KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

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DEPARTMENT OF ECONOMICS

THE IMPACT OF GENDER INEQUALITY ON TRADE IN GHANA: AN EMPIRICAL STUDY

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BY

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DECLARATION

I hereby declare that the submission is my own work towards the Master of philosophy (Economics) degree and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this work to my family and all my friends most especially my parents and my brother Dr Williams A. Atuilik and his wife Mrs Beatrice Atuilik, my parents, John A. Atuilik, Assibi Anamsibadek Atitey, Lamisi Akanbeadiiba and my elder sister- Lydia Quaye (Mrs). Without their enormous support and love I would not have reached this height in education.

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ABSTRACT

Free trade is considered the “royal highway” for enhancing economic growth and decreasing the incidence of absolute poverty. Developing countries including Ghana have therefore made several efforts to enhance their trade flows. However, Ghana is still experiencing low export performance and hence its persistent balance of payments deficit. Also, there is a lot of gender inequality in terms of employment, property ownership, education among others in Ghana even though females make up about 51.2% of the total population. How does gender inequality impact on trade in Ghana? Does Ghana stand a chance to gain from trade by taking advantage from its relatively abundant female labour force? This study seeks to answer these questions by examining the impact of gender inequality on trade in Ghana using the ARDL model for the period 1980 to 2013. The empirical results reveal that; female employment, male employment and male education positively affect trade. Also, gender inequality in education has a negative impact on trade. The study therefore recommends that, policy makers should make policies that are favourable for more female employment since female employment affects trade more than male employment. Also, girl child education policies should be intensified to promote female education and reduce gender inequality in education since a reduction in gender inequality in education promotes trade. More so, when male education is increased in the short run, it has the tendency to decrease trade but in the long run it increases trade, therefore policy makers should consider such policies which will generally be beneficial in terms of trade.

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LIST OF ACRONYMS AND ABBRESVIATIONS

ADF	Augmented Dickey-Fuller Test
AIC	Akaike Information Criterion
ARDL	Auto regressive Distributed Lag
ECM	Error Correction Method
CPI	Consumer Price Index
CUSUM	Cumulative Sum
CUSUMQ	Cumulative Sum of Squares
ECOWAS	Economic Community of West African States
EPZs	Export Processing Zones
ERP	Economic Recovery Program
EU	European Union
EU-EEA	European Union- Egyptian Exporters' Association
FDI	Foreign Direct Investment
FEMNET	African Women's Development and Communications Network
FTZ	Free Trade Zones
GDI	Gender-related Development Index
GDP	Gross Domestic Product
GEM	Gender Empowerment Measure
GII	Gender Inequality Index
GPI	Gender Parity Index
HDI	Human Development Index
H-O	Heckscher–Ohlin
IANWGE	United Nations Inter-Agency Network on Women and Gender Equality

ILO	International Labour Organization
IMF	International Monetary Fund
MDG	Millennium Development Goal
NAFTA	North American Free Trade Agreement
OECD	Organisation of Economic Co-operation for Development
OSHD	Human Development Department
PP	Philip-Perron
PTAs	Preferential Trade Areas
RCA	Revealed Comparative Advantage
SAP	Structural Adjustment Policy
SSA	Sub- Saharan Africa
TAs	Trade Arrangements
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UIS	UNESCO Institute for Statistics
WDI	World Development Indicators
WITS	World Integrated Trade Solutions

CHAPTER ONE

INTRODUCTION

1.1 Background Study

Trade is the economic exchange of goods and services and can happen nationally or across international borders or territories in a legal fashion. A country's trade with other countries comprises the imports and exports of goods and services of the country. Free trade is considered the "royal highway" for enhancing the growth of an economy and decreasing the incidence of absolute poverty (Papyrakis et al., 2009; Tran-Nguyen, 2004; United Nations Inter-Agency Network on Women and Gender Equality [IANWGE], 2014; Von Hagen, 2014; Zeray, 2015). This is because the expansion of trade is an opportunity for economies to allocate resources more efficiently, exchange of knowledge, transfer of technology and enhance productivity and employment levels including the development of human and physical capital (Papyrakis et al., 2009; 2012; Tran-Nguyen, 2004). This will lead to livelihood sustainability for all (i.e. men and women) and hence reduce the incidence of absolute poverty in the economy (IANWGE, 2014; Von Hagen, 2014). Exports trade generate the foreign exchange necessary to increase the import capacity of the country, boost its industrialization, expand countries markets and take advantage of economies of scale and overall economic activities, which in turn, augments its economic growth.

Statistically, trade accounted for 25% of world gross national product in 1970, rising to about 45% as at 1995 (Fontana et al., 1998). Openness to trade (and FDI) has been key in the economic success of countries in East Asia (e.g. Taiwan, Korea, Singapore, Thailand,

Hong Kong, Indonesia and Philippines) (Seguino, 2000b; Bonuedi, 2013; Papyrakis et al., 2009; 2012).

The Washington Consensus on policy reform measures, the IMF and the World Bank prescribe for ailing economies to adopt trade liberalisation (Papyrakis et al., 2009; 2012; IANWGE, 2011). Countries have therefore undertaken several efforts to enhance their trade flows. Consequently, the establishment of the World Trade Organization, tariff reductions, the construction of free-trade zones (ECOWAS, EU-EEA, NAFTA), reducing capital controls, internal infrastructural building, foreign direct investment (FDI) attraction, and institutional quality have all been considered with the aim to increase national capacity of trade and the global capacity of trade as a whole (Papyrakis et al., 2009; 2012).

However Africa still experience low export performance. These therefore call for the investigation of other drivers of trade. Gender inequality affects expansion of trade and specialisation in particular commodities (Tran-Nguyen, 2004; Busse and Spielmann, 2005; 2006; Randriamaro, 2012; Suranovic, 2010; IANWGE, 2011; Von Hagen, 2014). Gender equality refers to the equality between women and men, girls and boys, in all aspects of life including education, health, nutrition, access to economic assets and resources, political opportunity and freedom from coercion and violence, otherwise is gender inequality (UNCTAD, 2014). According to Cagatay (2001), when there is gender inequalities over the control of resources like land, credit and skills, it does not only prevent women's ability to make the most of new opportunities brought about by the liberalization of trade, but it also limit the output response and export volume of the economy as a whole. Considering two countries with comparatively more labour force,

an increase in the labour supply as a result of a rise in the labour force of females and/or males in just one country would improve its comparative advantage in labour-intensive products according to the Heckscher–Ohlin (H-O) trade theory (Busse and Spielmann, 2005; 2006; Suranovic, 2010). It is therefore not surprising that over the last few years, attention on the gender aspects of trade amongst policy makers and civil society is on the rise (Randriamaro, 2012; Busse and Spielmann, 2005; 2006; Suranovic, 2010; Von Hagen, 2014).

Ghana, like any African country has made trade promotion a central policy since 1956. Reforms implemented under the Economic Recovery Program (ERP) and Structural Adjustment Policy (SAP) such as, the trade restrictive, import-substitution development strategy of the 1960s and 1970s was replaced by a more liberalized, outward oriented and export-led growth strategy, with serious governmental efforts towards diversifying and broadening Ghana's export base into non-traditional items like handicrafts, pineapples, canned, yams and smoked fish, processed foods, and wood products (Bonuedi, 2013) where female productivity is believed to be high. The openness of Ghana's external sector, measured by the share of export and imports in GDP, kept fluctuating since 1982; from 60% in 1982 to 46% in 1992, to 116% in 2000 and then to 75% in 2010 (World Development Indicators [WDI], 2015). In 2013, export as percentage of GDP is 42.35% as against import as percentage of GDP is 47.44%. However, it has been difficult in spurring exports growth over the growth in imports, leaving the balance of trade in deficits for most of the years between 1982 and 2014.

Among the different factors affecting trade openness, the relationship between trade and gender inequality warrants particular attention. Also as Ghana aspires to improve its

middle-income status with an annual increase in real growth rate there is the need to explore other drivers to expand the volume of Ghana's trade by considering the effect of gender inequality on trade to boost the pace of the nation's economic growth.

1.2 Problem Statement

Gender inequality reduces labour productivity and agricultural productivity, lowers human capital, hinders investment in physical capital and is inefficient (Ward et al., 2010). When the inequalities are more at the beginning in the allocation of lands, education, assets or capital, the chance that a particular growth path would cause a decline in poverty reduces (Alesina and Rodrik, 1994; Deininger and Squire, 1998; UNCTAD, 2014). Gender inequality in less developed countries has been empirically proven to affect economic development negatively (Tran-Nguyen, 2004; Randriamaro, 2012).

Trade is commonly treated by economists as a principal agent of economic growth and development. However, in spite of government's massive export promotion campaign over the past years to promote export trade, it has not succeeded in increasing exports over imports. From the Table 2.1 below, imports as a percentage of GDP decreased from 22.69 in 1970 to 9.15 in 1980 and has been rising steadily afterwards to 25.85 in 1990 and then to 67.25 in 2000. Imports fall to 45.90 in 2010 and rose again to 47.44 in 2013. On the other hand, exports as a percentage took a similar trend like the imports but with less figures falling from 21.33 in 1970 to 8.47 in 1980 and then rising steadily from 16.88 in 1990 to 48.80 in 2000. Exports fell to 29.48 in 2010 and rose to 42.35 in 2013(WDI, 2015). The country experiences a persistent deficit in her balance of payments. Ghana's

share in the world's trade is not only small but it is also worsening (Bonuedi, 2013). Also, Ghana's openness to trade with the rest of the world fell from 116.05% in 2000 to 98.17% in 2005 and further to 75.38% in 2010. As if it was picking up in 2012 when it recorded 101.18% but it fell again to 89.40% in 2013 (WDI, 2015)

Table 1.1 Import and Export as a Percentage of GDP

YEAR	**1970**	**1980**	**1990**	**2000**	**2010**	**2013**
IMPORTS	22.69	9.15	25.85	67.25	45.90	47.44
EXPORTS	21.33	8.47	16.88	48.80	29.48	42.35

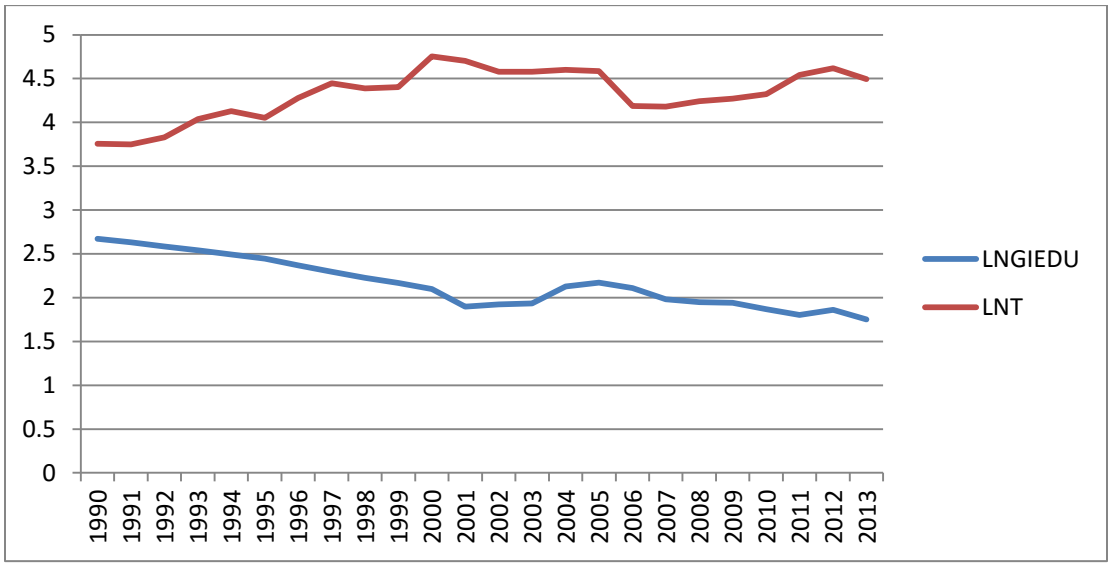
Source: WDI, 2015

The population and housing census conducted in 2010 shows that females account for 51.2% of the total population in Ghana. Also, according to the Ghana living standard survey round six (GLSS6), the economically active population for females between the ages of 15-60 years and 15 years and above is 64% and 71.5% whilst that of males is 61% and 67.5% respectively. This confirms that Ghana is relatively female labour endowed and hence a rise in the female labour force in Ghana will improve its comparative advantage in its labour-intensive commodities if it trades with some other country assuming the Heckscher–Ohlin trade model works (Busse and Spielmann, 2005; 2006; Suranovic, 2010).

SEND Foundation -GHANA (2014) claims that, if women farmers had the same access to productive resources as their men counterpart, they could increase yields on their farms

by 20 to 30 percent, and this could raise total agricultural output in Ghana by 4 percent and in similar vein, Amu (2004) attributed the low contributions of female to the fact that majority of their activities is in the informal low growth low-return areas and are basically subsistent. This could be the possible reason why trade is increasing when gender inequality in education is decreasing as shown in Fig 1.1 below. From Fig1.1, whiles trade is positively trending, gender inequality is negatively trending and at the periods where gender inequality in education fluctuates upwards, trade also fluctuates downwards.

Fig 1.1: Line Graph showing the relationship between Trade and Gender Inequality in Education



As Ghana aspires to improve its middle-income status, the question therefore is how does gender inequality impact on trade in Ghana? Does Ghana stand a chance to gain from trade by taking advantage from its relatively abundant female labour force? This study seeks to answer these questions by examining the impact of gender inequality on trade in

Ghana so as to maximize its gains from trade and boost the pace of the nation's economic growth.

1.3 Objective Statement

The general objective of this study is to analyze the relationship between trade and gender inequality in Ghana empirically.

Specifically, this study aims to;

I. Analyse the trends in trade and gender inequality indicators in Ghana.

II. Examine the impact of gender differences in employment and education on trade in the short-run and long-run in Ghana

III. Examine the impact of gender inequality in employment and education on trade in the short-run and long-run in Ghana.

1.4 Hypotheses Statement

This study seeks to test and validate the following theoretical hypotheses:

1. H_0: There is no impact of gender (males and females) in employment and education on trade in Ghana

   H_1: There is an impact of gender (males and females) in employment and education on trade in Ghana

2. H_0: There is no impact of gender inequality in employment and education on trade in Ghana

H_1: There is an impact of gender inequality in employment and education on trade in Ghana

1.5 Justification of the Study

Ghana has been battling with developmental problems and is in dire need of policies and programmes that will enhance economic growth leading to economic development. With consistent and persistent balance of payment deficits and the other macroeconomic policies failing to live up to expectation, it is imperative to explore the gender inequality impact on trade in Ghana. Busse and Spielmann (2005) attested to this relationship in their study using a sample of 92 developing and developed countries.

In Ghana like other developing countries, majority of female workers are unskilled. However, though there are related studies to the topic in Ghana such as Baden et al.'s (1994) and Amu's (2004) studies which provided a descriptive statistics on background issues on gender in Ghana and the role of women in Ghana's economy including Tsikata's (2009) and Food and Agriculture Organisation [FAO]'s (2012) studies which outlined policy and legislations promoting gender equality and how affirmative action can help achieve this goal, there is no empirical study on the impact of gender inequality on trade on country specific. This study will help fill the literature gap on the impact of gender inequality on trade in Ghana.

In view of this, as Ghana seeks to expand its exports base to stimulate economic growth and improve its status from a lower middle income country to upper middle income country, this work aims to bring to bare the impact of gender inequality on trade and ensuing implications for economic growth in Ghana.

The study is therefore expected to assist stakeholders and policy makers to come out with appropriate public policies and as well serve as a guide to government in an attempt to minimise the inequality or if possible balance gender in trade. This is necessary if growth and development is to be stimulated through reduction in gender inequality.

1.6 Limitations of the study

One of the main drawbacks usually encountered in studies of this nature on developing countries like Ghana is the unavailability of reliable data. Lack of complete data sets from a single source meant that data used had to be taken from different sources, which usually involves inconsistencies. However, to make the study valid and reliable, this study restricted the study period to the years that data is available for most of the variables used for the study.

1.7 Organisation of the Study

This study was structured into five chapters. The first chapter is introduction to the topic under study. After this introductory chapter, the other chapters follow in the order below; Chapter two talks about review of the documented literature related to the study so as to draw inferences. Chapter three gives a detailed methodology that explains the source of data, method used in data collection and the method used in analyzing the data. Chapter four is data analysis and presentation of the findings. This is where we will get to know whether there is a relationship between trade and gender gap. Findings from the analysis will then be presented in this same chapter. Chapter five being the final chapter contains a summary of findings, recommendations and from there conclusion will be drawn.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives a review of the concepts and definitions, theoretical and empirical literature on the trade and gender inequality relationships as well as the gender profile of Ghana. The chapter is organized in three main sections. The first section talks about the review of theoretical literature on trade and gender inequality. Classical and contemporary theories on the causes of trade, theories justifying the influence of gender inequality on trade are all presented in this section. The second section presents the empirical literature on the impact of gender inequality on trade. The final section gives an overview of the gender profile of Ghana.

2.2 Review of Theoretical Literature

This section reviews some of the conventional theories of trade and discusses the brain behind these theories.

