Foreign Direct Investments, Exports and Economic Growth in COMESA Countries: A Heterogeneous Panel Causality Approach

By

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DECLARATION

I, **Arcade NDORICIMPA**, hereby declare that this dissertation is wholly my original work except where acknowledged, and has never been submitted for any other degree award to any other University before.

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DEDICATION

This work is dedicated to my God, my fortress, my stronghold, my deliverer, my shield, in whom I take refuge; to the memory of my late parents, Sir Tite NDIKUMANA and Ms Thérèse MBONABUCA, who loved me so much and made me what I am today, their sacrifices will never be forgotten. It is also dedicated to my brothers, Gabriel NDORICIMPA, Jean DAURIAC, Alfred NDIKUMANA, Louis NDIKUMANA and their families, my lovely sister Consolate NDORICIMPA, my cousins, my uncles and aunties, my nephews and nieces, to my sister-in-law Perpétue BIGIRIMANA, for her kindness, and to my friend Richard NDEREYAHAGA who trained me to work hard.

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LIST OF ABBREVIATIONS

ADF: Augmented Dickey-Fuller

ADI: Africa Development Indicators

AERC: African Economic Research Consortium

AfDB: African Development Bank

ARDL: Autoregressive Distributed Lag

BDI: Burundi

CADF: Cross-section Augmented Dickey-Fuller

COM: Comoros

COMESA: Common Market for Eastern and Southern Africa

CV: Critical Value

DF: Dickey-Fuller

DGP: Data Generating Process

DJI: Djibouti

DRC: Democratic Republic of Congo

ECM: Error Correction Model

ELG: Export-led Growth

EP: Export-Promotion

EPZ: Export Processing Zone

EGY: Egypt

ETH: Ethiopia

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

GMM: Generalized Method of Moments

GNP: Gross National Product

HC: Homogeneous Causality

HNC: Homogeneous Non-Causality

IMF: International Monetary Fund

IPS: Im, Pesaran and Shin

IS: Import-Substitution

JFE: Joint Facility for Electives

KEN: Kenya

KPSS: Kwiatkowski-Phillips-Schmidt-Shin

LBY: Libya

LM: Lagrange Multiplier

L-R: Long-Run

MA: Mauritius

M&A: Mergers and Acquisitions

MDG: Madagascar

MDGs: Millennium Development Goals

MFR: Mixed Fixed and Random

MG: Mean Group

MNCs: Multinational Companies

MNEs: Multinational Enterprises

MW: Maddala and Wu

MWI: Malawi

NEPAD: New Partnership for Africa's Development

NICs: Newly Industrialized Countries

OLI: Ownership, Locational and Internalization (advantages)

PMG: Pooled Mean Group

PP: Phillips and Perron

PTA: Preferential Trade Area

R&D: Research and Development

RSS: Residual Sum of Squares

RWA: Rwanda

SAP: Structural Adjustment Programme

SDN: Sudan

S-R: Short-Run

SSA: Sub-Saharan Africa

SSC: Statistical Software Components

SWZ: Swaziland

SYC: Seychelles

TNC: Transnational Company

UNCTAD: United Nations Conference on Trade and Development

UNECA: United Nations Economic Commission for Africa

UG: Uganda

US: The United States

USA: The United States of America

VAR: Vector Autoregressive

VECM: Vector Error-Correction Model

WB: World Bank

WDI: World Development Indicators

ZMB: Zambia

ZIM: Zimbabwe

ABSTRACT

This study examines the interrelationship between Foreign Direct Investment, exports and economic growth in COMESA Countries so as to assess the validity of "FDI-led exports", "Export-led growth" and "FDI-led growth" hypotheses in that region. The study uses annual data for a panel of 16 COMESA Countries: Burundi, Comoros, DRC, Egypt, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe for the period 1983-2007. The following variables are involved; the Ratio of Inward FDI (percentage of GDP), the Ratio of exports of goods and services (percentage of GDP) and the Growth rate of Real GDP. We test for Granger causality in heterogeneous panels by testing first for Homogeneous Non-Causality and Homogeneous Causality hypotheses as proposed by Hurlin and Venet (2001, 2003) and Hurlin (2004, 2007, 2008). We further use the Pooled Mean Group (PMG) estimation for Heterogeneous Causality tests, method suitable for non-stationary panels, proposed by Pesaran et al. (1999). The findings suggest strong support for the "FDI-led exports" hypothesis, the "Export-led growth" hypothesis as well as the "FDI-led growth" hypothesis. Hence, in general, policies promoting exports and attracting FDI in COMESA Countries are to be encouraged so as to promote and sustain economic growth in the region.

CHAPTER ONE: INTRODUCTION

1.1 Background

COMESA (Common Market for Eastern and Southern Africa), created in 1994, is a regional economic community which is made up of 19 member states[1]. It is the offspring of the Preferential Trade Area (PTA), which came into existence in 1982 to promote trade and factor mobility among its member states. Despite being endowed with abundant natural resources, countries in the region are still ranked among the poorest in the world. In fact, according to the World Bank (2007)[2], the COMESA grouping includes 13 out of the 19 countries listed among the poorest countries in the world.

One of the Millennium Development Goals (MDGs) set by the United Nations in 2000 is to reduce the proportion of people living in extreme poverty by half by 2015. To achieve those MDGs, countries must boost their economic growth and the requirement is to achieve and sustain an average real GDP growth rate of 7 percent per annum by 2015 (UNECA, 2007). Although countries in the region are trying to boost their economies, the performances achieved so far remain below the 7 percent target required for meeting the MDGs. In fact, the overall real GDP growth[3] for COMESA was 1.3% in 2000, 3.3% in 2001, 2.1% in 2002, 2.0% in 2003, 3.9% in 2004, 4.2% in 2005, 4.7% in 2006 and 5.0% in 2007, with an average of 3.3% for the period 2000-2007; and except Sudan and Ethiopia whose average real GDP growth is 8.0% and 7.80% respectively for that period, for the rest, the performances are still below the required. Therefore, unless economic growth is accelerated, COMESA countries are not meeting MDGs by 2015.

Thus, strategies and policies are to be put in place in COMESA countries so as to accelerate growth and meet MDGs by 2015. Among others, the strategy proposed to promote economic growth in developing countries is the openness to trade and investment through exports and FDI promotion through the so-called "export-led growth" and "FDI-led growth" hypotheses. The relationship between FDI, exports and economic growth has been the subject of debates in the last decades, following the growth records of Asian Newly industrializing Countries (NICs) over the last decades, in particular, Hong Kong, Singapore, Korea, Taiwan, Malaysia

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[1] Burundi, Comoros Islands, DRC, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia, Zimbabwe.
[2] World Bank (2007), World Bank classification list
[3] Data from World Bank, Africa Development Indicators, 2007

and Thailand, growth records which were advocated by the World Bank to be the effect of policies promoting exports and FDI in those countries.

The FDI-exports nexus debate is whether FDI of Multinational Companies (MNCs) is export-oriented or market-oriented, intended just to capture the local or regional markets. Since the MNCs have superior export performance than local firms, in case of export-oriented FDI, this would lead local firms to imitate foreign firms in the same way (Shao-Wei, 2007). Through collaboration or even competition, or more likely imitation, foreign affiliates can stimulate local firms' exports (Görg and Greenaway, 2003). On the other hand, the reverse causality running from exports to FDI can also exist. It is argued that FDI is attracted to countries with a higher trade potential both in terms of imports and exports (Fernando Ponce, 2006).

