutually complement each other. In other words, structural transformation includes changes in product size and location of firms, skills of labour force, legal and social innovations and so forth which are intertwined aspects of economic growth (Paterka & Tamberi, 2008).

### **Empirical Model Specification**

Determining the key factors of export diversification is a daunting exercise since there is no unified theoretical models to capture them in their entirety. However, following De Benedictis, et al. (2009); Parteka (2010); Shabana & Zafar (2016), this study maintains the assumption that low levels of GDP per capita growth rate is associated with high overall concentration and specialisation. The basic model therefore can be expressed as;

$$THEIL = f(GDPC) \tag{1}$$

Where, *THEIL* is the measure of export diversification (Theil index) and *GDPC* is the gross domestic product per capita growth rate. By construction, a high

value of the index indicates more concentration and a low value shows more diversified export base. Thus, the inverse relationship between GDP per capita and the Theil index.

Following existing empirical works such as Osakwe (2007); Gylfason (2002); Bebczuk and Berrettoni (2006); Elbadawi (1999); Wood and Mayer (2001); Herzer and Nowak-Lehmann (2006); Parteka and Tamberi (2008); (Agosin et al., 2012) among others; the empirical model for the determinants of export diversification can be specified. Thus, equation (1) can be modified as;

$$THEIL_t = f(GDPC_t, REER_t, OPEN_t, FDI_t, TOT_t, TEL_t) \quad (2)$$

Where *REER* represents real effective exchange rate, *OPEN* denotes trade openness, *FDI* is foreign direct investment, *TOT* is terms of trade, *TEL* is infrastructure and *t* represents the time period.

For purpose of estimation, equation (2) which gives the general specification is transformed into a behavioural equation. Theil, GDPC, REER have their values in log form for easy interpretation and to remove outliers.

$$LTHEIL_t = \beta_0 + \beta_1 LGDPC_t + \beta_2 LREER_t + \beta_3 OPEN_t + \beta_4 FDI_t + \beta_5 TOT_t + \beta_6 TEL_t + \varepsilon_t \quad (3)$$

Where  $\beta_0$  is the constant term,  $\beta_i$  are the coefficients of the respective explanatory variables, *L* is the natural log operator, *t* denotes time and  $\varepsilon_t$  is the error term.  $i = 1, 2, 3 \dots$

## **Definition and Measurement of Variables**

### **Export Diversification (Concentration Index) (Theil Index)**

According to Balavac (2012), the conceptual definition of diversification is derived from the way diversification is measured. The concentration index (Theil) measures whether majority of country's export earnings comes from small range of export products (indication of export concentration) or the source of export earnings are more evenly spread across a given range of export goods (indication of export diversification). The Theil index is the preferred measure of export diversification. By construction, lower index values indicate higher levels of export diversification and vice-versa.

### **GDP per capita (GDPC)**

GDP per capita growth is included as the proxy for level of development or country's standard of living. Both supply-side (Aghion & Howitt, 1992) and demand-side growth theories (Fiorillo, 2001) suggest that as GDP per capita grows, the pattern of preferences guiding consumption changes. The change in the elasticities of demand influences sectoral productivities, and thus the structural composition of the economy. A negative sign is expected with the Theil index. Elhiraika and Mbate (2014) found a negative relationship between GDP per capita and the Herfindahl Hirschman Index of concentration (HHI).

### **Real Effective Exchange Rate (REER)**

Real effective exchange rate is the nominal effective exchange rate index (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (WDI). The decline in the REER (as in the case of Ghana) reflects the reduction in cost of producing domestic trading partners or due to beneficial inflation difference in domestic economy compared to those in trading partners' economies. It is expected that the decrease in REER (depreciation of the local currency) consequently increases export competitiveness and positively affect export diversification. The opposite is true for an increase in REER (appreciation of the local currency). The A' prior sign of the REER coefficient in relation with the Theil index is negative. Ferdous (2011) and Alaya (2012) found a negative relationship between exchange rate and export concentration.

### **Trade openness (OPEN)**

Trade openness is estimated by the sum of merchandise exports and imports divided by the value of GDP. Essentially, it is important to develop a competitive capacity for trade in order to eliminate principal domestic barriers to international business development and to improve business conditions for local industries. These barriers include government policy constraints such as high tariff trade protection systems which represent a tax on exports by raising input costs, financial market constraints (e.g. limited provision of export credit and insurance), poor infrastructure (including high transport costs) and administrative constraints (e.g.

bureaucratic red tape). These constraints generally represent transactions costs on exports which eventually bring about a decrease in export competitiveness and a decline in diversification. Degree of openness is expected to be negatively correlated with the Theil index. Nonetheless, Agosin et al. (2012) found that trade openness increases export concentration. Alaya (2012) on the other hand, found that trade openness increases export diversification.

### **Foreign Direct Investment (FDI)**

Foreign direct investment is defined as an investment made to acquire lasting interest in enterprises operating outside of the investor's country. FDI is measured by net inflows (as percentage of GDP). According to Gourdon (2010), FDI can lead to export diversification directly by entering the non-traditional export sector, or indirectly by increasing exports of traditional exports with the lowest share. On the other hand, if FDI is mainly directed to the exploitation of natural resources, export concentration on natural resources is likely to increase. All in all, there is a common consensus that the advantages of FDI outweigh the disadvantages. Thanks to spillovers effects channels, FDI can be an engine of export diversification (Iwamoto & Nabeshima, 2012). The expected sign between FDI and the Theil index is therefore negative.

### **Terms of Trade (TOT)**

Terms of trade is measured as the ratio of the export unit value index to the import value index. Terms of trade is expected to increase sectoral concentration

due to increased commodity prices that entice the exportation of unprocessed raw materials. Thus, positive terms of trade shocks by crude oil and primary agricultural cash crops exporting economies specifically deters the propensity to diversify export as a result of increases in export revenues associated with rising prices of commodities. Therefore, it is expected that terms of trade have a positive coefficient in relation with the Theil index. Agosin et al. (2012) found that terms of trade had a positive relationship with the concentration.

### **Infrastructure (TEL)**

Improvement in infrastructure (highways, ports, telephone, electricity, water) through investment and trade networks is among the main determinants of successful attempts at diversification (IMF, 2017). In this study, infrastructure is proxied by telephone lines (per 100 people) as used by most empirical studies. It is expected that infrastructure enhance export diversification and therefore a negative relationship with the Theil index is expected. Obeng (2018) found infrastructure to have a positive relationship with export diversification in Ghana.

## Variables and their expected signs

Table 2- *Explanatory variables and their expected signs*

Explanatory Variable	Definition	Expected Sign
GDPC	Gross domestic product per capita, current prices	–
REER	Real effective exchange rate index (2010 = 100)	–
OPEN	The sum of merchandise exports and imports divided by the value of GDP	–
FDI	Foreign direct investment, net inflows (% of GDP)	–
TOT	Export value index divided by import value index	+
TEL	Telephone lines (per 100 people)	–

Source: Author's construct (2018)

## Data Sources

The study uses annual time series data for the period spanning from 1983 to 2016 to analyze the determinants of export diversification in Ghana. The data set was mainly sourced from the International Monetary Fund (IMF) and World Development Indicators (WDI). Export dataset was created by the IMF Export Diversification and Quality Database. The dataset harmonizes UN COMTRADE bilateral trade flow data at the 4-digit SITC (Rev.1) based on updated version of the UN-NBER dataset. Data for Gross domestic product per capita current prices was also sourced from IMF World economic outlook database. Data for all other the explanatory variables are sourced from the World Development Indicators.



## **Estimation Procedure**

In order to estimate relationship between macroeconomic indicators and export diversification in Ghana, the study adopted the Autoregressive Distributed Lag (ARDL) model advanced by Pesaran et al, (2001). To carry out this estimation procedure, the study firstly analyzed the time series characteristics of the dataset among other tests. The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests are employed to undertake unit root tests to check for stationarity of variables in the order to ensure that none of the variables are no more than I (0) or I (1).

## **Choice of Lag Length**

The optimal number of lags can be selected using model selection criteria such as the Akaike Information Criteria (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC).