2.2.1 Review of Trade Theories

The theory of trade as we have today is the product of an evolution of ideas in economic thought, beginning from the mercantilists to the classical. The main focus of these international trade theorists was to explain the composition and direction of international flows of goods and services, and at the same time, to assess the impact of trade flows on domestic welfare. They also sought to predict how national policies affect trade flows, commodities prices, factors prices and their effect on consumers' welfare.

The mercantilists' view on trade and on the role of the government emerged the ideas of the classical economists on trade. Adam Smith propounded the absolute advantage theory of trade. The theory of absolute advantage is based on the premise that countries differ in their ability to produce commodities arising from differences in technology. According to Smith, a country should export its absolute advantage goods and import its absolute disadvantage goods. With free trade and no government interference, world output will rise due to specialization and division labour. Consumption is both countries will increase after trade (Salvatore, 1998; Carbaugh, 2006 in Bonuedi, 2013).

Unfortunately, Smith's theory of absolute advantage is limited by geographic and climatic conditions, special skills and techniques, and the economic environment. Also, it is unable to explain why nations which are efficient in producing all its traded goods still trade with partners which have absolute disadvantage in the production of all the traded goods. Hence, Smith's absolute advantage can explain only small part of the world trade today (Salvatore, 1998; Carbaugh, 2006 in Bonuedi, 2013).

Seeing the loopholes in the absolute advantage theory, David Ricardo propounded the theory of comparative advantage which is an extension of Smith's trade theory. Ricardo's comparative advantage demonstrated that, there exist basis for mutually beneficial trade, even when one country has absolute advantage on all goods given that their relative costs in terms of labour inputs, are not the same for the two or more goods. According to Ricardo, country A, which have absolute advantage in both commodities gains by specializing and exporting the good in which its comparative advantage is more, whilst leaving the other country to specialise in the product in which country A's relative advantage is smaller. Country A then gains by importing the other good because the

opportunity cost of producing it is less. Thus, Ricardian trade theory is also premised on differences in technology between the nations and motivates advantageous international trade (Anderson, 2004; Suranovic, 2006). Studies by MacDougall (1951) and Balassa (1963) all cited in Bonuedi (2013) confirmed Ricardo's claim that comparative advantage is based on differences in labour productivity. However, the theory of comparative advantage was criticized for its unrealistic assumptions. Also, the theory's inability to explain the reason for the differences in labour productivity across nations and the effect of international trade on factor earnings was all criticized (Salvatore, 1998).

Stefan Linder (1961) presented the similarity of preferences (or overlapping demands) theory, which explains the direction of trade in differentiated manufactured products. His theory is focused on the demand side rather the supply side which his predecessors' theories portrayed. Linder hypothesized that nations that have similar standards of living tend to consume similar types of goods and these standards of living are influenced in part by factor abundance. Hence, he argued that capital abundant countries tend to be richer than labour abundant countries. Linder's theory therefore expects rich (developed or industrial) countries to trade more with other wealthy nations and poor (or developing) nations to trade more with other poor nations. Although Linder's hypothesis is in contrast with the predictions of the H-O theory where trade is based on factor endowments only, it explains the extensive trade observed among the rich countries and the existence of intra-industry trade, which makes up a significant share of world trade today. Studies by Jerry and Thursby (1987) and Bergstrand (1990) cited in Bonuedi (2013) have reported evidence in favour of Linder's theory.

The classical models of trade fail to explain why regions with similar productivity trade extensively. Hence, Paul Krugman developed a new trade theory in 1983 in response to that failure by suggesting that, it is sufficient to advantageous trade when economies of scale in production exist between two countries regardless of their factor endowments and its comparative advantage differences (Liu and Shu, 2001; Suranovic, 2006; Carbaugh, 2006 in Bonuedi, 2013).

Finally, government interventions with trade policies, such as government tax and subsidies, antitrust immunity, loan guarantees, low-interest-loans and trade protection policies are enough for comparative advantage in production of some goods to exist and hence beneficial trade. The proponents advise that governments should focus on enacting policies that encourage resources moving towards the development of emerging, industries identified with good association with the rest of the economy, strong future competitiveness, and highest growth prospects. These policies would create a dynamic comparative advantage for the domestic economy over the course of time, allowing it to be more productive and more competitive in the international market (Liu and Shu, 2001; Carbaugh, 2006 in Bonuedi, 2013).

2.2.2 Theoretical Framework of the Heckscher- Ohlin Model

Eli Heckscher (1919) and his student, Berlin Ohlin (1933) extended the Ricardian trade theory into what is now called the Heckscher–Ohlin (H-O) theory by introducing capital, in addition to labour in the Smithian and Ricardian models. Their model sought to explain the source of international differences in productivity which was a weakness in the Racardian model. According to Heckscher and Ohlin comparative advantage arises

from differences in national resource or factor endowments. The H-O model assumed that different commodities require varying intensities of factor inputs for their production. The H-O model therefore assert that, countries will gain from trade if the capital-abundant (labour scarce) countries like the U.K and other industrial economies export capital-intensive commodities and import labour-intensive commodities from labour-abundant (capital scarce) countries like Ghana and other developing economies (Salvatore, 1998; Liu and Shu, 2001).

This model assumed that there are two countries (the home country and the foreign country), two goods (e.g. the labour intensive good and the capital intensive good) and two inputs (eg labour and capital). Also, the factor endowments differ among these two countries. Therefore, assuming labour abundant for the home country relative to the foreign country, it can be expressed mathematically given that labour is L and capital is C as;

$$L/C > L^*/C^* \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2.1$$

Where L/C is the home country's abundant factor and L*/ C* is the foreign country's scarce factor

The model assumes that the two countries use the same technology and so their production function is identical. Production in the home country is labour intensive relative to the foreign country if;

$$aL_h/aC_h > aL_f/aC_f \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2.2$$

Where aL_h/aC_h is labour-capital ratio for the home country and aL_f/aC_f is labour-capital ratio for the foreign country. This is because the home country uses relatively more labor for all factor prices. To illustrate this in table form, assume the two goods X and Y and two countries the home country and the foreign country.

Table 2.1 The relative resource abundance, factors intensity and trade specialization.

Country	**Inputs and production without trade**		**The relative abundance and trade specialization in the product for which there is a factor intensity.**	
	Labour (L)	**Capital (C)**	**L/C**	**C/L**
Home country	X	Y	X	-
X	95	20	4.75	0.21
Y	5	10	0.50	2.00
Total	30	100	3.33	0.30
Foreign Country	X	Y	-	Y
X	5	3	1.66	0.60
Y	2	10	1.20	5.00
Total	7	13	0.53	1.85

Given the number of labour and capital in the home and foreign country as shown in table 2.1 above, the home country is relative abundant in labour (L) and will specialize in producing good X and the foreign country is relative abundant in capital (C) so it will specialize in producing good Y. In this case, trade may benefit both countries involved.

Mathematically,

$T = f\ (aL_h/aC_h)$…….2.3

This implies that beneficial trade is a function of the relative factor abundant good. The H-O model therefore assert that, countries will gain from trade if the capital-abundant (labour scarce) countries export capital-intensive commodities and import labour-intensive commodities from labour-abundant (capital scarce) countries.

2.2.3 Theoretical Justification of the Heckscher–Ohlin (H-O) Theory for the Trade-Gender Inequality Relationship

With the link between trade and labour, the H-O framework dominates the entire economic literature (Wood, 1997). This is probably for the reason that, the H-O model directly connects demand for and supply of factors to trade, including different categories of labour in a unique way despite its simplifying assumptions (Fontana et al., 1998; Liu and Shu, 2001).

Also, this theory is flexible and can be expanded to incorporate several types of resource abundances, international differences in technology and wage-setting (e.g. minimum wages) as source of comparative advantage without much difficulty. Again, it is easy to link up the H-O model to analyse broader social considerations, as inputs and outputs as Kabeer (1995) does in her study of Bangladesh.

Theoretically, the H-O model like most economic approaches, neglect gender as an investigative category due to the assumption that trade is gender- neutral. However, it is highly stressed in female economic literature (e.g. Cagatay, Elson and Grown, 1995; Juhn, Ujhelyi, and Villegas-Sanchez, 2013; Von Hagen, 2014) that failure to consider important features of gender relations leads to an inaccurate evaluation of the gender-trade relationship (Fontana et al.,1998). More work is therefore needed to develop

investigative frameworks that include these concerns and yet provide basis for estimating empirical outcomes.

Therefore, as a suitable theoretical framework to analyse the relationship between trade and gender inequality, the standard H-O trade framework as applied by Gray et al. (2006), Busse and Spielmann (2005; 2006), and Neumayer and De Soysa (2007), in their respective studies is used in this study, with the assumptions that there are two nations, two goods (one capital- and one laour-intensive) and two inputs (labour and capital).

2.2.4 The Impact of Gender Inequalities on Trade

Gender inequality influences trade as trade policies also influences gender inequality. With capital and labour as the main inputs in a standard H–O trade (factor proportions) framework, the impact of gender labour on trade is subject to changes in relative factor proportions. When two countries both have a relatively more workforce, then a rise in the participation rate of labour force, for example, a rise in the labour force participation rate of females in only one country (reducing gender inequality in that country) will improve in its comparative advantage in labour-intensive goods (Suranovic, 2010; Busse and Spielmann, 2005; 2006). Hence the lesser gender inequality, the more trade performs in such country.

According to Cagatay (2001), when gender inequalities takes charge of resources, it reduces the chance for females to capitalize on new opportunities brought by liberalizing trade and also reduce productivity and thus the export capacity of the nation. He continues to state that, gender imbalances in health, farm inputs accessibility and education often reduce output efficiency and growth rates, and thus limit export

performance, especially in agricultural economies where smallholders are dominant.

Also, when firms' competitiveness is based on cheap labour costs rather than on more sustainable competitive strengths, such as innovation, inequality in gender wage can stimulate labour-intensive manufacturing exports via low female wage costs (Seguino, 2000b; cagatay, 2001). However, as gender differences in wage can produce a competitive advantage for some semi-industrialized countries, it may give rise to gradual but continuous decline in terms of trade of industrialized countries since there are greater female intensive exports from developing nations than those from industrialized nations (Cagatay, 2001; IANWGE, 2011). Gender wage differentials can influence terms of trade in that, low wages paid to women workers influence the final product price to be less than expected without compromising the share of profit (Joekes, 1999 cited in Cagatay, 2001).

The effect of gender inequality in educational achievement may affect comparative advantage in labour-intensive goods positively or negatively. There will be negative relationship when firms employ the low-paid well educated and productive female workers in the export sector of the economy (Busse and Spielmann, 2005; 2006; IANWGE, 2011). On the other hand, there will be a positive relationship when females and males attain the same educational level and can work in any sector, thereby reducing the unskilled-labour abundance and, hence, result in a decline in comparative advantage in (unskilled-) labour-intensive products (Busse and Spielmann, 2005; 2006). According to IANWGE (2011), though equality in education and employment opportunities has a positive influence on growth in the long run, strategies adopted by industries may negate the investments of semi industrialised countries.

2.3 Review of Empirical Literature on the Impact of Gender Inequality on Trade

Though there are many studies in relation to this topic, many of them are theoretical or case study in nature probably due to difficulty in getting available data. Hence only few studies have empirically studied the influence of gender imbalance on trade. Empirically, Busse and Spielmann (2005; 2006) examined the relationship between gender differences in accessing education and trade in labour-intensive goods in a sample of 94 high-income and low- income countries using the H-O model. They found that, there was no statistical significant relationship between gender inequalities in educational and trade in labour-intensive goods when they included all the countries under study. Also, they observe that, low gender inequality in accessing education is positively related to comparative advantage trade. However, when they excluded the high-income countries from the dataset, they had similar results, except that gender inequality in education was now significant at 5% significance level.

Busse and Spielmann (2005; 2006) also found a statistically significant positive association of gender imbalance to labour intensive exports as a proportion of total exports using cross-sectional and panel analysis. To ensure that the addition of developed countries did not influence the results making the results bias, developed countries were taken out in the second set of regressions. The result for labour force participation rate-inequality was still positive but not significant in the panel analysis.

Busse and Spielmann (2005; 2006) and (cagatay, 2001) again found a positive relationship between trade in labour-intensive products and inequality in gender wage in their respective studies. It is therefore critical to acknowledge gender structures that may impact on trade performance and trade policy outcomes.

Bhattacharya and Rahman (1999) attributed Bangladesh's export success in the ready-made garments industry when they observed that women in Bangladesh were pushed into low-skilled/low-wage jobs in the ready-made garments industry. According to Seguino (2000b) in her study, the lower female wages in export-orientated industries created a comparative advantage in labour-intensive commodities (and stimulated export-led growth) for many East-Asian economies.

Seguino (2000a) finds for her sample of Asian economies that a 10% increase in the male-female wage gap is expected to lead to a 16% increase in growth rate of GDP (by creating a comparative advantage in labour-intensive commodities). She went ahead to revealed that, the export-led growth miracle model of Taiwan was much supported by suppressing female wages to maintain the competitiveness of domestic industries and shield them from intense international competition in commodity markets and capital flight.

2.4 Gender Profile of Ghana

2.4.1 Historical Context of Gender Issues

The socio-economic and political developments of the diverse and multi-cultural Ghanaian economy have been influenced by diverse factors. Past research on conventional Ghanaian societies introduce the socio-economy as simple, yet demonstrating complex systems and structures that are distinctive in their form and functions (Malik, 2013). They posit that, the traditional ways of kinship, politics, economics and governance were created to enhance some sort of social functioning and is clear in the resulting economic, social and political systems with more influence on

gender. There are two main kinship and lineage systems namely matrilineal (practiced in southern Ghana) and patrilineal (practiced in northern Ghana) systems, though the Ghanaian traditional system encompasses diverse social organizations. These systems influence the socio-economic and political economy and thus knowing these systems is very essential to define the development and gender prospects of the country. Men are integrated into the economy (to participate in business and wage employment), social (boys to partake in formal education) and political systems whilst women were not allowed to partake in economic, social and political roles exterior to their home during the colonial ruling days of Ghana (Malik, 2013). The formal sector access and benefits from this sector were also not equal; creating environment that is not conducive largely to women.

To recognise the role representatives of females during the toil for independence, not many women got appointment to the legislation arm when Ghana became independent in 1957. The National Council of Women responsible for establishing day nurseries, vocational centres and education programs for females were subsequently established in 1960 (Malik, 2013). They further explained that, the traditional system that influenced the gender divisions continued to reign even after the post-independence. Although the social and gender discrimination were acknowledged early, developed programmes lacked the necessary drive to reverse the situation. This situation continued into the 1980s until the introduction of the Structural Adjustment Programs (SAPs) around which time gender crusading was also mounting (Malik, 2013).

The momentum continued to rise to the extent that, women's basic support in their families and production methods are being recognised the more nationally and

internationally in the 1990s and the 2000s. This was the result of efforts by both women and organisations interested in women issues in and out of the country (Amu, 2004). Women's associations were formed at the grass-root and national levels since the early parts of 1990s, capitalizing on the new political climate to proclaim their leadership roles. They simultaneously strengthened Ghana and African societies when they improve their own positions and enhance the country's developmental prospects as well (Manu, 1998 cited in Amu, 2004). This is right for the fact that, if we consider human resources to be an asset of a nation, it will be unimaginable to sideline women who make up more than half of the work force.

2.4.2 The Socio- Economic Outlook and Gender Statistics

Records in the population census in 2010 indicate that, Ghana is populated by 24.87 million; females making up 51.2% and 48.8% being males. The life expectancy for males being 56 years and 57 years for females, rates for the population 18-21 years in tertiary education is 10.8% for males and 7.5% for females. The literacy rate for males is 80% higher than that for females (68.5 %). Again, the economically active male population (15years and above) is 73.2% and 70.0% for females.

The agriculture sector was the largest in the economy of Ghana until 2006 but has been overtaken by the service sector with about 51% of the output of the country. The agric sector still employ more in the country about 55% but contribute only 30% of the output of the country while the industrial sector contribute 19% of the country's output. The informal sector employs about 86% of the total employment while cocoa and gold remain the leading export earnings (Ghana Economic Review and Outlook, 2012). The goal of

Ghana to achieve gender equality in productive employment to promote women empowerment has not been that good. The formal sector absorbs low proportion of the population; in 1997 for instance, 5% of the female economically active were employed whilst 19% of males were employed. Out of the total labour force, women account for 50.1% and 51.1% are in the agriculture sector, followed by 27.4% for trade and the least being manufacturing for 13.9%. The unpaid family workers in agriculture of the economically active females are 21% as compared to the 9.6% for men. About 95% and 80% of females and males respectively were employed in the informal sector. The number of females employed to be paid in sectors other than the agricultural sector fell from 29.8% in 1991/92 to 24.8% in 1998/99 and slightly increase to 25.4% in 2005/06 (2010 Ghana Millennium Development Goals [MDGs] Report). The inequality in paid employment record indicates that, men on average earned 76% more than what women earned in 2002 (Malik, 2013). In 2006, one out of every four paid workers was a woman in Ghana which is a distance away from the target of 50% in the year 2015.

Many women engage in small businesses and about 60 to 80% businesses are located in the rural areas. More women work in low-income businesses, for instance food processing activities, handicrafts and dress-making, with low potential for growth most often. The trend in Gender Parity Index (GPI) for primary school saw improvement from 0.77 in 2003/04 to 0.96 in 2006 but has been there since. At the JHS level, the index has stalled at 0.92 since 2007/08 (2010 MDG Report).