The relationship between exports and economic growth is also subject to debates; should a country promote exports to speed up economic growth or should it primarily focus on economic growth, which in turn will generate exports? Some advocate that a country could accelerate the economic growth by promoting exports, leading to the so-called "Export-led growth hypothesis" (Awokuse, 2002; Kónya, 2002; Yenteshwar, 2003; Sharma and Panagiotidis, 2004; etc.). However, others support that the causality may also run from economic growth to exports ("Growth-driven exports hypothesis"). In fact, it is advocated by the neo-classical trade theory that economic growth, through its effects on supply side (factor endowments) will create the demand for exports, providing the country with a strong export production base that is internationally competitive (Baharumshah and Rashid, 1999; Mahadevan, 2007).

As for the debate surrounding the nexus between FDI and economic growth, the question is whether countries should promote FDI to obtain economic growth, known as "FDI-led growth hypothesis" or whether they should promote economic growth to attract FDI, known as "Growth-driven FDI hypothesis".
The advocates of "FDI-led growth hypothesis" find their justification in the neo-classical models of growth and the endogenous growth models. In neoclassical models of growth, FDI increases the volume of investment and / or its efficiency, and leads therefore to the increase in long-run growth. As for the new endogenous growth models, they consider long-run growth as a function of technological progress, and provide a framework in which FDI can

permanently increase the rate of growth in the host economy through technology transfer, diffusion, and spillover effects (Nair-Reichert and Weinhold, 2000).

On the other hand, the advocates of "Growth-driven FDI hypothesis" say that the level of economic growth is recognised as one of the determinants of FDI inflows in the host country, insofar that rapid economic growth may create large domestic markets and businesses, hence attracting market-seeking FDI (Agiomirgianakis et al., 2006; Emrah Bilgiç, 2007; etc.).

Otherwise the data show that exports and FDI continue to grow in COMESA Countries. In fact, the overall average ratio of exports of goods and services to GDP for COMESA increased from 26.70% in 1980s, to 28.77% in 1990s and to 30.41% for the period 2000-2006[4], and net FDI inflows increased from $ 8,034.6 million in 1980s, to $ 14,457.9 million in 1990s and to $ 22,833.3 million for the period 2000-2005 in COMESA.

1.2 Problem Statement

In 2001, the United Nations launched the New Partnership for Africa's Development (NEPAD) which is Africa's development vision and framework for achieving the MDGs by 2015 and one of the strategies among others is to promote foreign direct investment and trade, with particular emphasis on exports.

Moreover, in a 2002 summit, the Heads of State and Government from both developed and developing countries adopted a consensus (Monterrey Consensus[5]) as for what should be done for African countries in order to speed up and progress towards MDGs. Among others, emphasis was put on mobilizing domestic financial resources, mobilizing international resources (FDI) and promoting international trade (exports) as engine of growth. However, it is not clear if those policies are a panacea to economic growth issue in COMESA countries. This is because the relationship between FDI, exports and economic growth remains controversial in the literature. In addition, although the nexus between FDI, exports and economic growth has been the subject of considerable research and empirical scrutiny in the last decades, empirical investigations in that area in COMESA countries remain few and give mixed conclusions as for the nature and direction of the causal links between FDI, exports and economic growth (Mafusire, 2001; Abou-Stait, 2005; Bahmani-Oskooee et al., 2007; Mohan and Nandwa, 2007; Mutenyo, 2008).

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[4] Data from World Bank, Africa Development Indicators, 2007 (CD-ROM).
[5] UNECA, Economic Report on Africa, 2008, pp.119

1.3 Research Objectives

The general objective of the study is to examine how FDI, Exports and Economic growth interrelate in COMESA countries. The study is intended at searching for the direction of causality between Foreign Direct Investment inflows (FDI*),* Exports and Economic growth for the case of COMESA countries.

The specific objectives are:

1. To explore the causal relationship between FDI and Exports for the case of COMESA countries.
2. To examine the causal link between Exports and Economic Growth for the case of COMESA countries.
3. To explore the causal link between FDI and Economic growth for the case of COMESA countries.

1.4 Justification of the Study

The need for this research arises because exports and FDI promotion policies have been and are still even now the policies encouraged for Developing Countries desiring to promote their economies. The Asian Newly Industrialised Countries (NICs), particularly Hong Kong, Singapore, Korea, Taiwan, Malaysia, and Thailand are often cited as examples of countries that have experienced and succeeded in promoting exports and attracting FDI. Those countries grew faster and are even now growing faster, and COMESA countries need to grow as well especially now that developing countries are struggling to progress in order to meet the MDGs by 2015. The knowledge of causality directions between FDI, Exports and Economic growth would have hence very crucial policy implications in COMESA countries. For instance if the "Export-led growth" and *"*FDI-led growth" hypotheses are valid for COMESA countries, this would mean that policies promoting exports and attracting FDI are to be encouraged to promote and to sustain economic growth in the region. Thus, the knowledge of the interrelation between the three elements would provide helpful information to policymakers of COMESA countries as for the expected impact of Exports and FDI inflows on economic growth.

Moreover, the interest of carrying out this research is motivated by the fact that insofar as we know, no study has been conducted for the subject and for the sample chosen which is "COMESA Countries". The study uses a new methodology of Panel causality which takes into consideration the heterogeneity in the cross-section units, dimension that most of the

Panel causality studies omit. We therefore hope that it will contribute to the existent literature on the FDI-exports-economic growth nexus in COMESA countries.

1.5 Hypotheses

In order to achieve the research objectives, the study tests the following hypotheses:

1. FDI inflows cause export expansion in COMESA countries.
2. Export expansion causes economic growth in COMESA countries.
3. FDI inflows cause economic growth in COMESA countries.

1.6 Brief presentation of the Methodology

This study uses annual data for a panel of 16 COMESA Countries[6] for the period 1983-2007. The following variables are involved; the Ratio of Inward FDI (percentage of GDP), the Ratio of exports of goods and services (percentage of GDP) and the Growth rate of Real GDP. The data of the above variables are obtained from the Africa Development Indicators (World Bank CD-ROM, 2007), Selected Statistics on African Countries (ADB, 2006, 2008), World Development Indicators (2008) and online database from UNCTAD website.

The heterogeneous panel unit root tests developed by Im, Pesaran & Shin (2003), Maddala & Wu (1999), Hadri (2000) and Pesaran (2005) are used in this study, where the latter assumes that individual time-series are cross-sectionally dependent and the former three assume that individual time-series are cross-sectionally independent.

The residual-based panel cointegration tests of Pedroni (2004) and the ECM-based panel cointegration tests of Westerlund (2007) are used in order to test if there is any long-run relationship between FDI, exports and economic growth in COMESA Countries.

