

**INTERNATIONAL TRADE, LABOUR EMPLOYMENT AND
INCOME INEQUALITIES IN SUB-SAHARAN AFRICA: EVIDENCE
FROM PANEL VAR**

MASTERS OF ARTS (ECONOMICS) THESIS

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**UNIVERSITY OF MALAWI
CHANCELLOR COLLEGE**

JUNE, 2012

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MASTERS OF ARTS (ECONOMICS) THESIS

By

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**Thesis Submitted to the Department of Economics, Faculty of Social Science, in
Partial Fulfillment of the Requirements for a Masters of Arts Degree in Economics.**

UNIVERSITY OF MALAWI

CHANCELLOR COLLEGE

JUNE, 2012

DECLARATION

I the undersigned hereby declare that this thesis/dissertation is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used acknowledgements have been made.

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Signature

Date

STATEMENT OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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DEDICATION

To my Departed grandfather: Mr Jazi Mwendayekha Nyirenda.

To my Beloved mother: Mama Elizabeth NyaChirambo.

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ABSTRACT

This paper examined the impact of increased openness to international trade on labour employment and income inequalities among 20 sub-Saharan African countries for the period between 1980 and 2002. The paper employed a panel vector autoregressive (Panel VAR) model to account for endogeneity in the variables in the model. The study used both the aggregated and disaggregated measures of the trade openness. The aggregated trade openness measure regression showed that increased international trade resulted in significantly increasing income inequalities but had insignificant impact on labour employment. In the disaggregated trade openness regression, results show that on the overall, the export side reduced labour employment but at the same time, significantly increased income inequalities. The import side however, had an insignificant impact on income inequalities but a slight positive impact on labour employment. This seemed to hold for the high income countries, but also the low income countries.

Among the possible tools to help reduce inequalities is for government to engage more in policies that will increase labour participation rates both in production and marketing. Secondly, use of a government determined optimal tax level on production systems that are highly capital intensive and then channeling the revenue into labour intensive production channels. Lastly strengthening competitiveness both in the goods market and labour market would also help reduce income inequalities. This would reduce exploitation of both the labour resource and consumers by the capitalist monopolists.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADI:	Africa Development Indicators
EAC:	East African Community
ECCAS:	Economic Community of Central African States
ECOWAS:	Economic Community of West African States
FEM:	Fixed Effects Model
GMM:	Generalised Method of Moments
H-O:	Heckscher-Ohlin (trade theory)
IIT:	Intra-Industry Trade
IRF:	Impulse Response Function
LEB:	Lower Error Bound
OECD:	Organisation of Economic Development and Corporation
OLS:	Ordinary Least Squares
REM:	Random Effects Model
SADC:	Southern Africa Development Community
UEB:	Upper Error Bound
UMA:	Arab Maghreb Union
UNCTAD:	United Nations Commission for Trade and Development
UNIDO:	United Nations Industrial Development Organisation
UTIP:	University of Texas Inequality Project
VAR:	Vector Autoregressive Model
VFS:	Vent-for-Surplus (trade theory)

WDI: World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background

International trade has had varying impact on African economies in terms of labour employment creation and income distribution. Theories on international trade have different predictions as regards to the impact of trade openness on labour employment and income inequalities. Most trade theories work under the assumption that countries produce more and export goods in which they have comparative advantage and produce less and import goods in which they do not have comparative advantage. According to the Heckscher-Ohlin theory (Salvatore, 2007), this comparative advantage is in terms of factor endowment. This theory argues that countries produce more and export goods whose production intensively uses their abundant resources and produce less and import goods which intensively use resources that are scarce in their economies.

For most of African countries, which are abundant in unskilled labour and scarce in capital, opening to international trade is expected lead to these countries producing more and exporting goods which are labour intensive and produce less and import goods which are capital intensive. This is hence expected to bring these benefits: first, it is expected to lead to increased demand for the surplus unskilled labour resource and reduced in the demand for capital (Kareem, 2008). As a follow-up, it is expected to lead to increased

returns to the abundant unskilled labour due to its increased marginal productivity, while reducing the returns to the scarce capital (Meschi and Virarelli, 2007). This is hence expected to help in narrowing the gap between the high income earners, most of whom are the owners of capital (physical capital and skilled labour) and the low income groups, most of whom are the owners of the unskilled labour resource.

However, trends show that on the overall, income inequalities have been increasing in all African countries despite increased openness to foreign trade (Odedukun and Round, 2001). This is not a healthy situation; with regard to that most African countries are low income. Large variations in income distribution would result in some part of the population living in dire poverty while few have substantially enormous wealth. Those in the low income category would in this case be those that hardly even meet the minimum required standards of living. In addition, differences in income distribution will also imply that people will have different access to opportunities for self advancement. Those with higher income have more access to capital for investment and can access quality education as opposed to the low income groups. On the other hand, high inequalities negatively impact on economic development. This is because in the first place, this leads to reduction in citizen participation in development programmes especially by the section of the society that feels marginalised. In addition, unequal income distribution is a major cause of political instabilities which leads to disruption of development projects and destruction of infrastructure.

Empirical studies have been carried out to examine the impact of international trade, both on labour employment and income distribution in Africa and world over, but have come up with varying results. In a study by Hussain et al. (2009) on Pakistan and in

another study by Jaumotte et al. (2008) on a sample of both developed and developing countries found that trade openness resulted in reduction of inequalities. On the other hand, Aradhyula et al. (2007) also on a sample of developed and developing countries found that on overall trade openness increased inequalities. However when he used disaggregated samples found that foreign trade increased inequalities for developing countries but for developed countries, the impact was not significant. Among the studies carried out for Africa, results are not similar either. Kai and Hamori (2009) and Barro (2008) found that increased trade openness resulted in increasing inequalities. On the other hand, Anyanwu (2011) and Odedokun and Round (2001) found that trade openness had no significant impact on income inequalities. In terms of labour employment, both Kareem (2008) and Jenkins and Sen (2005) who conducted studies on particular African countries found that trade openness had no significant impact on employment creation.

1.2 Problem Statement

Statistics show that inequalities have on the overall been increasing with time for all countries in the sub-Saharan Africa. At the same time, with the passage of time, these countries have tended to increase their openness to foreign trade, both in terms of exports and imports. There is therefore the perception that increased foreign trade has resulted in increased inequalities in this region (Odedokun and Round, 2001). Studies have been carried out to ascertain this belief but have come up with different findings. The studies that have been carried have all but one used the Gini coefficient as the inequality measure. However this data has many missing observations which can in one way or another compromise the findings. These studies include Anyanwu (2011), Barro (2008) and Odedokun and Round (2001). This study on the other hand uses a new data set on

household income inequalities that was generated by the University of Texas Inequality Project (UTIP). This data has much more observations on within-country income inequalities as compared to the Gini hence more suitable for empirical analysis.

The only study for sub-Saharan Africa that used this new data is by Kai and Hamori (2009). However, this study, just like Anyanwu (2011) and Barro (2008) just looked at the aggregative impact of foreign trade on income inequalities, where the combined effect from the export side and the import side was assessed. In addition, this study used a standard panel data analysis. This method of estimation is however not suitable in cases where there are some variables that are endogenous; which is common in most macroeconomic variables. Under this situation, using the standard panel estimation would not be precise in terms of the parameters because of the endogeneity in the variables (Love and Zicchino, 2006). This may therefore also compromise on the findings. This study hence uses panel vector autoregressive (panel VAR) model estimation to address this endogeneity in the variables.

The only study that used this model on African data is by Anyanwu (2011). The study however besides not using the new data on inequalities, was for all African countries and not specific for sub-Saharan Africa. Therefore its findings can limitedly be deduced for sub-Saharan Africa. In addition this study, just like the other previous studies used the aggregative impact of foreign trade on income inequalities. In this study however, the trade component is looked at from export side and import side separately so as to examine the impact brought by each side. Some studies have found that trade openness has insignificant impact on both labour employment and inequalities among African countries. These findings might be the result of the two sides having

contradictory impact both on labour employment and inequalities hence the aggregated impact is not significant. This study therefore besides using the aggregated measure, also disaggregates trade openness into the export side and import side. This is meant to investigate the impact from each side in terms of direction, and in case they have the same impact, which side has the dominant impact whether in increasing or reducing income inequalities.

Therefore this study aims to investigate what impact trade openness has had both on labor employment and income inequalities among the sub Saharan African countries. This study aims to examine both the aggregated and disaggregated impact of foreign trade so as to come up with a decomposed impact either from the export side or the import side on labour employment and income inequalities.

1.3 Objectives

The main objective of this study is to investigate the impact of trade openness on labour employment and income inequalities. The specific objectives of this study are to investigate the impact of:

- aggregated trade openness on labour employment and income inequalities
- exports and imports on income labour employment and income inequalities
- exports and imports on labour employment and income inequalities depending on countries' economic development

1.4 Testable Hypotheses

The testable hypotheses for this study are:

- aggregated trade openness has no impact on labour employment and income inequalities
- exports and imports have no impact on labour employment and income inequalities
- impact of exports and imports on labour employment and income inequalities does not depend on economic development of a country

1.5 Significance of the Study

This study investigates how foreign trade has impacted on income inequalities and hence can give insights as to how foreign trade dynamics can be manipulated to help improve labour employment and also reduce within-country income inequalities. Foreign trade would therefore give policy makers an extra tool in a quest to balance income distribution. There are several tools that governments can use to alter income distribution, for example, the tax system, government transfers, support of community development projects among others. These tools will involve government's direct involvement in implementing them and also involve direct government expenditure to support these social welfare programmes. On the other hand tools like tax imply direct shift of wealth from one section of the society to the other which might bring resentment to the groups that have been made worse off by this measure. The foreign trade tool however provides an escape from all these inconveniences. In addition, this tool works through channels that are difficult to control with precision and accuracy. These include: labour employment, market system foreign exchange system and financial deepening. These

require a diversity of changes in other policies to ensure that the desired results are achieved.

1.6. Outline of the Thesis

This thesis is structured into six chapters. Chapter One gives the introduction to this study. Chapter Two provides an overview of the Africa's involvement in international trade in terms of major exports and imports but also how this has impacted on individual country economies. Chapter Three outlines the literature review and this comprises of the theoretical and empirical literature. Chapter Four discusses the research methodology. Chapter Five discusses the regression results and interpretation; and finally Chapter Six gives the conclusion, outlining the summary of results obtained, policy recommendations and the limitations of the study.

CHAPTER TWO

OVERVIEW OF AFRICA'S INVOLVEMENT IN FOREIGN TRADE AND ITS IMPACT

2.0 Introduction

This chapter presents an overview of the economies in the sub-Saharan Africa in terms of trade openness and its associated variables. The outline of the chapter is as follows: Section 2.1 gives the trends that have been observed in the variables in the study for the period between 1980 and 2002; Section 2.2 gives the country by country level of the income inequalities based on the trends that have been observed. And finally Section 2.3 gives an outline of the kind of exports and imports of the countries that are in the study with the rest of the world.

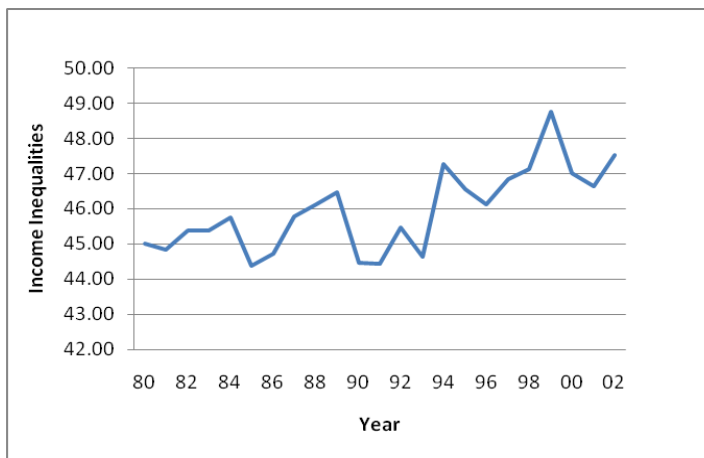
2.1 Observed Trends

2.1.1 Income Inequalities

The income inequality measure used in this study is the one generated by the University of Texas Inequality Project (UTIP) (University, U.N., 2005). The calculation of the index makes use of the income gaps between the high income earners and low income earners in a country and expressed as percentage of total incomes. However, the variable is captured as unitless and in principle ranges between 0 and 100. The higher the index implies the higher the within-country income inequalities. For the study period,

income inequalities have on the overall showed an increasing trend, though there are some up and down fluctuations. For all the study period, the income inequality measure shows an overall increasing trend fluctuating between 44 and 49. Even though in actual sense, income inequalities fluctuations varied from a minimum of about 31 and a maximum of 64. The mean has been fluctuating between 44 and 49 showing a fluctuating, but increasing trend. Figure 1 below shows the trend that has been observed for income inequalities among the countries in this sample.

Figure 1: Income Inequality Measure



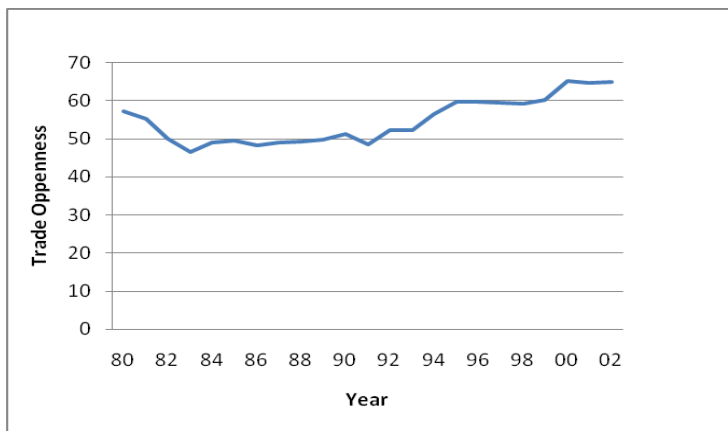
Source of Data: UTIP (2005) database

2.1.2 Trade Openness

Trade openness has shown that it has been varying in movements. This variable represents the aggregated measure for foreign trade which comprises both exports and imports of goods and services but expressed as percentage of GDP. Data reveals that on average, foreign trade accounted for higher percentage of national output in the early 1980s accounting for about 67% of GDP. However, this decreased in the late 1980s going down to accounting for as low as 56% of GDP before picking up again in the early 1990s.

From there, there has always been an increasing trend as foreign trade accounted for larger and larger share of national output of up to around 55% in the years from 2000 and afterwards. Figure 2 below shows the trends of trade openness.