In the agricultural sector, women constitute 52% of the agricultural labour force producing about 70% of food crops and contribute 46% to the total agricultural GDP. Even though they are crucial participants in fisheries, agro-forestry and post-harvest

activities, making up 95% of agro-processing and 85% in food distribution, they lack the required resources to boost their productivity and enhance their level of income.

2.5 Gaps Identified in the Literature

From the trade theories reviewed, there are several factors that influence trade. The influence of gender inequality on trade has not been considered in the trade models. However, the fact that gender (males and females) is considered as human capital and for that matter labour force means that it can be incorporated in trade models that have labour force as a contributing factor of trade. Therefore, though the H-O model is popularly used in gender-trade relationship, a theoretical framework that directly link gender and trade need to be developed to provide basis for empirical estimations.

Also, in the empirical literature, almost all the studies on gender inequality-trade relationship using secondary data applied cross-sectional or panel analysis mostly due to data issues. However, cross-sectional analysis is disadvantageous especially in gender inequality related studies in that, cross-country regressions cannot provide causal evidence. This is because there are differences in economic growth and/or development level and institutions that favour gender issues in various countries (Bandiera and Natraj, 2013). Thus, cross-country studies base on wage, income legal rights among others could lead to biasness due to country differences and development levels.

Fortunately, advances in time series theories have rendered time series estimates more advantageous over the use of cross section estimates (Jansen and Bruce, 1992). This study therefore employed time series techniques in the analysis.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter is devoted to the methodology adopted for the study. It is divided into three sections outlined as follows; Section I: measurement issues in gender inequality and trade debate, Section II: specifies and justifies the econometric model adopted by the study while giving clear reasons for the variables used in the model and data issues and Section III: estimation strategy.

3.2 Measurement Issues

In measuring the key variables of interest in the study i. e. trade and gender inequality, there are issues that need to be addressed. This is outlined below:

3.2.1 Gender Inequality

There have been several attempts to compute gender inequality across countries; the Gender-related Development Index (GDI), the Gender Empowerment Measure (GEM), Gender Inequality Index (GII), among others. The GDI as introduced by UNDP (1995) is computed by considering life expectancy, educational achievement and the accessibility of resources in terms of per capita GDP. The Human Development Index (HDI) is also calculated using these variables but the GDI adjusts the values for gender equality (Klasen, 1999; IANWGE, 2011). The GEM also introduced by UNDP uses the same variables in addition to the number of parliamentary seats occupied by males and females, share of income, participation in decision making and professional opportunities

(Anand and Sen, 1995). GDI and GEM are common in the sense that, they add the absolute values for the considered indicators with a penalty for inequality. Dijkstra (2002), Busse and Spielmann (2005; 2006) and Papyrakis et al. (2009) criticize the indexes introduced by UNDP saying GEM and GDI may undervalue the gender gap in developed nations. Their argument was that, these indicators do not merely estimate inequality since they combine absolute accomplishment levels with an assessment of inequality. The World Economic Forum in 2010 estimation of GII was centred on four equally weighted sub-indexes relating to women such as (1) economic opportunity and participation, (2) educational achievement, (3) health and survival, and (4) political empowerment (Ramjoué, 2010). This measure is likely to face the same problem since the components are similar to that of GDI and GEM.

Against this background, this study relied on disaggregated measures for gender inequality in employment and education following Baliamoune-Lutz (2007) since these measurements avoids the lapses pointed out above. Specifically, gender inequality was measured as follows; (i) the difference between male secondary enrolment (%) and female secondary enrolment (%) as a proxy for gender inequality in education (GIEDU), (ii) gender inequality in employment is proxied as the difference between the male employment (percentage of total persons engaged) and the female employment (percentage of total persons engaged) (GIEM).

Note that a higher figure for GIEDU and GIEM implies increased gender inequality in education and employment respectively. To ensure a consistent dataset, the gender inequality in education and gender inequality in employment were estimated based on the

ILO modeled estimate obtained from the World Bank World development Indicators (WDI, 2015) and de Vries, Timmer and de Vries (2013) respectively.

3.2.2 Trade

Trade can be indicated in several ways such as; Exports, Imports, Total Trade, Trade openness, revealed comparative advantage (RCA), etc. Trade indicators either gives a summary of the size and importance of trade or characterise trade growth and competitiveness or better still make suggestions on potential sources of future growth (World Bank, 2013). The World Integrated Trade Solutions (WITS) platforms developed by the World Bank describe some of trade indicators (World Bank, 2013) below;

Exports, Imports, Total Trade (which is made of total exports plus total imports) and Balance of Trade (computed as imports subtracted from exports) are primary indicators of a country's participation in international trade. However, these trade indicators are limited by the fact that they are influenced by several factors such as national and international prices, exchange rates, subsidies and other Trade Arrangements (TAs).

Trade openness indicator for trade gives a standardized observation of a nation’s entire trade by adding the entire imports and exports divisible by GDP. It illustrates that, as national income rises, countries have the tendency to trade more at a decreasing rate. All other things being equal, large countries are incline to have low ratios of trade to GDP because they may likely trade more in their country and also, the geography and the population may interfere with openness to trade in that, landlocked nations trade below what their GDPs suggests.

The revealed comparative advantage (RCA) index assesses a nation's relative advantage or disadvantage in a specified industry. Since more size of exports may be as a result of market interferences, like depreciating exchange rate, subsidies etc, it is argued that RCA is misleading. It is observed to measure competitiveness better than comparative advantage (Siggel, 2006 cited in World Bank, 2013).

The trade intensity index (TII) employs the method of calculating RCA, but TII does that for markets rather than products. It shows whether a reporter exports more than the world does on average. It is computed as country i's exports to country j relative to its total exports divided by the world's exports to country j relative to the world's total exports.

Finally, the trade complementarity index shows the extent to which the export profile of the reporter matches the import profile of the partner. Nations that incur high cost of transportation and transaction due distance between nations may not be ideal partners in trade but may have huge complementarity index. This index may also suffer from aggregation bias.

Even though any of these indicators can be used to represent trade for whatever purpose, some are best suited for particular purposes than others. Therefore, reviewing the limitations for each of the trade indicators makes trade openness the best indicator for the trade - gender inequality relationship estimation. This is so for the following reasons: First, it is easy to identify increasing trade openness policies for implementation. Openness to trade may not be implemented if its costs are dominant on specific groups, while the benefits are widely spread— especially if those groups are influential politically. Secondly, is easy to identify how trade openness affects the welfare of

individuals and households. This may be due to extensive evidence which show that people are concern about their absolute and relative income and consumption levels to others. Many others studies have adopted trade openness in their study of trade and (gender) inequality relationships such as Wood (1997), Cooper (2002), Rama (2003), Anderson (2005; 2009). Against this background, this study adopted trade openness as the indicator for trade.

3.3 Model Specification

As discussed in the literature review, the appropriate model to estimate the relationship between trade and gender inequality is rooted in the standard Heckscher–Ohlin trade framework. The theory assumes 2 countries, 2 goods (1 labour-intensive and the other capital-intensive) and 2 inputs (labour and capital). Assuming uniform preferences of consumers, similar technologies, and constant returns to scale, Ghana will have comparative advantage in the goods that are labour intensive given that it has relatively more labour than capital. Other variables were used as control variables similar to the benchmark regression in Busse (2002) and Busse and Spielmann (2005; 2006) but with some modification. In order to achieve objective II and III, two models are specified below as;

Model I:

$$T_t = f(L_t, GI_t, DC_t, INF_t, EXC_t, GDP_t) \quad \text{.....3.1}$$

Model II:

$$T_t = f(L_t, F_t, M_t, DC_t, INF_t, EXC_t, GDP_t) \quad \text{.....3.2}$$

Model I implies that, Trade Openness (T) is a function of the ratio of labour force to gross capital formation (L) representing the relative labour endowment, indicator for gender inequality (GI) (i.e. Gender inequality in education [GIEDU] and Gender inequality in employment [GIEM]), Domestic credit to private sector (% GDP)(DC) as availability of credit as a proxy for financial development in the country, inflation (INF) which is a proxy for economic stability, Official exchange rate (LCU per US$, period average) (EXC) and Gross Domestic Product (2006 constant prices; million GHC) (GDP), which is a proxy for market size. Also, there is the indicator for female employment or education (F) and indicator for male employment or education (M).

Model II implies that, Trade Openness (T) is a function of the ratio of labour force to gross capital formation (L) representing the labour endowment, indicator for female employment or education (F) (i.e FEM for female employment and FEDU for female education) and indicator for male employment or education (M) (i.e MEM for male employment and MEDU for male education), Domestic credit to private sector (% GDP)(DC) as a proxy for financial development or availability of credit in the country, inflation (INF) which is a proxy for economic stability, Official exchange rate (LCU per US$, period average) (EXC) and Gross Domestic Product (2006 constant prices; million GHC) (GDP), which is a proxy for market size.

To estimate the models and interpret the results as elasticities or growth rate, Equations 3.1 and 3.2, can be transformed into the operational (in log linear) as follows;

$$LNT_t = \beta_0 + \beta_1 LNL_t + \beta_2 LNGI_t + \beta_3 LNDC_t + \beta_4 LNINF_t + \beta_5 LNEXC_t + \beta_6 LNGDP_t + \mu_t \text{.....3.3}$$

$$LNT_t = \alpha_0 + \alpha_1 LNL_t + \alpha_2 LNF_t + \alpha_3 LNM_t + \alpha_4 LNDC_t + \alpha_5 LNINF_t + \alpha_6 LNEXC_t + \alpha_7 LNGDP_t + \mu_t \ldots.3.4$$

The symbol t stand for time period, μ is error terms and β_i and α_i, are parameters in the equations 3.3 and 3.4 respectively.

The theoretical sign of β_1 (α_1) is expected to be positive (β_1, $\alpha_1 > 0$) since Ghana is a labour-abundant country. Therefore, labour is less costly and hence low cost of production when the country specialises in labour- intensive production.

In the study, gender inequality (GI) has two indicators i.e. gender inequality in education and gender inequality in employment. Therefore, using gender inequality in education (GIEDU), the sign of β_2 can either be positive or negative. The coefficient would be expected to be positive if firms take advantage of a well-educated and thus productive female labour force, by employing them in low-paid export-oriented sectors of the economy. On the other hand, if females are as well educated as males and are able to work in sectors and professions they want, a better-trained female workforce would lead to a reduction in the unskilled-labour endowment in the economy and, hence, would lead to a decline in comparative advantage in (unskilled-) labour-intensive goods. Therefore, $\beta_2 > <0$. However, gender inequality in employment (GIEM) representing GI is expected to be negative ($\beta_2 <0$). Ghana is a female labour endowed country and so female labour cost is low than males and hence low cost of production when more females are employed compared to males.

When F is female employment (FEM), the coefficient of F (α_2) is greater than zero. This is because Ghana is female labour endowed and so female labour cost is low than males

and hence low cost of production when more females are employed but when F is female education (FEDU), $\alpha_2 > <0$ because, when the well-educated and productive female is employed in the low-paid export-oriented sectors of the economy, trade will increase but if the better-trained female workforce lead to a reduction in the unskilled-labour endowment in the economy and, it will lead to a decline in comparative advantage in (unskilled-) labour-intensive goods.

The expected sign when M is male employment (MEM) is $\alpha_3 <0$ because Ghana is male labour scarce and so cost high to produce when they are employed. When M is male education (MEDU), $\alpha_3 <0$ since Ghana is male labour scarce country and the well trained and productive male cost high to be employed and hence reduces trade when employed. Availability of credit and market size are expected to exert positive impact on trade since countries with available credit and large market size is expected to have comparative advantage trade hence β_3 (α_4) >0 and β_6 (α_7)>0. This is because availability of credit enhances the financial power of traders and so they can expand their business and hence increase trade.

A stable economy has comparative advantage trade so the expected sign of inflation is negative (β_4 (α_5) <0) and exchange rate can either hamper trade or improve trade because depreciation improves export trade whilst at the same time, distabilises the economy which goes a long way to hamper trade and so the expected sign is unknown i.e. β_5 (α_6) > <0.

To estimate equations 3.3 and 3.4 the study employs time series techniques. This is because advances in time series theories have rendered time series estimates more

advantageous over the use of cross section estimates (Jansen and Bruce, 1992). Bandiera and Natraj (2013) discussed some of the disadvantages of cross-country studies arguing that, cross-country regressions cannot provide causal evidence for the reasons that; firstly, cross-country differences in gender inequality may be as a result of cross-country variation in growth of an economy or their development level is different. This is because first of all, the means of development is linked to changes in relative prices (Munshi and Rosenzweig, 2006) and also to technological advancement which reduces the comparative advantage of men in physical strength, raising the returns to education and labour-market participation of females (Alesina et al., 2010). Finally, adoption of institutions that favour gender (in)equality could be a consequent of the process of development. Fernandez (2010), Doepke and Tertlit (2010) cited in Bandiera and Natraj (2013) also argued on why cross-country studies base on wage, income legal rights among others could lead to biasness due to country differences and development levels.

In view of these major concerns over the methodologies deployed to study trade issues or gender issues, even some prominent proponents of free trade such as Srinivasan and Bhagwati (1999) (cited in Ackah and Aryeetey (2012)) have rejected cross-country regressions in favour of more in-depth country-specific studies.

3.4 Data Source and Description of Variables

3.4.1 Data Source

The variables such as trade openness, female education, male education, exchange rate, inflation, domestic credit (% GDP) and GDP are annual data extracted from World Development Indicators (WDI) at World Bank databank online whilst female

employment and male employment were extracted from De Vries, Timmer and de Vries (2013) extracted from: http://www.rug.nl/research/ggdc/data/10-sector-database. The data is sampled from 1980 to 2013.

3.4.2 Description of Variables

Trade openness: Trade openness is the sum of total exports and total imports computed as a share of gross domestic product. This is used to measure trade in the model.

Labour Endowment: The ratio of active population group (ages 15-64) (labour force) to Gross capital formation as a percentage of GDP was used as a proxy for the relative Labour endowment. Total labour force refers to everyone who supply labour whether employed or not to produce goods and services for a particular time within the ages of 15 and 64.

Female Education: The female secondary enrolment (%) was used as a proxy for female education. This is the percentage of females enrolled at the secondary level. The relationship between educated females and labour-intensive goods trade can be negative or positive.

Male Education: The male secondary enrolment (%) was also used to represent male education. The relationship between male education and labour intensive trade is expected to be negative since Ghana is male labour scarce.

Gender Inequality in Education: Using the difference between male secondary enrolment (%) and female secondary enrolment (%) as a proxy for gender inequality in education.

Female Employment: The female employment refers to the females employed as a percentage of the total number of persons engaged in employment.

Male Employment: The male employment refers to the females employed as a percentage of the total number of persons engaged in employment. Because Ghana is male labour scarce, it has a comparative disadvantage in male labour intensive goods hence a negative relationship.

Gender inequality in Employment: Is proxied as the difference between the male employment (as a percentage of total persons engaged) and the female employment (as a percentage of total persons engaged).

Availability of Credit: Following Manova (2008) in Kowalski (2011), credit availability is measured as the WDI ratio of domestic to private sector to GDP. It refers to resources in terms of finance given to the private sector such as loans, trade credit, purchases of non-equity securities and other account receivables that establish a claim for repayment. It is used as a proxy for financial development. According to Kowalski (2011), countries with a better financial development translate into comparative advantage trade

Market size: Real Gross domestic product is a proxy for market size. Real GDP is the market value of total production of goods and services in a country measured in real terms at constant 2006 GH¢ to account for inflation. The size of the market is included in the model since larger markets gives more opportunities to investors. This may influence the amount of trade in the economy. A positive relationship is therefore expected between the size or growth of the economy in terms of market and trade.

Economic stability: Is represented by the inflation rate measured by annual percentage change of consumer prices. A country with a stable economy is very likely to attract more trade. For the purposes of this study, this stability is captured in the form of inflation and hence included in the model to determine its effect on trade. This effect is however, intuitively expected to be negative.

Exchange rate: Official exchange rate refers to the rate determined by national authorities. It is calculated as an annual average based on monthly averages (local currency units relative to the US dollar). The depreciation of local currencies makes domestic goods relatively cheaper than imported goods.

3.5 Econometric Strategy

In this section, the methodologies used in analyzing the dataset are discussed. The following tests were employed: Augmented Dickey-Fuller Test and Philips-Perron Test for Unit root test for stationarity, Co-integration test, Autoregressive Distributive Lag Model, etc. The study relied on Stata 12 and Eviews 9 statistical computing software for the analysis and all the statistical tests were carried out at 1%, 5% and 10% levels of significance.

3.5.1 Exploratory Data Analysis

The methodology applied in this section is descriptive statistics. This procedure enabled the researcher to achieve objective one and also gives more understanding about the data set and their distributions. The data distribution was examined using standard descriptive statistics namely line graph.

3.5.2 The Test for Unit Root

There exists non-stationarity in most time series data. Thus, it is required to first test for the existence of non-stationarity in the dataset before estimating coefficients of the model when using time series data. This test helps determine the order of integration of each the variables used. A stochastic process is considered to have no unit root if its expected value and variance are constant overtime. If one or more of these conditions are not met then the process is said to have unit root or non-stationary (Charemza and Deadman, 1992 in Enyaah, 2011).