## **Tests for Stationarity**

It is vital to test for the statistical characteristics of the variables in the model since time series data are scarcely stationary in level forms. A time series is said to be stationary if its mean, variance and auto-covariance do not change over time. Thus, the series does not contain a unit root. On the other hand, a time series is non-stationary if both its mean and variance change over time and the value of the covariance depends on time. When time series data are non-stationary, running a regression with the variables involved often lead to the problem of spurious

regression. This problem occurs when regression results indicate high and significant relationship among the variables when in fact there is no relationship.

Unit root tests are also carried out to ensure that the variables are stationary and that none of the variables in the model are integrated of an order greater than I (1). By doing so, the model is free from spurious regression. In view of this, the Augmented Dickey-Fuller (ADF) and the Phillips - Perron (PP) tests are used. The null hypothesis of non – stationarity (presence of unit root) is tested against the stationarity alternative. A time series can be made stationary by taking the first difference so that the variables become integrated of order one – that is; I (1). The ADF test involves estimating the following regression;

$$\Delta Y_t = \beta_0 + \beta_1 t + \delta Y_{t-1} + \sum_{i=1}^p \theta_i \Delta Y_{t-1} + \varepsilon_t \quad (4)$$

where  $\Delta Y_t = (Y_{t-1} - Y_{t-2})$ ,  $\Delta$  is the first difference operator,  $\beta_0, \beta_1, \theta_i$  are the parameters to be estimated and  $\varepsilon_t$  is a pure white noise error term.

While the ADF test does not consider heteroscedasticity and non-normality and unable to identify non-stationarity with high level of autocorrelation, the PP test is used to tackle this problem. Another difference between the ADF tests and the PP tests is with respect to the way they correct for autocorrelation in the residuals. The PP is often considered as a nonparametric test which generalizes the ADF procedure, allowing for less restrictive assumptions for the time series in question. The null hypothesis to be tested is that the variable under investigation has a unit root against the stationarity alternative. The Phillips – Perron test can be specified as;

$$\Delta Y_t = \mu + \tau_2 Y_{t-1} + \left(t - \frac{T}{2}\right) + \sum_{i=1}^n \varphi \Delta Y_{t-i} + u_t \quad (5)$$

The main strength of the PP test over the ADF test lies in its robustness to general forms of heteroscedasticity in the error term and it is less sensitive to lag selection as compared to the ADF test.

### **Autoregressive Distributed Lag (ARDL) Approach to Cointegration**

The Autoregressive Distributed Lag (ARDL) approach to cointegration or bound procedure developed by Pesaran et al. (2001) is adopted in the study to test for the cointegration relationships among the variables in the model regardless of whether the variables under consideration are I (0), I (1) or a combination of both. This approach includes lagged values of the dependent variable as well as current and lagged values of the explanatory variables. Additionally, the ARDL is chosen ahead of other cointegration procedures like the Phillips and Hansen (1990), Engle and Granger (1987), Johansen and Juselius (1990) because the ARDL helps in identifying the cointegrating vector(s). Specifically, each of the variables in the model stands as a single long-run relationship equation. If there is exist a cointegrating vector, the ARDL model of the cointegrating vector is re-parameterized into Error Correction Model (ECM). The re-parameterized result yields short-run dynamics and long run relationship of the variables of a single model. This re-parameterization is possible since the ARDL is a dynamic single model and of the same form with the ECM. In addition, the Distributed Lag Model simply means the inclusion of unrestricted lag of the explanatory variables in a regression function.

Furthermore, the rationale for the choice of this approach is centered on the fact that the ARDL cointegration technique has been proven to be more efficient for small sample data sizes as in the case of this study. The current study uses an annual data covering a period from 1983 to 2016. Specifically, the data points are 34 which is comparatively small. Secondly, unlike other cointegration techniques, the autoregressive distributed lag model makes it possible to estimate the cointegration among the various variables by the Ordinary Least Square (OLS) methods given that the lag of the model is known.

Moreover, the ARDL approach to cointegration takes into account sufficient number of lags to capture the data generating process (DGP) from general to specific modelling framework. The approach solves the problem of endogeneity and serial correlation inherent in macroeconomic variables with the help of the appropriate number of lags. Equation (3) can be written in an ARDL model as follows;

$$\begin{aligned}
\Delta LTHEIL_t = & \beta_0 + \beta_1 LTHEIL_{t-1} + \beta_2 LGDPC_{t-1} + \beta_3 LREER_{t-1} + \\
& \beta_4 OPEN_{t-1} + \beta_5 FDI_{t-1} + \beta_6 TOT_{t-1} + \beta_7 TEL_{t-1} + \sum_{i=0}^p \phi_{1i} \Delta LTHEIL_{t-i} + \\
& \sum_{i=0}^p \phi_{2i} \Delta LGDPC_{t-i} + \sum_{i=0}^p \phi_{3i} \Delta LREER_{t-i} + \sum_{i=0}^p \phi_{4i} \Delta OPEN_{t-i} + \\
& \sum_{i=0}^p \phi_{5i} \Delta FDI_{t-i} + \sum_{i=0}^p \phi_{6i} \Delta TOT_{t-1} + \sum_{i=0}^p \phi_{7i} \Delta TEL_{t-i} + \varepsilon_t
\end{aligned} \tag{6}$$

Where  $\beta_0$  is the constant term  $\beta_i$  are the long – run elasticities and  $\phi_i$  are the short – run elasticities,  $\varepsilon_t$  is the error term and  $\Delta$  is the difference operator.  $p$  is the optimal lag length.  $i = 1, 2, 3, \dots$

The presence of a long – run relationship among the variables is first tested using the F – statistic (Wald Test). The null hypothesis of no long – run relationship is tested against the alternative hypothesis of a long – run relationship. That is;

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7$$

$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7$$

The distribution of this F-statistics is non-standard, regardless of whether the variables in the system are I (0) or I (1). The null hypothesis of no long-run relationship is rejected if the computed F-statistic is greater than the upper critical bound. But if the computed F-statistic is less than the lower critical bound, then, the test fails to reject the null, suggesting that a long-run relationship does not exist.

The ARDL approach estimates  $(p + 1)^k$  number of regressions in order to obtain the optimal lags for each variable, where p is the maximum number of lags to be used and k denotes the number of variables in the model (Shresth & Chowdhury, 2005). The optimal number of lags can be selected using model selection criteria such as the Akaike Information Criteria (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC).

### **Long-run Estimation of Selected ARDL Model**

The long-run ARDL model can be estimated once cointegration relationship among the variables is established. The long – run can be expressed as;

$$\begin{aligned} LTHEIL_t = & \alpha_0 + \sum_{i=0}^p \omega_1 \Delta LTHEIL_{t-i} + \sum_{i=0}^p \omega_2 \Delta LGDPC_{t-i} + \\ & \sum_{i=0}^p \omega_3 \Delta LREER_{t-i} + \sum_{i=0}^p \omega_4 \Delta OPEN_{t-i} + \sum_{i=0}^p \omega_5 \Delta FDI_{t-i} + \\ & \sum_{i=0}^p \omega_6 \Delta TOT_{t-1} + \sum_{i=0}^p \omega_7 \Delta TEL_{t-i} + \varepsilon_t \end{aligned} \quad (7)$$

### Short-run Estimation of Selected ARDL Model

The presence of a long-run equilibrium relationship among variables implies that they are cointegrated. The error term in the long run equilibrium model is treated as an 'equilibrium error' and thus can be used to tell the short run behaviour to its value in the long run. The estimation of the short – run coefficients of the variables within the framework of the error correction model. The Error Correction Model (ECM) is thus specified to estimate the short – run adjustments to equilibrium in equation (7) as follows;

$$\begin{aligned} LTHEIL_t = & \beta_0 + \sum_{i=0}^p \phi_1 \Delta LTHEIL_{t-i} + \sum_{i=0}^p \phi_2 \Delta LGDPC_{t-i} + \\ & \sum_{i=0}^p \phi_3 \Delta LREER_{t-i} + \sum_{i=0}^p \phi_4 \Delta OPEN_{t-i} + \sum_{i=0}^p \phi_5 \Delta FDI_{t-i} + \\ & \sum_{i=0}^p \phi_6 \Delta TOT_{t-1} + \sum_{i=0}^p \phi_7 \Delta TEL_{t-i} + \delta ECM_{t-i} + \varepsilon_t \end{aligned} \quad (8)$$

where  $\delta$  is the speed of adjustment parameter or feedback effect which is expected to be negative and significant.  $ECM_{t-1}$  is the cointegration residual lagged one period is obtained from equation (7). The coefficients ( $\phi_i$ ) represents the short-run dynamics while  $\delta$  denotes the speed of adjustment to long run equilibrium resulting from a shock to the economy.