In order to examine the causal links between FDI, exports and economic growth in COMESA Countries, heterogeneous panel causality tests are used. We follow Hurlin and Venet (2001, 2003) and Hurlin (2004, 2007, 2008) to test for the Homogeneous Non-Causality and Homogeneous Causality hypotheses, so as to know whether the non-causality or causality between the variables is homogeneous in COMESA countries. We further use the Pooled Mean Group (PMG) estimation of Pesaran et al. (1999) for Heterogeneous Causality tests to know finally in which cross-section units of our panel, the causal links are present and in

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[6] Burundi, Comoros, DRC, Egypt, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe

which they do not exist. PMG estimation is in fact developed for non-stationary heterogeneous panels.

1.7 Outline of the dissertation

This study is organized as follows: Chapter One presents the background of the study, the problem statement, the justification, objectives and hypotheses of the study; methods and procedures used in the study are also briefly presented. Chapter Two presents some salient features of Foreign Direct Investment, exports and economic growth in COMESA countries. Chapter Three reviews the literature, theoretical and empirical, concerning the relationship between FDI, exports and economic growth. Chapter Four presents in detail the various testing procedures used in this study. In Chapter Five, the results are presented, interpreted and discussed. And the final Chapter Six concludes by giving a general summary of the study, policy implications, limitations of the study and challenges for further studies in the area.

CHAPTER TWO: FOREIGN DIRECT INVESTMENT, EXPORTS AND ECONOMIC GROWTH IN COMESA COUNTRIES: SOME SALIENT FEATURES

2.1 Foreign Direct Investment in COMESA Countries: Some trends

In order to reduce the resource gap arising from imbalances between domestic savings and domestic investment, countries are relying more and more on foreign saving especially by attracting FDI because of its merit in promoting economic growth in host countries. Attracting FDI has become like a race and depends on many factors. Below, we show the difference in FDI inflows attracted by COMESA Countries without considering the differences in economic size of the countries. Figure 1 exhibits the largest and smallest recipients of FDI inflows in COMESA Countries over the period 1980-2007.

Figure 1: Largest and Smallest recipients of FDI Inflows in COMESA, Millions of US dollars, 1980-2007 (Annual Average)
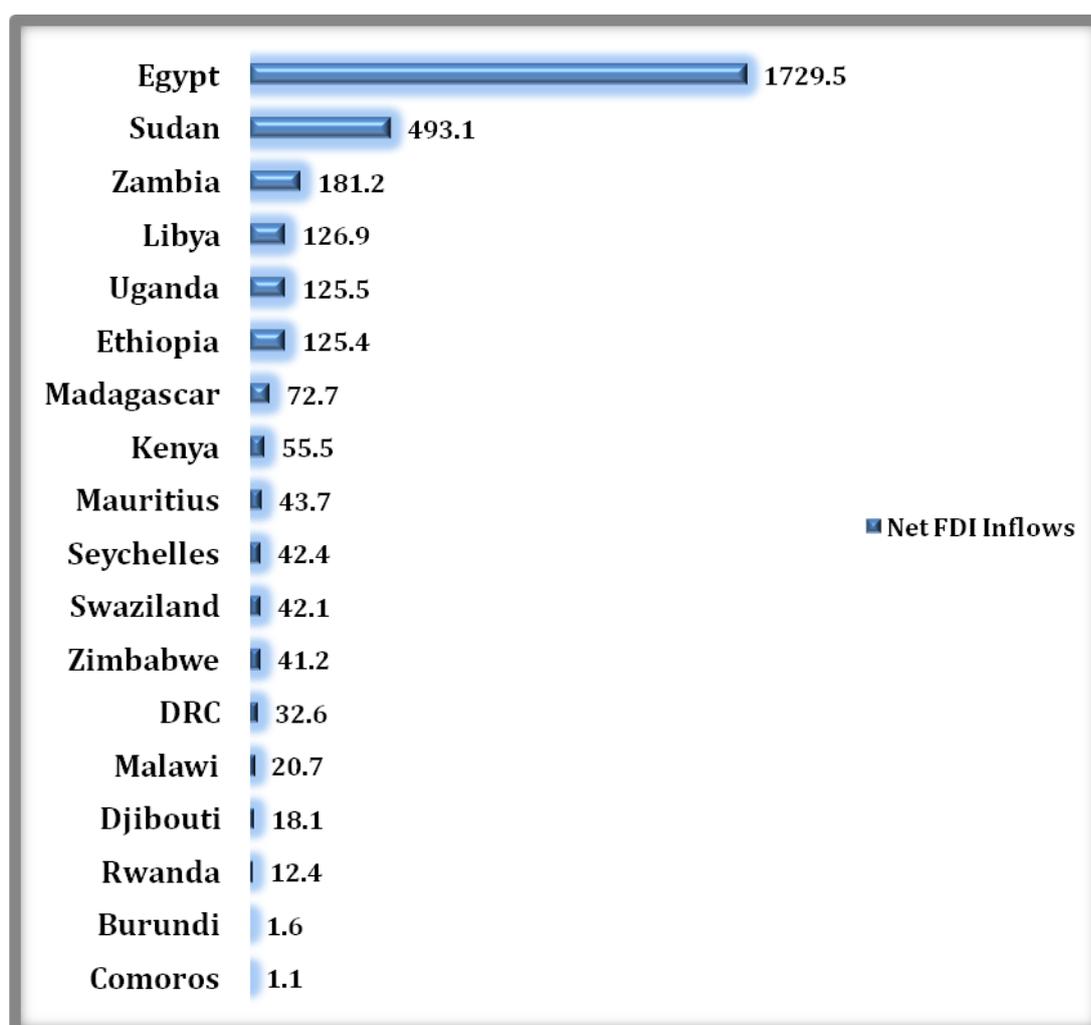
Source: The author, using data from UNCTAD, online database

It can be seen from the above graph that Egypt is by far the largest recipient of FDI in the COMESA region. For the period 1980-2007, Egypt managed to attract an average of 1,729.5 million of US dollars, followed by Sudan with an average of 493.1 million of US dollars, Zambia with an average of 181.2 million of US dollars, Libya with an average of 126.9 million of US dollars, Uganda with an average of 125.5 million of US dollars and Ethiopia with an average of 125.4 million of US dollars. The list is closed by small countries like Comoros and Burundi which managed to attract an average of FDI inflows of only less than 2 million of US dollars.

It is however to be remarked that Libya is ranked fourth among the largest recipients of FDI inflows in COMESA, despite some past years where it was undergoing an embargo, during which period some foreign investors were disinvesting, experiencing hence outflows instead of FDI inflows. This shows that Libya is an upcoming attractive country for foreign investors, along with some countries like Mauritius, Seychelles and Swaziland, though small, are attracting some significant FDI because of some economic reforms undertaken that have improved their investment climate. And Rwanda, though among the bottom three (with only an average of 12.4 million of US dollars), should be another upcoming attractive country for FDI in the region because of some considerable efforts made to attract foreign investors, including the country's policies of zero tolerance on corruption.

But because in some past years, the attractiveness of FDI might have been hindered in some countries by some exogenous factors like wars, embargoes, political instability and other factors, leading to outflows instead of inflows, we analyse the recent trends of FDI flows in COMESA countries, Figure 2 shows the distribution of FDI inflows in COMESA countries during the period 2000-2007.