Figure 2: Trade Openness

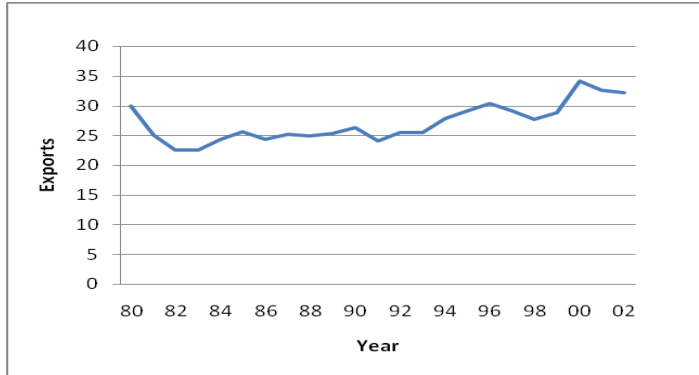


Source of Data: World Bank (2011): Africa Development Indicators

2.1.3 Exports

Exports as a percentage of GDP have shown rather an ambiguous trend though a small increasing trend is observed. Exports share as percentage of GDP were relatively high in the early 1980s before reducing and fluctuating around 25% before picking up again in the 1990s to ranges of 30% of GDP towards 35%. Therefore it is observed that much as export volume for the countries in this region had been increasing substantially, the share of national output had not increased much, just fluctuating between 20% and 35% of national income. Figure 3 below shows the trend that has been observed for export of goods and services as percentage of national income.

Figure 3: Exports as Percentage of GDP

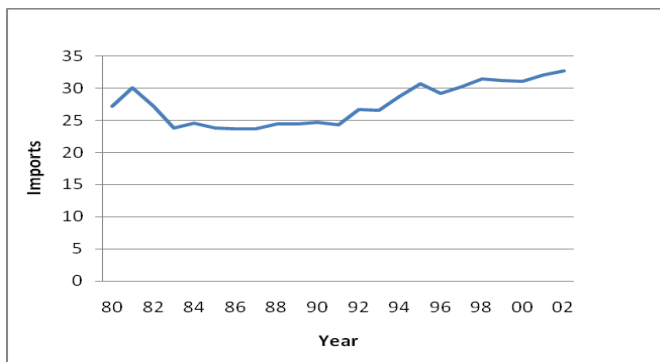


Source of Data: World Bank (2011): Africa Development Indicators

2.1.4 Imports

Imports have also shown a similar trend. In the early 1980s, imports accounted for around 30% of gross domestic income, but with time this share decreases to lower levels of just below 25% before picking up again in the 1990s increasing to 30% of GDP and even beyond but not above 35% as per the study period. Therefore, much as the absolute value of imports for the countries kept increasing, the share of these imports as percentage of GDP did not change much. Figure 4 below shows the trend that has been observed for imports as percentage of GDP for the sub Saharan African region.

Figure 4: Imports as Percentage of GDP

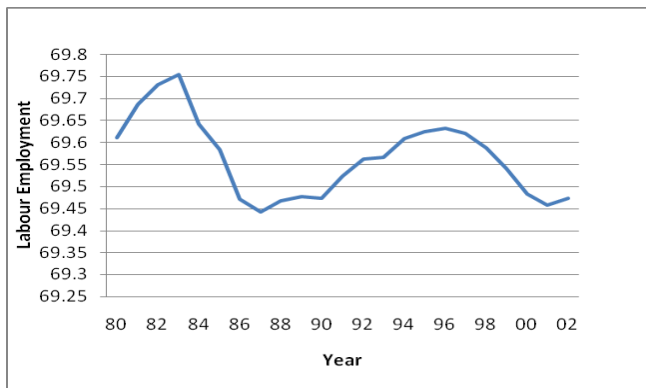


Source of Data: World Bank (2011): Africa Development Indicators

2.1.5 Labour Participation Rates

Labour participation rates have shown a slightly fluctuating trend though a small decreasing trend has been observed. The levels of labour participation rates on average fluctuated around 69% and ranged between 69.4% and 69.85 of total labour force. In the early 1980s, labour participation rates were relatively higher with an average of about 69.7% before reducing in the late 1980s and early 1990s to lower levels of just above 69.4% before picking again in the mid 1990 to just above 69.6% before decreasing to lower levels of just above 69.4% of the labourforce. Figure 5 below shows the trend that has been observed for labour participation rates for the countries in the study sample.

Figure 5: Labour Participation Rate



Source of Data: World Bank (2011): Africa Development Indicators

2.2 Income Inequality Levels by Country

This section looks at country by country account of national levels of income inequalities that have been observed. Table 1 below shows African countries grouped based on the average income inequalities based on the Gini coefficient that were observed. Gini coefficient captures the income share held by the richest depicted percentage of the population divided by total incomes of the society. The higher the Gini

coefficient means that a small rich population holds a bigger proportion of the total society's income. This therefore means that the higher the Gini coefficient, the higher the income inequalities in that society. Gini coefficient is captured as a decimal, ranging from 0 to 1, but can also be expressed as percentage in which case it ranges from 0% to 100%.

Table 1: Distribution of Gini Coefficients for Selected African Economies (1960-2006)

Range	Countries
0.30-0.39	Senegal, Mauritania, Malawi, Mauritius, Benin, Chad, Burkina Faso, Burundi, Tanzania, Algeria, Togo, Egypt, Mali, Guinea-Bissau
0.40-0.44	Congo (DRC), Central African Republic, Ghana, Guinea, Niger, Nigeria, Sierra Leone, Uganda, Gabon, Morocco, Tunisia, Djibouti
0.45-0.49	Cameroon, Cote d'Ivoire, Congo Rep, Gambia, Kenya, Madagascar, Mozambique, Rwanda
0.50-0.55	Lesotho, Swaziland, Zambia, Zimbabwe, Liberia, Cape Verde
0.56-0.60	Namibia, Angola, South Africa
Above 0.60	Comoros, Botswana

Source: Anyawu (2011)-(Author using data from African Development Bank (2009)).

In the first place, trends though not significantly show that income inequalities were relatively higher for countries with relatively higher levels of per capita income. For most of the countries in the study sample that have relatively higher average per capita income in the study period are among the countries with higher income inequalities. These include: Botswana, South Africa, Swaziland, Zimbabwe, Cameroon, Cote d'Ivoire and Congo Republic. On the other hand, most of the countries in the study sample with relatively lower income levels averaging showed lower level of income inequalities. These among others include Senegal, Malawi, Tanzania, Togo, Central African Republic, Ghana and Nigeria.

2.3 Major Exports and Imports for the African Countries

In assessing how trade openness has impacted on labour employment and income inequalities, there is need to look at trade flows between African countries and the rest of the world. Table 2 below gives that information on Africa's trade flows to and fro the rest of the world for the period between 1995 and 2006 which is part of the study period in this study. The traded goods and services grouped into seven major categories.

Table 2: Africa's World Exports and Imports: Average Figures in US\$ (1995-2006)

Product Categories	Exports to World	Imports from World	Difference
Basic food	14,875,274	21,052,701	-6,177,427
Beverages and tobacco	1,934,175	1,653,717	280,458
Ores, metals, precious stones	19,304,114	3,931,312	15,372,801
Fuels	81,278,815	17,188,542	64,090,273
Manufactured goods	19,442,801	34,861,887	-15,419,085
Chemical products	6,829,963	16,684,141	-9,854,178
Machinery and transport equipment	9,685,665	53,868,421	-44,182,756
Product total	153,350,808	149,240,722	4,110,086

Source: Anyanwu (2011)-Data Compiled from UNCTAD Handbook 2008

Table 2 above generally shows that on the overall, the trade balance was positive. This means Africa's exports to the rest of the world were more than what the continent imported from the rest of the world. But when disaggregated into specific areas of trade goods, there are variations in the trade balances.

In terms of basic food stuff, Africa as a whole imported more than it exported. This is the trend that is observed because the continent imports a large amount of manufactured foodstuff from other parts of the world. Most African countries food stuff produced is

primary products and little manufactured goods which are not as competitive at the world market, hence the current account deficit in terms of basic foodstuff.

For beverages and tobacco, the continent exported more than it imported. This is because this sector mainly comprises the primary product and light manufacturing which is mostly engaged in by African countries as compared to countries outside Africa. In the category of ores, metals and precious stones, the Table shows that Africa again exported more than it imported. This is also usually the trend that for some African countries, their major exports are minerals. These are extracted as raw and exported to developed countries to be processed into finished treasures and jewelries then trade back with African countries.

The category of fuels also shows that Africa had a current account surplus. The continent exported more fuel than it imported. This is the case for two reasons. First is that there are some countries that drill oil among African countries and the oil sector is usually a bigger part of the export sector of those countries. Secondly, there are fewer heavy manufacturing industries on the continent as compared to the rest of the world. This hence implies that there is less demand for fuels on the continent as compared to the rest of the world.

In the manufacturing category, the balance of payment was negative. As put above, there is less heavy manufacturing among African countries as compared to the outside world. Most African countries mainly engage in light manufacturing as compared to the heavy manufacturing in the other countries especially the developed countries of the

West. This is therefore what results into the current account deficit in this category of trade flow.

Chemical products category also shows a huge current account deficit. This sector works just like that manufacturing sector. Because of technological advances, developed countries are the ones that greatly produce most complicated chemicals of various categories. Therefore on the overall the continent exported less chemicals than it imported. This is usually the trend that is observed.

And finally, in the category of machinery and transport equipment, the continent had a deficit as well. This is usually the trend due to technology differences between African countries and the rest of the world especially the developed countries of the west. With their advanced technique, the developed countries are the ones that build stocks of sophisticated machinery, transportation and communication equipment.

These trade flows records, much as was specifically for the period between 1995 and 2006; is a true reflection of the trade that takes place between African countries and the rest of the world. African countries are fond of producing and exporting agricultural produce and other primary products. These goods have two characteristics: first in terms of production, most of these are relatively labour intensive to make use of the cheap surplus labour in most African economies; secondly in terms of marketing, most of these goods have low income elasticity. The developed countries on the other hand produce and export manufactured goods plus heavy machinery and other equipment which use relatively more capital intensive, but at the same time have higher income elasticity.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

This chapter gives the literature review part of the study which comprises both the theoretical and empirical literature. This section of the study looks at how opening to international trade affects the levels of labour employment rates but also income inequalities. This chapter is divided into the following areas: Section 3.1 gives the introduction to the theoretical literature for this study; Section 3.2 gives the theoretical literature on how trade openness affects labour employment and income inequalities, but focusing on classical and neo-classical trade theories; Section 3.3 gives the theoretical literature on how trade openness affects labour employment and income inequalities, but focusing on the alternative trade theories; Section 3.4 gives empirical literature on the impact of international trade on labour employment and income inequalities; and finally Section 3.5 gives summary of literature.

3.1 Theoretical Literature

Literature on impact of international trade on labour employment and income distribution, resulting from employment creation is mixed. The Ricardian theory points out a negative relationship between trade openness and labour employment but not clear on income inequalities. On the other hand, the Heckscher-Ohlin theory (Salvatore, 2007)

postulates that opening up to international trade leads to increase in labour employment in labour abundant economies but also a reduction in income inequalities. On the other hand, most of the alternative theories, which have arisen due to the weaknesses in the classical and neo-classical trade theories, do not draw a clear link between trade openness and labour employment in labour abundant countries, but also no clear link between trade openness and income inequalities.

3.2 Classical and Neo-classical Trade Theories

3.2.1 The Ricardian Theory

This Ricardian theory (Ricardo, 1817) argues that one of the driving forces of foreign trade is the existence of comparative advantage. According to the Ricardian theory, comparative advantage is in terms of the average productivity of labour in that product. A country produces more and exports a good in which its average productivity of labour is relatively greater and produces less and imports a good in which its marginal productivity of labour is relatively lower. This model uses the labour theory of value hence recognises labour as the only factor of production. Country H has comparative advantage in good X and country F has comparative advantage in good Y when:

$$\frac{a_{LX}^H}{a_{LY}^H} < \frac{a_{LX}^F}{a_{LY}^F} \quad (3.1)$$

Where:

a_{LX} is the cost (amount) of labour units required in production of a unit of good X

a_{LY} is the cost (amount) of labour units required in production of a unit of good Y

Country *H* has comparative advantage in good *X* if the ratio of labour units required in the production of good *X* to the labour units required in the production of good *Y* in country *H* is less than the ratio of labour units required in the production of good *X* to the labour units required in the production of good *Y* for country *F*. Then country *H* will produce and export *X* whereas country *F* will produce and export *Y*. At autarky condition, good *X* will be relatively cheaper in Country *H* but expensive in country *F*. On the other hand good *Y* will be relatively cheaper in country *F* and expensive in country *H*. This is what drives foreign trade (Appleyard and Field, 2001).

In terms of employment however, trade openness is expected to have a negative impact on labour employment. Since countries specialise in the goods in which they have comparative advantage in, countries specialise in the goods that require relatively less amount of input in production. Since labour is the only factor of production, this hence means that countries will produce more and export goods on which they use less labour value and import goods on which they use more labour value. Therefore trade openness is expected to be negatively related to employment of labour (Dutt et al., 2009). However, this theory does not clearly link trade openness and income distribution. Since labour is the only factor of production; therefore the theory does not shed light on the income distribution dynamics that will result from increased trade openness.

3.2.2 The Heckscher-Ohlin Theory

The Heckscher-Ohlin theory also argues that foreign is based on comparative advantage. However, unlike the classical Ricardian theory, the H-O theory postulates that this comparative advantage is in terms of factor endowments. A country produces more and exports goods whose production intensively uses its abundant factor. On the other

hand a country produces less and imports a good which intensively uses its scarce. The departure from the Ricardian theory is that the H-O model recognises other factors of production rather than labour (Salvatore, 2007).

The H-O theory is a two country-two factor-two product (2x2x2) analysis. The belief is that you have two countries, home (H) and foreign (F); two factors of production, labour (L) and capital (K); and two products, good X and good Y. This theory however works under certain assumptions and two of the most crucial are: *factor intensity*, thus there is clear demarcation that one good, say good X is labour intensive while the other, say good Y is capital intensive; and *factor endowment*, that is it is clearly pointed out that one country, say country H is labour abundant and capital scarce while the other, say country F is capital abundant and labour scarce. In this case, country H has comparative advantage in good X while country F has comparative advantage in good Y when:

$$\frac{P_X^H}{P_Y^H} < \frac{P_X^F}{P_Y^F} \quad (3.2)$$

Where: P_X^H and P_Y^H are prices of good X and good Y in Country H while P_X^F and P_Y^F are prices of good X and good Y in country F. At autarky terms of trade, good X is relatively cheaper in country H than at Country F and vice versa for good Y. This is what drives international trade and eventually, *ceteris paribus*, the prices of the same goods tend to equalize between the two economies. This theory has extensions of the factor price equalisation and the Stolper-Samuelson analyses that draw a clear link between increased foreign trade and labour employment for labour abundant economies but also between trade openness and income inequalities.