In order to ensure the goodness of fit of model, the diagnostic and stability tests are also conducted. The diagnostic test examines the serial correlation, functional form, normality and heteroscedasticity associated with the selected model. Pesaran and Pesaran (1997) suggested that conducting stability test is of great importance. This technique is also known as cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ). The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the break points. If the plots of CUSUM

and CUSUMSQ statistics stay within the critical bounds of five percent level of significance, the null hypothesis of stable coefficients in the given regression cannot be rejected.

### **Chapter Summary**

This chapter presented the methodological framework suitable for conducting the study. The model was developed based on a number of new trade theories. Annual time series data on export diversification (Theil index), gross domestic product per capita, real effective exchange rate, trade openness, foreign direct investment, terms of trade and infrastructure from 1983 to 2016 were used for the study.

Time series properties were examined by way of stationarity tests using graphical approach, ADF and PP tests. Finally, ARDL approach to cointegration was used to examine the long-run and short-run dynamics among the variables. The next chapter present results and discussion of the estimated results of the study.

## **CHAPTER FIVE**

### **RESULTS AND DISCUSSION**

#### **Introduction**

The aim of this chapter is to present and discuss the results of the study. The first section presents the descriptive statistics of the variables used in the study. The next section presents and discusses the results of both the Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) tests for stationarity. The results from the estimation of the ARDL model is also presented and finally results of diagnostic tests are presented in this chapter.

#### **Descriptive Statistics**

This section briefly discusses the basic statistical properties of the non-binary variables. All the variables have positive average values (means). With the exception of trade openness (OPEN), all the variables are positively skewed implying that these variable values are less than their means.

The average export diversification index for the country over the period was approximately 4.1 indicating that on average, Ghana is gradually picking up in its attempts at diversifying exports. It can also be observed that GDP per capita averaged about 1036 units. The maximum value of GDP per capita was 6068 units with a minimum of about 2.530 units. This indicates a relatively wide income disparity between the rich and the poor in the country. In similar fashion, the real effective exchange rate averaged about 239 units. While the lowest value is about 70 units, the maximum value of the real effective exchange rate was about 578 units.



The high deviations of the variables, GDP per capita and real effective exchange rate from their means as indicated by the standard deviations demonstrate that by taking the logs (L) of variables minimize their variances. Trade openness for the period averaged about 0.6 percent. Infrastructure (TEL) for the period under study averaged 0.8 units. Also, the terms of trade and foreign direct investment averaged about 132.9 and 3.2 percent respectively.

Table 3- *Summary Statistics of the Variables used for Analysis (1983-2016)*

	THEIL	GDPC	REER	OPEN	FDI	TOT	TEL
Mean	4.083266	1036.346	238.856	0.5765	3.29684	132.9198	0.8049
Median	4.07754	213.3365	107.421	0.5798	1.76104	125.1326	0.7942
Maximum	4.82817	6067.990	3463.81	0.932	9.51704	190.6066	1.6577
Minimum	3.63714	2.526000	69.5803	0.2535	0.04533	89.21569	0.2886
Std. Dev.	0.301587	1606.343	577.581	0.1674	3.32134	30.70782	0.4748
Skewness	0.552314	1.793398	5.34905	-0.0523	0.71822	0.540909	0.2299
Kurtosis	2.75502	5.220475	30.3509	2.7029	1.92275	2.038975	1.5707
Sum	138.831	35235.77	8121.1	19.602	112.092	4519.275	27.366
Sum Sq. Dev.	3.001514	85151146	1.1E+07	0.9242	364.033	31118.02	7.4401
Observations	34	34	34	34	34	34	34

Note: Std. Dev. Represents Standard Deviation while Sum Sq. Dev. Represents Sum of Squared Deviation

Source: Computed by author.

The standard deviation measures the dispersion of the variables from their respective means. High standard deviations indicate the presence of outliers that significantly influence the data. Comparatively, the variable with the highest standard deviation was the GDP per capita (1606).

## **Tests for Stationarity**

Although the bounds test (ARDL) approach to cointegration does not require the pretesting of the variables for unit roots, it is important to conduct this test to confirm that the variables are not integrated of an order higher than one. Thus, in order to ensure that some variables are not integrated at higher order, there is the need to complement the estimated process with unit root tests.

In view of this, prior to applying the Autoregressive Distributed lags approach to co-integration, unit root tests were conducted in order to investigate the stationarity properties of the data. It is argued in the literature that observing only trend of time series variables to establish unit root is not the best. Therefore, the Augmented Dickey –Fuller (ADF) and Philip-Perron (PP) tests were also applied to all variables in levels and in first difference in order to formally establish their order of integration and confirms stationarity.

In order to be sure of the order of integration of the variables, the tests were conducted first with intercept and no time trend, and second with intercept and time trend in the model. The maximum lags length used were determined based on lag selection criteria and the appropriate number of lags included in the test was based on automatic selection by Schwarz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC). The study used the P-values in the parenthesis to make the unit root decision, that is, rejection or acceptance of the null hypothesis that the series contain a unit root.

The results of the ADF test for unit root with intercept only in the model for all the variables are presented in Table 4. The null hypothesis is that the series is

non-stationary or contains a unit root. The rejection of the null hypothesis of the test is based on the Mackinnon (1993) critical values as well as the probability values.

The results obtained for ADF test for unit root with both intercept and trend in the model for all the variables are reported in Table 4.

Table 4- *Results of Unit Root Test with intercept and Trend: ADF Test*

Level		First Difference		
Variable	ADF-Statistic	Variable	ADF-Statistic	I ( )
LTHEIL	-0.698517 (0.9649)	$\Delta$ LTHEIL	-4.794733 (0.0030)***	I (1)
LGDPC	-1.735575 (0.7071)	$\Delta$ LGDPC	-3.385957 (0.0744)**	I (1)
LREER	-11.13688 (0.0000)***	$\Delta$ LREER		I (0)
OPEN	-2.745398 (0.2263)	$\Delta$ OPEN	-4.632439 (0.0043)**	I (1)
FDI	-2.784876 (0.2127)	$\Delta$ FDI	-4.736715 (0.0032)***	I (1)
TOT	-2.211623 (0.4670)	$\Delta$ TOT	-4.564377 (0.0051)**	I (1)
TEL	-2.020096 (0.5692)	$\Delta$ TEL	-7.315424 (0.0000)***	I (1)

Note: \*\*\* and \*\* indicate the rejection of the null hypothesis of non-stationary at 1% and 5% level of significance respectively,  $\Delta$  denote first difference, and I ( ) is the order of integration. The values in parenthesis are the P-values.

Source: Computed by the author.

From the unit root test results in Table 4, GDP per capita was stationary at levels while the remaining variables were non-stationary. This is because the P-values of the ADF were statistically significant at 1 percent significance level. However, the P-values of the ADF statistics are not statistically significant in any of the conventional levels of the remaining variables.

Nonetheless, the variables that were not stationary at levels became stationary at first difference. This is because the null hypothesis of the presence of a unit root (non-stationary) is rejected at 1 percent and 5 percent significant levels for all first difference variables. It can be seen that the ADF unit root test results in Table 4 are made up of a mixture of  $I(0)$  and  $I(1)$  variables when both intercept and trend are included in the model.