Co-integration process demands the test for the order of integration for econometric model specification since some variables should be integrated or have a random walk (Boateng, 2015). In such a situation, it is imperative to perform such test in other to find exact estimated values. The Augmented Dickey-Fuller Test (ADF) was used to check the stationarity following Dickey and Fuller (1981). The Pillips-Perron (PP) test is used to supplement the ADF following Philips (1986); Phillips and Perron (1988). The objective of this unit root test is to check whether or not the variables of interest are integrated of order one i.e. *I (1)* before proceeding to estimate the coefficients of the model in order to avoid bogus regression results.

The ADF test is performed base on the models generated below;

$$\Delta y = b_0 + b_1 y_{t-1} + \sum_{n=1}^{n}(B_i \Delta y_{t-i}) + u_t \quad \text{.....3.5}$$

$$\Delta y = b_0 + b_1 t + b_1 y_{t-1} + \sum_{n=1}^{n}(B_i \Delta y_{t-i}) + u_t \quad \text{.....3.6}$$

For all t=0, 1 ... and u is a white noise. b_0 is the constant term and b_1 is the estimated parameter of the first level lag. y_{t-1} is the first level lag, B_i is the vector of the estimated

parameters of the lagged values of the differenced value and Δy_{t-i} stands for the vector of the lagged value of the differenced value of the series. Δ represents the first- differenced operator. n is the maximum number of lags base on the AIC lag selection criteria

In a unit root test as per the above regressions, the null hypothesis to be tested is that the coefficient of Y with one lag is equal to zero. Rejection of the null hypothesis implies the absence of unit root or stationarity. The hypothesis is expressed mathematically as;

H_0: $b_1 = 0$

H_1: $b_1 \neq 0$

The PP test is a generalized and modified version of the ADF test method by correcting for serial autocorrelation and heteroskedasticity. It therefore improved on the ADF test since it is usually viewed as DF test that cater for serial correlation and heteroskedasticity. Thus, the Phillips-Perron test attempt finding a way of handling deviations in order not to achieve white noise in the estimated model. The test regression for the PP test is specified below;

$\Delta y_{t-1} = a_0 + a_1 y_{t-1} + v_t$ 3.7

Rejection of the null hypothesis implies the absence of unit root or stationarity. The null hypothesis and alternative hypothesis is stated below as;

H_0: $a_1 = 0$

H_1: $a_1 \neq 0$

3.5.3 Co-integration

When all the time series data for unit root are checked and is established to be integrated of either order zero or order one, that is I~ (1) or I~ (0), then the study will proceed to test for co-integration among the variables of interest. The variables can be tested by either applying the Engle Granger (1987) estimation method or the Johansen- Juselius estimation method (Johansen, 1988; Johansen and Juselius, 1990) to defeat the problem of spurious correlation and misleading inferences. However, the Engle Granger estimation method and the Johansen- Juselius estimation method are rendered inappropriate when the variables are integrated of different order. The ARDL bounds test is appropriate in such a situation. The co-integration test will help to determine whether a group of non-stationary series is co-integrated or not. If the variables are co-integrated, the association may be taken to mean a long run relationship. Therefore, in this study the ARDL bounds method was used.

3.5.3.1 The ARDL Co-integration Test

According to Gujarati (2004), co-integration is the presence of a long-run equilibrium association among time series variables which are non-stationary individually at their level form. This study employs the autoregressive distributed lag (ARDL) technique to test for the long-run and short-run link between trade and gender imbalance in Ghana. The study employed ARDL model for the following advantages; the ARDL model is a highly significant approach to find the co-integration even with small sample size. Also, the ARDL approach does not need all of the variables to be integrated of the same order unlike other co-integration techniques which requires that; the ARDL technique can be applied whether the variables are I(1) and/or I(0). In effect, the ARDL technique avoids

the pre-testing problems connected to standard co-integration, which demands that the variables be already categorised into *I (1)* or *I (0)* (Pesaran et al., 2001). This model is even the more appropriate model for empirical work in a case where the stationarity properties of the data are uncertain. Bahmani-Oskooee et al. (2004) observe that, in ascertaining the order of integration of each variable in the model, the result may differ depending on which test one uses hence the results could contradict. For instance, when one apply the Augmented Dickey Fuller and the Phillips-Perron tests for unit root, it is easy to wrongly conclude that there is nonstationarity when there is actually stationarity around a one-time structural break. The ARDL approach is therefore the best for this study because it avoids these problems.

In order to run the long run estimation, the conditional error correction (ECM) version of the ARDL Bounds test was first applied to check for long run relationship. The various lags of the variables are automatically selected by the Akaike Information Criterion (AIC).The dynamic structure of the *ARDL* (*p, q*) model takes the following form;

$$\Delta LNT_t = \alpha + \sum_{i=1}^{p} a_i \Delta LNL_{t-i} + \sum_{i=0}^{q_1} b_i \Delta LNGI_{t-i} + \sum_{i=0}^{q_2} c_i \Delta LNDC_{t-i} + \sum_{i=0}^{q_3} d_i \Delta LNINF_{t-1} + \sum_{i=0}^{q_4} e_i \Delta LNEXC_{t-1} + \sum_{i=0}^{q_5} f_i \Delta LNGDP_{t-1}$$
$$+\delta_1 LNT_{t-1} + \delta_2 LNL_{t-1} + \delta_3 LNGI_{t-1} + \delta_4 LNDC_{t-1} + \delta_5 LNINF_{t-1} + \delta_6 LNEXC_{t-1} + \delta_7 LNGDP_{t-1} + \zeta_t \quad \text{.....3.8}$$

$$\Delta LNT_t = \Omega + \sum_{i=1}^{p} h_i \Delta LNL_{t-i} + \sum_{i=0}^{q_1} j_i \Delta LNF_{t-i} + \sum_{i=0}^{q_2} m_i \Delta LNM_{t-1} + \sum_{t=0}^{q_3} n_i \Delta LNDC_{t-i} + \sum_{i=0}^{q_4} r_i \Delta LNINF_{t-1} + \sum_{i=0}^{q_5} s_i \Delta LNEXC_{t-1} + \sum_{i=0}^{q_6} u_i \Delta LNGDP_{t-1}$$
$$+\chi_1 LNT_{t-1} + \chi_2 LNL_{t-1} + \chi_3 LNF_{t-1} + \chi_4 LNM_{t-1} + \chi_5 LNDC_{t-1} + \chi_6 LNINF_{t-1} + \chi_7 LNEXC_{t-1} + \chi_8 LNGDP_{t-1} + \zeta_t \quad \text{.....3.9}$$

Where all the variables are as defined earlier and Δ is the first difference operator. The parameters (a, b, c, d, e, f) and (h, j, m, n, r, s, u) denote the short run dynamics of model 3.8 and 3.9 respectively to be estimated through the error correction framework and δ_i and χ_i are the long run multipliers in the ARDL model with α and Ω, as constants and Ϛ is disturbance term in each of the models.

The ARDL framework is carried out in three stages (Pesaran et al., 2001). First, the presence of co-integration predicted by the theory is tested using an F-test. The F statistic tests for the joint significance of all the lagged levels variables (coefficient of the long run effect). The null hypothesis of no co-integration among the variables of interest is tested against the alternative hypothesis as stated below;

Model I	Model II
H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$	H_0: $\chi_1 = \chi_2 = \chi_3 = \chi_4 = \chi_5 = \chi_6 = \chi_7 = \chi_8 = 0$
H_1: Not all the δ_S is zero.	H_1: Not all the χ_S is zero.

The two critical values bounds presents a co-integration test when the independent variables are *I (h)* (where $0 \leq h \leq 1$): a lower value assuming the regressors are *I (0)* and an upper value assuming purely *I (1)* regressors. If the F-statistic is greater than the upper critical value, the null hypothesis of no co-integration is rejected regardless of the orders of integration. The null hypothesis cannot be rejected if the F-statistic is below the lower bound. If the result falls between the lower and upper bounds, the result is inconclusive.

The second stage is where the coefficients of the long run relationship are estimated. This section forms a conditional ARDL model of order (p, q_1, q_2, q_3, q_4, q_5, q_6) to test the long

run association between all the variables of interest. The ARDL model will assume the form;

$$\Delta LNT_t = \alpha + \sum_{i=1}^{p} \delta_1 \Delta LNL_{t-i} + \sum_{i=0}^{q_1} \delta_2 \Delta LNGI_{t-i} + \sum_{i=0}^{q_2} \delta_3 \Delta LNDC_{t-i} + \sum_{i=0}^{q_3} \delta_4 \Delta LNINF_{t-1} + \sum_{i=0}^{q_4} \delta_5 \Delta LNEXC_{t-1} + \sum_{i=0}^{q_5} \delta_6 \Delta LNGDP_{t-1} + \zeta_t \quad \text{.....3.10}$$

$$\Delta LNT_t = \Omega + \sum_{i=1}^{p} \chi_1 \Delta LNL_{t-i} + \sum_{i=0}^{q_1} \chi_2 \Delta LNF_{t-i} + \sum_{i=0}^{q_2} \chi_3 \Delta LNM_{t-1} + \sum_{t=0}^{q_3} \chi_4 \Delta LNDC_{t-i} + \sum_{i=0}^{q_4} \chi_5 \Delta LNINF_{t-1} + \sum_{i=0}^{q_5} \chi_6 \Delta LNEXC_{t-1} + \sum_{i=0}^{q_6} \chi_7 \Delta LNGDP_{t-1} + \zeta_t \quad \text{.....3.11}$$

Finally, the third stage is where estimation of the short-run with the error correction term of the ARDL model is done. By employing the ECM version of the ARDL, the speed of adjustment to equilibrium will be determined

$$\Delta LNT_t = \alpha + \sum_{i=1}^{p} a_i \Delta LNL_{t-i} + \sum_{i=0}^{q_1} b_i \Delta LNGI_{t-i} + \sum_{i=0}^{q_2} c_i \Delta LNDC_{t-i} + \sum_{i=0}^{q_3} d_i \Delta LNINF_{t-1} + \sum_{i=0}^{q_4} e_i \Delta LNEXC_{t-1} + \sum_{i=0}^{q_5} f_i \Delta LNGDP_{t-1} + \lambda ECM_{t-1} + \zeta_t \quad \text{.....3.12}$$

$$\Delta LNT_t = \Omega + \sum_{i=1}^{p} h_i \Delta LNL_{t-i} + \sum_{i=0}^{q_1} j_i \Delta LNF_{t-i} + \sum_{i=0}^{q_2} m_i \Delta LNM_{t-1} + \sum_{t=0}^{q_3} n_i \Delta LNDC_{t-i} + \sum_{i=0}^{q_4} r_i \Delta LNINF_{t-1} + \sum_{i=0}^{q_5} s_i \Delta LNEXC_{t-1} + \sum_{i=0}^{q_6} u_i \Delta LNGDP_{t-1} + \mu ECM_{t-1} + \zeta_t \quad \text{.....3.13}$$

Where, (a_i, b_i, c_i, d_i c_i d_i e_i f_i) and (h_i, j_i, m_i, n_i, r_i, s_i, u_i) is the short-run dynamics coefficients of the model's dynamic adjustment to equilibrium. ECM_{t-1} term is the Error Correction factor (λ and μ). Thus it represents the short run disequilibrium adjustment of the estimate of the long-run equilibrium for 3.12 and 3.13 respectively.

3.5.4 Diagnostic and Stability Tests

The diagnostic tests are done to examine the validity of the results of the study. In order to check for the appropriateness of the estimated model, diagnostic tests such as the Harvey test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test for serial correlation, the Jacque-Berra test for normality, the Ramsey RESET Test for correct functional form and the CUMSUM and CUSUM Square Test for model stability were carried out. The Harvey test involves testing the null hypothesis that the error variances are all equal against the alternative hypothesis that the error variances are a multiplicative function of one or more variables. A large chi-square would indicate that, heteroskedasticity is present, thus it indicate that the error term is a multiplicative function of the predicted values. The Breusch-Godfrey Serial Correlation LM Test was employed to test whether adjacent residuals are correlated which is in violation of the regression assumption that the error terms are independent. The Breusch- Godfrey test can be used when (1) the independent variables are stochastic or not (2) the regression equation is autoregressive or not (3) whether the regression equation is first order autoregressive or higher order autoregressive. When the null hypothesis is not rejected, it implies that the error terms are not correlated otherwise they are correlated. The Jarque-Bera test is also conducted to check how normal the data is distributed. Also, the stability of the regression parameters was assessed by the CUMSUM and CUSUM Square Test

and they can show whether or not the regression equation is stable over time or not. The null hypothesis for both the CUSUM and CUSUMQ is that the coefficients of vector is constant in every period and are plotted against the critical bound of the 5% significant level. This stability test is appropriate in time series data, especially when we are uncertain about when structural change might have taken place.

CHAPTER FOUR

PRESENTATION OF EMPIRICAL RESULTS AND ANALYSIS

4.1 Introduction

This chapter embodies the results of the estimated model in the methodology of the study and the analysis. Trend analysis for trade, gender inequality in employment and gender inequality in education are discussed first followed by the unit root tests. Thirdly, the (ARDL) bounds test for co-integration results for the relationship between trade and female and male in employment and in education are presented and discussed, followed by the results for the long-run and the short-run dynamic influence of female and male in employment and in education on trade and vice versa with their diagnosis tests. Finally, the (ARDL) bounds test for co-integration results for the link between trade and gender imbalance in employment and in education are presented and discussed, followed by the results for the long-run and the short-run dynamic effects of gender inequality in employment and in education on trade and vice versa with their diagnosis tests.

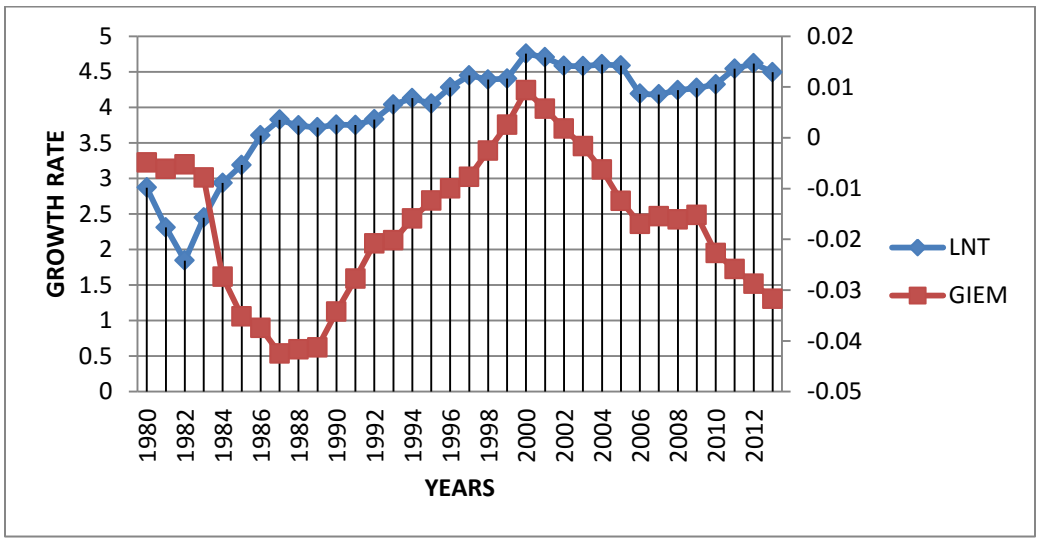
4.2 Trend Analysis of Variables

This section compares the behavior of trade and gender inequality in employment and, trade and gender inequality in education over the period under study in Ghana to see if the move in the same trend or not. This gives an informal way of speculating the relationship between the variables.

4.2.1 Trend Analysis of Trade and Gender Inequality in Employment

Fig 4.1 shows the linear trend for trade and gender inequality in employment between the period 1980 and 2013. The graph suggests that as gender inequality in employment and trade fluctuated throughout the period from 1980 to 2013. Between 1980 and 1982 when gender inequality in employment maintained a horizontal trend, trade fell till it reach an all period lowest in 1982 and started rising when gender inequality in employment began falling. Trade maintained its positive trend whiles gender inequality in employment was falling till gender inequality got to its lowest point over the period in 1987 and started rising again. Whiles gender inequality in employment was positively trending and peaked in 2000, trade kept fluctuating but positively trending slowly throughout the period. However, gender inequality in employment fell from 2000 and kept the negative trend till the end of the period in 2013. From the graph, it is difficult to tell how trade and gender inequality in employment influence each other.