3.2.2.1 Factor Price Equalisation

According to factor price equalization (Samuelson, 1948), as countries open up to foreign trade, it results in the returns for the same factors of production tending to equalize. For example when there is increased foreign trade, if country *H* specialises in *X* production which is labour intensive, it will increase *X* production and reduce production of *Y* which is capital intensive. Therefore, the demand for labour relative to capital is high, but factors released from *Y* production have a higher *K/L* ratio while *X* production requires a lower *K/L* ratio. This results in the labour being a relatively scarce resource while capital a relatively abundant resource; hence the price of labour (wages) goes up while the price of capital (rent) reduces. In the capital abundant country *F* on the other hand, this process works in the opposite direction. The process eventually results in the capital being a relatively scarce resource while labour a relatively abundant resource, As a result, the price of capital (rent) goes up while the price of labour (wages) goes down. Eventually this openness to foreign trade results in the factor prices in the two countries equalising, thus the price of labour in the two economies will tend to equalize and the price of capital in the two economies will also tend to equalize.

3.2.2.2 The Stolper-Samuelson Analysis

According to Stolper and Samuelson (1941) opening to foreign trade results in the returns to the abundant factor increasing while the returns to the scarce factor decreasing. This is a follow-up to the factor price equalisation process with respect to income distribution effects. Since foreign trade results in the prices of the same type of factors in the two countries equalizing, it implies that the factors that initially earned higher returns (scarce factors) earn relatively less than before while those that earned lower returns

(abundant factors) will earn relatively higher than before. Then working with our two factors of production, the real wage (real return to labour) and real rent (real return to capital) functions are:

$$w = W / P \quad (3.3a)$$

$$r = R / P \quad (3.3b)$$

Where: w is real wage; W is nominal wage; r is the real rent; R is the nominal rent; and P is the general price level. Nominal wage and nominal rent functions therefore are:

$$W = w * P \quad (3.3c)$$

$$R = r * P \quad (3.3d)$$

But real wage (w) is the marginal productivity of labour (MPL) and real rent (r) is the marginal productivity of capital (MPK).

For the labour abundant country H, as the economy shifts to more of X production (labour intensive) and less of Y production (capital intensive), marginal productivity of the abundant labour resource increases while the marginal productivity of the scarce capital reduce. The general price level changes are convergent as the price of good X increases while the price of good Y decreases hence the general price levels between the two economies tend to equalise.

$$W^H \uparrow = MPL^H \uparrow * \bar{P} \quad (3.4a)$$

$$R^H \downarrow = MPK^H \downarrow * \bar{P} \quad (3.4b)$$

This therefore results in reducing the income gap between the owners of capital who now earn relatively lower than before and the owners of labour who earn relatively higher than before increased trade openness (Samuelson, 1953). This therefore helps reduce the

levels within-country income inequalities. At the country F on the other hand, it is the reverse. As the economy shifts to more of Y production (capital intensive) and less of X production (labour intensive), the returns to the abundant capital increase while the returns to the scarce labour resource reduces.

$$W^F \downarrow = MPL^F \downarrow * \bar{P} \quad (3.4c)$$

$$R^F \uparrow = MPK^F \uparrow * \bar{P} \quad (3.4d)$$

This therefore will result in reducing the income gap between the initially high earning owners of labour and initially low earning owners of capital, eventually reducing income inequalities.

3.2.3 The Vent-for-Surplus Theory

The vent-for-surplus (VFS) theory which was formulated by Adam Smith but developed by Hla Myint (1971), points out a clear link between increased international trade and creation of employment for the country's abundant resource especially if it is in surplus. The VFS theory postulates that foreign trade helps mop out a country's excess production. This is usually the output produced by the country's abundant resource especially when it is in surplus. Therefore in essence, international trade helps implicitly create effective demand for the country's abundant resource which is in surplus. Without trade that excess production would be useless but foreign trade helps in disposing this excess production at a value. This implies that increased foreign trade is beneficial by creating a value for the country's surplus resource hence increasing its marginal productivity (Kurz, 1992).

Unlike the Ricardian and the H-O theories which assume full employment of resources, this theory assumes underemployment of a particular resource and hence is more applicable for most African countries which are in surplus of unskilled labour. The belief in the Ricardian and the H-O theories is that as the economy moves into producing more of one good, it only sources the required factors from the reduction in the production of the other good. In the vent-for-surplus theory however, this extra required resource is also sourced from the idle resources in the economy. This then implies that when the labour surplus country H shifts to more X production and less of Y production, the extra required labour resource will be pulled from the unemployed unskilled labour which is in surplus (Kung et al., 2011). This therefore would result in increasing the marginal productivity (wage) to the initially economically inactive unskilled labour resource.

$$W^H \uparrow = MPL^H \uparrow * \bar{P} \quad (3.5a)$$

$$\bar{R}^H = \bar{MPK}^H * \bar{P} \quad (3.5b)$$

However, the impact on the returns to capital is not very straight forward. Since the extra required labour resource will be sourced from the labour resource that is initially inactive in the economy, capital will still have abundant labour to work with. Therefore, there will be no change to the marginal productivity of capital (rent) while the marginal productivity of labour (wage) increases. This then would help reduce the income gap between the owners of capital who will earn lower than before and the owners of the unskilled labour resource who will now earn higher than before (Aradhyula et al., 2007)

3.3 Alternative Trade Theories

3.3.1 The Specific Factors Theory

This theory arose from relaxation of the assumption in the H-O theory that factors are perfectly mobile across production sectors. Among the pioneers of this theory are: Jones (1971), Samuelson (1971), Mussa (1974) and Neary (1978). This theory is a departure from the two-factor belief in the H-O theory. The argument is that there are some factors of production that are specific to the production of certain goods and not others. This is mainly in terms of some types of physical capital other financial capital itself; but also in terms of sector-specific skilled labour. While unskilled labour might be perfectly mobile between production sectors, some factors are not perfectly mobile. Therefore when there is trade openness, there is increased demand for the specific factors for the booming production sector and reduced demand for the specific factors for the declining sector.

If we assume there are two goods produced, good X and good Y . Further assume that the two goods require a specific type of capital in production, where capital type S is specific for X production and capital type T specific for Y production while labour is perfectly mobile between the two sectors. In the case that there is increased demand for good X at the international market, there will be need to increase X production at the expense of Y production. There will hence be increased demand and hence marginal productivity for capital type S specific for X production and reduced demand for capital type T specific for Y production.

$$R_s^H \uparrow = MPK_s^H \uparrow * \bar{P} \quad (3.6a)$$

$$R_T^H \downarrow = MPK_T^H \downarrow * \bar{P} \quad (3.6b)$$

$$W_X^H \uparrow = MPL_X^H \uparrow * \bar{P} \quad (3.6c)$$

$$W_Y^H \downarrow = MPL_Y^H \downarrow * \bar{P} \quad (3.6d)$$

Where: R_S^H and R_T^H are the nominal rents in country H for capital type S (specific for good X) and capital type T (specific for good Y) respectively. W_X^H and W_Y^H are the nominal wage rates in country H in the X production sector and Y production sector respectively.

Assuming that factors are paid at their marginal productivity rate, the owners of capital type S will earn higher than before while owners of capital T will earn less than before. In terms of labour however, the overall impact of this is not clear, though the returns to labour that was in sector X earns relatively higher because its marginal productivity increases while the labour that was in sector Y earns lower than before. But since labour is perfectly mobile, labour can freely move between the two sectors hence neutralizing this impact (Markusen et al., 1995). Therefore, there is no clear link between trade openness and labour employment creation and hence no clear link between trade openness and income distribution.

3.3.2 The Imperfect Markets Theory

One of the assumptions in the H-O theory is that markets for the goods and services are perfectly competitive. However, according to Markusen, (1981) and Helpman and Krugman (1985), in some cases, there might be some production under monopoly or oligopolistic market conditions. For example, if in country H good X is produced under

monopoly conditions, at autarky, the monopolist will exploit consumers. Monopolists will produce relatively less and sell at relatively higher price; hence the output produced is less than if it was in competitive markets. Opening to trade however brings two benefits: pro-competitive gains and comparative advantage gains. Pro-competitive gains result from the fact that trade openness brings a threat on the monopolists of a possible competition from abroad hence they start to produce more and sell at relatively lower prices. In the general price model, the price charged on a good is expressed as:

$$P_X = MC_X / (1 + 1/\varepsilon_X) \quad (3.7)$$

Where: P_X is the price of good X ; MC_X is the marginal cost of good X ; ε_X is the own price elasticity of good X (which is in normal circumstances less than zero).

For monopolistic markets, price elasticity tends to zero. Therefore the denominator tends to decrease with increase in monopoly power hence resulting in general price levels being higher. In highly competitive markets price elasticity tends to infinity. This will hence result in the denominator increasing as markets become more competitive hence the price levels being lower as opposed to monopolistic markets. Therefore with increased trade openness, the potential threat from abroad make domestic markets move towards more competitive markets structure. This therefore leads in reducing the income earnings to the monopolist producers hence narrowing the income gaps between the capitalist monopolist producers and the common consumers.

Comparative advantage gains on the other hand work as in the classical and neo-classical trade theories where countries produce more and export goods in which they

have comparative advantage and produce less and import goods in which they do not have comparative advantage (Markusen et al., 1995). In terms of income inequalities, this theory proposes that trade openness helps in reducing incomes for the capitalist-monopolists who are the owners of capital and reduces exploitation of consumers who are of relatively low income. Therefore, increased foreign trade is likely to lead to reduction in income inequalities. On the other hand, the theory does not draw a clear link between increased trade openness and labour employment.

3.3.3 The Returns to Scale Theory

The H-O theory assumes that there are constant returns in the production of both goods. However, at times some goods may have increasing returns to scale while others do not. Increasing returns to scale imply that as a country increases the production of those good, average production costs reduce. In other words, as production volumes increase substantially, the amount of inputs required to produce an additional unit of output decreases. Melvin (1969) argued that increasing returns to scale is one of the driving forces on the countries' choice of goods and services to specialise in.

For example if good *Y* has increasing returns to scale while good *X* has decreasing returns to scale, both country *H* and Country *F* will prefer to engage in production and export of good *Y* than good *X*. Therefore if resources allow, even country *H* which is labour abundant will be producing more and export good *Y* which is capital intensive. This hence will result in the increase in the demand for capital and reduction in the demand for labour. The marginal productivity of capital increases while the marginal productivity of labour which is already low decreases.

$$W^H \downarrow = MPL^H \downarrow * \bar{P} \quad (3.8a)$$

$$R^H \uparrow = MPK^H \uparrow * \bar{P} \quad (3.8b)$$

Therefore, the returns to owners of capital, both financial capital and skilled labour, increase at the expense of the surplus poor unskilled labour (Ethier, 1982). Therefore, in this instance it does not necessarily hold that labour abundant countries will produce and export labour intensive goods in which they have comparative advantage. The production combinations will rather be influenced by the returns to scale. Therefore, trade openness would have no clear link, whether to labour employment creation or on income inequalities as predicted in the classical and neo-classical trade theories.

3.3.4 The Intra-Industry Trade (IIT) Theory

The theory argues that trade between countries may involve goods in the same industry and intensively using the same factors of production. Among the major proponents of this theory are Jones (1971) and Samuelson (1971). This is believed to be the most common form of trade nowadays where most countries especially those in the same economic development stratum trade in same but differentiated goods which are in high demand in those countries. Among the major driving forces behind this kind of trade are: seasonality in production of some goods; transports costs especially for very large countries; and also to capture economies of scale in production.

Under the circumstances of intra-industry trade, it is not clear whether increased foreign trade will indeed result in increase in the demand of the country's abundant factors. The belief in the H-O theory is that for the labour abundant country H , it will be producing and exporting relatively labour intensive goods and importing capital intensive

goods. Labour demand, and hence labour productivity increases while capital requirement reduces; thereby narrowing the income gaps between owners of capital and owners of labour (Krugman, 1981). However, if country H imports the same kind of goods that intensively use its abundant labour resource, increased trade openness through the import side will negatively impact on labour employment while the burgeoning export side helps increase labour employment.

$$W_X^H \uparrow = MPL_X^H \uparrow * \bar{P} \quad (3.9a)$$

$$R_X^H \downarrow = MPK_X^H \downarrow * \bar{P} \quad (3.9b)$$

$$W_M^H \downarrow = MPL_M^H \downarrow * \bar{P} \quad (3.9c)$$

$$R_M^H \uparrow = MPK_M^H \uparrow * \bar{P} \quad (3.9d)$$

Where: W_X^H and W_M^H are the nominal wages in country H in the export sector and import sector respectively; R_X^H and R_M^H are the nominal rents in country H in the export sector and import sector respectively. Therefore, the two sides of foreign trade will be working in opposite directions both in terms of labour employment and income inequalities. Therefore, the aggregated trade openness does not have a straight forward impact on labour employment and income inequalities. It will all depend on the volumes and characteristics of the goods exported and imported in terms of the production techniques.

3.3.5 The Life Cycle Trade Theory

This model is looked at from two approaches: technology life cycle and product life cycle. Technology life cycle hypothesis, proposed by Posner (1961) argues that high tech countries introduce new products and have temporary monopoly over those products. They produce more and export those products requiring high technologies to developing countries. However foreign producers acquire that technology, adopt and adapt it to suit their labour abundant economies. These are eventually able to conquer markets abroad and even the technology origin countries due to lower labour costs in their economies. On the other hand, the product life cycle hypothesis, proposed by Vernon (1966) argues that as a new product is introduced, it usually requires high tech and skilled labour in production. As it reaches maturity and acquires mass acceptance, it becomes standardized and produced by mass production technologies and less skilled labour. Therefore comparative advantage shifts from the high tech and skilled labour developed countries to less developed countries where labour is relatively cheaper. Under this theory, the most highly industrialised developed countries produce and export new non-standardised goods embodying new and advanced technologies and import products embodying old and less advanced technologies, and vice versa for the non-industrialised developing countries (Krugman, 1979).