Table 5 presents the unit root test results obtained for the PP test with both intercept and trend in the model. The unit root test results in Tables 5 show that the terms of trade and real effective exchange rate are stationary at levels. This is because the P-values of the PP statistic are statistically significant at 10 percent and 1 percent for terms of trade and real effective exchange rate respectively. The remaining variables are non-stationary at levels since P-values of the PP statistics are not statistically significant in any of the conventional levels of significance. However, at their first difference, the non-stationary variables at levels all become stationary since the null hypothesis of the presence of a unit root (non-stationary) is rejected at 1 percent significance level.

Table 5- Results of Unit Root Test with intercept and trend: PP Test

Level		First Difference		
Variable	PP-Statistic	Variable	PP-Statistic	I ( )
LTHEIL	-0.424453 (0.9823)	ΔLTHEIL	-8.128719 (0.0000)***	I (1)
LGDP	-2.117703 (0.5174)	ΔLGDP	-6.853171 (0.0000)***	I (1)
LREER	-14.65503 (0.0000)***	ΔLREER		I (0)
OPEN	-2.894884 (0.1769)	ΔOPEN	-9.120236 (0.0000)***	I (1)
FDI	-2.454107 (0.3471)	ΔFDI	-4.762355 (0.0030)***	I (1)
TOT	-3.238718 (0.0946)*	ΔTOT		I (0)
TEL	-1.981624 (0.5895)	ΔTEL	-7.346729 (0.0000)***	I (1)

Note: \* and \*\*\* indicates the rejection of the null hypothesis of non- stationary at 10% and 1% level of significance respectively, Δ denotes the first difference, BW is the Band Width and I ( ) is the lag order of integration. The values in parenthesis are the P-values.

Source: Computed by author.

It is therefore clear from the unit root test results discussed above that the series is a mixture of variables integrated of order zero I (0) and order one I (1). Having confirmed the absence of I (2) variables, ARDL framework is now used for the estimation. The subsequent sections discuss the co-integration results and the results for determinants of export diversification.

### **Bound Test for Cointegration Analysis**

Fundamentally, the main objective of this study is to assess the main drivers of export diversification in Ghana. In view of this, it is important to test for the existence of long-run equilibrium relationship among the variables within the framework of the bounds testing approach to cointegration. As recommended by

Pesaran, Shin & Smith (1999), a maximum of lag length of two is appropriate for annual data in the bound test. After the lag length is identified, the F – test is then calculated within the framework of the ARDL model. The F-statistic computed is then compared with the critical values for the upper and lower bounds provided by Pesaran and Pesaran (2010).

The null hypothesis of no long-run relationship is rejected if the computed F-statistic is greater than the upper critical bound as tabulated by Pesaran and Pesaran (2010). However, if the computed F-statistic is less than the lower critical bound, then, the test fails to reject the null, suggesting that a long-run relationship does not exist. In the case where the F statistic lies within the lower and upper critical bounds, conclusive inference can only be made if the order of integration of each regressor is known (Pesaran et al., 2001). From Table 6, the calculated F-statistics of 8.159342 exceeds the upper bound critical value and therefore ensures that the null hypothesis of no long-run relationship is rejected at 1 percent. The results of bound test for the existence of cointegration are reported in Table 6.

*Table 6- Bound test for the existence of Cointegration*

Critical value	Lower Bound Value	Upper Bound Value
1%	3.267	4.542
5%	2.476	3.646
10%	2.141	3.251
Calculated F-statistics = 8.159342*** k = 6		

Note: Critical values were obtained from Pesaran and Pesaran (2010), \*\*\* denotes statistical significance at 1% level and k is the number of regressors.

Source: Author’s computation

The result, as reported in Table 6 shows the existence of a cointegration relationship between Ghana’s export diversification (measured by the Thiel index) and its determinants.

### Long-run Estimation

Establishing the presence of cointegration among the variables makes it suitable to estimate the long run determinants of export diversification in Ghana. Table 6 presents results of the long run estimate based on the Akaike Information Criterion (AIC) or Schwartz Bayesian Criteria (SBC) within the ARDL model framework.

Table 7- Results of Long – Run Estimation

Selected Model based on AIC: ARDL (1, 1, 2, 1, 0, 0, 0)

Dependent Variable: LTHEEL

Variable	Coefficient	Standard Error	t-Statistic	Probability
LGDP	-0.052150	0.015307	-3.406855	0.0028***
LREER	-0.14021	0.037925	-3.697140	0.0014***
OPEN	-0.51129	0.079047	-6.46822	0.0000***
FDI	-0.0188	0.005196	-3.61848	0.0017***
TOT	0.000884	0.000377	2.343132	0.0296**
TEL	-0.0726	0.026080	-2.7838	0.0115**
C	2.017707	0.213308	9.459145	0.0000***

Note: \*\* and \*\*\* denote significance at 5% and 1% respectively

Source: Author’s computation using EViews 10

The results from the long run estimates as reported in Table 7 show that the all variables, namely; gross domestic product per capita (LGDP), real effective exchange rate (LREER), trade openness (OPEN), foreign direct investment (FDI)

terms of trade (TOT) and infrastructure (TEL) are strong long-run determinants of export diversification in Ghana. Specifically, GDP per capita (LGDPC), real effective exchange rate (REER), trade openness (OPEN), foreign direct investment (FDI) and infrastructure (TEL) were found to be positive determinants of export diversification in Ghana. On the other hand, terms of trade (TOT) was found to increase specialisation and thus reduce export diversification.

The negative coefficient of GDP per capita growth rate indicates a positive relationship between the level of development and export diversification. A percentage increase in GDP per capita is accompanied by a decrease in concentration (increase in diversification) by approximately 0.05 percent (at 1 percent statistically significant level). This result implies that as income per capita increases in the Ghanaian economy, there is a corresponding change in the pattern of consumption preference, with a bias towards more diversified products. The result is consistent with the empirical findings of Elhiraika and Mbate (2014); Alaya (2012); Parteka and Tamberi (2008); Obeng (2018).

From Table 7, real effective exchange rate (LREER) was found to negatively affect export concentration (improve diversification). As discussed earlier in this paper, a higher real effective exchange rate indicates an appreciation of the local currency (Cedi) in terms of major currencies. On the other hand, lower Theil index means diversified trade. A decrease in REER (depreciation of the Ghana Cedi) by 1 percent causes export diversification to improve by approximately 0.14 percent (at 1 per significance level) as denoted by the negative coefficient.



This result confirms the theory that a depreciating currency is one of most important macroeconomic factors that supports increases in current exports and ease potential exportable commodities into new markets. The possible implication of this result is that a stable and depreciating exchange rate impact positively on exporters by making local products less expensive in foreign market thereby encouraging firms to undertake investment, innovation and trade. It may also enable firms have easy access export markets. On the other hand, an appreciation of exchange rate could hamper export profitability serving as a disincentive for some firms to leave foreign markets and hence increase export concentration. The result is in line with the findings of Alaya (2012); Alemu (2009); Ferdous (2011); Mubeen and Ahmad (2016).

Theoretically, trade openness promotes export diversification by lowering transaction costs and improving the competitiveness of domestic firms. Mostly, decrease in trade barriers positively impact export diversification by allowing more firms to enter foreign markets. This assumption was confirmed by the econometric regressions of this study. The estimated coefficient of trade openness has the expected negative sign and is statically significant at 1 percent. Specifically, a 1 percent increase in trade openness is likely to cause an increase in export diversification by about 0.51 percent (decrease in concentration). This goes to explain the fact that a gradual approach to trade liberalization is important in paving way for the export new products. The result confirms the findings of Kamuganga (2012).

The results from long-run estimates also show that foreign direct investment reduces export concentration (increases diversification) as indicated by the negative coefficient. A 1 percent increase in FDI is associated with a decrease in export concentration by 0.02 percent (at 1 percent significance level). The result is consistent with the idea that FDI can increase competition in the host economy, making domestic companies more efficient and stimulates sectoral and product diversification. It is also evident that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment (Alemu, 2009). This result is in line with the findings of Iwamoto and Nabeshima (2012) who also found a negative relationship between FDI and export concentration in developing countries.