Fig 4.1: Trend Analysis of Trade and Gender Inequality in Employment



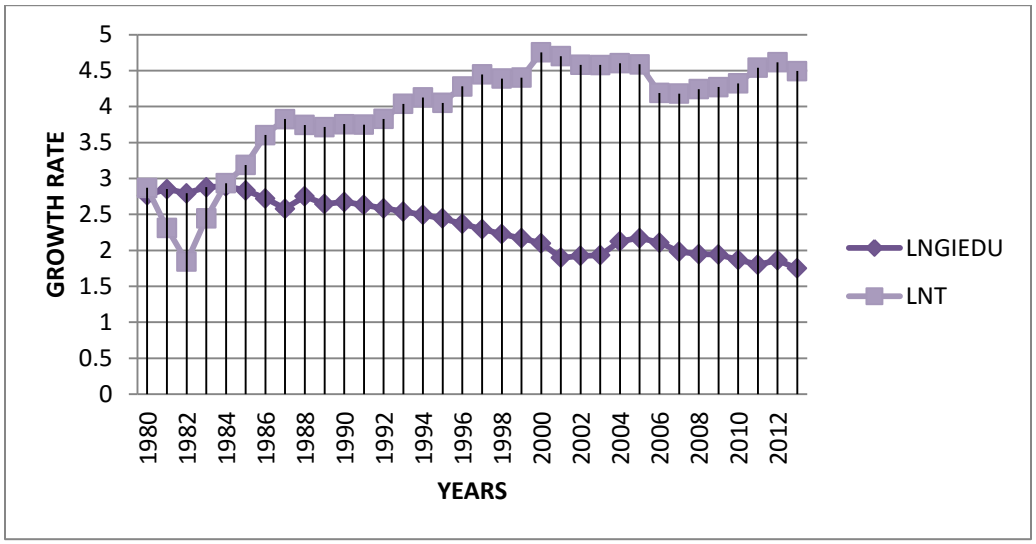
Source: WDI, 2015 (for the trade variable) and De Vries, Timmer and De Vries (2013) (for the gender inequality in employment variable)

4.2.2 Trend Analysis of Trade and Gender Inequality in Education

On the trade and gender gap in education trend graph in Fig. 4.2, trade and gender inequality in education kept crisscrossing each other at the beginning part and then after, diverged over the rest of the period. Gender inequality in education had an increasing trend from 1980 to 1983 and afterwards kept falling steadily over the whole time. Trade on the other hand, sloped negatively from 1980 to 1982 and from then onwards, maintained a positive trend with intermittent mild fluctuations throughout the period.

From the graph it is observed that, when gender inequality in education is falling, trade rises and when gender inequality in education is rising, trade tend to fall. For instance, when trade fall to a lower point in 1982, gender inequality in education rose to its highest point in 1983 and when trade was rising after its dip in 1982 with fluctuations, gender inequality in education was also falling with similar fluctuations within that time. However, this does not necessarily imply that trade influences gender inequality in education or the vice versa since there could be other reasons for such behavior of the variables. Therefore, an empirical analyses need to be carried out to either confirm or refute this observation.

Fig 4.2: Trend Analysis of Trade and Gender Inequality in Education



Source: WDI, 2015

4.2 Results and Analysis of the Unit Root Test

Table 4.1 shows the results of the ADF and PP unit root test at levels and at first difference. The ADF test employed included a constant only and the constant plus trend for both tests. From the table, the null hypothesis were rejected for the variables; log of inflation (LNINF), log of exchange rate (LNEXC), log of male education (LNMEDU),), log of imports (LNIMP),), log of exports (LNEXP) and log of trade (LNT) at either 1%, 5% or 10% significance levels in their levels which imply they achieved stationarity at their levels. However, log of labour endowment (LNL), gender inequality in employment (GIEM), log of gender inequality in education (LNGIEDU), log of availability of credit (LNDC), log of gross domestic product (GDP), female employment (FEM), male employment (MEM) and log of female education (LNFEDU) were all stationary in their first difference at 1%, 5% or 10% significance levels. Therefore, not all the underlying series in the present study are integrated of order one [i.e *I* (1)] and there is no *I* (2) variable hence the reason for applying ARDL model. Given these results, statistically, the data has the potential of producing spurious relationships when ordinary least squares (OLS), VAR or VEC methods are applied on the data since all the data are not *I (0)* or do

not have the same order of integration. The results imply that, a shock to any of the variables will not have a lasting effect. Also, the residuals of a linear combination of *I (0)* and *I (1)* should be *I (0)* implying there is a co-integrating relationship between them.

Table 4.1 ADF and PP Unit Root Results

PANEL A: LEVEL				
	ADF		PP	
Variable	Constant	Constant + Trend	Constant	Constant + Trend
LNL	-2.245	-2.064	-1.639	-1.438
GIEM	-1.941	--1.935	-1.555	-1.559
LNGIEDU	-0.411	-2.573	-0.079	-2.955
LNDC	-1.282	-2.378	-0.873	-2.628
LNINF	-3.124**	-4.597***	-3.456**	-5.275***
LNEXC	-3.444**	-2.657	-3.507**	-1.264
LNGDP	1.436	-1.901	3.119	-2.283
LNFEDU	0.751	-1.038	0.534	-0.792
LNMEDU	-4.497***	-5.919***	0.402	-1.800
FEM	-1.941	-1.935	-1.555	-1.559
MEM	-2.325	-1.649	-1.556	-1.561
LNIMP	-2.795*	-2.370	-1.502	-1.438
LNEXP	-2.518	-2.937*	-1.409	-1.706
LNT	-2.922*	-2.620	-1.409	-1.610
PANEL B: FIRST DIFFERENCE				
	ADF		PP	
Variable	Constant	Constant + Trend	Constant	Constant + Trend
LNL	-5.849***	-6.704***	-4.964***	-5.424***
GIEM	-2.446	-2.402	-2.983**	-2.931
LNGIEDU	-3.614**	-3.561*	-5.872***	-5.770***
LNDC	-5.680***	-5.811***	-6.795***	-6.998***
LNINF	-6.257***	-6.136***	-10.465***	-10.344***
LNEXC	-3.610**	-6.347***	-3.349**	-4.319***
LNGDP	-4.391***	-4.914***	-3.034**	-3.509**
LNFEDU	-2.875*	-3.678**	-5.656***	-6.811***
LNMEDU	-5.219***	-6.561***	-1.475	-0.822
FEM	-2.446	-2.647	-2.983**	-2.931
MEM	-2.074	-2.402	-2.983**	-2.931
LNIMP	-6.451***	-9.005***	-4.687***	-5.293***
LNEXP	-4.697***	-5.627 ***	-4.748***	-5.076***
LNT	-5.898***	-7.464***	-4.594***	-5.007***

Note: *, **,*** denote statistical significance at 10% Critical value, 5% Critical value, 1% Critical Value respectively for the levels and for the first difference.

4.3 Results and Analysis for the Influence of Gender (Inequality) in Employment and in Education on Trade

In this section, the ARDL bounds test for co-integration, the long- and short run results are presented and analysed to understand or establish the influence of gender (inequality) in employment and education on trade. As presented in this section, Model IA_1 and Model IIA_1 represent the gender inequality in employment and trade relationship of Model I and the female and male in employment and trade relationship in Model II whilst Model IB_1 and Model IIB_1 represents the gender inequality in education and trade relationship in Model I and the female and male in education and trade relationship in Model II. To see which component of trade openness gender (inequality) contributes more or less, trade openness was disaggregated into imports and exports as dependent variables and tested against the independent variables (female employment, male employment, female education, male education, gender inequality in education, gender inequality in employment, exchange rate, market size, economic stability and credit availability). Therefore, Model IA_2 and Model IIA_2 represent the gender inequality in employment and exports relationship of Model I and the female and male in employment and exports relationship in Model II. Model IB_2 and Model IIB_2 represents the gender inequality in education and exports relationship in Model I and the female and male in education and exports relationship in Model II. Also, Model IA_3 and Model IIA_3 shows the gender inequality in employment and imports relationship of Model I and the female and male in employment and imports relationship in Model II whilst Model IB_3 and Model IIB_3 represents the gender inequality in education and imports relationship in Model I and the female and male in education and imports relationship in Model II.

4.3.1 Results and Analysis of the Co-integration Test

The ARDL bounds test was used to estimate for the presence of long run relationship. The maximum number of lags was selected automatically by the Akaike Information Criterion (AIC) for the models. Using the bounds test, when the F-statistic is greater than critical value bounds, reject the null hypothesis that there is no co-integration, otherwise do not reject.

From Table 4.2, the F- statistic for all the models is greater than the corresponding 10%, 5% and 1% upper critical value bounds. Therefore, the null hypothesis is rejected for all the models at 10%, 5% and 1% significance level implying that there is co-integration between the variables in Model IA_1, Model IA_2, Model IA_3, Model IB_1, Model IB_2, Model IB_3, Model IIA_1, Model IIA_2, Model IIA_3, Model IIB_1, Model IIB_2 and Model IIB_3. Having established the co-integration among the variables, the ARDL method is applied in the estimation of the parameters of Model IA_1, Model IA_2, Model IA_3, Model IB_1, Model IB_2, Model IB_3, Model IIA_1, Model IIA_2, Model IIA_3, Model IIB_1, Model IIB_2 and Model IIB_3.

Table 4.2: Bounds Test Results for the Existence of Co-integration

MODEL	**F-STATISTIC**	**CRITICAL VALUE BOUNDS**					
		10%		**5%**		**1%**	
		I (0)	I(1)	I(0)	I(1)	I(0)	I(1)
Model IA_1	5.087***	2.12	3.23	2.45	3.61	3.15	4.43
Model IA_2	4.013**	2.12	3.23	2.45	3.61	3.15	4.43
Model IA_3	5.633***	2.12	3.23	2.45	3.61	3.15	4.43
Model IB_1	3.717**	2.12	3.23	2.45	3.61	3.15	4.43
Model IB_2	4.714***	2.12	3.23	2.45	3.61	3.15	4.43
Model IB_3	3.469*	2.12	3.23	2.45	3.61	3.15	4.43
Model IIA_1	6.105***	1.70	2.83	1.97	3.18	2.54	3.91
Model IIA_2	4.666***	1.70	2.83	1.97	3.18	2.54	3.91
Model IIA_3	5.850***	1.70	2.83	1.97	3.18	2.54	3.91

Model IIB_1	9.488***	1.70	2.83	1.97	3.18	2.54	3.91
Model IIB_2	8.090***	1.70	2.83	1.97	3.18	2.54	3.91
Model IIB_3	6.083***	1.70	2.83	1.97	3.18	2.54	3.91

Note: *****, **, *** denote statistical significance at 1% Significance level, 5% Significance level and at 10% significance level respectively. Dependent variable for Model IA_1, Model IIA_1, Model IB_1 and Model IIB_1 is LNT, Model IA_2, Model IIA_2, Model IB_2 and Model IIB_2 is LNEXP. Also, Model IA_3, Model IIA_3, Model IB_3 and Model IIB_3 is imports.

4.3.2 Results and Analysis of the Long Run Relationships

Models I and II was estimated for Ghana using annual data from 1980-2013 using the ARDL estimation technique.

The long-run results presented are interesting in terms of the significance and signs of the variables. From the Table, not all the variables have their expected theoretical signs met. For instance, the labour endowment (LNL) and market size (LNGDP) (except for in Model IIA_2), male employment (MEM) and male education (LNMEDU), female employment (FEM) (in Model IIA_2) in all the models, economic stability (LNINF) in model IIA_2, availability of credit (LNDC) in Model IB_2 and IIA_3 and exchange rate in model IIA_2 all did not meet their apriori expectations. The rest met their expected theoretical signs.

The results in all the models contradicts the theory that says labour promote trade because of the comparative advantage in labour-intensive products that Ghana is supposed to have. The coefficient of labour endowment is -0.743, -0.723, -0.672, -0.815, -0.861, -0.639, -0.743, -0.486, -0.561, -0.122, -0.255 and -0.131 for Models IA_1, IA_2, IA_3, IB_1, IB_2, IB_3, IIA_1, IIA_2, IIA_3, IIB_1, IIB_2 and IIB_3 respectively suggesting that, when labour increases relative to capital by one (1) unit, trade will decrease by 0.743%, 0.815%,

0.743% and 0.122% respectively. Also, a one unit increase in labour- capital ratio will cause exports to decrease by 0.723%, 0.861%, 0.486% and 0.255% respectively in Models IA_2, IB_2, IIA_2 and IIB_2. Labour- capital ratio also causes imports to fall by 0.672%, 0.639%, 0.561% and 0.131% in Models IA_3, IB_3, IIA_3 and IIB_3 respectively when it increases by a unit. Even though this goes contrary to Busse and Spielman's (2006) cross-sectional analysis, it conforms to their panel analysis in terms of the negative sign. It also contradicts the results of Liu and Shu (2001) in their work. Except the coefficient in Model IIB_1, Model IIB_2, and Model IIB_3, all the labour endowment coefficients is significant at 1% significance level, implying that relative labour abundance is detrimental to trade (whether exports or imports) in Ghana. This is indeed surprising seeing how almost every industry in the country applies labour intensive method of production as a result of how the country is endowed with labour. This could be for the reason that Ghana is making use of the new technologies which favour capital use than labour use being introduced.

Male employment boosts trade in the long run. The results tell us that, a one unit rise in male employment increases trade openness by 9.841% which is contrary to expectation. Male employment contributes to export trade and import trade by 9.734% and 8.860% respectively when it increases by a unit. This implies that male employment contributes more to export trade than import trade. These coefficients are significant at 5% and 1% significance level respectively. This is probably due to the reason that males are more productive and therefore are able to compensate for their higher wages caused by the scarcity of male labour.

Also, the coefficient for female employment 15.564 and 16.328 implies that a unit increase in female employment will cause a responsive increase in trade openness and import trade by 15.564% and 16.328 % respectively. Ghana is female labour endowed and so have comparative advantage for female labour intensive products, this result is therefore not expected. Interestingly, a unit increase in female employment reduces export trade by 6.885%. It is therefore surprising and contrary to what the theory says.

Gender inequality in employment does not boost trade (whether import trade or export trade) in the long run as theory proposes. The results indicate that, one unit increase in gender inequality in employment decreases trade openness, export trade and import trade by 2.861, 0.282 and 3.363 respectively however, it is statistically not significant. Seguino (2007) argue that, export sales rely on low unit labour costs, a goal that can be achieved by hiring women whose relative labour costs are low. Ghana is female labour endowed and so have comparative advantage for female labour intensive products hence the negative link. Many East Asian countries have been able to be competitive in world markets through the use of women-intensive export-oriented manufacturing industries (Seguino, 2000a; 200b).

From Table 4.3.2, a unit increase in female education will lead to a decrease in trade openness by 1.182 units whiles a unit increase in male education will lead to an increase in trade by 4.435 units. In terms of the gender impact of education on export trade and import trade, when female education increases by a unit, export trade and import trade decreases by 0.469 and 1.004 units respectively while a unit increase in male education causes export trade and import trade to rise by 4.074 and 4.553 units However, the coefficients of male education is significant at 1% significant level and the coefficients of

female education is not significant. The possible reason for the female education is that, well-educated females reduces the abundance of unskilled-labour in the nation and, hence, reduces the advantage in trade for (unskilled-) labour-intensive goods (Busse, 2002). However, when employers take advantage and employ the well-educated and productive male, they are likely to produce more and compensate for their higher wages which will then increase trade in the economy.

More so, a unit increases in gender inequality in education will lead to a decrease in trade by 0.841 and significant at 10% significance level. In similar vein, one unit increases in gender inequality in education decreases export trade and import trade by 1.062 and 0.298, however, only the gender inequality impact on export trade coefficient is significant at 10% significance level. This negative link exist because firms take opportunity of the well trained, productive female labour force and employ them in the low-paid export-oriented sectors of the economy. Busse and Spiemann (2006) had similar results when they found a statistical insignificant but negative relationship between gender inequality in accessing education and trade when they employed cross-sectional analysis.

Inflation was negatively related to trade openness, exports and imports in all the models except in Model IIA_2 and IIA_3 however, only the coefficients in Models IIB_1 IIA_2 and IIA_3 are statistically significant at 10% significance level. From the table, a 1% upsurge in inflation reduces trade by 0.145%, 0.050%, 0.145% and 0.178% in Model IA_1, Model IB_1, Model IIA_1 and Model IIB_1. However, in Model IIA_2 and IIA_3, when credit availability increases by one, exports and imports increase by 0.190% and 0.091% respectively.

Table 4.3.1: Long Run Estimate of the impact of Gender Inequality on Trade

	MODEL (DEPENDENT VARIABLE)					
INDEP. VARIABLES	Model IA_1 (LNT)	Model IA_2 (LNEXP)	Model IA_3 (LNIMP)	Model IB_1 (LNT)	Model IB_2 (LNEXP)	Model IB_3 (LNIMP)
INTERCEPT	12.703***	12.498***	13.637***	12.504***	18.223***	15.504***
	(2.505)	(3.879)	(1.839)	(1.988)	(4.704)	(2.674)
LNL	-0.743***	-0.723*	-0.672***	-0.815***	-0.861***	-0.639***
	(0.232)	(0.354)	(0.165)	(0.190)	(0.298)	(0.169)
GIEM	-2.861	-0.282	-3.363			
	(3.458)	(5.094)	(2.582)			
LNGIEDU				-0.841*	-1.062*	-0.298
				(0.432)	(0.565)	(0.335)
LNDC	0.226	0.080	0.296	0.144	-0.156	0.191
	(0.259)	(0.395)	(0.191)	(0.143)	(0.304)	(0.178)
LNINF	-0.145	-0.225	-0.075	-0.050	-0.254	-0.091
	(0.139)	(0.236)	(0.094)	(0.065)	(0.176)	(0.088)
LNEXC	0.198**	0.223	0.230***	0.028	0.150	0.208***
	(0.095)	(0.144)	(0.070)	(0.142)	(0.117)	(0.070)
LNGDP	-0.803***	-0.818**	-0.991***	-0.603***	-1.099***	-1.101***
	(0.256)	(0.384)	(0.191)	(0.173)	(0.346)	(0.212)

Note: *, ** and *** denote statistical significance at 10% Significance level, 5% Significance level, 1% Significance level respectively. Standard deviation is in parenthesis

Selected Model: Model IA_1- ARDL (1, 0, 1, 0, 0, 1, 0), Model IA_2- ARDL(1, 0, 0, 1, 0, 1, 0), Model IA_3- ARDL(1, 0, 0, 1, 0, 1, 0), Model IB_1- ARDL (4, 1, 0, 0, 1, 0, 1), Model IB_2- ARDL(1, 0, 0, 1, 0, 1, 0) and Model IB_3- ARDL(1, 0, 1, 1, 0, 1, 0).