This will therefore imply that the H-O belief of foreign trade resulting labour abundant countries producing labour intensive goods and importing capital intensive goods will indeed hold. For country H, with increased foreign trade, labour demand increases while capital requirement decreases, hence:

$$W^H \uparrow = MPL^H \uparrow * \bar{P} \quad (3.10a)$$

$$R^H \downarrow = MPK^H \downarrow * \bar{P} \quad (3.10b)$$

This however will not have a clear impact on income inequalities because there is no certainty that these technologies can indeed change to be labour intensive. In addition, much as production in the two sets of countries will clearly be based on comparative advantage, but technology transfer will depend on among others the level of globalization and the recipient countries' ability to adopt and adapt the new technology.

3.5 Empirical Literature

3.5.1 Trade Openness and Labour Employment

There are several studies that have been carried out to assess how international trade has impacted on labour employment but have come up with different findings. A study by Kung et al., (2011) for China since trade reforms in 1978 revealed that export led growth was an excellent study for the vent-for-surplus framework. The studies show that a “vent” existed for surplus farm workers to obtain off-farm migrant employment and that the slack in the farming created by this migration process attracted those from lower wage districts resulting in the creation of a hierarchy of labour markets differentiated by education and skills. On the overall, labour employment improved and average wage also improved.

Kareem (2006) using time series analysis for Nigeria for the period between 1981 and 2006 found no direct link between trade flows and employment levels. This does not confirm the propositions in the H-O model and the VFS theories which predict a positive correlation. The findings do not confirm the postulations of the Ricardian theory either

which predicts a negative relationship between increased trade openness and labour employment.

On the other hand, Jenkins and Sen (2005) in their four developing country case study found conflicting results. Their study was mainly focused on the manufacturing sector employment of two countries from sub-Saharan Africa, Kenya and South Africa and two countries from south-east Asia, Bangladesh and Vietnam. The findings of this study were that trade helped create employment for Bangladesh and Vietnam but did not work for Kenya and South Africa. This suggests that there were crucial Asia and Africa in terms of impact of globalization on employment opportunities in the manufacturing sector. This hence made them come up with the suggestion that country specific factors are crucial.

3.5.2 Trade Openness and Income Inequalities.

3.5.2.1 Studies Not Specific African Countries

Several studies have also been carried out to examine the trade openness and income inequality relationship and the findings are also varying. The analysis looks at the findings of studies carried out in some countries of the world, not specific for Africa. Babones and Vonada (2009) used both panel and cross sectional data in their study of all English speaking countries and found that income inequality was not robustly related to trade, though scattered significant correlations could be detected. This was assessed in terms of both aggregated impact, where a summed up impact from the export and import sectors were assessed together and disaggregated impact where the two sides of trade openness were assessed separately. The findings showed no significant link in both cases.

It was hence concluded that inequality trends observed are due to country specific policies rather than broad policies related to trade globalization.

Jaumotte et al. (2008) in their study on 51 countries of which 20 were technologically advanced developed countries while 31 were developing countries found that the limited overall significance of globalization represents two off-setting tendencies. Whereas trade globalization is associated with reducing income inequalities, financial globalization, and foreign direct investment in particular is associated with an increase in inequalities. It was generally found that an expanding export sector helped to reduce income inequalities more than the import sector. This was then split into agricultural sector, manufacturing sector and service sector. Findings showed that it was the agriculture exports part that reduced inequalities while the other two sectors had statistics testing insignificant. The agricultural sector is where most poor unskilled labour earn their income hence had more impact on reducing inequalities than other sectors.

Aradhyula et al. (2007) in their study of 60 countries which included both developed and developing countries had mixed findings. When they used aggregated balanced panel data, found a positive and significant coefficient implying that trade openness increased income inequalities for the overall sample. But when they used unbalanced panel data split into two based on levels of economic development; they found that trade openness increases income inequalities only for developing countries but reduces inequalities for developed countries though the test for the later was not statistically significant at 5% but 10%.

A study by Meschi and Virarelli (2007) of 70 developing countries between the years 1980-1999 using the generalized method of moments (GMM) panel vector autoregressive estimation technique found that total aggregate trade flows are weakly related with income inequalities. However, when disaggregated according to the areas of origin/destination, it was found that trade in both exports and imports, with high income countries worsens income inequalities. The channel that this trend could be working through is that of importing capital goods which eventually venture into capital intensive production techniques. This hence provides support that technological differences are crucial in determining distributive effects of trade openness.

Another study by Lee and Virarelli (2006) using panel data estimation for 55 developing countries showed that the optimistic H-O model does not hold. Neither employment creation nor decrease in within-country income inequalities were automatically assured by increasing trade openness. On the other hand, increase in foreign direct investment also showed no significant impact on income inequalities. Even though, trade openness and foreign direct investment were not the main culprits in increasing the within-country inequalities, some evidence emerged that import of capital goods might have resulted in increasing income inequalities via the skill-biased technology change.

3.5.2.2 Studies Done for Africa Countries

Findings of the studies on the impact of international trade on income inequalities that have been carried out specifically for Africa also show varying outcomes. A study by Anyanwu (2011) on international remittances and income inequalities employing both the ordinary least squares (OLS) and the generalized method of moments (GMM) panel

vector autoregressive model found contradictory results on the impact of trade openness on income inequalities. When employing OLS estimation, findings showed that trade openness had a negative coefficient but the test statistic was insignificant. On the other hand, by using the GMM model estimation, findings showed that a shock to trade openness resulted in increasing income inequalities at all periods. However this relationship did not test significant for all periods.

Kai and Hamori (2009) carried out a study on the impact of globalization on income inequalities, working through the financial deepening channel for 29 sub-Saharan African countries. The study found that trade openness coefficient was positive and significant. However the joint effect of trade and log of per capita income has negative coefficient implying that this equalizing or dis-equalising impact of international trade depends on the country's level of economic development. Trade's income equalizing effect is more portrayed for countries with relatively higher per capita output than those with lower levels of per head national income.

Barro (2008) in his study on the impact of foreign trade on income inequalities in sub Saharan Africa and Latin America, on overall found a positive and significant coefficient for trade openness. When he used disaggregated dummies; one for sub Saharan Africa and another for Latin America, both tested positive and significant. This therefore provides evidence that trade openness has resulted in increasing income inequalities in the two regions. These findings contradict the optimism in the H-O theory and the VFS theory.

Odedokun and Round (2001) in a study on the impact of trade openness on income inequalities using standard panel data analysis, found that the relationship is not significant. None of the trade coefficients whether that of the aggregated trade impact or even when disaggregated into export side and import side tested significant. Therefore the fear that increased trade globalization would increase income inequalities was not supported by the data, and hence neither was the standard predictions of the trade theories supported by the data in the African countries.

3.6 Summary of Literature

This chapter looked at the relationship between international trade and labour employment and income inequalities. There are various competing trade theories on how trade openness affects levels of factors of production employment and income inequalities. The classical Ricardian theory proposes that opening to foreign trade will lead to reduction in the employment of labour but the impact on income inequalities is not clear. The neo-classical Heckscher-Ohlin and the vent-for-surplus theories on the other hand agree that for labour surplus economies, trade openness will lead to increase in labour employment; and reduction in capital requirements and hence lead to reduction in income inequalities. Most of the contemporary trade theories on the other hand, contend that trade openness has no clear link to labour employment but also to income inequalities. Different studies have also been carried out to ascertain how trade openness has impacted both on labour employment and income inequalities but have come up with varying results.

CHAPTER FOUR

METHODOLOGY

4.0 Introduction

The study uses a panel data analysis for 20 Sub Saharan African countries for the years from 1980-2002. However, due to the endogeneity in the variables in the model, the study uses panel vector autoregressive model estimation technique. The vector autoregressive approach sidesteps the need for structural model by treating all variables as endogenous in the system as a function of lagged values of all endogenous variables in the system. The chapter is outlined as follows: Section 4.1 discusses the panel autoregressive model; Section 4.2 outlines the model that will be estimated; Section 4.3 gives the variable description; Section 4.4 outlines other specification issues; Section 4.5 gives the diagnostic tests that will be carried out; Section 4.6 outlines the interpretations techniques or methods of interpretation; and finally Section 4.7 gives the data sources.

4.1 Panel Vector Autoregressive Model

Panel vector autoregressive models combine the techniques of the ordinary panel data regressions and vector autoregressive models. It differs from standard panel model in that panel vector autoregressive models treat all variables in the model as endogenous and as function of the lag terms of all the variables in the model. On the other hand, panel VAR models differ from the standard VAR models in that they still maintain the

combination of times series and cross section variations in their analyses (Hayakawa, 2011).

Panel vector autoregressive models can be estimated in various forms among which are: Generalised Method of Moments (GMM), Bayesian inference and Quasi-maximum likelihood. The generalised method of moments is suited for panels which are homogenous or not very heterogeneous (Hayakawa, 2011). The GMM, which is the replica of the random effects model in standard panel data analysis; works under the assumption that the individual fixed effects are not so significant in analysis. However, there is an error in the drawing these common intercept terms which vary with each individual cross section observation. Therefore GMM estimates a panel vector autoregressive model with one common column vector of intercept terms but with two columns of error terms: one that varies with each individual cross section unit but time invariant and the other is the stochastic error term. The Bayesian Inference and Quasi-maximum likelihood on the other hand are suited for cases where the cross section terms are highly heterogeneous. These assume that the individual fixed effects are significant in estimation. Therefore these models estimate a panel vector autoregressive model with the column of intercept terms that varies with each cross section unit but with one column of error terms, that is the stochastic error terms (Love and Zicchino, 2006).

This study however employs the panel VAR using the GMM style of estimation. This is because most of the countries in the analysis are seemingly homogenous to great extent. In most respects, most of the countries share the common characteristics of developing countries some which are low standards of living (per capita income), lower literacy levels and dependence on agricultural produce and other primary products export.

In addition the estimation procedure itself is three-way where the first regression is for the overall sample, then the two sub-sample regressions, one for the high income sample and the other for the low income sample. Therefore, there are likely to be low variability among the cross section units in the regressions that are not accounted for.

4.2 Estimated Model

The model estimated in the study generally takes the outlined principles in Holtz-Eakim et al, (1988) in the estimation of a panel vector autoregressive model. The model used in this thesis in particular is the model used by Meschi and Virarelli (2007) who also employed the GMM estimation. However this study differs from Meschi and Virarelli (2007) in two ways. Firstly, this study uses both aggregated and disaggregated measure of foreign trade; where the impact from the export and import sides is assessed separately. Secondly this study uses a three regression analysis; where the first regression is on the whole sample; the second and third regressions are for the high income sample and low income sample respectively. Therefore, the model for this analysis will be specified as:

$$Y_{it} = \alpha_{oi} + \sum_{q=1}^p \beta_q Y_{it-q} + \varepsilon_i + \mu_{it} \quad (4.1)$$

Where subscript i denotes the county index and t denotes the time index

q is the lag length and p is the maximum lag length

Y_{it} is a column vector of endogenous variables

α_{oi} is a column vector of intercept terms

β_q is a matrix of coefficients

Y_{it-q} is a matrix of lagged variables

ε_i is the country effect

μ_{it} is the stochastic error term

NB: The endogenous variables that are in Y_{it} are:

$INQ_{it}, OPEN_{it}, X_{it}, M_{it}, PCI_{it}, EMP_{it}, FDI_{it}$ which represent: the income inequality measure; trade openness, exports, imports, per capita income, labour employment (participation) rates and foreign direct investment.

4.3 Description of the Variables

Income Inequality

INQ represents the inequality measure as computed by the University of Texas Inequality Project (UTIP) on household income. It is calculated using quintiles of the income groups using the income gaps between the high income earners and the low income earners. This measure is unitless, just like the GINI coefficient; and also makes use of the income earnings and the asset holdings differences between the countries' high income groups and the low income groups. The generation of this data used measures of within-country inequality using internationally comparable pay data, collected for industrial statistics released by the United Nations Industrial Development Organisation (UNIDO). This measure also made use of the Theil Index that captures measures that are perfectly decomposable into a within-country and between-country distribution. This

measure is generated with long and dense measures of inequality that are broadly comparable across countries. The index is also interpreted just as in the GINI coefficient in such a way that the higher the value, the greater the income inequalities in that country (University, U.N., 2005).

Trade Openness

OPEN represents trade openness and is measured as exports plus imports of goods and services as a percentage of GDP. This variable is meant to capture how the aggregated trade openness measure has impacted on both labour employment and income inequality. The Ricardian theory predicts a negative relationship between trade openness and labour employment but the relationship between increased foreign trade and income inequalities is not clear. On the other hand the H-O theory and the VFS theory predict a positive relationship between trade openness and labour employment in labour surplus economies but also a negative relationship between trade openness and income inequalities. Most of contemporary theories however show that this link is not as clear because this depends on other factors other than the factor demand and supply dynamics.

Exports

The export side of disaggregated foreign trade is represented by variable X and this is measured as exports of goods and services as percentage of GDP. This variable will therefore be used to assess if the expected impact of international trade both on labour employment and income inequalities holds for the export sector of foreign trade. In other words, this variable is to capture how trade openness has impacted on labour employment and income inequalities, but working through the export sector only.

Imports

On the other hand, M represents import side of foreign trade and is measured as imports of goods and services as percentage of GDP. This variable is also meant to capture the impact of foreign trade on labour employment and income inequalities, but specifically working through the import sector.

Per Capita Income

PCI captures the level of economic growth measured as gross domestic product per capita at constant US\$ prices. This enters the model as natural logarithm of per capita output. The Kuznets theory on the link economic growth and income inequalities predicts an inverted U-curve relationship. The theory argues that for countries at lower levels of economic development, increase in per capita income leads to increase in inequalities in the societies. For countries with higher levels of economic development on the other hand, increases in per capita income leads to a reduction in income inequalities (Kuznets, 1955). This variable therefore is there to ascertain if this relationship indeed holds for the countries in this sample.

Labour Employment

The variable EMP represents the labour employment rate and is proxied by labour participation rates. This variable captures the percentage of the labour force, thus the percentage of the population between 15 and 65 years of age that was economically active. In the first, this variable is included to assess how trade openness has impacted on the levels of labour employment. Secondly, the variable is also meant to assess how the levels of labour employment have impacted on inequalities in the study sample. This is in

terms of whether increased labour employment benefits the high income groups (skilled workers) or the low income groups (surplus unskilled labour).

Foreign Direct Investment

FDI represents foreign direct investment measured as net foreign direct investment inflows as percentage of GDP. The impact of foreign direct investment on income inequalities depends on the kind of investments that are ventured in. If much of the investment is done in labour intensive production techniques, it will positively impact on the demand for the unskilled labour and reduction in capital requirements. This would hence help narrow income gaps between the high income earners (owners of capital) and the low income earners (owners of labour). On the other hand, if foreign investors mainly venture into capital intensive production techniques, it will negatively impact on the demand for unskilled labour and increase capital demand. This makes foreign direct investment positively related to income inequalities. This variable hence is expected to show what impact shocks to foreign investment inflows have on income inequalities.