The results reported in Table 7 also indicate that terms of trade (TOT) has negative effect on diversification. This implies that as prices of exportable commodities increase, Ghana, a resource-rich country is more likely to specialise in the production and export of a few products in order to benefit from increased export revenues. Results from the long-run estimation indicate that a unit increase in terms of trade (TOT) will lead to a reduction in export diversification by 0.009 percent (more concentration). The result is consistent with the empirical findings of Agosin et al (2012); Elhiraika & Mbate (2014).

The negative sign of infrastructure (proxied by telephone lines per 100 people) indicates that an increase in the infrastructure by a unit reduces export concentration (improves diversification) by about 7 percent (at 1 percent significance level). The result conforms to the A' priori expected sign and the

empirical result of Obeng (2018). Moreover, adequate infrastructure provides a very significant stimulus to private sector development, sectoral and product diversification. Infrastructure is also a necessary condition for foreign investors to operate successfully (Wheeler & Mody, 1992).

$$ECM = LTHEEL - (-0.0522*LGDP - 0.1402*LREER - 0.5113*OPEN - 0.0726*TEL + 0.0009*TOT - 0.0188*FDI + 2.0177).$$

### **Short-run Estimation**

The estimation of long run estimates follows from the presence of a long run relationship between export diversification and its explanatory variables as is reported in Table 8. Estimation of short-run model within the ARDL model is based on the Akaike Information Criterion (AIC) employed. From Table 8, the results of short run estimates show that the adjusted  $R^2$  is 0.964362 indicating that approximately 96 percent of the variation in the dependent variable (export diversification) is well explained by the exogenous variables. Moreover, a Durbin-Watson statistic of 2.284766 confirms the existence of no autocorrelation in the residuals and therefore ensures that the estimated results are not spurious.

The speed of adjustment to restore long run equilibrium captured by the lagged error correction term  $ECM_{t-1}$  which is -0.426260 has the expected negative sign and is also statistically significant at 1 percent. The significant error correction term indicates that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by approximately 43 percent at the end of each year.

The results from short run estimations reveal that the coefficient of initial THEIL; that is 0.57, remains positive and significant at the one percent level, suggesting path dependence in export diversification. This accentuates the importance of Ghana's initial position in its development path and supports the view that Ghana, a resource-rich country is more likely to continue exporting unprocessed raw materials with limited diversification in the absence of effective industrial and diversification strategies. This result is consistent with the findings of Agosin et al. (2012); Elhiraika and Mbate (2014) who examined the determinants of export diversification across the World and in Africa respectively.

Table 8- Results of Estimated Short Run Error Correction Model

Selected Model based on AIC: ARDL (1, 1, 2, 1, 0, 0, 0)

Dependent Variable:  $\Delta(\text{LTHEIL})$

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.860069	0.174415	4.931169	0.0001
$\Delta \text{LTHEIL}(-1)$	0.57374	0.085023	6.748065	0.0000***
$\Delta \text{LGDP}$	-0.098251	0.041712	-2.355478	0.0288**
$\Delta \text{LGDP}(-1)$	-0.07602	0.039008	-1.94888	0.0655*
$\Delta \text{LREER}$	-0.13914	0.035784	-3.88826	0.0009***
$\Delta \text{LREER}(-1)$	0.035218	0.027034	1.302741	0.2075
$\Delta \text{LREER}(-2)$	0.04415	0.009958	4.433785	0.0003***
$\Delta \text{OPEN}$	-0.12931	0.03114	-4.15237	0.0005***
$\Delta \text{OPEN}(-1)$	-0.08864	0.033446	-2.6502	0.0154**
$\Delta \text{FDI}$	-0.00802	0.002556	-3.13593	0.0052**
$\Delta \text{TOT}$	0.000377	0.000204	1.851789	0.0789*
$\Delta \text{TEL}$	-0.03095	0.014307	-2.16303	0.0428**
$\text{ECM}_{t-1}$	-0.426260	0.085023	-5.013482	0.0001***
R-squared	0.977008	Mean dependent variable		1.394719
Adjusted R-squared	0.964362	S.D. dependent variable		0.063309
S.E. of regression	0.011952	Akaike Info Criterion		-5.735914
Sum squared residual	0.002857	Schwarz Info Criterion		-5.186263
Log likelihood	103.7746	Hannan-Quinn Criterion		-5.553721
F-statistic	77.25993	Durbin-Watson statistic		2.284766
Prob (F-statistic)	0.000000			

Note: \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% respectively.

Source: Author's computation using EViews 10 package

The results as presented in Table 8 reveal that the positive drivers of export diversification in the short-run are GDP per capita, current real effective exchange rate, trade openness, foreign direct investment and infrastructure. While two-year lag of real effective exchange rate and terms of trade favour export specialization.

Consistent with the long-run results, the coefficient of gross domestic product per capita has the expected negative sign in the short-run. The coefficient of gross domestic product per capita is statistically significant at 5 percent significant level. It implies that, a 1 percentage increase in gross domestic product per capita will reduce export concentration (improve export diversification) by approximately 0.1 percent in the short-run. This result is also in line with the results of Obeng (2018). Likewise, a year lag of GDP per capita was found to reduce concentration (increase diversification) by about 0.1 percent for a 1 percent increase in GDP per capita (at 10 percent statistically significant level).

The coefficient of real exchange rate had the expected negative sign in the short-run and statistically significant at 1 percent significance level. The result indicates that the decrease in current real effective exchange rate by 1 percent is expected to enhance export diversification by about 0.14 percent in the short-run. The results of this study support the findings of Shabana and Zafar (2016); Rodrik (1998) and Krugman (1987). On the other hand, two-year lag of real effective exchange is also found to improve export concentration by decreasing export diversification as indicated by the positive coefficient. A depreciation of the code by 1 percent increases export concentration by roughly 0.04 percent (less diversification) and it is also significant at 1 percent significance level. This can be explained by the fact the impact of a depreciation of the local currency takes some time before yielding positive effect on export diversification.

The negative coefficient of current trade openness in the short-run is consistent with the results in the long-run and is statistically significant at 1 percent

level. This implies that, trade openness help improves export diversification in both long-run and short-run as indicated by a decrease in concentration. Precisely, the result shows that 1 percent increase in degree of openness reduces concentration by approximately 0.1 percent in the short-run. The implication from the short-run and long-run estimates imply that step-by step liberalization and opening the economy is one of the pre-requisites to enhance export diversification. The result suggests that trade reform, which are more consistent with neoclassical trade models, stimulates dispersion into sectors other than only the traditional sector. Trade openness can therefore be associated with significant entry of new products and exporters. This result is in line with the empirical findings of Obeng (2018). Likewise, a year lag of trade openness was found to reduce export concentration by 0.1 percent (at 5 percent significant level) for any 1 percent increase in trade openness.

The short-run results as reported in Table 8 also reveal that foreign direct investment reduces export concentration. The expected negative coefficient suggests that a percentage increase in foreign direct investment leads to a decrease in concentration by 0.008 percent (at 5 percent significant level). This implies an improvement in diversification.

In line with the sign of long-run estimates, the positive sign of terms of trade (TOT) indicates that terms of trade increases export concentration by about 0.04 percent and is statistically significant at 10 percent for a unit increase in terms of trade. The implication of this result is that favourable terms of trade emanating from

primary commodity price boom are likely to encourage a resource-rich country like Ghana to concentrate on exporting primary commodities.

Results of short-run estimates (Table 8) also indicate that infrastructure decreases export concentration (improve diversification) in line with the long-run estimation as indicated by the negative coefficient. An increase in infrastructure by 1 percent reduces specialisation (more diversification) by about 3 percent (at 5 percent level of significance). Studies indicate that infrastructure; particularly telecommunications infrastructure significantly increases economic growth through product diversification. Thus, new market access alone would not spur investment in new supply capacity unless it is supported by decent roads, efficient ports, and the technical capability to produce and distribute goods of sufficient quality which collectively called 'exporting infrastructure' (Stiglitz, 2006)

### **Model Diagnostic Tests**

Table 9 shows the following diagnostic tests that were conducted in the study, namely serial correlation, normality, heteroscedasticity, and functional form. Results reported in the table indicate the model passes all the model diagnostic tests and therefore devoid of econometric problems.