Figure 2: Share in Total COMESA's FDI Inflows (%), 2000-2007
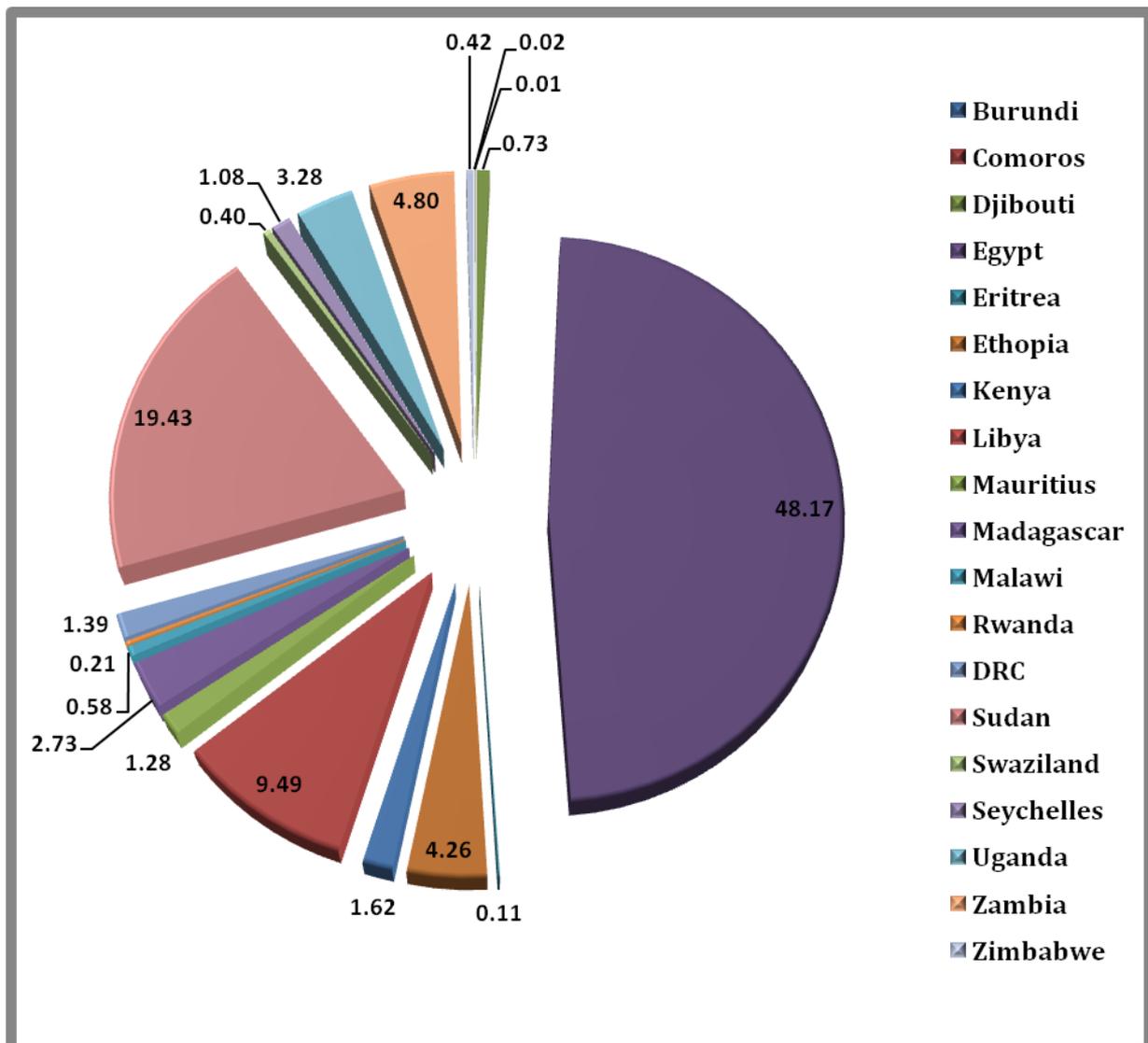
Source: The author, using data from UNCTAD, online database

In the total FDI inflows (66 Billion US dollars) that the region attracted during 2000-2007, Egypt attracted alone 48.17 percent which makes it the largest recipient of FDI in COMESA. It is followed in that group of giants by Sudan, 19.43 percent, then Libya, 9.49 percent; the three attracting together more than three-quarters of FDI flowing to COMESA. They are followed by Zambia, 4.80 percent, Ethiopia, 4.26 percent and Uganda, 3.28 percent. The rest of the countries together attracted less than 12 percent of the Total FDI that flowed to COMESA during the period 2000-2007, with countries like Comoros, Burundi, Eritrea and Rwanda attracting a share of 0.01 percent, 0.02 percent, 0.11 percent and 0.21 percent, respectively. We realize that the bulk of FDI flowing to COMESA go to oil-rich countries like Egypt, Sudan and Libya, and mineral-rich countries like Zambia inferring that FDI entering COMESA region is mainly resource-seeking. DRC however, a country endowed

with abundant mineral resources, surprisingly is among the least recipients of FDI inflows in COMESA, attracting only 1.39 percent of the total FDI received by COMESA during the period 2000-2007. This can be partly explained by internal wars that devastated that country in the past years.

Otherwise, the uneven distribution of FDI inflows in COMESA can be in general explained by differences in host countries pull factors, economic or political, like the differences in endowments in natural resources, skilled labour and infrastructure, differences in market size, differences in costs of labour but also the differences in the host government's policy framework, business facilitation activities and business conditions. It should also be noted that privatisation programmes undertaken in some countries helped them attract some FDI resulting from Cross-border Mergers & Acquisitions.

The previous analysis was done without considering the difference in economic size or the investment levels of the countries. By considering the economic size and investment levels of countries, two indicators are used to analyse FDI. These are the Inward FDI Stocks as a percentage of GDP and the FDI Inflows as a percentage of Gross fixed capital formation.

When inward FDI stocks are compared with the size of the economies, the following differences can be seen in COMESA Countries decade by decade.

Table 1: Inward FDI stocks as a percentage of GDP, Annual Average, decade by decade

Countries	1980-1989	1990-1999	2000-2007	1980-2007
Burundi	2.04	3.41	6.53	3.74
Comoros	3.16	8.34	7.57	6.24
Djibouti	3.10	4.68	21.72	8.65
DRC	6.56	8.52	13.89	9.23
Egypt	17.09	24.94	28.66	23.20
Ethiopia	1.42	4.02	21.73	7.79
Kenya	6.77	7.92	6.61	7.15
Libya	2.24	2.35	4.22	2.81
Madagascar	1.89	5.13	8.55	4.85
Malawi	13.79	13.23	23.53	16.17
Mauritius	3.39	7.13	14.11	7.62
Rwanda	-	2.88	3.86	3.32*
Seychelles	69.68	65.28	101.4	76.53
Sudan	0.58	2.58	22.62	7.19
Swaziland	38.21	39.02	39.19	37.97
Uganda	0.43	4.40	21.38	7.47
Zambia	16.63	45.88	60.53	39.06
Zimbabwe	3.04	8.20	22.31	10.07
Africa	**10.8**	**17.3**	**28.3**	**17.3**

Source: Computed using data from UNCTAD (online database) and ADI (2007)

It can be seen from Table 1 that the ratio of inward FDI stocks relative to GDP has been increasing decade by decade almost in all the countries of the region, showing that decade by decade they have been trying to be more open to FDI. Measured against GDP, inward FDI stock in some countries appears much more sizeable than absolute flows might suggest, and the ranking might therefore be the reverse. For instance, relative to GDP, Seychelles has a big inward FDI Stock ratio of 76.53 percent for the period 1980-2007, followed by Zambia, 39.06 percent, Swaziland, 37.97 percent. Egypt ranked first in absolute flows is ranked fourth with a ratio of 23.2 percent and then Malawi, 16.17 percent.