4.4 Other Specification Issues

In the first place, it should be noted that separate regressions are to be estimated: one uses the aggregated trade openness variable (OPEN); while the other to use the two disaggregated trade openness variables (X for exports and M for imports). The aggregated trade openness variable (OPEN) is used so as to compare the findings with previous studies which either did not use the inequality data that is used in this study, or did not use a panel vector autoregressive model.

On the other hand, the disaggregated trade openness analysis is to be estimated in three separate regressions, all using the panel vector autoregressive model. The first is for

the whole sample, the second for the relatively high income countries and the third one is for the relatively low income countries. This is to assess how trade openness has impacted on labour employment and inequalities depending on the countries' level of economic growth. The grouping is based on the World Bank categorisation of the middle income countries where some belong to the upper category while others are in the lower category. The low income sample has these countries: Central African Republic, Eritrea, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Nigeria, Senegal, Tanzania and Togo. The high income sample includes: Botswana, Cameroon, Cote d'Ivoire, Congo Republic, Gabon, Mauritius, Swaziland, South Africa and Zimbabwe.

4.4.1 Forward Mean Differencing

Forward mean differencing is the process of removing fixed effects from the data. Since this study uses the GMM estimation of a panel VAR model, it is essential to remove the fixed effects for the data before the model is estimated (Love and Zicchino, 2006). In the simple time series analysis, this is done using the within-group transformation for example by differencing. This procedure however in panel data would result in the error terms being correlated with some variables in the model since there tends to be variations among individual cross-sectional units observations. This therefore results in problems of autocorrelation and heteroscedasticity in the series that initially did not have these problems.

Therefore the appropriate procedure used is forward mean differencing. This was proposed by Arrelano and Bover (1995) and is also known as the Helmet procedure. Forward mean differencing removes the mean of all future observations available for each country-year. This procedure maintains orthogonality amongst the errors as well as

orthogonality between the transformed error terms and the untransformed original variables which are used as instrumental variables. Orthogonality characteristic implies that the error terms are not correlated with any of the variables in the model. This implies that for this estimated model of this study:

$$Y_{it} = \alpha_{oi} + \sum_{q=1}^p \beta_q Y_{it-q} + \varepsilon_i + \mu_{it} \quad (3.2a)$$

$$E(Y_{is}\mu_{it}) = E(\alpha_{oi}\mu_{it}) = E(\varepsilon_i\mu_{it}) = 0; s < t \quad (3.2b)$$

This is essential to ensure unbiased estimators of the impulse response functions. Therefore in this study, the Helmert procedure shall be applied to time –demean the data before estimation of the model.

4.4.2 Lag Order Selection

Before estimation of the model, there is need for selection of the correct lag length. Lag order selection uses several criteria. However the widely used criteria are the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC) (Gujarati, 2004). This is because these have the advantage of accounting for effect brought in by the inclusion of more variables in the model. The two criteria are more responsive to the inclusion of extra variables than the other criteria, hence are better suited to cases where you have many variables. In comparative terms however, the SIC is more punitive for more variable inclusion than the AIC. Therefore the model is to be estimated at the lag length that will be selected by the Schwarz Information Criteria.

4.5 Diagnostic Tests

4.5.1 Unit Root Test for Stationarity

Before estimation of the model it is necessary to carry out stationarity test to see whether the series are stationary or not. With panel data, conventional time series unit root tests like the Augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) test readily reject the null hypothesis that panels are non-stationary; hence it is necessary to use the panel data specific tests for stationarity. This study uses the Levin, Lin and Chut (t^*) test which is one on the mostly used panel data tests for stationarity. This test however has a limitation. It is inefficient in panel data with higher number of panels and relatively fewer time series observations. The Levin–Lin–Chu test requires that the ratio of the number of panels to the number of time periods should tend to zero asymptotically. Therefore, it is not well suited to samples with large number of panels and fewer time periods. In such cases, the appropriate test to use is the Harris- Tzavalis (1999) test. This test assumes that the number of panels tends to infinity while the number of time periods is fixed. However, this test has a constraining factor in that it works only for highly balanced panel data. Since this study uses unbalanced panel data, this test is not applicable. Therefore, this study employs the Levin, Lin and Chut (t^*) test for stationarity. Besides, the panel data used in this study has more time observations terms than cross-sectional units, therefore the Levin, Lin and Chut (t^*) test can still be used.

4.6 Interpretation Methods

In vector autoregressive models, the individual coefficients are difficult to interpret, hence the interpretation of these models uses among others: impulse response functions, variance decomposition and granger causality. This study will specifically use the

impulse response functions (IRF) and the Monte Carlo simulations. The IRF gives the direction and magnitude of impact of a shock in a variable on the variable itself but also on the other variables in the model (Gujarati, 2004). The Monte Carlo simulation gives the statistical significance of that relationship depicted by the impulse response function.

4.6.1 Impulse Responses and Monte Carlo Simulations

The impulse response function traces out the response of the dependent variable in the VAR system to shocks in the error terms. This traces the effect of one standard deviation shock to one of the innovations on current and future values of the endogenous variables in the VAR system. Impulse response functions give both the direction and the magnitude of the response of one variable due to a shock to another variable that is observed or predicted at a particular period in time (Love and Zicchino, 2006). Monte Carlo simulations on the other hand give the error bands that are used to test for statistical significance of the impulse response functions. Just like the conventional error bounds also known as the confidence intervals of where the test parameter is likely to be picked, the Monte Carlo simulations also give the error bands in that respect (Hayakawa 2011). The lower error bound and upper error bounds are computed for each response parameter and are calculated as

$$\beta_j \pm t_{\alpha/2} * se(\hat{\beta}_j) \quad (3.3)$$

Where β_j is the response parameter of variable j due to a one standard deviation shock to any other variable in the VAR system, observed at period p ; where $j = 1, 2, 3, \dots, k$.

$t_{\alpha/2}$ is the two sided t-distribution statistic at α level of significance and $se(\hat{\beta}_j)$ is the standard error of $\hat{\beta}_j$

The Monte Carlo simulations are evaluated at 5% level of significance ($\alpha = 0.05$) and gives the error bounds so as to determine whether the test statistic is significant or not. For the impulse response estimates that are not statistically significant, the error bands include zero; that is the lower error bound (LEB) is below zero while the upper error bound (UEB) is above zero. In such cases you fail to reject the null hypothesis of no causality between any two variables in the model. But in the case that the error bounds do not include zero, the test is statistically significant. This is when either both the lower error bound (LEB) and the upper error bound (UEB) are below zero or above zero. In this case, you reject the null hypothesis of no causality between any two variables in the model.

4.7 Data Sources

The study uses unbalanced panel data for 20 sub-Saharan African countries using annual data for the period between 1980 and 2002. The study includes countries that have adequate data available on the data sources given below and also countries that have not been through major political instabilities in the study period. The GINI coefficient inequality data for most African countries is not sufficiently available at the World Bank (2011) database. Therefore, the income inequality data used in the study is the one generated by the University of Texas Inequality Project (UTIP) (2005) on Household Income Inequalities. Data on all the other variables are obtained for the Africa Development Indicators (ADI) on the World Bank database. These include: trade openness (exports and imports), per capita income, labour employment (proxied by labour participation rates) and foreign direct investment.

CHAPTER FIVE

REGRESSION RESULTS AND DISCUSSION

5.0 Introduction

This chapter presents the regression results of the panel vector autoregressive regression that was estimated. The chapter is outlined as follows: Section 5.0 gives the introduction to the chapter; Section 5.1 gives the descriptive statistics for the variables in the model; Section 5.2 gives the results of the diagnostic tests that were carried out; Section 5.3 gives regression results; and is divided into three sub-sections: sub-section 5.3.1 gives the results of the regression equation mainly focusing on the aggregative impact of trade openness on both labour employment and income inequalities; sub-section 5.3.2 gives the regression results on the disaggregated impact of exports and imports on labour employment; sub-section 5.3.3 gives the regression results on the impact of the disaggregated impact of exports and imports on income inequalities.

5.1 Descriptive Statistics

This section presents the descriptive statistics for the variables in this study. The study is carried out in three regressions in which case the analysis is done for the whole sample, then separated into high income sample and low income sample. Table 3, Table 4 and Table 5 below give the descriptive statistics for the samples in the study

Table 3: Descriptive Statistics for the Whole sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Inequality	305	45.657	4.515	31.14	64.36
Trade openness	460	69.305	39.379	6.194	198.906
Exports	437	34.218	19.072	3.212	94.928
Imports	436	38.823	20.406	2.982	114.046
Per capita incomes	439	2.764	.455	1.970	3.722
Labour employment	460	71.457	9.116	53.1	91.1
Foreign direct investment	432	1.364	2.722	-8.947	22.045

Table 4: Descriptive Statistics for High Income Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Inequality	135	45.936	4.891	31.14	64.36
Trade openness	207	90.952	40.614	19.350	198.906
Exports	207	46.318	18.989	9.220	94.928
Imports	206	44.850	23.217	10.129	114.046
Per capita incomes	207	3.167	.310	2.731	3.722
Labour employment	207	65.961	6.351	53.1	74.2
Foreign direct investment	206	1.672	3.481	-8.947	22.045

Table 5: Descriptive Statistics for Low Income Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Inequality	170	45.436	4.194	34.17	54.97
Trade openness	253	51.594	27.862	6.194	116.698
Exports	230	23.328	10.805	3.212	54.267
Imports	230	33.425	15.699	2.982	87.383
Per capita incomes	232	2.404	.179	1.970	2.683
Labour employment	253	75.953	8.562	54.9	91.1
Foreign direct investment	226	1.082	1.730	-1.562	12.047

The statistics show that on overall, income inequalities have a mean of 45.66. The minimum observation was 31.14 while the maximum was 64.36. The statistics do not show any substantial difference in income inequalities between the high income and the

low income countries. However, the high income sample had a relatively higher average level of income inequalities; the mean observation was 45.94 as compared to a mean of 45.43 for the lower income countries. This trend however is contrary to the postulations in the Kuznets theory which predicts a negative relationship between economic development and income inequalities.

Trade openness which is measured as summation of exports and imports as percentage of GDP showed an overall average of 69.3%. The minimum observation was 6.19% and the maximum was 198.9%. For the high income countries, the combined foreign trade flows accounted for an average of 90.95% of GDP while for the low income sample, trade openness was accounting for an average of 51.59% of GDP. In general, it shows that the foreign trade sector account for some good part of national output for most countries and this percentage is greater for the high income countries than those with low per capita income countries.

Exports as percentage of GDP show an overall average of 34.22%. The minimum observation was 3.21 and the maximum was 94.93. For the high income countries, exports accounted for average of 46.32% of GDP. For the low income sample however, exports accounted for an average of 23.33% of GDP. In general, it shows that exports account for some good part of national output for some countries and this percentage is greater for the high income countries than those with lower per capita income countries.

On the other hand, imports as percentage of GDP show an average observation of 38.82. At the minimum, imports accounted for 2.98% of GDP and the maximum was 114.05%. For the high income countries, exports accounted for an average of 44.85%. The low income sample shows that on average, imports accounted for 33.43% of GDP.

Therefore on average, high income countries seem to have a greater share of national output that is accounted for by imports as compared to low income countries. In terms of the overall trade balance, the external balance is slightly positive for the high income countries while highly negative for the low income countries. This hence results in that the overall trade balance is negative (balance of payments deficit) with exports accounting for an average of 34.22% of GDP while imports are attributed to 38.812% of national output.

In terms of per capita income, the overall sample shows that the natural logarithm of per capita GDP has an average of 2.76. The minimum observation is 1.97 and the maximum is 3.75. For the high income sample, the natural logarithm of per capita income shows an average of 3.17. On the other hand for low income countries, the average natural logarithm of per capita is 2.4. Therefore as the demarcation itself puts it, high income countries have higher levels of logarithm of per capita income as compared to low income.

Labour employment rates show that on the overall, labour participation rates had a mean of 71.46% of total labour force. The minimum participation rate was 53.1% of labour force and the maximum was 91.1%. The high income sample shows that the labour participation rates were relatively lower with a mean of 65.96%. However, low income countries showed higher levels of labour participation rates as compared to high income countries. The average was 75.95%. One of the reasons for this is because in the high income countries, production techniques are relatively capital intensive as compared to the low income countries. These include manufacturing, mineral and petroleum

extraction as opposed to the relatively labour intensive agricultural production which comprises a bigger part of low income countries' exports.

Foreign direct investment also captured as net FDI inflow as percentage of national output has an overall mean of 1.36%. The maximum observation is 22.05% while the minimum is (-8.95%). In terms of the high income sample, FDI was averaging 1.67% of GDP. Low income countries show that they had relatively lower levels of FDI as compared to high income countries. In addition it is also observed that the low income countries had relatively lower variability if FDI inflows as compared to high income countries. The low income countries average was 1.08% of GDP. Therefore, in general, countries with higher income levels attracted more foreign investors than countries with lower per capita incomes, though in percentage terms the difference is not substantial.

5.2 Diagnostic Tests Results

5.2.1 Unit Root Test for Stationarity

Before empirical estimation unit root test was conducted to test for stationarity in the panels. The stationarity test used was the Levin, Lin and Chut (t^*) test. Table 6 below presents the results.

Table 6: Levin, Lin and Chut (t^*) test

Variable	t^* -Statistic	P-Value	Order of Integration
Inequality	-41.44	0.0000*	I (0)
Exports	-3.54	0.0002*	I (0)
Imports	-2.32	0.0314*	I (0)
Per capita incomes	-3.20	0.0007*	I (0)
Labour employment	-4.26	0.0014*	I (0)
Foreign direct investment	-3.45	0.0003*	I (0)

From the results obtained from the unit root test, all the series are stationary at levels. This therefore shows that there is absence of unit roots in the panels. Therefore the study will employ ordinary panel vector autoregressive model of estimation.

5.2.2 Lag Length Selection

Before the estimation of the model, it is also necessary to come with the correct lag length at which the results have to be estimated. Table 7 below shows the results obtained from the lag order selection criteria.