Table 9- *Results of Model Diagnostic tests*

Test	F-statistic	P-value
Serial Correlation	1.740096	0.2038
Normality	1.407093	0.4948
Heteroskedasticity	0.586652	0.8177
Functional Form	2.197231	0.1382

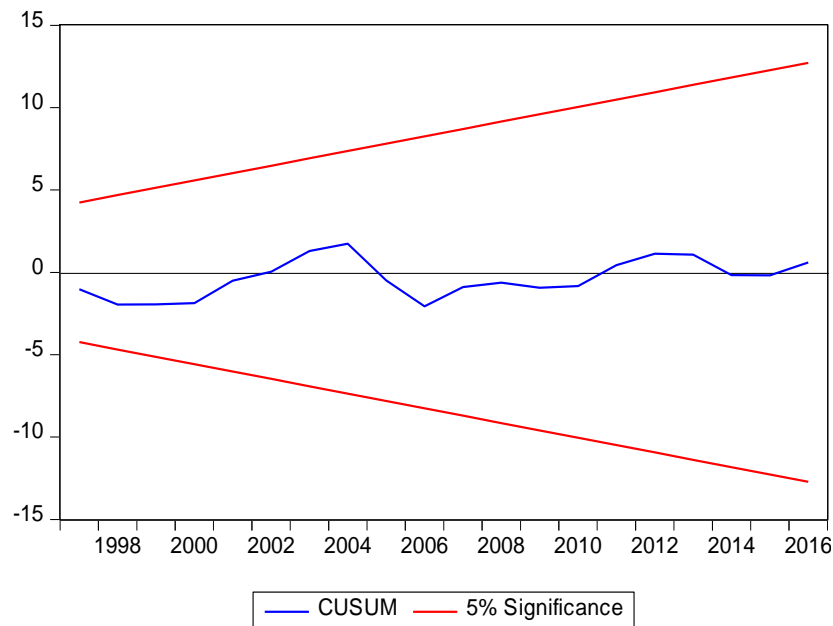
Source: Author's computation

Results from Table 9 show that the model passes all diagnostic tests. Specifically, the Breusch-Godfrey Serial Correlation LM test reveals the absence of serial correlation among the variables, as the F-statistic of 1.740096 was not statistically significant with a P-value of 0.2038. Based on Jacque-Bera normality test, the study found evidence that the series in the model is normally distributed, as the F-statistics of 1.407093 is insignificant with a P-value of 0.4948. The Breusch-Pagan-Godfrey test for Heteroskedasticity also presented (Table 9) is statistically insignificant with F-statistics of 0.586652 and P-value of 0.8177 therefore indicating the absence of heteroskedasticity among the error terms. Finally, Ramsey RESET test of functional form was found to be statistically insignificant with F-statistic of 2.197231 and P-value of 0.1382 implying that the model is correctly specified.

### **Tests for Model Stability**

The results for CUSUM and CUSUMSQ for stability of parameters as recommended by Pesaran and Pesaran (1997) are shown in Figure 12 and Figure

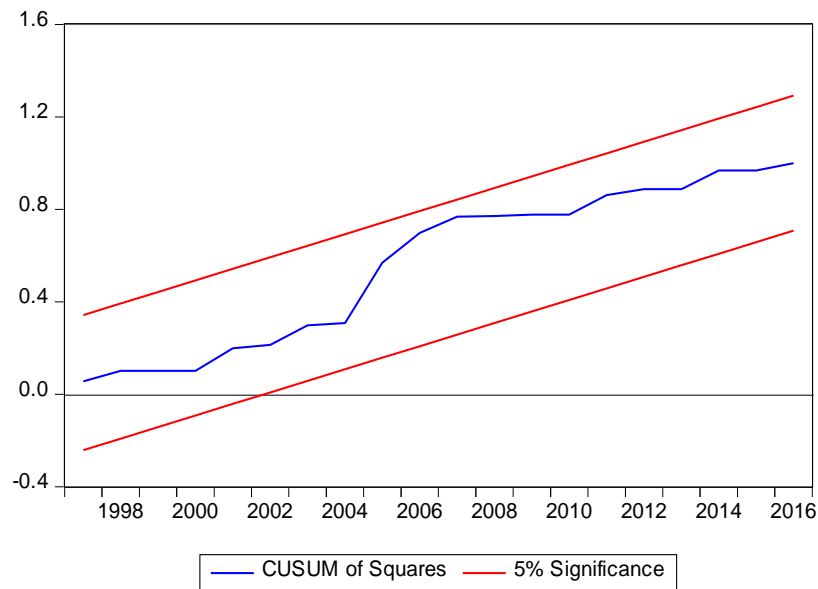
13 respectively. The null hypothesis is that coefficient vector is the same in every period and the alternative is that it is not. The CUSUM and CUSUMSQ statistics are plotted against the critical bound of 5 percent significance level. If the plot of these statistics remains within the critical boundaries of the 5 percent significance level, the null hypothesis that all coefficients are stable is rejected.



*Figure 12-* Plot of Cumulative Sum of Recursive Residuals

Source: Author's construct (2018)

Also, the plot of CUSUM for the estimated ARDL model is displayed in Figure 13. The plot suggests that all parameters are stable over the period under study since the plots of all coefficients fall within the critical bounds at 5 per cent level of significance.



*Figure 13-* Plot of Cumulative Sum of Squares Recursive Residuals

Source: Author's construct (2018)

Figure 13 shows plots of CUSUMSQ for the estimated ARDL model. The plot suggests that over the period under study, the coefficients are stable since the plots of all coefficients fall within the critical bounds at 5 per cent level of significance.

### **Chapter Summary**

This chapter mainly focused on the estimation of the ARDL model, presentation and discussion of the results of the study. Specifically, this chapter began by examining the time series properties of the data used for estimation, presented and discussed the results. Unit root tests with the aid both the ADF and the PP techniques essentially showed that some of the series was stationary at levels while others were at first difference. The results of both tests implied that the variables are integrated of order zero  $I(0)$  and order one,  $I(1)$ . The existence of

non-stationary variables indicated the possibility of the existence of a long-run relationship among the variables, which the study confirmed using ARDL bounds test.

The results showed the presence of long-run and short-run relationship between Theil index of concentration (export diversification), GDP per capita, real effective exchange rate, trade openness, foreign domestic investment, terms of trade and infrastructure. The results from the long run estimates showed that GDP per capita (LGDPC), real effective exchange rate (LREER), trade openness (OPEN), foreign domestic investment (FDI), terms of trade (TOT) and infrastructure (TEL) were found to be long-run determinants of export diversification in Ghana. Specifically, while GDP per capita, real effective exchange rate, trade openness, foreign domestic investment and infrastructure had the expected negative sign indicating improvement in export diversification, terms of trade was found to hamper export diversification in Ghana.

Results from short-run estimation show that GDP per capita, current real effective exchange rate, trade openness, foreign direct investment and infrastructure were found to boost export diversification in Ghana. In contrast, previous two- year lag of real effective exchange rate and terms of trade were found to enhance export concentration (reduce diversification) in the short-run.

The results of the dynamic ARDL model selected based on AIC shows that the error correction term ( $ECM_{t-1}$ ) carried the expected negative sign and was significant at 1 percent. This confirms the cointegration test result. The diagnostic and parameter stability tests revealed that the model satisfies the tests of serial

correlation, functional form misspecification, non-normal errors and heteroscedasticity at conventional levels of significance.

The plots of the CUSUM and CUSUMSQ indicate the absence of any instability of the coefficients since the plots of these graphs are confined within the 5 percent critical bounds of parameter stability, suggesting that all the coefficients of the estimated ARDL model are stable over the study period. The next chapter present summary of the study, conclusions and recommendations based on the findings.

## **CHAPTER SIX**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **Introduction**

The purpose of this chapter is to present the summary, conclusions and some policy recommendations based on the findings of the study. The chapter also offers some directions for future research in the area of determinants of export diversification.

#### **Summary**

Basically, the need for export diversification is essential to mitigate all kinds of risks associated with high level of export concentration. These risks include economic risks such as commodity price volatility, instability in foreign exchange earning which have negative effects on macroeconomic factors, secular and unpredictable decreasing terms of trade performance.