Availability of credit meets the expected sign as it has a positive link with trade in all the models except in Model IB_2 but was statistically not significant in all the models too except in Model IIA_3 and IIB_3 where it was significant at 10% significant level. The result imply that, a rise in credit by one unit increases trade by over 0.226%, 0.144%, 0.226% and 0.190% in Models IA_1, IB_1, IIA_1 and IIB_1 respectively. Also, export trade increases by 0.080%, 0.378% and 0.158% but falls by 0.156% when credit availability increases by a unit in Models IA_2, IIA_2, IIB_2 and IB_2 respectively. On the other hand, when credit availability increases by a unit, import trade increases by 0.296%, 0.191%, 0.290% and 0.276% in Models IA_3, IB_3, IIA_3 and IIB_3 respectively. This is in conformity

with the results obtained by Kowalski (2011) and it implies that, the more credit is available, the more firms take advantage and expand trade.

Table 4.3.2: Long Run Estimate of the impact of Gender on Trade

	MODEL (DEPENDENT VARIABLE)					
INDEP. VARIABLES	Model IIA_1 (LNT)	Model IIA_2 (LNEXP)	Model IIA_3 (LNIMP)	Model IIB_1 (LNT)	Model IIB_2 (LNEXP)	Model IIB_3 (LNIMP)
LNL	-0.743***	-0.486**	-0.561***	-0.122	-0.255	-0.131
	(0.232)	(0.195)	(0.131)	(0.266)	(0.246)	(0.230)
FEM	15.564**	-6.885	16.328***			
	(4.398)	(7.098)	(2.746)			
MEM	9.841**	9.734***	8.860***			
	(4.138)	(3.199)	(2.359)			
LNFEDU				-1.182	-0.469	-1.004
				(0.753)	(0.818)	(0.675)
LNMEDU				4.435***	4.074***	4.553***
				(0.626)	(0.807)	(0.560)
LNDC	0.226	0.378	0.290*	0.190	0.158	0.276*
	(0.259)	(0.224)	(0.155)	(0.152)	(0.206)	(0.136)
LNINF	-0.145	0.190**	0.091*	-0.178*	-0.101	-0.103
	(0.139)	(0.080)	(0.051)	(0.093)	(0.119)	(0.072)
LNEXC	0.198**	-0.036	0.252***	0.338***	0.347***	0.330***
	(0.095)	(0.147)	(0.059)	(0.086)	(0.102)	(0.079)
LNGDP	-0.803***	0.112	-0.934***	-0.807*	-1.046**	-1.035***
	(0.256)	(0.365)	(0.159)	(0.396)	(0.526)	(0.350)

Note: *, ** and *** denote statistical significance at 10% Significance level, 5% Significance level, 1% Significance level respectively. Standard deviation is in parenthesis

Selected Model: Model IIA_1- ARDL (1, 0, 0, 1, 0, 1, 0, 0), Model IIA_2- ARDL(3, 0, 0, 0, 0, 0, 0, 0)), Model IIA_3- ARDL(1, 1, 1, 0, 0, 1, 1, 1), Model IIB_1- ARDL (1, 1, 1, 1, 0, 1, 1, 0), Model IIB_2- ARDL(1, 0, 0, 1, 0, 1, 1, 0) and Model IIB_3- ARDL(1, 0, 1, 1, 0, 1, 0).

Interestingly, exchange rate is positive and statistically significant at 1% and 5% in all the models except in Model IB_1, IA_2, IB_2 and IIA_2 which had an insignificant result and Model IIA_2, having a negative relationship. These results suggest that a depreciation (or devaluation) of the Ghanaian cedi by one cedi results in a 0.198%, 0.028%, 0.198% and 0.338% increase in trade in Model IA_1, Model IB_1, Model IIA_1 and Model IIB_1 respectively. Also, unit depreciation causes exports to increase by 0.223%, 0.150% and 0.347% in Model IA_2, Model IB_2 and Model IIB_2 respectively but falls by 0.036% in

Model IIA_2. On the other hand, one unit depreciation leads to an increase in imports by 0.230%, 0.208%, 0.252% and 0.330% in Model IA_3, Model IB_3, Model IIA_3 and Model IIB_3 respectively. This happens for the reason that, fluctuations in exchange rate transmits to local prices via prices of imported intermediate and consumption goods and via prices of local products priced in foreign currency. Therefore, if depreciation cause price of imported goods to rise, demand for local products competing against imports will increase (Simiyu and Ngile, 2015). These results corroborate with Bonuedi (2013). In similar vein, Verhoogen (2008) using a panel dataset of Mexican manufacturing plants, finds that the 1994-1995 peso devaluation increased exports particularly at those plants with higher initial productivity.

Finally, the GDP which is a proxy for market size did not meet their positive apriori expectation in all the models except in Model IIA_2. All the coefficients that did not their apriori expectations were significant at 1% and 10% significance level while the one that conform to theory was not significant. This means that, when the size of market in the economy increases by 1%, trade decreases by 0.803%, 0.603%, 0.803% and 0.807% in Model IA_1, Model IB_1, Model IIA_1 and Model IIB_1 respectively. When trade was disaggregated into exports and imports, GDP contributes 0.991%, 1.101%, 0.931% and 1.030% to import trade negatively in Model IA_3, Model IB_3, Model IIA_3 and Model IIB_3 respectively while it contributes 0.818%, 1.099% and 1.035% to export trade negatively but 0.112% positively to export trade in Model IA_2, Model IB_2, Model IIB_1 and Model IIA_2 respectively. The results suggest that the size of the markets hampers trade between trading partners due probably to a high domestic absorption effect. These results are contrary to the results in Bonuedi (2013) and Zeray (2015).

4.3.3 Results and Analysis of the Short Run Dynamic Model

The next step is to investigate the short run dynamics within the ARDL framework having estimated the long run coefficients in Model I and Model II.

Basically, the Error Correction Model (ECM) reconciles the short-run behaviour of the variables with their long-run behaviour. The coefficient of ECM indicates the speed of convergence to reestablish equilibrium in the dynamic model. The ECM coefficient measures how quick variables can return to stability and it is expected to be significant with a negative sign.

Table 4.4.1 and Table 4.4.2 shows that, the coefficient of ECM had its expected negative sign and is highly significant. The coefficient of ECM_{t-1} implies that the deviation from the long-term trade is corrected by 49.4%, 38.5%, 64.9%, 80.8%, 46.1%, 68.1%, 49.3%, 66.1%, 90.0%, 58.6%, 54.4% and 71.8% in Model IA_1, Model IA_2, Model IA_3, Model IB_1, Model IB_2, Model IB_3, Model IIA_1, Model IIA_2, Model IIA_2, Model IIB_1, Model IIB_2 and Model IIB_3 by the coming year. This confirms the existence of the co-integration relationship among the variables in the model yet again.

From Table 4.4.1 and Table 4.4.2, trade openness lagged by three (3) positively promotes current period trade by 0.293% and significant at 1% significance level whiles exports lagged by two (2) also positively promotes current period export by 0.398% and is significant at 1% significance level.

Similar to the long run results, labour endowment is negatively related to trade and statistically significant in all the models except in Model IIB_1 and IIB_2 in the short run. From the table, a unit increase in labour endowment will cause trade to respond by

decreasing by 0.366%, 0.498%, 0.367% and 0.303% in Models IA_1, IB_1, IIA_1 and IIB_1 respectively. This conforms to the results of Busse and Spielmann (2006) when they employed panel analysis. However, this result is in contrast to Gourdon (2007) in the second period for all manufactured products in his study where capital intensity in production promotes trade. When trade was disaggregated into exports and imports, one unit rise in labour- capital ratio will lead to a 0.278%, 0.396%, 0.322% and 0.139% fall in exports in Models IA_2, IB_2, IIA_2 and IIB_2 respectively and a 0.437%, 0.434%, 0.505% and 0.358% fall in imports in Models IA_2, IB_2, IIA_2 and IIB_2 respectively. This shows that labour endowment in Ghana has more impact on imports than exports.

As in the long run, male employment and female employment boost trade in the short run, however, the impact of female employment is more than the male employment. Disaggregating trade in to exports and imports, the results show that both female employment and male employment boost imports but female employment discourages exports while male employment encourages exports. The results says that, employing one more male increases trade by 4.859% whilst a unit increase in female employment will cause trade to increase by 7.684% and they are significant at 1% and 5% significant level in the short run. Also, employing one female and one male will lead to 14.692% and 7.972% rise in imports respectively and their coefficients are significant at 1% significance level. However, employing one female will lead to 4.554% fall in exports whilst employing one male will lead to 6.438% rise in exports but only the male employment coefficient is significant at 5% significance level. In contrast, Ozler (2000) find a positive relationship between female employment and export trade. From the results, female and male employment contributes more to import trade than export trade.

Gender inequality in employment also maintained its negative insignificant relationship in the short run. According to the table, a unit increases in the level of gender inequality in employment decreases trade openness, exports and imports by 1.41, 0.108 and 2.184 respectively.

On the other hand, the coefficient of female education and male education means that, a unit increase in female education will lead to an increase in trade openness and imports by 0.297 and 0.549 respectively but a fall in exports by 0.255 whiles a unit increase in male education will lead to a decrease in trade openness, exports and imports by 89.618, 78.481% and 78.335 respectively. The male education coefficient is significant at 1% and female education is insignificant in the short run as was the case in the long run. Gender inequality in education also maintained its negative relationship and only significant in its effect on trade openness and exports in the short run. The coefficients are interpreted as, when the gender inequality in education is widened by a unit, trade openness, exports and imports will respond by decreasing by 0.196, 0.489 and 0.203 respectively. This implies that gender inequality in education has more impact on export trade than on import trade in Ghana. This result is contrary to what Busse and Spielmann (2006) got in their panel analysis.

Table 4.4.1: Estimated Short Run Error Correction Model of the impact of Gender Inequality on Trade

	MODEL (DEPENDENT VARIABLE)					
REGRESSOR	Model IA_1 (LNT)	Model IA_2 (LNEXP)	Model IA_3 (LNIMP)	Model IB_1 (LNT)	Model IB_2 (LNEXP)	Model IB_3 (LNIMP)
D(LNT(-3))				0.293***		
				(0.099)		
D(LNL)	-0.366***	-0.278**	-0.437***	-0.498***	-0.396***	-0.434***
	(0.119)	(0.133)	(0.118)	(0.119)	(0.140)	(0.129)
D(GIEM)	-1.41	-0.108	-2.184			
	(1.677)	(1.959)	(1.622)			
D(LNGIEDU)				-0.196	-0.489*	-0.203
				(0.268)	(0.270)	(0.233)
D(LNDC)	0.111	0.031	0.192	0.116	-0.072	0.130
	(0.130)	(0.154)	(0.126)	(0.113)	(0.137)	(0.122)
D(LNINF)	0.004	-0.019	0.033	-0.040	-0.038	0.038
	(0.044)	(0.053)	(0.042)	(0.052)	(0.046)	(0.043)
D(LNEXC)	0.484***	0.508***	0.436***	0.308*	0.470***	0.359***
	(0.090)	(0.101)	(0.092)	(0.163)	(0.096)	(0.101)
D(LNGDPC)	-0.397***	-0.314*	-0.644***	-0.488**	-0.506**	0.842
	(0.140)	(0.160)	(0.144)	(0.194)	(0.181)	(0.829)
ECM_{t-1}	-0.494***	-0.385***	-0.649***	-0.808***	-0.461***	-0.681***
	(0.120)	(0.131)	(0.120)	(0.168)	(0.129)	(0.121)

Note: *, ** and *** denote statistical significance at 10% Significance level, 5% Significance level, 1% Significance level respectively. Standard deviation is in parenthesis

Selected Model: Model IA_1- ARDL (1, 0, 1, 0, 0, 1, 0), Model IA_2- ARDL(1, 0, 0, 1, 0, 1, 0), Model IA_3- ARDL(1, 0, 0, 1, 0, 1, 0), Model IB_1- ARDL (4, 1, 0, 0, 1, 0, 1), Model IB_2- ARDL(1, 0, 0, 1, 0, 1, 0) and Model IB_3- ARDL(1, 0, 1, 1, 0, 1, 0).

The availability of credit variable is not significant in all the models except in Model IIA_2, IIA_3 and IIB_3 even though availability of credit meet the expected sign apart from the coefficient in Model IB_2 as was the case in the long run. From the Table, an increase in domestic credit by 1% increases trade openness and exports by 0.111%, 0.031%, 0.116%, 0.112%, 0.250%, 0.111%, and 0.086% respectively in Models IA_1, IA_2, IB_1, IIA_1, IIA_2, IIB_1, IIB_2 and which is similar to Kowalski's (2011) findings but decreases exports by 0.072% in Models IB_2. On the other hand, a unit increase in credit availability

promotes import trade by 0.192%, 0.130%, 0.261% and 0.198% in Model IA_3, IB_3, IIA_3 and IIB_3.

Table 4.4.2: Estimated Short Run Error Correction Model of the impact of Gender on Trade

	MODEL (DEPENDENT VARIABLE)					
REGRESSOR	Model IIA_1 (LNT)	Model IIA_2 (LNEXP)	Model IIA_3 (LNIMP)	Model IIB_1 (LNT)	Model IIB_2 (LNEXP)	Model IIB_3 (LNIMP)
D(LNEXP(-2))		0.398***				
		(0.121)				
D(LNL)	-0.367***	-0.322**	-0.505***	-0.303	-0.139	-0.358***
	(0.119)	(0.126)	(0.137)	(0.105)	(0.131)	(0.121)
D(FEM)	7.684***	-4.554	14.692***			
	(2.338)	(4.148)	(2.313)			
D(MEM)	4.859**	6.438**	7.972***			
	(2.313)	(2.563)	(2.277)			
D(LNFEDU)				0.297	-0.255	0.549
				(0.497)	(0.461)	(0.519)
D(LNMEDU)				-89.618***	-78.481***	-78.335***
				(21.212)	(25.984)	(20.466)
D(LNDC)	0.112	0.250*	0.261*	0.111	0.086	0.198*
	(0.130)	(0.141)	(0.144)	(0.093)	(0.116)	(0.105)
D(LNINF)	0.004	0.126**	0.082*	-0.001	0.014	0.044
	(0.044)	(0.051)	(0.046)	(0.034)	(0.044)	(0.035)
D(LNEXC)	0.485***	-0.024	0.227***	0.365***	0.430***	0.236***
	(0.091)	(0.094)	(0.050)	(0.079)	(0.091)	(0.043)
D(LNGDPC)	-0.396***	0.073*	-0.841***	-0.473*	-0.570**	0.468
	(0.139)	(0.232)	(0.138)	(0.231)	(0.271)	(0.973)
ECM_{t-1}	-0.493***	-0.661***	-0.900***	-0.586***	-0.544***	-0.718***
	(0.119)	(0.136)	(0.091)	(0.109)	(0.127)	(0.103)

Note: *, ** and *** denote statistical significance at 10% Significance level, 5% Significance level, 1% Significance level respectively. Standard deviation is in parenthesis

Selected Model: Model IIA_1- ARDL (1, 0, 0, 1, 0, 1, 0, 0), Model IIA_2- ARDL(3, 0, 0, 0, 0, 0, 0, 0)), Model IIA_3- ARDL(1, 1, 1, 0, 0, 1, 1, 1), Model IIB_1- ARDL (1, 1, 1, 1, 0, 1, 1, 0), Model IIB_2- ARDL(1, 0, 0, 1, 0, 1, 1, 0) and Model IIB_3- ARDL(1, 0, 1, 1, 0, 1, 0).

From the Table, a 1% upturn in inflation diminishes trade openness by 0.040% and 0.001% in Model IB_1 and Model IIB_1 respectively, exports by 0.019% and 0.038% respectively in Model IA_2 and Model IB_2 but increases trade openness by 0.004% and 0.004% in Model IA_1 and Model IIA_1 respectively and exports by 0.126% and 0.014%.

On the inflation-import trade relationship, a 1% rise in inflation will result in a rise in imports by 0.033%, 0.038%, 0.082% and 0.044% in Model IA_3, IB_3, IIA_3 and IIB_3. However, inflation which is a proxy for economic stability is only statistically significant at 5% and 10% in Model IIA_2 and IIA_3 respectively.