Table 7: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2136.501	NA	343770.5	26.93711	27.03362	26.97630
1	-983.6416	2218.710	0.237166	12.75021	13.32925*	12.98535*
2	-947.4785	67.32258	0.206287*	12.60979*	13.67136	13.04088
3	-934.5252	23.29965	0.240594	12.76132	14.30543	13.38837
4	-898.7831	62.04291*	0.211100	12.62620	14.65284	13.44920
5	-888.5674	17.09039	0.256045	12.81217	15.32134	13.83111

* indicates lag order selected by the criterion

Results show that the sequential modified LR test statistic selected lag length 4, the Final prediction error (FPE) and Akaike information criterion (AIC) selected lag 2 while Schwarz information criteria (SC) and Hannan-Quinn information criterion (HQ) selected lag length 1. Since as put above, the SC is the most responsive to changes brought in by the inclusion of more variables, therefore is suited in models with many variables. This study hence estimates the results at lag 1 which is selected by the SC.

5.3 Regression Results and Interpretation

This section presents the regression results from the estimated model. This study assessed how trade openness, has impacted on labour employment creation and income inequalities. This study assessed the trade openness both as the aggregated measure but also disaggregated in terms of exports and imports.

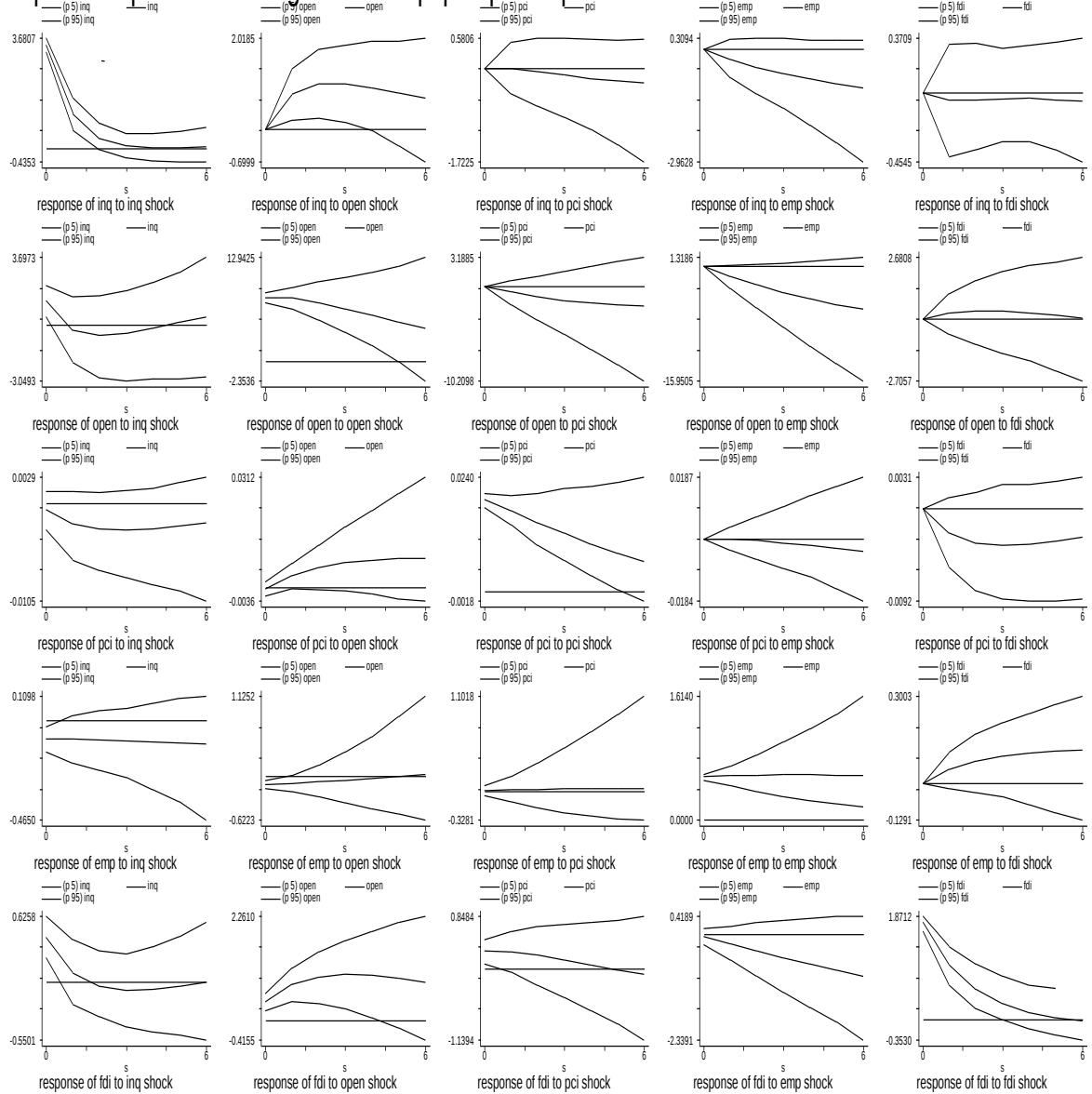
5.3.1 Aggregated Trade Openness versus Labour Employment and Income Inequalities

This sub-section looks at the aggregative impact of foreign trade on labour employment and income inequalities. This is meant to compare the findings of this study with previous studies which either did not use the data set used in this study or used the standard panel data analysis and not use the panel vector autoregressive model. For details, refer to Figure 6 below, but also refer to Appendix 1. Results show that increased trade openness has an ambiguous impact of labour employment, though the dominant trend is negative. A one standard deviation shock to trade openness results in reducing labour employment at periods $p = 0,1,2,3,4,5$ but increases labour employment at period $p = 6$. However, the response parameters at all periods test insignificant except at period $p = 0$.

This therefore implies that trade openness does not have a significant impact on labour employment. This finding does not confirm any of the beliefs whether in the Ricardian theory or the H-O theory. These findings are in line with Kareem (2008) and Jenkins and Sen (2005) who also conducted studies in some African countries and found no significant impact of trade openness on labour employment.

Figure 6: Impulse-Responses, Monte Carlo Simulations (Overall Sample) With Trade Openness Aggregated

Impulse-responses for 1 lag VAR of inq open pci emp fdi



Errors are 5% on each side generated by Monte-Carlo with 1000 reps

In terms of the relationship between trade openness and income inequalities, results show that increased foreign trade leads to increase in inequalities. A one standard deviation shock to trade openness results in increasing inequalities at all periods

where $p \neq 0$. The trend shows that the response parameters increase in the initial stages and then falls towards zero but is at all periods positive. The response parameters for this relationship are statistically significant for periods $p = 1,2,3,4$ but insignificant at periods where $p = 5,6$. Figure 6 above gives the detailed results. For further details, also refer to Appendix 1. The findings show that the postulations of the optimistic H-O theory are not applicable for sub-Saharan Africa. The findings are in line with Kai and Hamori (2009) and Barro (2008) who also found that trade openness resulted in increasing inequalities. These findings however are not in line with findings of Anyanwu (2011) and Odedukum and Round (2001) who found that trade openness had insignificant impact on income inequalities.

This therefore shows that in terms of the aggregated impact of trade openness, the departure from using the Gini coefficient inequality data to the inequality data used in this study does not bring big differences in the findings. On the other hand methodological issues also play a minimal role in altering the results of the study. In terms of labour employment, the findings of this study show that trade openness has insignificant impact on labour employment. Similar findings were found by Kareem (2008) and Jenkins and Sen (2005) who did not use VAR model. The study also found that trade openness results in increasing inequalities. Barro (2008) had the same findings despite not using the new data and Kai and Hamori (2009) also found the relationship between increased foreign trade and inequalities to be positive though he did not use the panel VAR model. Therefore, in terms of the aggregated measure of trade openness, the findings of this study do not show a significant departure from the other studies' findings that either used the Gini coefficient data or used the standard panel regression.

5.3.2 Exports and Imports versus Labour Employment

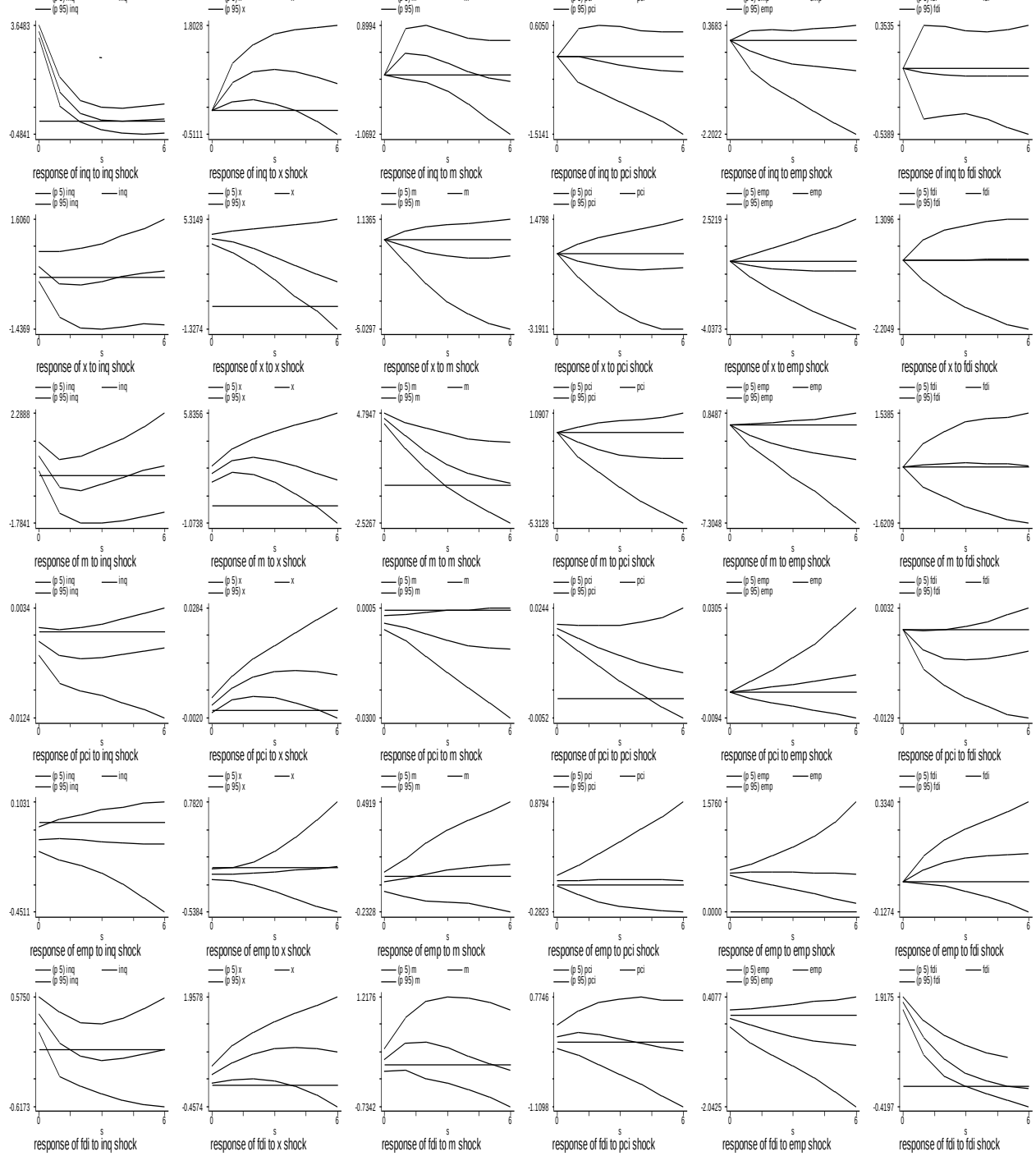
Impact of trade openness on levels of labour participation is mixed as results show that the export and import sides show different impacts for different samples. Figure 7, Figure 8 and Figure 9 below show the responses in labour employment to shocks to exports and imports, for the overall sample, and for the high income and low income sub-samples. For further details, refer to Appendices 2 and 3.

Regression results show that in the overall sample, the impact of a one standard deviation shock to exports is ambiguous though a negative trend dominates the relationship. The test for this is however not significant at all periods. Likewise, the impact from one standard deviation shock to the import side is also ambiguous though a positive trend dominates in the relationship between the two. However the response parameters are all insignificant at all periods.

In the high income sample regression, results show that one standard deviation shock to exports result in reducing levels of labour participation rates and this holds at all periods. However the test is significant only at period $p = 0$ only but for all other periods it is not significant. The impact from the import side is rather ambiguous. A one standard deviation shock to imports result in reducing labour employment at periods $p = 0, 5, 6$ but results in increasing labour participation rates in all the intermediate periods. The test for this relationship is also significant at period $p = 0$ only and insignificant for all $p \neq 0$.