Compared to the Africa average, during the 1980-1989 decade, except Egypt, Malawi, Seychelles, Swaziland and Zambia, the rest had ratios under the Africa average (10.8%). During the period 1990-1999, except Egypt, Seychelles, Swaziland and Zambia, the rest had ratios under the Africa average (17.3%), and during this current decade, all the countries have ratios under the Africa average (28.3%) except Egypt, Seychelles, Swaziland and Zambia. It should, however, be noted that though some countries, such as Djibouti, Ethiopia, Madagascar, Mauritius, Sudan, Uganda and Zimbabwe still have an inward FDI stock ratio under the Africa average, they made big progress, from 3.10 percent to 21.72 percent; 1.42 percent to 21.73 percent; 1.89 percent to 8.55 percent; 3.39 percent to 14.11 percent; 0.53 percent to 22.62 percent; 0.43 percent to 21.38 percent and 3.04 percent to 22.31 percent, respectively, from 1980s to 2000s.

We now examine the direct contribution of foreign affiliates to host COMESA Countries' total investment, by comparing the investments of those affiliates proxied by FDI inflows and the total investments of domestic firms proxied by Gross Fixed Capital formation.

Table 2 shows the trend of the direct contribution of FDI inflows to gross capital formation in COMESA countries.

Table 2: Net FDI inflows as a Percentage of Gross Fixed Capital Formation, Annual average, decade by decade

Countries	1980-1989	1990-1999	2000-2007	1980-2007
Burundi	1.65	0.60	3.45	1.78
Comoros	8.16	0.92	2.05	2.65
Djibouti	-	4.89	30.07	12.74*
DRC	-0.88	0.87	15.28	4.18
Egypt	9.38	6.71	19.61	11.32
Ethiopia	0.02	4.74	17.58	6.49
Kenya	1.73	0.93	3.25	1.87
Libya	-3.22	-1.09	11.91	2.05
Madagascar	1.50	4.46	16.11	6.55
Malawi	3.24	4.85	19.78	8.36
Mauritius	2.25	2.72	7.20	3.77
Rwanda	6.57	1.45	3.60	3.98
Seychelles	27.32	22.25	45.81	30.67
Sudan	0.44	4.79	30.03	10.10
Swaziland	21.97	26.08	11.31	20.45
Uganda	-	8.36	16.72	10.89♣
Zambia	12.63	26.95	25.85	21.22
Zimbabwe	-0.42	6.13	10.79	4.93
Africa	**2.61**	**6.84**	**13.95**	**6.86**

Source: The author using data from UNCTAD (online database) and ADI (2007)

* Annual average for 1985-2007
♣ Annual average for 1988-2007

The table indicates that in most of the countries, the contribution of FDI inflows to total domestic investment has been increasing decade by decade. Over the period 1980-2007, the largest recipients of FDI in relation to GFCF are Seychelles with a contribution of 30.67 percent in GFCF, 21.22 percent for Zambia, 20.45 percent for Swaziland, 12.74 percent for Djibouti, 11.32 percent for Egypt, 10.89 percent for Uganda and 10.10 percent for Sudan.

It is to be noted that countries like DRC, Ethiopia, Libya, Madagascar, Malawi, Mauritius, Sudan and Zimbabwe, though they are not among the largest recipients of FDI in relation to GFCF, made big progress. From the 1980s to 2000s, their FDI inflows ratio relative to GFCF rose respectively from -0.88 percent to 15.28 percent, 0.02 percent to 17.58 percent, -3.22 percent to 11.91 percent, 1.50 percent to 16.11 percent, 3.24 percent to 19.78 percent, 2.25 percent to 7.20 percent, 0.44 percent to 30.03 percent and -0.42 percent to 10.79 percent.

Compared to the Africa average in the 1980s, the contribution of FDI inflows to local capital formation exceeded the Africa average (2.61%) in seven countries (Comoros, Egypt, Malawi, Rwanda, Seychelles, Swaziland and Zambia); in the 1990s, the contribution of foreign affiliates to local capital formation exceeded the Africa average (6.84%) in four countries

(Seychelles, Swaziland, Uganda and Zambia), whereas in the 2000s, the contribution of FDI inflows to domestic capital formation exceeded the Africa average (13.65%) in ten countries (Djibouti, DRC, Egypt, Ethiopia, Madagascar, Malawi, Seychelles, Sudan, Uganda and Zambia).

Though in some countries the contribution of FDI inflows in gross fixed capital formation is relatively big, on average, we realize that FDI still plays a modest role in capital formation in COMESA Countries, suggesting that policies should be put in place to attract more and more FDI in the region.

2.2 The Volatility of FDI inflows in COMESA Countries

The fact that countries compete and try to attract the maximum flow of FDI shows that the level of FDI is critical for a country's development. But while it is so, it should be noted that the study of the volatility of FDI flows is also important. According to UNCTAD (1999), among all the forms of external financing, FDI is the least volatile on average; it is however possible that sudden changes in the volume of FDI inflows can have a destabilising impact on the economy (Lensink and Morrissey, 2001). Büthe and Milner (2008) point out that the study of the volatility of FDI flows into developing countries is of a profound interest insofar that high volatility in these flows can disrupt an economy and hurt its growth rate. The volatility of FDI flows can be caused by many factors, domestic or international and of diverse nature.

We therefore examine the volatility of FDI inflows that COMESA Countries received during the past decades. To measure the volatility of FDI inflows we use the Coefficient of variation which is equivalent to the Standard deviation divided by the absolute value of the mean.

Table 3: Coefficients of variation of FDI inflows in COMESA Countries

Countries	1980-1989	1990-1999	2000-2007	1980-2007
Burundi	1.2	1.3	2.6	1.8
Comoros	-	2.5	0.5	1.7
Djibouti	1.5	0.5	1.3	2.6
DRC	21.6	8.6	2.3	4.7
Egypt	0.4	0.4	1.1	1.6
Ethiopia	6.0	1.6	0.4	1.4
Kenya	0.8	0.9	1.8	2.4
Libya	1.6	5.3	1.3	5.6
Madagascar	1.3	0.8	1.4	2.6
Malawi	1.3	1.8	0.6	1.3
Mauritius	1.2	0.6	1.3	1.8

Rwanda	0.2	0.6	1.2	1.0
Seychelles	0.4	0.5	0.8	1.2
Sudan	1.3	1.7	0.7	1.8
Swaziland	1.0	0.7	1.9	1.1
Uganda	-	0.8	0.4	0.9
Zambia	1.0	0.7	0.7	1.2
Zimbabwe	2.4	1.4	1.0	2.2

Source: Computed using data from UNCTAD, online database.