The coefficient of GDP which is a proxy for market size did meet their positive apriori expectation only in Model IIA_2, Model IB_3 and Model IIB_3 in the short run and was statistically significant at 10%, 5% and 1% significance level in all the models except in Model IB_3 and Model IIB_3 where the coefficients are not significant. According to the results, as in the long run, a percentage increase in market size will lead to a 0.397%, 0.488%, 0.396% and 0.473% decrease in trade in Model IA_1, Model IB_1, Model IIA_1 and Model IIB_1 respectively similar to the short run findings of Bonuedi (2013). The disaggregated trade results show that a unit increase in market size decreases exports by 0.314, 0.506 and 0.570 in Model IA_2, Model IB_2 and Model IIB_2 but increases exports by 0.073 in Model IIA_2 and also decreases imports by 0.644 and 0.841 in Model IA_3 and IIA_3 respectively but increases imports by 0.842 and 0.468 in Model IB_3 and Model IIB_3 respectively.

Exchange rate maintained its long run positive relationship with trade openness, exports and imports except in Model IIA_2 and statistically significant at 1% and 10% significance level for all the models except in Model IIA_2. These results suggest that exchange rate depreciating by a unit would lead to 0.484%, 0.308%, 0.485% and 0.365% increases in trade in Model IA_1, Model IB_1, Model IIA_1 and Model IIB_1 respectively. The negative relationship corroborate with Zeray (2011) findings but contradictory to the work by Bonuedi (2013). Again, a one unit depreciation of the currency will lead to 0.436, 0.359,

0.227 and 0.236 increases in imports in Model IA_3, Model IB_3, Model IIA_3 and Model IIB_3 respectively and 0.508, 0.470 and 0.430 increases in exports in Model IA_2, Model IB_2 and Model IIB_2 but 0.024 decreases in exports in Model IIA_2.

4.5 Model Diagnostics and Stability Test

The diagnostic and stability test is a first order test for the determination of the statistical significance of the parameters to evaluate their statistical reliability and these tests includes serial correlation, functional form, normality and heteroscedasticity. The results in Table 4.5 show no reject of the null hypothesis of absent autocorrelation and homoscedasticity using the Breusch-Godfrey Serial Correlation LM Test and Harvey Test respectively for all the models. The F-statistic also indicated the no rejection of no autocorrelation and no heteroscedasticity hence it can be concluded that there is no autocorrelation and no heteroscedasticity between the variables employed in this study.

Given that the model is statistically not significant at 5% significance level, the Ramsey RESET test showed the functional form is correct hence the stability of the coefficients in all the models. This implies that, the models are correctly specified and therefore is dependable.

The normality test was based on the null hypothesis of normality distribution of the residuals. The results in Table 4.5 indicate that we accept the null hypothesis of normality distribution at 5% level of significance for both models. Thus the residuals are normally distributed.

Table 4.5 Diagnostics Test

	Test Type					
MODEL	Serial Correlation (F-Statistic)	Functional Form (F-Statistic)	Normality (Chi-Sq)	Hetero (F-Statistic)	CUSUM	CUSUMQ
Model IA_1	1.481	0.246	1.021	0.721	Stable	Stable
	(0.249)	(0.625)	(0.600)	(0.685)		
Model IA_2	0.722	0.103	0.857	0.416	Stable	Stable
	(0.497)	(0.751)	(0.651)	(0.913)		
Model IA_3	0.829	2.459	0.351	0.735	Stable	Stable
	(0.372)	(0.131)	(0.839)	(0.674)		
Model IB_1	0.345	0.339	0.337	0.628	Stable	Stable
	(0.566)	(0.569)	(0.845)	(0.799)		
Model IB_2	0.447	1.207	0.675	0.628	Stable	Stable
	(0.646)	(0.284)	(0.790)	(0.762)		
Model IB_3	1.333	2.456	0.142	0.969	Stable	Stable
	(0.286)	(0.111)	(0.931)	(0.496)		
Model IIA_1	1.481	0.245	1.021	0.721	Stable	Stable
	(0.250)	(0.624)	(0.600)	(0.685)		
Model IIA_2	0.975	0.217	0.213	1.013	Stable	Stable
	(0.395)	(0.646)	(0.899)	(0.461)		
Model IIA_3	1.707	3.580	0.729	0.998	Stable	Stable
	(0.204)	(0.071)	(0.695)	(0.456)		
Model IIB_1	1.380	0.012	1.405	0.422	Stable	Stable
	(0.277)	(0.913)	(0.495)	(0.941)		
Model IIB_2	0.002	2.181	0.579	0.450	Stable	Stable
	(0.965)	(0.155)	(0.749)	(0.914)		
Model IIB_3	0.770	0.357	0.666	1.653	Stable	Stable
	(0.391)	(0.557)	(0.717)	(0.155)		

Note: () denote Probability values and stable means plots of CUSUM and CUSUMQ error terms are within the boundaries

Lastly, the CUSUM and CUSUMQ were employed to analyse how stable the long run coefficients and the short run coefficient are. The stability of the regression coefficients is right in annual data, particularly when one does not know whether structural break has happened or not (Bahmani-Oskooee, 2001). The null hypothesis for both the CUSUM and CUSUMQ is that the coefficients of vector is constant in every period and are plotted against the critical bound of the 5% significant level. As indicated in Table 4.5 and shown in the Appendices, the plots of both the CUSUM and CUSUMQ error terms are within the boundaries. This implies that the parameters are stable constantly within its critical bounds of parameter stability confirming the stability of the long run coefficients of all the models.

CHAPTER FIVE

FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

This final chapter of the study and provides the summary of findings and draws policy implications of these findings and make recommendation for the Ghanaian economy with regards to the trade and gender inequality relationship.

5.2 Summary of Major Findings

The relationship between trade and gender have taken the centre stage of feminist economists in recent years after the realisation that trade is not gender-neutral as perceive by the classical economist some time ago. To this end, the study aim to explore the impact of gender inequality on trade in Ghana from 1980 to 2013. After embarking on series of analysis to achieve the set objectives, the study revealed that:

It is difficult to tell the link between trade and gender inequality in employment from the trend analysis. This is because gender inequality in employment maintained an almost constant trend whilst trade fluctuated throughout the period. However, trade and gender inequality in education seem to show some negative relationship. At periods where gender inequality in education is falling, the trend of trade was positive whilst when gender inequality in education is positively sloped, trade is negatively sloped.

The findings from the analysis in the previous chapter indicate that male employment and female employment had a positive influence on trade both in the long run and the short

run, however, the female employment had more influence than male employment. Also, both male employment and female employment contributes more to import trade than to export trade. All the coefficients of female and male employment were statistically significant except the coefficient of female employment in its effect on exports.

The results also indicated that, female education had negative impact on trade in the long run but a positive impact in the short run and a negative impact on both exports and imports in the long run. However, it was not significant in both the short run and the long run. Also, male education has a significantly negative effect on trade (including exports and imports) in the short run but a positive and significant effect in the long run.

As anticipated, gender inequality in employment and gender inequality in education negatively affect trade both in the short run and the long run. The results showed that gender inequality in education does not significantly affect trade openness and imports in the short run but significantly affect exports both in the short run and long run whiles gender inequality in employment is not significant both the short run and the long run.

Labour endowment did not meet its expected sign in the short run and the long run but was significant in both the long run and the short run except for Model IIB_1. The results showed a negative relationship between labour endowment and trade (and also exports and imports) in Ghana.

Inflation is negatively related to trade in the long run but has a mix effect in the short run. However, the coefficient of inflation was significant in only Model IIA_2 and IIA_3. More so, exchange rate is statistically significant and positively affects trade openness, exports and imports in both the short run and the long run. Availability of credit is only

significant in Model IIA_2, IIA_3 and IIB_3 but positively related to trade openness, exports and imports in the long run and short run.

Finally, GDP did not meet its expected sign as it discourages trade openness, exports and imports in both the long run and the short run though it is significant.

5.3 Policy Implication and Recommendations of the Study

Based on the major findings outlined above, the study makes the following recommendations considering the policy implications of the findings:

The results show a negative relationship between gender inequality in employment and trade. This is supported by the positive higher impact of female employment over male employment in both the short run and the long run on import trade. This implies that when more females are employed than males, import trade is likely to improve.

Also, the negative influence of gender inequality in education on trade openness and export trade means that educated females are more productive and therefore enhance export trade. Therefore, more effort should be put in encouraging girl-child education in the country.

When business sectors where women workers are the majority is non-performing, educational and other appropriate policies should be considered in upgrading the skills of women and technological training that enable them to be more competitive and move to higher technology segment of the economy.

More so, when male education is increased in the short run, it has the tendency to decrease trade but in the long run it increases trade, therefore policy makers should consider such policies which will generally be beneficial in terms of trade.

More so, government and policy makers in taking decisions on how to alter macroeconomic variables such as exchange rate, GDP, e.t.c. to achieve a particular purpose should also consider its effect on trade.

5.4 Limitation and Further Research

The main limitation of the study, as typical of studies in developing countries, was the quality and availability of data on some key variables adopted in the study. There was no data to extend the data length below 1980 or beyond 2013. All data used was retrieved from the World Bank's world development indicators. Also, even with the available data, there were missing data for some of the years and so the researcher used Microsoft Excel to interpolate to fill in the missing data. This might have tilted the data a bit.

Effort should be made to further study gender-trade relationship by industry to help reveal the type of jobs created for females and males and those destroyed when trade expands. This will make it clear as to whether females are being substituted in jobs already in existence for males or jobs for male are disappearing. It can also show the volatility and persistency of jobs created.

There is also the need to know who is contributing what to trade and in what sector. Understanding these will help make policies to relieve the negatively affected. It will also help in the development of richer gender-trade theories.

5.5 Conclusion

This study examined the impact of gender inequality on trade in Ghana using annual data from 1980 to 2013 retrieved from the World Bank's World Development Indicators (2015) website. Thus the study first analysed the impact of gender (female and male in employment and in education) on trade in Ghana. The study further examined the relationships trade and gender inequality in employment and in education. The empirical methodology used the ARDL test for co-integration to examine the possible long-run and short-run link among the involved series. The augmented Dickey-Fuller (ADF) and Philips- Perron (PP) test was used to examine the unit roots of the involved variables. The study then went on to analyse whether a long run and short run relationship exist after all the variables were found to have no unit roots – either integrated of order zero I (0) or order one I (1). The co-integration evidence indicated confirmed the long-run connection among the variables.

From the study; female employment, male employment and male education positively affect trade whiles gender inequality in education have a negative impact on trade and gender inequality in employment statistically does not affect trade. Also, exchange rate positively impacts on trade whiles market size negatively impacts on trade.

Finally, the diagnostics and stability test carried out showed that the results are reliable and good for policy formulation and implementation as the model passes all the tests.

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ISSN 2225-0921 (Online) Vol.5, No.11, 2015

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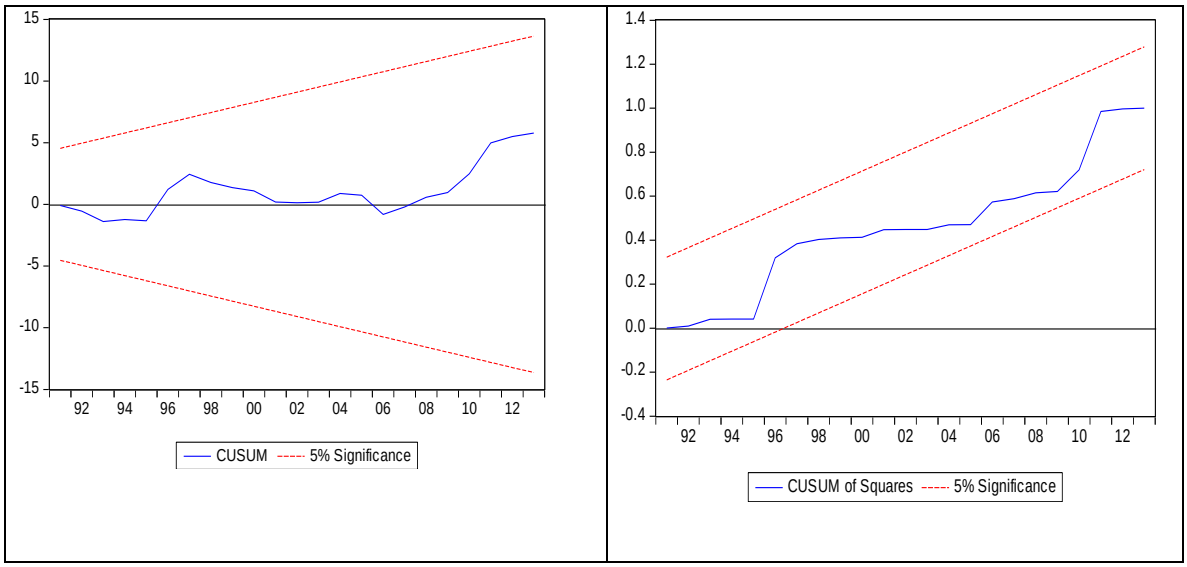
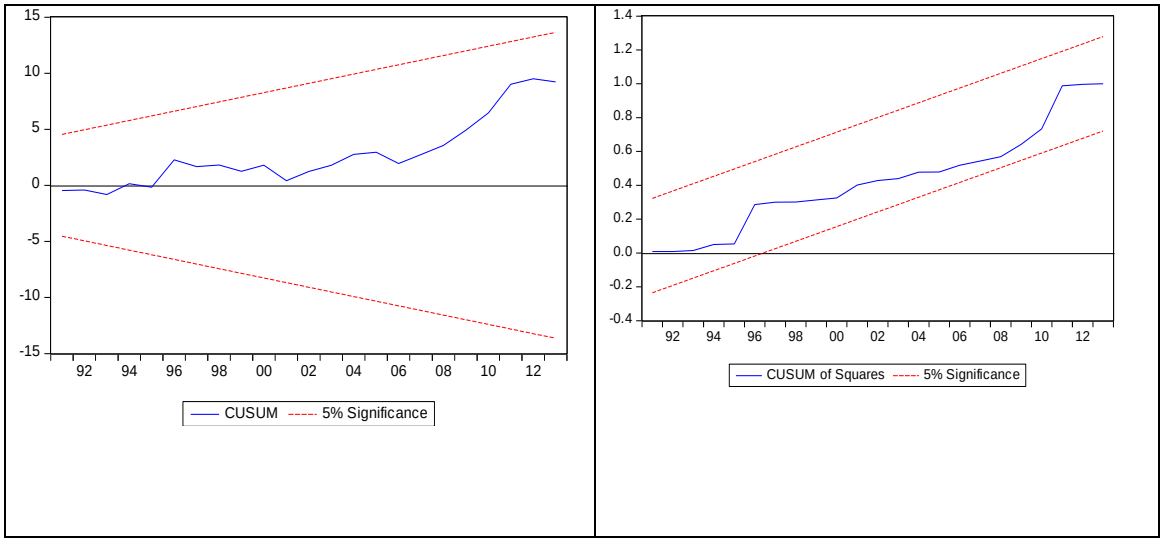
2012 Ghana Economic Review and Outloo

APPENDICES

Appendix 1: Stability Test for Model IA_1



Appendix 2: Stability Test for Model IA_2



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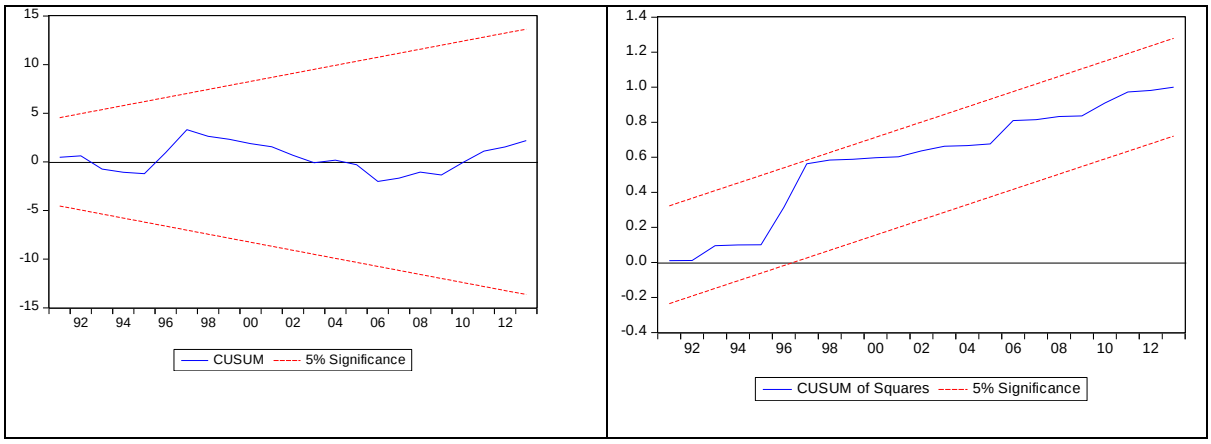