Nonetheless, export diversification has long been identified as the way by which commodity dependent countries cushion against unstable economic growth through unstable export earnings. Export diversification has been variously defined as the change in the composition of a country's existing export product mix or export destination (Ali et al., 1991), or as the spread of production over many sectors (Berthelemy & Chauvin, 2000).

Moreover, the capacity to shift production and exports from traditional goods to more dynamic ones is considered a key factor in breaking the vicious cycle of dependence and turning it into a virtuous cycle of dynamism and development.

This can be achieved in a stable economic atmosphere at the macro level plus an international trading system and drive of entrepreneurs at the micro level are necessary conditions that need to be met.

Ghana has made several attempts to diversify its exports yet export structure remains virtually unchanged since the colonial era with the traditional exports of cocoa, gold and timber accounting for about 70% of total exports. The little diversification has been achieved mainly through expanding recently into other agricultural opportunities, namely horticulture and fisheries (MOTI, 2012). Analysis on export diversification in the literature mainly centers either on the effects of export diversification or on policy response regarding the diversification process.

While the majority of these empirical works find that export diversification increases economic growth the expected question is what determines export diversification? By comparison, empirical studies on the determinants of export diversification are few. The lack of a systematic theoretical framework could serve as a possible explanation for the scarcity of empirical investigation (Balavac, 2012). Empirical studies on the determinants of export diversification have produced mixed results. The reason being that, most of these empirical studies on the determinants of export diversification are mainly cross-country studies. Empirical studies in the context of Ghana remain limited. The objective of this study was to identify factors that significantly explain export diversification in Ghana. Specifically, the study examined structural factors (gross domestic product per capita), economic/policy reforms (trade openness, infrastructure) as well as

macroeconomic determinants (real effective exchange rate, foreign direct investment and terms of trade and) of export diversification.

In order to achieve the objectives, the study employed the Autoregressive Distributed Lag (ARDL) approach to cointegration to examine the long-run and short-run dynamics among the variables used in the estimation. The Theil index of concentration was used as the preferred measure of export diversification. The explanatory variables used in the study were gross domestic product per capita, real effective exchange rate, trade openness, foreign direct investment, terms of trade and infrastructure. All the tests and estimations were conducted with the help of E-views 10 package.

Before estimating the model, time series characteristics of data were tested using the Augmented Dickey Fuller (ADF) and Phillips-Perron test statistics. The unit roots results suggested that all the variables were stationary but there were made of mixture of variables integrated at  $I(0)$  and  $I(1)$ . The study then proceeded to examine the determinants of export diversification in Ghana.

The following are the main findings of the study in relation to the objectives:

- The cointegration analysis revealed the presence of long-run relationship between export diversification and its determinants. The error correction model also revealed a short-run relationship among export and its determinants. The study found that all the explanatory variables had a long-run relationship with export diversification. Specifically, GDP per capita, real effective exchange rate, trade openness, foreign direct investment and infrastructure had the expected negative signs. These results imply a



decrease in concentration and thus increase in export diversification. On the other hand, terms of trade was found to contribute negatively to export diversification in Ghana.

- The estimated results within the ARDL framework also show that the lag of Theil index, two-year lag of real effective exchange rate and terms of trade exhibited positive and significant effect on specialisation in the short-run. However, GDP per capita, current real effective exchange rate, trade openness and foreign direct investment showed negative and significant effect on export concentration and thus boost export diversification in the short-run.
- The negative and significant coefficient of the lagged error correction term further confirmed the existence of a long-run relationship among export diversification (proxied by the Theil) and its determinants. The coefficient of the error correction term was about 43 percent and this indicates that disequilibrium caused by shocks to the economy in the previous year converges back to the long run equilibrium of the current year.

The model diagnostic tests and the stability tests showed that the estimated model was free from autocorrelation, functional form misspecification, heteroscedasticity and non-normal errors. The plots of the cumulative sum of recursive residuals and the cumulative sum of squares of recursive residual stability tests for the model indicated that all the parameters estimated were stable over the study period since they were found to be within the 5 percent critical bounds level.

Thus, the existence of a stable relationship between export diversification and its determinants.

## **Conclusions**

This study therefore examined the drivers of export diversification in the context of Ghana. The main objective of the study was to examine the determinants of export diversification in Ghana. Specifically, the study focused on investigating the relationship among export diversification and the explanatory variables used annual data from 1983 to 2016. Based on the results obtained in this study the following conclusions were reached in accordance with the study's specific objectives.

In achieving the specific objectives, the empirical evidence from the study revealed that, Structural factors namely; GDP per capita (LGDPC) reduces specialization and thus enhances export diversification in the long-run.

Economic/reforms namely; trade openness (OPEN) and infrastructure (TEL) were found to reduce export concentration and thus increase export diversification as they had the expected negative and significant coefficients in the long-run.

Macroeconomic factors; real effective exchange rate (LREER) and foreign direct investment (FDI) boost export diversification while terms of trade (TOT) was found to favour export concentration in the long-run

Also, the econometric outcome of this study indicated that GDP per capita, current real effective exchange rate, trade openness, foreign direct investment and infrastructure positively drive export diversification in the short-run. However,

terms of trade and two-year lag of real effective exchange rate do not favour diversification in the short-run.

### **Recommendations**

Creating jobs and improving the living standards of Ghanaians especially the youth by making Ghana a world class exporter of competitive products and services is the main vision of the national export strategy (NES). The policy implications of this study are fairly forthright. A sound macro-economic environment is a crucial element to accelerate export diversification and eventually promote structural change on the economy of Ghana.

Based on the findings of this study, it is recommended that the Bank of Ghana continues to work towards the realisation of good macroeconomic conditions including the stabilization of the value of the Cedi. Essentially, the government should take advantage of the fall in Cedi value in order to export differentiated commodities at different export markets.

Ghana Investment Promotion Centre (GIPC) should design and implement friendly regulatory policies which promote the proper functioning of the market in eliminating market frictions and inefficiencies. Accordingly, government should design incentive mechanisms to encourage both foreign direct investment in new activities. Additionally, government through the GIPC should potentially consider investing in promoting a broader variety of FDI opportunities to investors, while also developing other sectors of the economy, if the country is to diversify its exports in the long term.

A well-developed export community motivated and trained to organise resources efficiently is important. Its absence can be a barrier to development. Exporters, producers and all those involved in assisting the promotion and development of non-traditional export, should be trained to acquire adequate knowledge about trade information facilities to enable exporters achieve high level of performance. Among other things, these programmes should cover training programmes such as packing, marketing, processing, procedures and documentation and all other aspects of the export trade in the form of seminars and workshops. Exporters should be taken through export marketing fundamentals, commercial representation abroad, market research and analysis among others. Also, a critical tool is the acquisition of ICT knowledge to help boost the export business.

The Ministry of Trade and Industry in order to maximize synergies between policies and strategy, should not only work concurrently with the export strategy; it must reinforce it to permit trade and export to play their recognized role as an engine of economic growth. It is therefore essential to develop a competitive capacity for trade in order to eliminate principal domestic barriers to international business development and also to improve business conditions for local industries.

Moreover, there is the need for government to substantially increase its investment in basic infrastructure as well as reinforce the accumulation pace of physical capital in order to reduce its reliance on primary commodities. The majority of Ghana's non-traditional exports are agro-based. Therefore, in the short to long-term, a focus on infrastructure development will open up potentially

productive areas to facilitate the transportation of produce to other sectors of the economy and make a significant contribution to the achievement of the expected results of the national export strategy (MOTI, 2012).

### **Direction for Future Research**

Future research could consider the determinants of export diversification at both the intensive and extensive margins as well as other components of diversification in Ghana. The possible drivers of export diversification include, social factors, trade factors, geographical factors and institutional factors. This indicates that the model employed in the study did not capture all the possible explanatory variables of export diversification, therefore future research could model export diversification to include more possible explanatory variables. Finally, this study ignored exports in the service sector, which future researchers could consider as well.