Table 3 shows that FDI inflows in COMESA Countries have been in general fairly stable. However, for countries like Libya and DRC, FDI inflows have been very volatile, relatively volatile in countries like Djibouti, Madagascar, Kenya and Zimbabwe, and less volatile in countries like Uganda, Rwanda, Swaziland, Seychelles and Zambia. It should however be noted that in some countries like Burundi, Egypt, Kenya, Madagascar, Mauritius, Rwanda, Seychelles and Swaziland, FDI inflows are more volatile today than in the past decades. While FDI inflows are of a great importance, their volatility can hurt countries' economic growth they come to rescue. Host countries should therefore try to minimize the volatility of FDI flows that they receive.

2.3 Absorptive capacity of COMESA Countries

The literature shows that the effect of FDI on growth depends on the absorptive capacity of the host countries (UNECA, 2006). This is determined mainly by factors such as the level of technology used in domestic production in the host country, the level of financial sector development, the human capital quality of the host country, etc. (Massoud, 2008).

2.3.1 Technology gap in COMESA Countries

As far as the effect of the technology gap on the country's ability to benefit from spillovers is concerned, it is argued that if the technology gap between host and home country is too big, the externalities will not spread to the local firms, the gap will be too wide to bridge.

We follow Massoud (2008) and compute the technology gap for the COMESA countries for the period 1980-2007. The technology gap is proxied here by the difference between US Real GDP per capita and country specific Real GDP per capita as a ratio of country specific Real GDP per capita.

Table 4: Technology gap in COMESA Countries, 1980-2007 (Annual Average)

BDI	COM	DJI	DRC	EGY	ETH	KEN	LBY	MDG	MWI
241.2	74.7	37.3	241.8	22.6	239.6	69.2	5.8	120.1	206.4

MA	RWA	SYC	SDN	SWZ	UG	ZMB	ZIM
9.7	119.9	4.2	89.2	23.5	145.9	85.3	49.3

Source: Computed using data from Selected Statistics on African Countries, AfDB (2008), ADI (2007) and WDI (2008)

Note: GDP per capita gap is the gap between US real GDP per capita and the country specific real GDP per capita; USA is taken as a benchmark because it is assumed that it has the most developed technology in the world.

It comes out from Table 4 that the technology gap is big in countries like DRC, Burundi, Ethiopia, Malawi, Uganda, Madagascar, Rwanda, Sudan and Zambia, and relatively low for countries like Libya, Mauritius, Seychelles, Egypt, Swaziland and Djibouti.

According to Glass and Saggi (1998), the bigger the technology gap, the less likely the host country is to have the human capital, physical infrastructure and distribution networks to support FDI. This influences not only the decision of TNCs to invest in that country but also what kind of technology to transfer. Countries with big technology gap (DRC, Burundi, Ethiopia, Malawi, Uganda, Madagascar, Rwanda, Sudan and Zambia) are likely to attract low level of FDI, quality of technology transferred will also be low. They are therefore likely not to benefit from FDI externalities; the impact of foreign affiliates on economic growth in those Countries is hence likely to be small.

2.3.2 Financial development in COMESA Countries

It is argued that countries with well-developed financial sectors gain significantly from FDI (UNECA, 2006). According to Sadik and Bolbol (2003)[7], the host economy will start benefiting from FDI inflows when the banking sector credit to the private sector is above 13 per cent of GDP. Table 5 shows the level of financial development in COMESA Countries measured by the ratio of the credit to the private sector (percentage of GDP).

Table 5: Domestic credit to the private sector (percentage of GDP), 1980-2007 (Annual Average)

BDI	COM	DJI	DRC	EGY	ETH	KEN	LBY	MDG	MWI
17.1	12.1	38.8	1.7	41.6	14.8	29.1	25.8	14.1	10.7

MA	RWA	SYC	SDN	SWZ	UG	ZMB	ZIM
47.3	8.2	19.2	0.1	19.4	5.0	11.1	23.8

Source: Computed using data from World Bank, WDI, 2008.

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[7] Cited by Massoud (2008), Op.cit

The Table shows that COMESA countries with most developed financial sectors are Mauritius, Egypt, Djibouti, Kenya and Libya, that is, those with high ratio of credit to private sector (% GDP). Countries with least developed financial sector are Sudan, DRC, Uganda and Rwanda. Basing on Sadik and Bolbol (2003), countries like Mauritius, Egypt, Djibouti, Kenya, Libya, Zimbabwe, Swaziland, Seychelles, Burundi, Ethiopia and Madagascar, whose ratio of domestic credit to the private sector is above 13 per cent, are likely to benefit from FDI, unlike the countries like Sudan, DRC, Uganda, Rwanda, Malawi, Zambia and Comoros, whose ratio of credit to private sector is less than 13 per cent.

It is also observed that countries with developed financial sector are likely to attract more FDI. According to UNECA (2006), financial development is one of the determinants of FDI inflows; the deeper the financial system, the broader the range of investment opportunities and the higher the incentives for foreign investors to enter the country. However, Sudan, though it has the least developed financial sector, it attracts a big portion of FDI flowing to the region. This can be explained by the kind of FDI it receives. Sudan receives mainly resource-seeking FDI and MNCs investing in that country are attracted by its natural resources (Oil).

2.3.3 Human capital development in COMESA Countries

It is argued that host countries with an educated work force are in a position to reap positive externalities from FDI. Table 6 presents the human capital development in COMESA Countries; we proxy the human capital development by the Secondary School Enrolment Ratio.

Table 6: Secondary School Enrolment Ratio (percentage), 1988-2006, Annual Average

BDI	COM	DJI	DRC	EGY	ETH	KEN	LBY	MDG	MWI
8.5	23.8	14.6	23.6	79.5	17.7	32.2	93.4	16.4	21.1

MA	RWA	SDN	SWZ	UG	ZMB	ZIM
68	11.4	24.4	46.6	14.4	25.3	46.6

Source: Computed using data from Selected Statistics on African Countries, AfDB (2007, 2008)

The table indicates that countries with most developed human capital in COMESA Countries are Libya, Egypt and Mauritius. Those countries are likely to benefit from the presence of foreign affiliates in their countries; whereas countries like Burundi, Rwanda, Uganda, Djibouti, Madagascar, Ethiopia, Malawi, DRC, Comoros, Sudan and Zambia with least developed human capital are likely not to benefit from FDI inflows. It should be noted that countries with developed human capital will also attract more FDI, since the costs of training

will not be high in upgrading the skills base. Furthermore, MNC may have little inducement to invest in skill upgrading in countries with least developed human capital (poor basic skills level) because their employees lack the educational base to make the training effective (UNCTAD, 1999).

2.4 Exports in COMESA Countries: Some trends

Without considering the difference in economic size of the countries, we show the share of each country in the total COMESA exports for the period 1980-2007.