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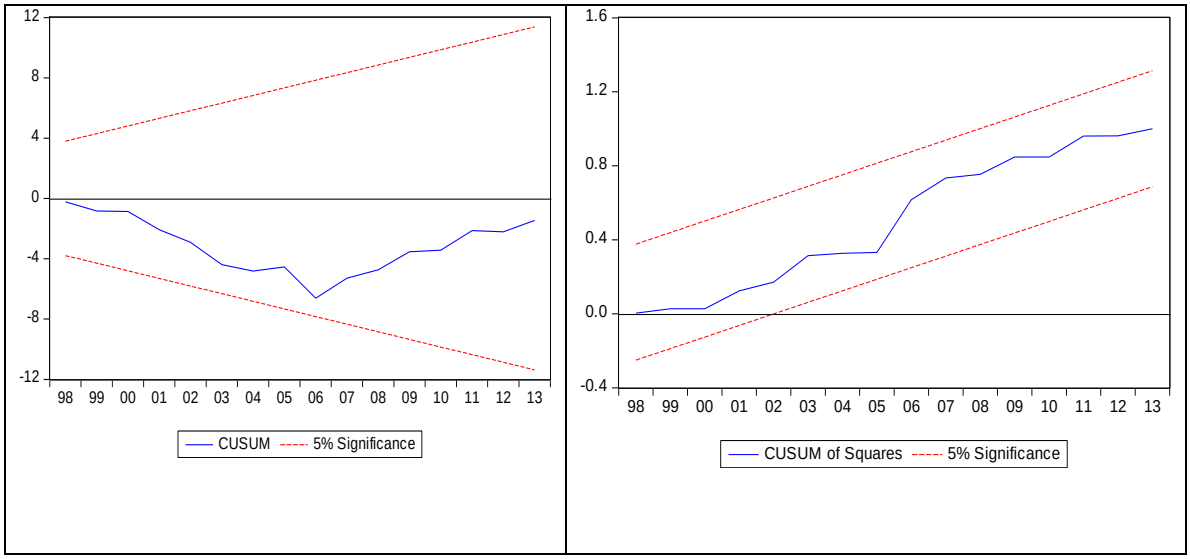
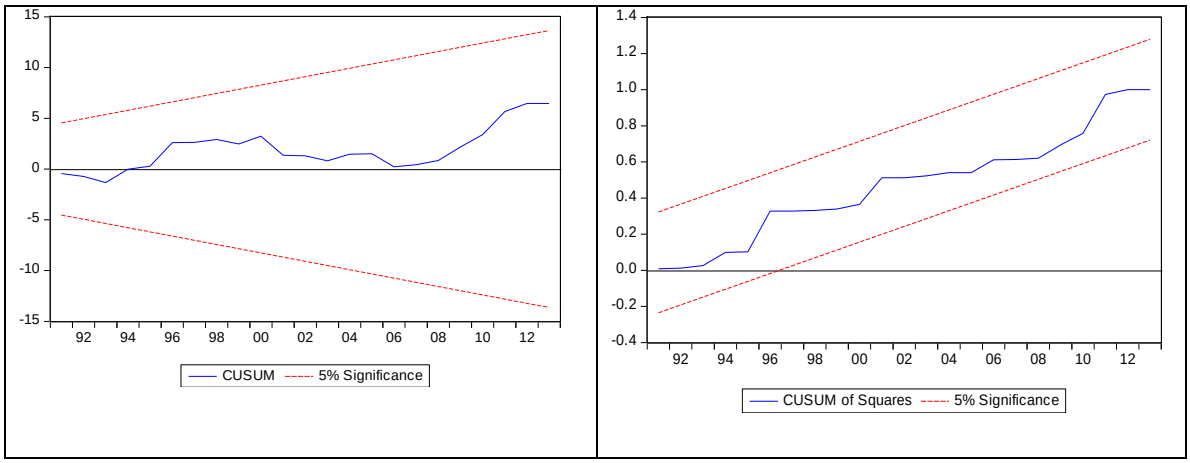


Appendix 5: Stability Test for Model IB_2



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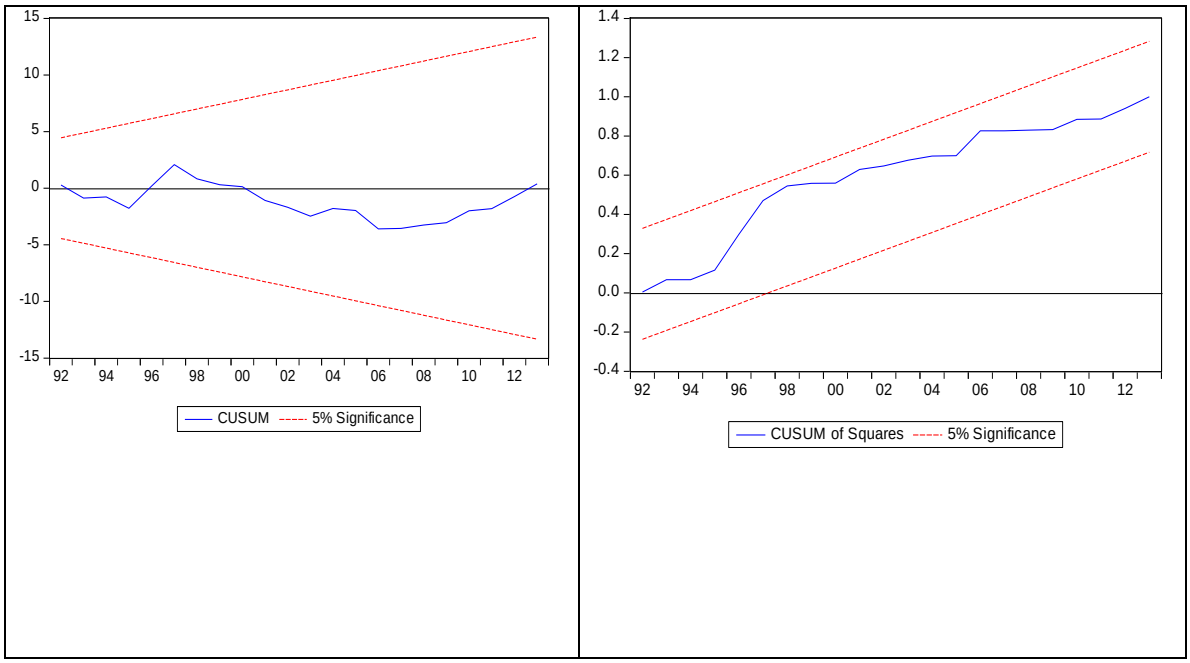
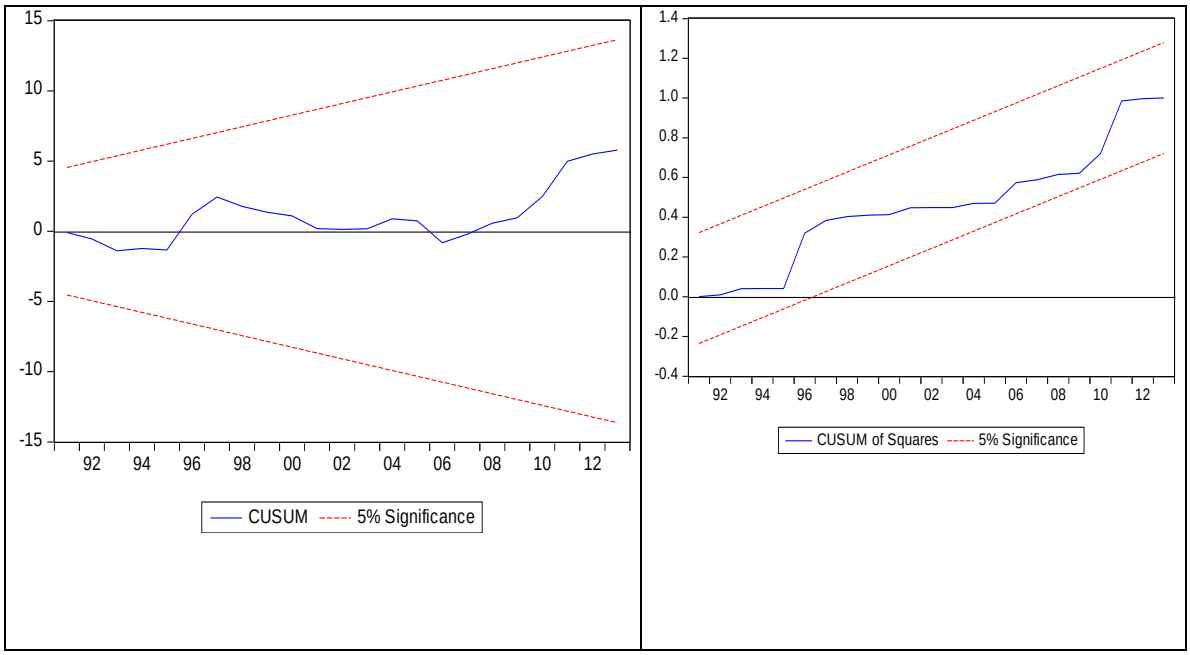
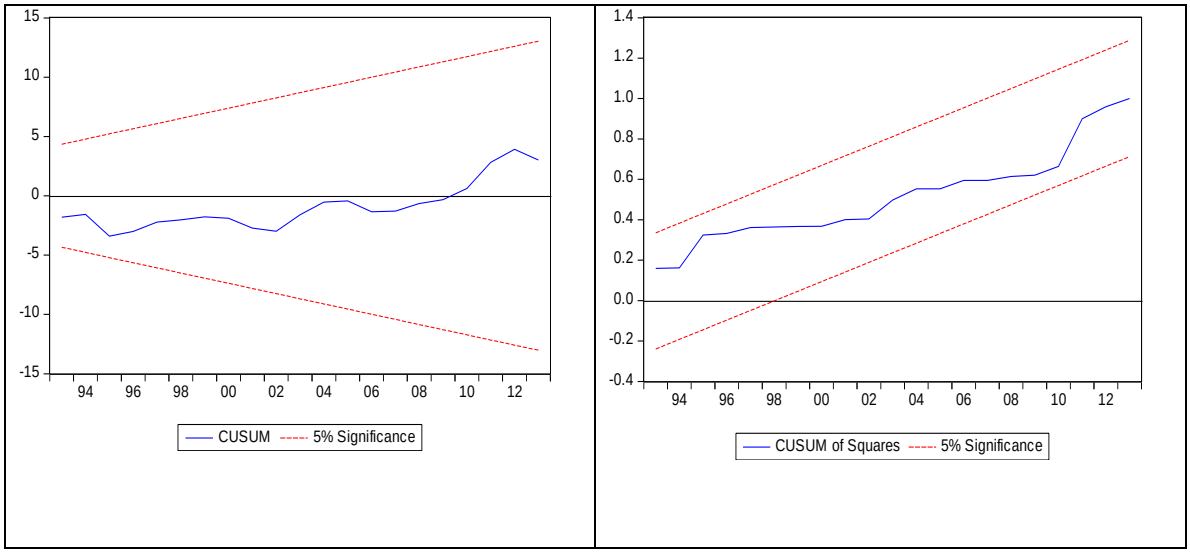


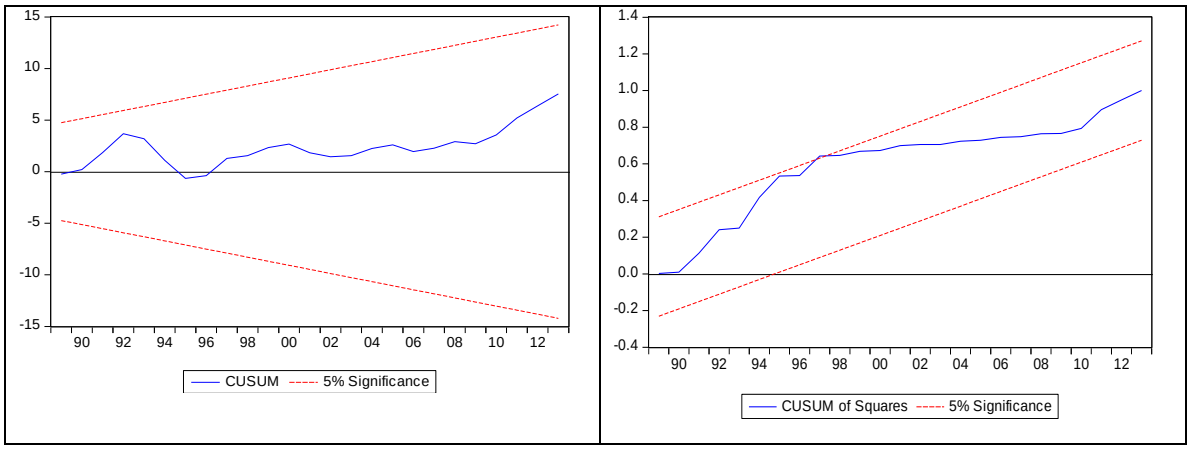
Appendix 7: Stability Test for Model IIA_1



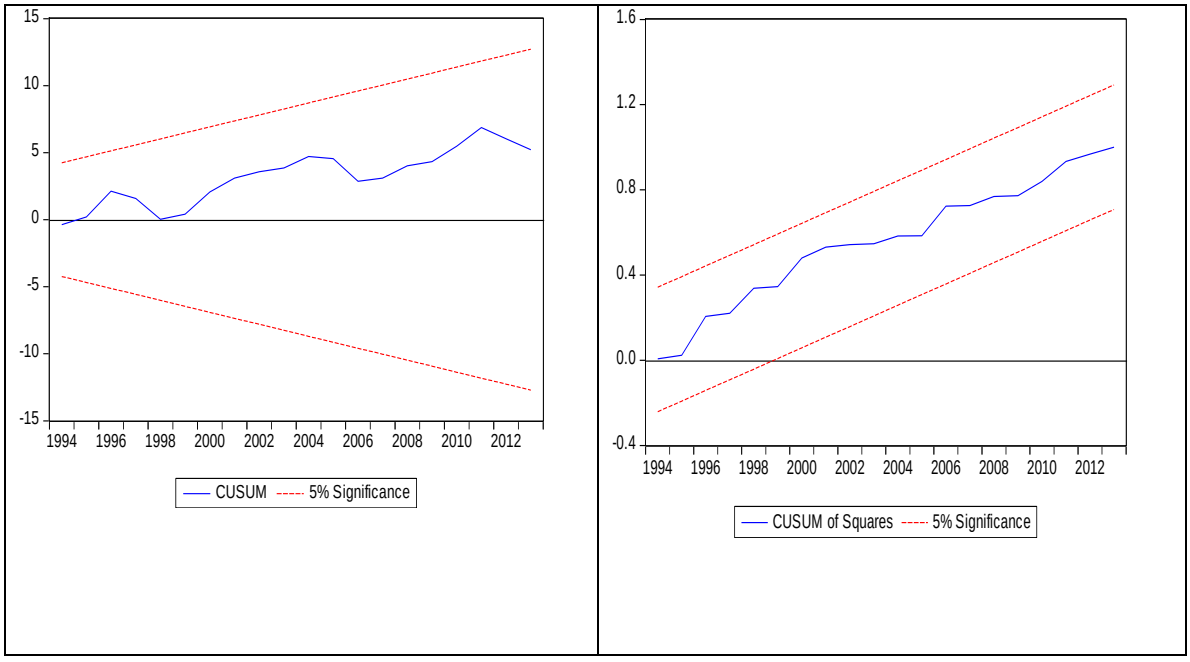
Appendix 8: Stability Test for Model IIA_2



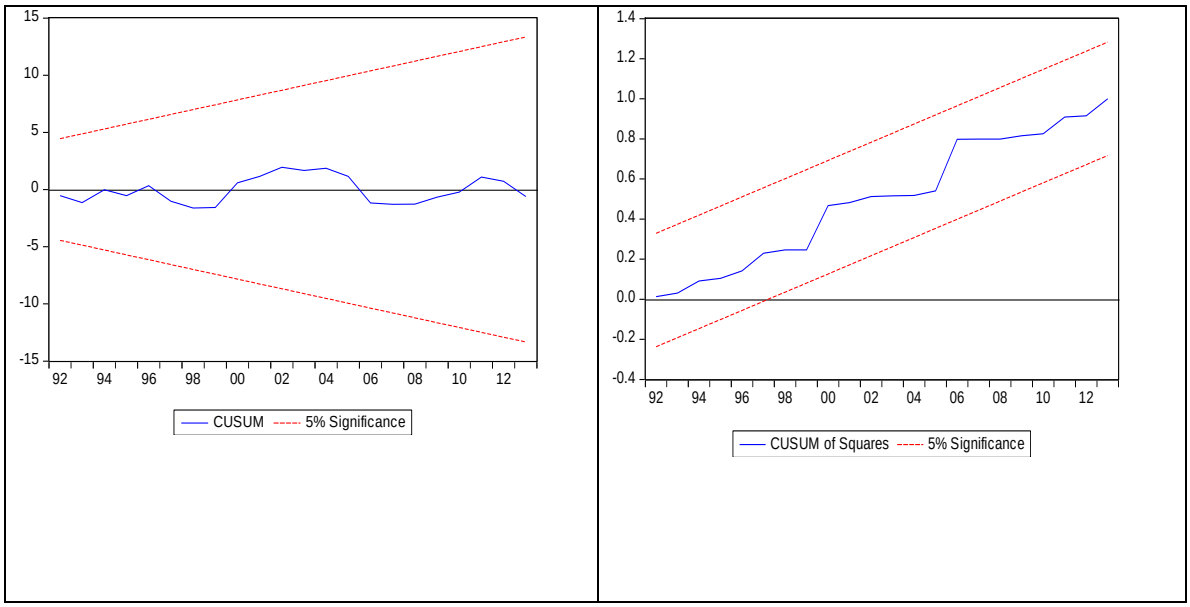
Appendix 9: Stability Test for Model IIA_3



Appendix 10: Stability Test for Model IIB_1



Appendix 11: Stability Test for Model IIB_2



Appendix 12: Stability Test for Model IIB_3