Figure 7: Impulse-Responses, Monte Carlo Simulations (Overall Sample) With Trade Openness Disaggregated

Impulse-responses for 1 lag VAR of inq x m pci emp fdi



Errors are 5% on each side generated by Monte-Carlo with 1000 reps

Figure 8: Impulse-Responses, Monte Carlo Simulations (High Income Sample) With Trade Openness Disaggregated

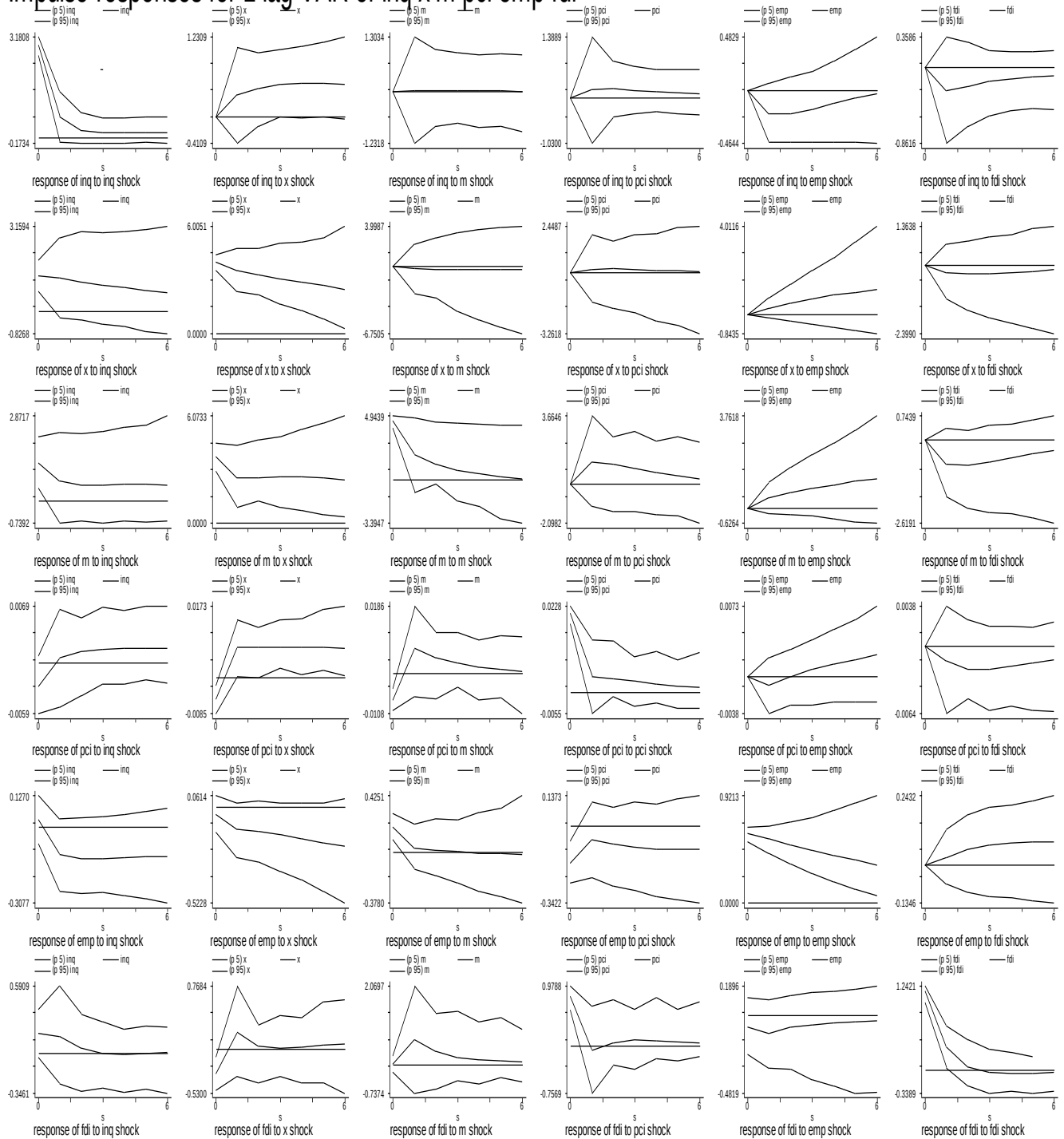
Impulse-responses for 1 lag VAR of inq x m pci emp fdi



Errors are 5% on each side generated by Monte-Carlo with 1000 reps

Figure 9: Impulse-Responses, Monte Carlo Simulations (Low Income Sample) With Trade Openness Disaggregated

Impulse-responses for 1 lag VAR of inq x m pci emp fdi



For the low income sample, regression results show that a one standard deviation shock in exports results in reducing labour employment rates and this relationship is observed at all periods. However the response parameters are all statistically insignificant. On the other hand, results show that a one standard deviation shock to import side results in increasing labour participation rate for periods $p = 0,1,2,3$ but reduces inequalities at periods $p = 5,6$, although observations after period $p = 2$ are not substantially different from zero. The response parameters are significant at periods $p = 0$ but insignificant at all other periods.

The export side shows a weak reducing labour employment impact. This is in line with the predictions of the Ricardian theory which predicts a negative relationship between increased foreign trade and labour employment. The import side on the other hand shows that trade openness in the import sector result in increasing labour employment in periods $p = 0,1$ but no impact in the subsequent periods. This finding shows that the H-O theory and the vent-for-surplus theory, which predict a positive relationship between increased foreign trade and labour employment for labour abundant countries is weakly operative in the import sector of foreign trade.

These findings show that the use of aggregated impact of international trade on labour employment compromised the findings. Since the two side of foreign trade have contradicting impact on labour employment, this is the reason why previous studies found that trade openness had insignificant impact. Both studies carried out among African countries showed that trade openness did not significantly impact on labour employment. On the other hand, it can also be deduced that the impact from the export

side is slightly more dominant than the impact from the import side. The regression using the aggregated trade measure shows that a one standard deviation shock to trade openness has insignificant impact on labour employment. However it is noted that a weak negative trend dominates the relationship between the two. In the disaggregated analysis however, results show that it is the export side that negatively impacts on labour employment while the import side leads to increase in labour employment in the initial stages though has no long run impact.

5.3.3 Exports and Imports versus Income Inequalities

This subsection looks at the relationship between income inequalities and all the variables in the model. The analysis looks at the response of inequality measure to shock in the other variables in the models and the relative significance of the response parameters. The analysis also uses the impulse-response analysis to give the size and direction of the responses of inequalities due to shocks in other variables and also the Monte Carlo simulations for statistical significance at 5% level. For details refer to Figure 7, Figure 8 and Figure 9 above.

Exports

Increased international trade in the export side generally show an increasing inequalities trend and this holds for all three regressions samples. For the overall sample, a one standard deviation shock to export volume results in widening income inequalities, and this holds at all periods of observation where $p \neq 0$. The test for this relationship is significant for periods $p = 1, 2, 3$ but insignificant at all the other periods. The same trend is observed for high income sample and low income sample where a one standard deviation shock to exports result in increasing income inequalities and this trend holds at

all periods of observation where $p \neq 0$. However, the test is not statistically significant for the high income sub-sample at all periods but for the low income sample, the test is significant at period $p = 3$ and insignificant for all other periods. For details refer to Figure 7, Figure 8 and Figure 9 above. For further details, also refer to Appendix 2. This generally contradicts the optimistic postulations of the H-O theory and the vent-for-surplus theory which predict a negative relationship between trade openness and income inequalities. These findings on the impact of international trade on income inequalities working through the export side are in line with findings of Kai and Hamori (2009) and Barro (2008) who also found a positive and significant coefficient.

Imports

The impact of imports on income inequalities is rather ambiguous as it shows both increasing and reducing trends for different samples at different periods. For the overall sample, a one standard deviation shock to imports increase inequalities in the short run at periods $p = 1, 2, 3, 4$ but the relationship turns negative for periods $p = 5, 6$. However the test is statistically insignificant at 5% for all periods of observation. Results for the high income sample regression also show ambiguity as a one standard deviation shock to import sector results in increasing inequalities at period $p = 1$ but reduces inequalities at all other periods of observation where $p \neq 0$. However, the test is not significant for all periods. Likewise for the low income sample, a one standard deviation shock to exports result in increasing inequalities in periods $p = 1, 2, 3, 4, 5$ but for period $p = 6$, the relationship is negative. For details refer to Figure 7, Figure 8 and Figure 9 above. For further details, also refer to Appendix 3. Therefore this shows that there is generally a

short run positive relationship but long run negative relationship between a burgeoning import sector and income inequalities, but the relationship is however weak for predictive purposes. These findings were also come upon by Anyanwu (2011) and Odedukun and Round (2001) who also found that trade openness had insignificant impact on income inequalities. In fact the later also used a disaggregated analysis and found that the trade variables, both from the export side and import side had insignificant impact on income inequalities.

From the results obtained on that disaggregated impact of foreign trade on income inequalities, it is revealed that the export side significantly increases income inequalities while the import side's impact is insignificant. This has two implications. Firstly, this implies the aggregation of the international trade variable could have influenced the findings of Anyanwu (2011) who found that trade openness had insignificant impact. Since the two sides do not have the same impact on income inequalities, the import side might have compromised the inequalities increasing of the export side hence rendering the aggregated trade openness coefficient insignificant. Secondly, other results also reveal that the impact from the export side pre-dominates the one from the import side of international trade. Regression using the aggregated trade openness variable show that increased foreign trade significantly increases income inequalities. The disaggregated analysis however show that it is the export side that significantly increases income inequalities while the import side's impact is insignificant. Therefore findings of Kai and Hamori (2009) and Barro (2008) might have been influenced more by the impact from the export side than from the import side.

Labour Employment

Impact of labour participation rates on income inequalities is not very certain though a weak negative relationship is observed for all samples. Results for the high income sample regression show that a one standard deviation shock to levels of labour participation rates result in reducing inequalities at all periods where $p \neq 0$ but the statistic is insignificant for all periods. Likewise for the high income sample, a one standard deviation shock in the labour participation rates show a reduction of inequalities trend for all periods where $p \neq 0$, but the test is not significant at all periods of observations. In the low income sample, the relationship is not as clear though a weak negative trend is evident at all periods where $p \neq 0$ even though the test is highly insignificant as well. Therefore, this generally shows that the increases in labour participation rates are convergent in terms of income inequalities; however the relationship is not strong for predictive purposes. For details refer to Figure 7, Figure 8 and Figure 9 above. For further details, also refer to Appendix 4. Among the reasons for this trend is that there is an observed mixed response to impulses from the exports and imports sides of trade openness. One sector (imports) increases while the other (exports) reduces the levels of labour participation rates hence the impact of labour employment rates on income inequalities is mixed. It does not clearly show whether shocks to labour employment rates benefits the lower income groups or the higher income groups. However the trend shows that it is weakly equalising and this trend holds for all samples at all periods though the test statistics are all insignificant.

Per Capita Income

Per capita income impact on inequalities is also mixed. It also depends on the level of economic development and weakly confirms the Kuznets prediction of an inverted U-curve relationship between per capita income and income inequalities. For the whole sample, results show that a one standard deviation shock to per capita income results in reduction in income inequalities at all periods of observation where $p \neq 0$. However the response parameters are not significant for all periods. Likewise, high income sample shows a negative relationship between per capita income and inequalities at all future periods of observation where $p \neq 0$. The test is also insignificant for all periods though the magnitude of the response parameters is relatively higher than in the overall sample. For the low income sample however, a one standard deviation shock to per capita income results in increasing inequalities and this relationship holds at all periods in the future where $p \neq 0$. However, the test for this relationship is not statistically significant for all periods of future observation. For details refer to Figure 7, Figure 8 and Figure 9 above. For further details, also refer to Appendix 5.

This therefore shows that the Kuznets predictions weakly apply to African countries in the sub-Saharan Africa region. At lower levels of per capita income, it is expected to have an increasing trend while at higher level of economic development; it is expected to have a negative trend. This is because countries at lower levels of economic development are characterised by low literacy levels and lower percentage of the people who have access physical capital to invest in productive ventures. This results in that very few benefit from economic growth because the majority of the population does not have the capacity to participate in income earning opportunities. On the other hand, countries with

higher per capita income have a higher percentage of the population with more than basic education and a good section of the population have access to capital to venture into productive means. Therefore, if there is economic growth, a greater part of the population benefits hence the negative long run relationship between per capita output and income inequalities.

Foreign Direct Investment

Impact of foreign direct investment on income inequalities is also mixed and it depends on the level of economic development. In the overall sample, a one standard deviation shock to foreign direct investment result reducing income inequalities though the impact is very weak and highly insignificant at all periods of observation. High income sample however shows that increase in foreign direct investment results in reducing inequalities only at period $p = 1$, but generally increases inequalities and this trend holds at all subsequent periods of $p \neq 0$. It is noted however that the test statistics are not statistically significant at all periods. In the low income sample regression, results show that positive shocks to foreign direct investment result in reducing inequalities and this holds at all periods where $p \neq 0$. However, the relationship also tests insignificant at all periods. For details refer to Figure 7, Figure 8 and Figure 9 above. For further details, also refer to Appendix 6. Therefore the observed trends generally show that increased foreign direct investment has varying impact on income inequalities. However, this impact seems to depend on the level of economic growth. While in the relatively low income countries, it leads to reduction in inequalities; in the high income countries it leads to increase in income inequalities, though the impact is not significant in both cases.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.0 Introduction

This chapter presents the conclusion and policy implications of this study. The chapter is outlined as follows: Section 6.1 gives a summary of results from the panel vector autoregressive model that was estimated; Section 6.2 give the policy recommendations that can be driven from the results that have been obtained; Section 6.3 gives some of the weaknesses of this study; and finally Section 6.4 outlines the areas for further research.

6.1 Summary of Results

This study used a panel vector autoregressive model to examine the impact of openness to foreign trade on labour employment and income inequalities in sub-Saharan Africa for the period between 1980 and 2002. The study used both the aggregated and disaggregated measures of the trade openness, in terms of exports and imports. The disaggregated analysis used three regression estimation in which case the first estimation was for the overall sample, the last two were; one for the relatively high income countries and the other for the relatively low income countries.

The aggregated trade openness measure regression showed that increased international trade significantly resulted in increasing income inequalities but had

insignificant impact on labour employment. In the disaggregated trade openness regression, results show that exports and imports do not have the same impact on labour employment and income inequalities. The export side is more detrimental to the economies under study both in reducing labour employment and increasing income inequalities. A one standard deviation shock to the export side results in reduction in labour employment and at the same time results in diverging income inequalities. This generally holds for all sample regressions though the impact is greater for the high income sample than the low income sample. The import side however, has an insignificant impact on income inequalities but a slight positive impact on labour employment. A one standard deviation shock to imports generally results in increase in labour employment and this holds for the overall sample and the two sub-samples. In terms of income inequalities however, the impact is insignificant. Labour employment rates showed a converging impact on income inequalities. A one standard deviation shock to labour employment results in reduction in income inequalities at all periods and this holds for all sample regressions. However the test statistics are not significantly different from zero.

6.2 Policy Implications

Results show that goods and services exported by most African countries lead to increase in income inequalities. This impact is greater for high income countries which are observed to be main exporters of relatively capital intensive goods like minerals, petroleum and others. On the import side however the impact is insignificant where results seem to be mixed both for low income economies and high income countries.

One way to remedy this problem would be to increase labour involvement in most of these activities. This would help create labour employment which would benefit much of the surplus unskilled labour in these economies. This can be achieved by instituting binding state laws ensuring that in the production systems, both for export and import substitution, there should be a minimum level of labour involvement. On the other hand, government can also use trade tariffs to restrict the importation of labour intensive goods but also import of capital goods and intermediate goods which specifically venture into capital intensive production systems. This would positively impact on labour employment in the domestic economies hence increasing the income earning opportunities for the labour force much of which is the poor unskilled labour. The results from this study show that increase in labour participation rates helps reduce income inequalities. Therefore taking steps in increasing labour involvement in the production systems would help reduce inequalities in these economies where unskilled labour is in surplus.

However, this would be difficult to implement because this would lead to perceived inefficiencies in production. Most investors, especially foreign investors have little incentive to invest in that economy where production systems are low technology labour intensive. Therefore the alternative to be taken would be increased taxation and re-distributing the resulting revenues to the low income earners. This on the other hand has to be taken with caution because if taxes increase substantially, it will lead into driving away investment both domestic and foreign. The remedy would hence be to figure out an optimal tax level and having the resulting revenue channeled into social welfare activities or production channels where the poor unskilled labour force earn their income. These

include labour intensive activities like agricultural production plus other ventures like fishery, forestry and others.