Figure 3: Share in Total COMESA's Exports (%), 1980-2007
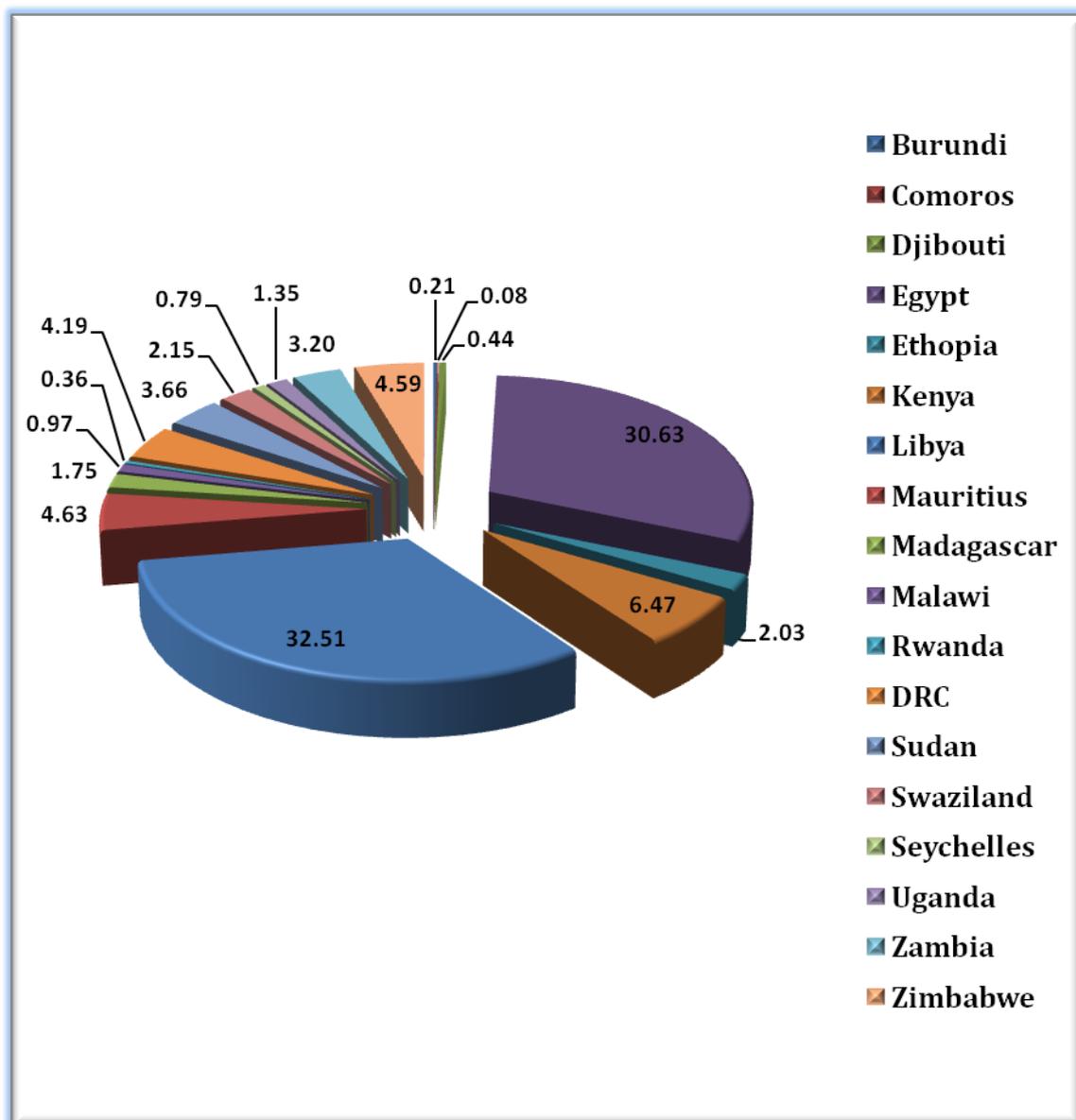
Source: The Author, using data from ADI (2007) and Selected Statistics on African countries, AfDB (2008)

Figure 3 shows that Libya and Egypt are by far the biggest exporters of the region with the share of 32.51 percent and 30.63 percent respectively. They are followed by Kenya (6.47%), Mauritius (4.63%), Zimbabwe (4.59%), and DRC (4.19%). The smallest exporters of the region are Comoros (0.08%), Burundi (0.21%), Rwanda (0.36%) and Djibouti (0.44%).

By considering the economic size of countries, the following trends can be seen decade by decade for COMESA Countries.

Table 7: Ratio of Exports of goods & services (percentage of GDP) in COMESA Countries, Annual Average, decade by decade

Countries	1980-1989	1990-1999	2000-2007	1980-2007
Burundi	10.50	9.10	8.75	9.50
Comoros	14.70	17.30	14.38	15.54
Djibouti	46.7*	43.26	40.93	43.20**
DRC	21.30	23.20	25.88	23.29
Egypt	22.22	21.80	23.42	22.41
Ethiopia	7.40	8.10	13.38	9.22
Kenya	25.70	27.70	24.13	25.96
Libya	45.08	28.72	59.34	43.31
Madagascar	13.50	20.00	26.75	19.61
Malawi	23.60	25.10	24.50	24.39
Mauritius	53.10	61.40	60.38	58.14
Rwanda	10.50	6.10	9.13	8.54
Seychelles	62.10	59.80	97.88	71.50
Sudan	7.80	7.40	15.63	9.89
Swaziland	70.30	74.80	79.88	74.64
Uganda	11.60	9.80	12.75	11.29
Zambia	34.30	32.80	33.00	33.39
Zimbabwe	21.30	34.10	32.25	29.00

Source: Computed using data from World Bank, WDI (2008)
*Annual average for 1985-1989
**Annual average for 1985-2007

Table 7 shows that relative to GDP, countries like DRC, Ethiopia, Madagascar and Swaziland saw an increase in exports decade by decade. For other countries like Comoros, Kenya, Malawi, Mauritius, and Zimbabwe, the ratio of exports to GDP increased in 1990s to decrease in 2000s, whereas for some others like Burundi and Djibouti, the ratio of exports to GDP decreased decade by decade. Overall for the period 1980-2007, Swaziland has the biggest ratio of exports to GDP (74.64%), followed by Seychelles (71.50%), Mauritius (58.14%), Libya (43.31%) and Djibouti (43.20%). Countries with lowest ratio of exports to GDP are Rwanda (8.54%), Ethiopia (9.22%), Burundi (9.50%), Sudan (9.89%) and Uganda (11.29%). Table 7 shows that not only is the ratio of exports low in some countries but also

not consistently increasing for most of the countries. Export promotion policies are therefore crucial for COMESA countries in order to boost exports.

2.5 Economic Growth in COMESA Countries: Some trends

We present below the differences in size of economies of COMESA Countries, measured by the Gross Domestic Product at current prices for the period 1980-2007. We exclude Eritrea because of unavailability of data.