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## APPENDICES

### APPENDIX A

#### VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-157.042	NA	6.69E-05	10.25264	10.57327	10.35892
1	97.25952	381.4526*	1.93E-10	-2.57872	-0.01368*	-1.72848*
2	157.4325	63.9338	1.55e-10*	-3.27703*	1.532415	-1.68284

Note: \* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

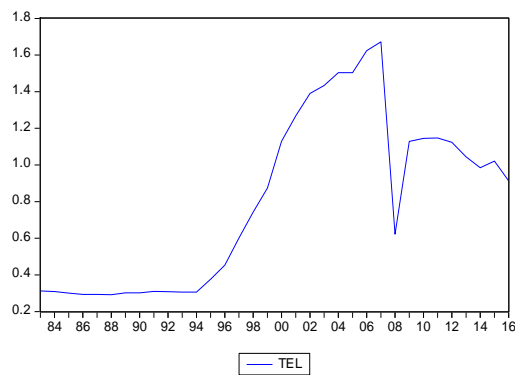
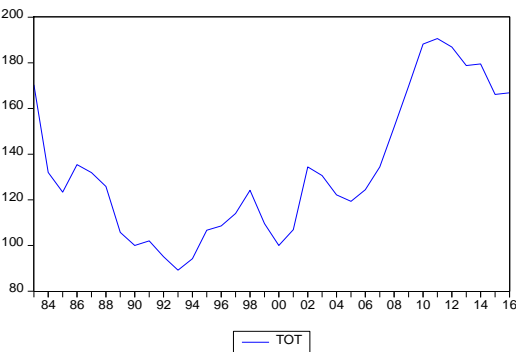
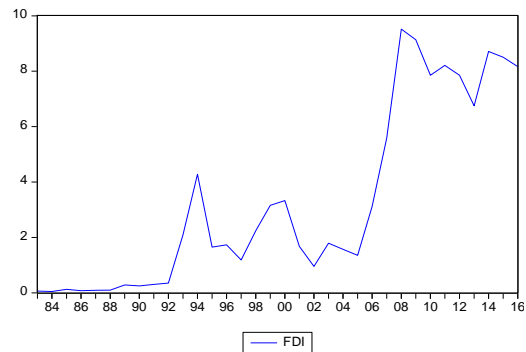
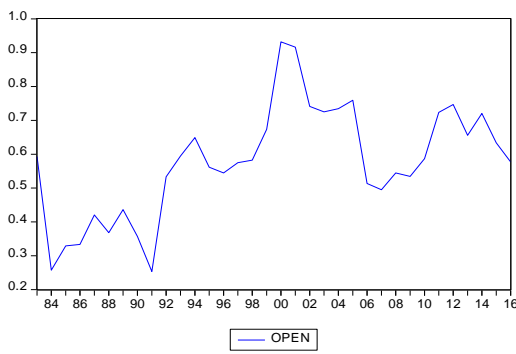
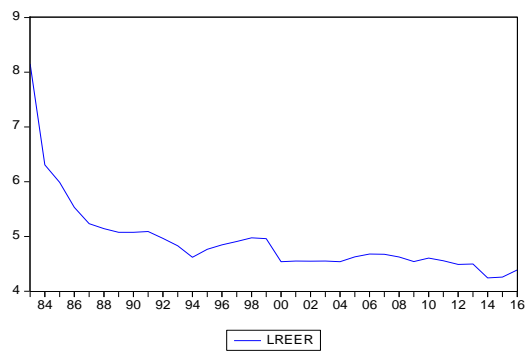
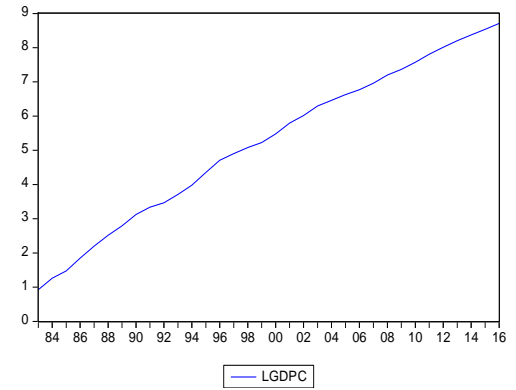
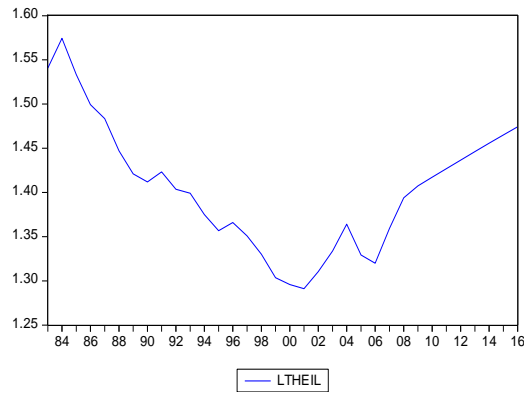
SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Author's computation using EViews 10 package

# APPENDIX B

## Plots of Variables in Levels

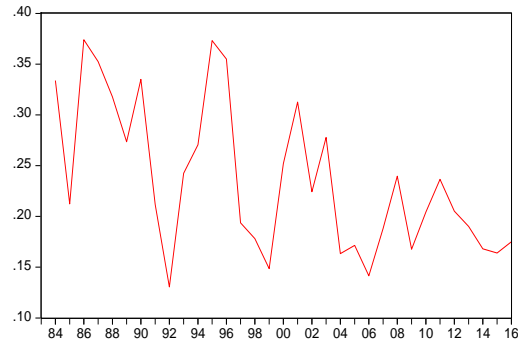


# APPENDIX C

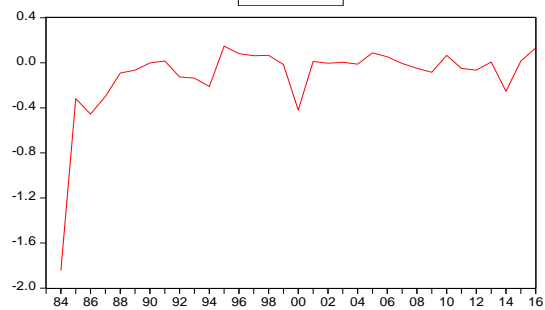
## Plots of Variables in First Difference



DLTHEIL



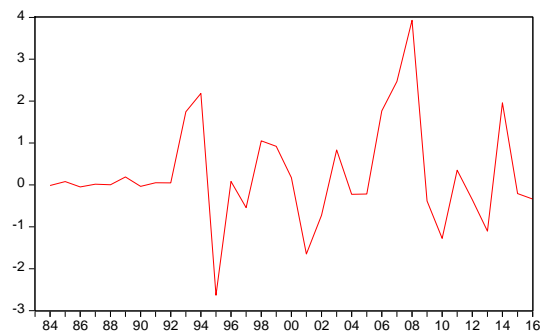
DLGDPC



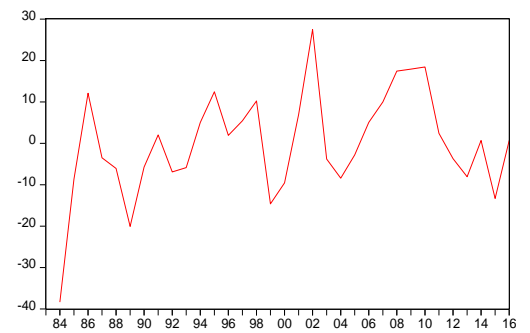
DLREER



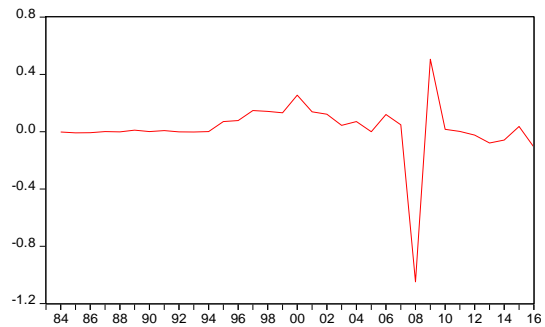
DOPEN



DFDI



DTOT



DTEL