The other remedy is the introduction of competitiveness in the production and marketing of all goods and services, but also in the labour markets. Bringing policies that would entice investors and minimize business risk, for example, reduction of interest rates, reduction of taxes, inflation targeting, exchange rate policy and providing capital to small scale investors would help achieve this goal. This can also be done by curbing monopoly power by restricting formation few large scale producers in an industry and curbing formation of cartels. This will help reduce income inequalities between the high income earning monopolist capitalists and the common consumers who are relatively low income groups. It is observed that most of production, whether for export purposes or import substitution is highly monopolized by those who have capital. These exploit both the cheap labour resource and the ordinary consumers. The capitalists pay their workers very low wages, but at the same time restrict production so as to sell at substantially higher prices than their production costs. This market competitiveness has to apply to both domestic and foreign investments.

6.3 Limitations of the Study

This study has several limitations. Firstly is the study period. This study captures the trends observed between 1980 and 2002 which is not as recent. This is because of data availability especially on income inequalities. Therefore, there is need for a new, but reliable data set which incorporates the most recent trends on how foreign trade has impacted on labour employment and income inequalities among sub-Saharan African countries.

Secondly, this study uses unbalanced panel data specifically on the inequality data. The observations, though far much frequent than the GINI coefficient, still have some considerable number of gaps which are not even regularly distributed. This can hence compromise the reliability of the findings of the study. There is therefore need for extrapolations and interpolations of the data so that the observations are numerically increased and at least evenly distributed.

Lastly, the study includes only 20 countries in the sub-Saharan Africa region. Most countries are not included in this analysis because of data availability especially on income inequalities. This study does not include most of the countries in the troubled Africa's Great Lakes region and some countries in West Africa. As put above, this is because of the political instabilities that have been in these regions during the study period. Therefore the results can limitedly be applicable and generalised for the whole sub-Saharan African region.

6.4 Areas of Further Research

There are several areas that this study has not tackled as relating to how trade openness has impacted on labour employment and income inequalities. In the first place, this study has just disaggregated the trade openness variable into the export sector and import sector. However it would also be interesting to look at the various sectors of production both for exports and imports. Both sectors can be disaggregated into agricultural exports and imports, manufacturing sector exports and imports, mining and petroleum exports and imports and service exports and imports. This would give a picture as to how trade openness impacts on labour employment and income inequalities based on the production sector that the foreign trade channels through.

Secondly, the labour employment creation used in this study is also aggregative. This can be disaggregated in two ways. First is to ascertain what portion of the economically active labour force is a result of trade openness. If there could be a possible measure to capture what percentage of the active labour that is a result of a burgeoning foreign trade sector, it would be more informative. This would give a much clearer picture as to how trade openness has impacted on labour employment and hence on income inequalities. The second disaggregation can also be based on the production sectors. Labour employment can also be disaggregated into agricultural sector employment, manufacturing sector employment, natural resource extraction sector employment and services sector employment; and see how changes to the various sectoral employment shares affect income inequalities.

Lastly follow-up studies can also look at the impact of the regional variable on how trade openness affects income inequalities in this region. This can be investigated both in terms of impact of regional integration, but also the impact of the region the countries belong to. Regional economic groupings can be used for this purpose. These include: the Southern Africa Development Community (SADC), the East African Community (EAC), the Economic Community of Central African States (ECCAS) and the Economic Community of West African States (ECOWAS). Further studies may even include the Arab Maghreb Union (UMA) to make the study all Africa inclusive.

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APPENDICES

Appendix 1: Impulse-Responses of variable in *Varname* to the shock in *OPEN*

Varname	Period(<i>p</i>)	LEB	β_j	UEB
emp	0	-0.1777	-0.1173	-0.0525
emp	1	-0.2101	-0.1032	0.0166
emp	2	-0.2772	-0.0812	0.1372
emp	3	-0.3532	-0.0553	0.2885
emp	4	-0.4255	-0.0281	0.4688
emp	5	-0.5051	-0.0010	0.6744
emp	6	-0.5904	0.0248	0.9265
inq	0	0.0000	0.0000	0.0000
inq	1	0.2461	0.7906	1.3471
inq	2	0.2731	1.0018	1.7177
inq	3	0.1876	0.9984	1.8012
inq	4	0.0101	0.9163	1.8107
inq	5	-0.2563	0.8063	1.8848
inq	6	-0.6342	0.6880	1.9828

Appendix 2: Impulse-Responses of Variable in *Varname* to the Shock in *X*

Overall Sample					High Income Sample			Low Income Sample		
Varname	Period(<i>p</i>)	LEB	β_j	UEB	LEB	β_j	UEB	LEB	β_j	UEB
emp	0	-0.1441	-0.0838	-0.0230	-3.7686	-3.3751	-2.8944	-0.1365	-0.0383	0.0614
emp	1	-0.1603	-0.0856	-0.0067	-15.4105	-1.8280	12.8284	-0.2777	-0.1229	0.0255
emp	2	-0.2111	-0.0766	0.0617	-1.2e+02	-3.5345	11.9544	-0.2995	-0.1321	0.0356
emp	3	-0.2887	-0.0595	0.1937	-3.6e+02	-4.4658	649.8765	-0.3523	-0.1505	0.0253
emp	4	-0.3817	-0.0374	0.3638	-6.8e+03	-6.5767	187.3120	-0.3965	-0.1726	0.0241
emp	5	-0.4751	-0.0132	0.5601	-1.4e+04	-9.4318	3.6e+04	-0.4602	-0.1946	0.0258
emp	6	-0.5384	0.0107	0.7820	-3.9e+05	-13.7931	2.3e+03	-0.5228	-0.2146	0.0468
inq	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
inq	1	0.1715	0.5919	0.9975	-10.3927	3.8870	17.7082	-0.4109	0.3320	1.0560
inq	2	0.2307	0.8215	1.3783	-1.2e+02	2.4325	16.0070	-0.1482	0.4388	0.9755
inq	3	0.1406	0.8628	1.6069	-3.4e+02	3.9635	718.5183	0.0012	0.4897	1.0289
inq	4	-0.0136	0.8049	1.7056	-6.7e+03	5.0055	105.0935	-0.0140	0.5082	1.0787
inq	5	-0.2393	0.6976	1.7465	-1.3e+04	7.2308	3.6e+04	-0.0052	0.5104	1.1502
inq	6	-0.5111	0.5701	1.8028	-3.9e+05	10.3185	684.7851	-0.0348	0.5037	1.2309

Appendix 3: Impulse-Responses of Variable in *Varname* to the Shock in *M*

Varname	Period(<i>p</i>)	Overall Sample			High Income Sample			Low Income Sample		
		LEB	β_j	UEB	LEB	β_j	UEB	LEB	β_j	UEB
emp	0	-0.0975	-0.0348	0.0302	-0.6541	-0.4717	-0.2612	0.0930	0.1919	0.2909
emp	1	-0.1302	-0.0101	0.1186	-8.5762	0.8305	10.0031	-0.1270	0.0346	0.2172
emp	2	-0.1634	0.0180	0.2238	-72.1088	0.2325	10.8985	-0.1689	0.0181	0.2527
emp	3	-0.1720	0.0430	0.3082	-2.7e+02	0.3359	393.7274	-0.2308	0.0065	0.2435
emp	4	-0.1778	0.0623	0.3764	-3.7e+03	0.0647	119.0617	-0.2942	-0.0026	0.2986
emp	5	-0.2032	0.0755	0.4315	-8.8e+03	-0.1253	2.2e+04	-0.3311	-0.0084	0.3338
emp	6	-0.2328	0.0831	0.4919	-2.2e+05	-0.4417	1.3e+03	-0.3780	-0.0114	0.4251
inq	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
inq	1	-0.0709	0.3939	0.8405	-8.1099	1.4133	10.3098	-1.2318	0.0243	1.3034
inq	2	-0.1257	0.3555	0.8994	-73.3836	-0.2903	8.6289	-0.8227	0.0212	1.0013
inq	3	-0.2933	0.2058	0.7665	-2.4e+02	-0.1258	457.6992	-0.7507	0.0267	0.9090
inq	4	-0.5178	0.0595	0.6687	-4.2e+03	-0.4040	60.6628	-0.8427	0.0208	0.8801
inq	5	-0.8136	-0.0494	0.6128	-9.1e+03	-0.2626	2.2e+04	-0.8381	0.0101	0.8835
inq	6	-1.0692	-0.1178	0.6234	-2.5e+05	-0.1196	553.2915	-0.9605	-0.0008	0.8788

Appendix 4: Impulse-Responses of Variable in *Varname* to the Shock in *EMP*

Varname	Period(<i>p</i>)	Overall Sample			High Income Sample			Low Income Sample		
		LEB	β_j	UEB	LEB	β_j	UEB	LEB	β_j	UEB
emp	0	0.5203	0.5651	0.6008	0.6158	0.7253	0.7912	0.5302	0.6013	0.6520
emp	1	0.4571	0.5732	0.6819	-1.0985	1.0716	3.4137	0.4284	0.5509	0.6615
emp	2	0.3873	0.5752	0.8009	-16.6883	1.5823	5.2246	0.3322	0.5005	0.6938
emp	3	0.3227	0.5716	0.9331	-79.6431	2.3029	70.3859	0.2533	0.4549	0.7373
emp	4	0.2581	0.5634	1.0849	1.0e+03	3.3486	43.7480	0.1831	0.4111	0.7958
emp	5	0.1903	0.5514	1.2886	-2.6e+03	4.8726	3.3e+03	0.1197	0.3686	0.8598
emp	6	0.1218	0.5365	1.5760	-5.2e+04	7.1084	568.2347	0.0595	0.3274	0.9213
inq	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
inq	1	-0.6992	-0.2607	0.2357	-2.5511	-0.2267	1.9772	-0.4484	-0.2014	0.0639
inq	2	-1.0848	-0.4288	0.2610	-19.3518	-0.6192	1.8745	-0.4560	-0.2002	0.1236
inq	3	-1.3676	-0.5406	0.2405	-82.0982	-1.2247	76.1614	-0.4543	-0.1596	0.1738
inq	4	-1.6630	-0.6149	0.2725	-1.0e+03	-2.0739	23.1257	-0.4564	-0.1121	0.2654
inq	5	-1.9537	-0.6627	0.3008	-2.8e+03	-3.2759	3.6e+03	-0.4498	-0.0659	0.3692
inq	6	-2.2022	-0.6912	0.3683	-5.5e+04	-4.9898	195.8870	-0.4644	-0.0231	0.4829

Appendix 5: Impulse-Responses of Variable in *Varname* to the Shock in *PCI*

Varname	Period(<i>p</i>)	Overall Sample			High Income Sample			Low Income Sample		
		LEB	β_j	UEB	LEB	β_j	UEB	LEB	β_j	UEB
emp	0	-0.0123	0.0474	0.1088	0.7424	0.9214	1.0535	-0.2519	-0.1649	-0.0651
emp	1	-0.1033	0.0528	0.2040	-3.1893	1.7343	7.1224	-0.2312	-0.0594	0.1123
emp	2	-0.1797	0.0585	0.3392	-39.0417	2.6551	10.3363	-0.2651	-0.0787	0.0873
emp	3	-0.2240	0.0618	0.4644	-1.9e+02	4.0240	194.3575	-0.2845	-0.0929	0.1106
emp	4	-0.2468	0.0622	0.5925	-2.1e+03	5.9380	104.4879	-0.3148	-0.0998	0.1035
emp	5	-0.2647	0.0596	0.7202	-6.4e+03	8.7190	8.9e+03	-0.3270	-0.1020	0.1266
emp	6	-0.2823	0.0547	0.8794	-1.2e+05	12.7681	1.2e+03	-0.3422	-0.1011	0.1373
inq	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
inq	1	-0.5164	-0.0101	0.5364	-5.2860	-0.1243	4.9519	-1.0300	0.1913	1.3889
inq	2	-0.6995	-0.0971	0.6050	-40.4763	-0.9391	4.5992	-0.4270	0.2039	0.8368
inq	3	-0.8859	-0.1835	0.5673	-1.7e+02	-1.9977	188.1533	-0.3504	0.1672	0.7129
inq	4	-1.0733	-0.2456	0.5008	-2.3e+03	-3.5703	49.7228	-0.2991	0.1360	0.6510
inq	5	-1.2655	-0.2803	0.4627	-6.5e+03	-5.7553	9.7e+03	-0.3544	0.1126	0.6460
inq	6	-1.5141	-0.2919	0.4725	-1.4e+05	-8.8749	418.6890	-0.3761	0.0936	0.6344

Appendix 6: Impulse-Responses of Variable in *Varname* to the Shock in *FDI*

Varname	Period(<i>p</i>)	Overall Sample			High Income Sample			Low Income Sample		
		LEB	β_j	UEB	LEB	β_j	UEB	LEB	β_j	UEB
emp	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
emp	1	-0.0070	0.0511	0.1082	-7.8854	-0.9430	5.4999	-0.0675	0.0270	0.1266
emp	2	-0.0199	0.0817	0.1765	-9.0714	-0.8701	52.3289	-0.0977	0.0554	0.1774
emp	3	-0.0420	0.0996	0.2211	-2.8e+02	-1.3540	193.7602	-0.1125	0.0701	0.2037
emp	4	-0.0637	0.1098	0.2596	-92.1793	-1.8400	3.1e+03	-0.1146	0.0771	0.2124
emp	5	-0.0914	0.1152	0.2961	-1.6e+04	-2.6928	6.6e+03	-0.1288	0.0800	0.2270
emp	6	-0.1274	0.1178	0.3340	-1.1e+03	-3.9359	1.8e+05	-0.1346	0.0805	0.2432
inq	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
inq	1	-0.4117	-0.0359	0.3501	-6.5086	-0.2370	6.3699	-0.8616	-0.2588	0.3586
inq	2	-0.3852	-0.0530	0.3414	-5.3591	1.1118	53.9008	-0.6704	-0.2075	0.2981
inq	3	-0.3675	-0.0597	0.3041	-3.1e+02	1.3339	196.9032	-0.5459	-0.1554	0.1946
inq	4	-0.4143	-0.0621	0.3009	-42.1172	1.9080	3.2e+03	-0.4845	-0.1253	0.1861
inq	5	-0.4812	-0.0636	0.3122	-1.5e+04	2.4477	7.2e+03	-0.4583	-0.1069	0.1905
inq	6	-0.5389	-0.0660	0.3535	-3.9e+02	3.3245	1.9e+05	-0.4746	-0.0932	0.1997