Figure 4: Largest and Smallest Economies in COMESA, GDP at market current prices, Billions of US dollars, 1980-2007 (Annual Average)
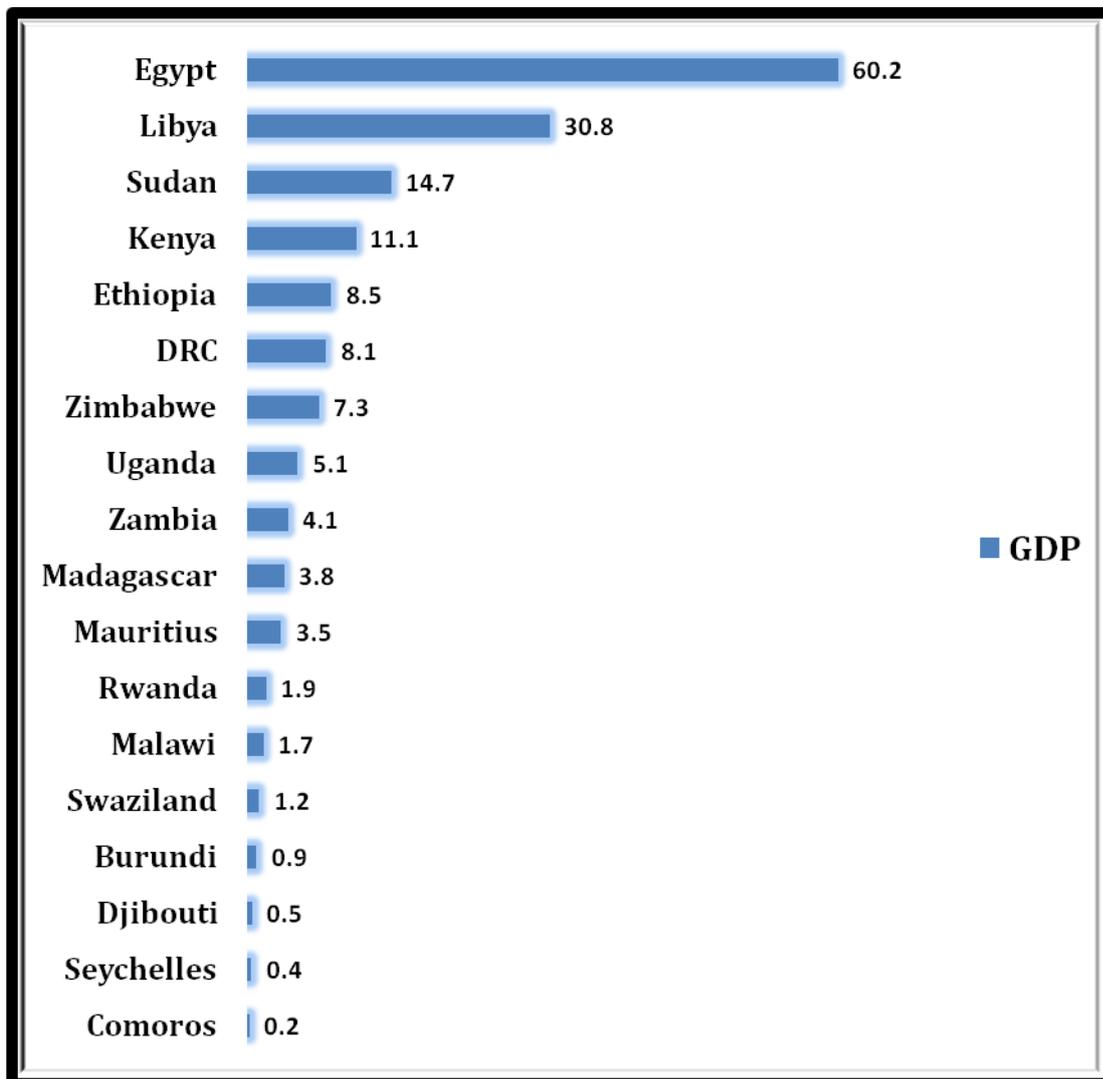
Source: Author, using data from ADI (2007) and Selected Statistics on African countries, AfDB (2006, 2008)

Figure 4 shows that Egypt is by far the largest economy of the COMESA region, with an average GDP of 60.2 billion of US dollars for the period 1980-2007. It is followed in the group of giants of the region by Libya with an average GDP of 30.8 billion, Sudan with an

average GDP of 14.7 billion, Kenya with an average GDP of 11.1 billion and by Ethiopia with an average GDP of 8.5 billion. The five smallest economies of the region for the period 1980-2007, are Swaziland with an average GDP of 1.2 billion of US dollars, Burundi, an average GDP of 0.9 billion, Djibouti, an average GDP of 0.5 billion, Seychelles, an average GDP of 0.4 billion and Comoros, an average GDP of 0.2 billion.

Studies have shown that the size of the economy is one of the determinants of FDI inflows especially "market-seeking FDI" (Zhang, 2001; Emrah Bilgic, 2007). It is therefore not surprising that countries like Egypt, Libya and Sudan, the largest economies of the region, are attracting the bulk of FDI flowing in COMESA region. Apart from receiving "resource-seeking FDI", because they are oil-rich countries, they should also be attracting "market-seeking FDI". And no wonder countries like Comoros, Burundi and Djibouti are among the least recipients of FDI inflows in the region, they are among the smallest economies in the region.

We present below the difference in growth performance in COMESA Countries during the past decades.

Table 8: High and low growers in COMESA Countries, Annual Average, decade by decade

Countries	1980-1989	1990-1999	2000-2007	1980-2007
Burundi	4.29	-1.15	2.37	1.79
Comoros	2.78	1.80	1.75	2.11
Djibouti	-	-2.0	3.01	0.36*
DRC	1.81	-5.45	3.08	-0.42
Egypt	5.92	4.40	4.72	5.04
Ethiopia	2.38	2.60	7.80	4.10
Kenya	4.23	2.22	4.00	3.44
Libya	-2.92	-0.77	4.99	0.11
Madagascar	0.37	1.62	3.62	1.74
Malawi	1.72	4.15	3.10	2.98
Mauritius	5.75	5.12	4.29	5.08
Rwanda	2.24	2.26	5.40	3.15
Seychelles	1.94	4.87	0.90	2.69
Sudan	3.39	4.37	8.0	5.05
Swaziland	6.82	3.78	2.33	4.45
Uganda	3.01	6.81	5.56	5.34
Zambia	1.44	0.38	4.91	2.05
Zimbabwe	5.22	2.14	-5.61	1.02

Source: Computed using data from Selected Statistics on African Countries, AfDB (2006, 2008).

*Annual average from 1991-2007

We realise from Table 8 that some countries like Ethiopia, Libya, Madagascar, Rwanda and Sudan have, on average grown consistently decade by decade since the 1980s. Other countries like Comoros, Mauritius, Swaziland and Zimbabwe, have experienced stagnation or even recession in 1990s and 2000s compared to 1980s. The five top performers of the region in 1980s are Swaziland with a real growth rate of 6.82 percent, Egypt (5.92%), Mauritius (5.75%), Zimbabwe (5.22%) and Burundi (4.29%). The top five performers of 1990s are Uganda with a real GDP growth of 6.81 percent, Mauritius (5.12%), Seychelles (4.87%), Egypt (4.40%) and Sudan (4.37%). For the whole period 1980-2007, the five high performers of the COMESA region are Uganda with an average real GDP growth of 5.34 percent, Mauritius (5.08%), Sudan (5.05%), Egypt (5.04%) and Swaziland (4.45%); and the five bottom performers of the region for the period are Madagascar (1.74%), Zimbabwe (1.02%), Djibouti (0.36%), Libya (0.11%) and DRC (-0.42%).

In 2000, United Nations launched the Millennium Developing Goals (MDGs) to be achieved by 2015. In order to meet these goals, the target is to achieve an average real GDP growth of 7 percent by 2015. The following is the assessment of how far countries in the region are from the target.

Figure 5: Recent performances of COMESA Countries in economic growth, 2000-2007 (Annual Average)
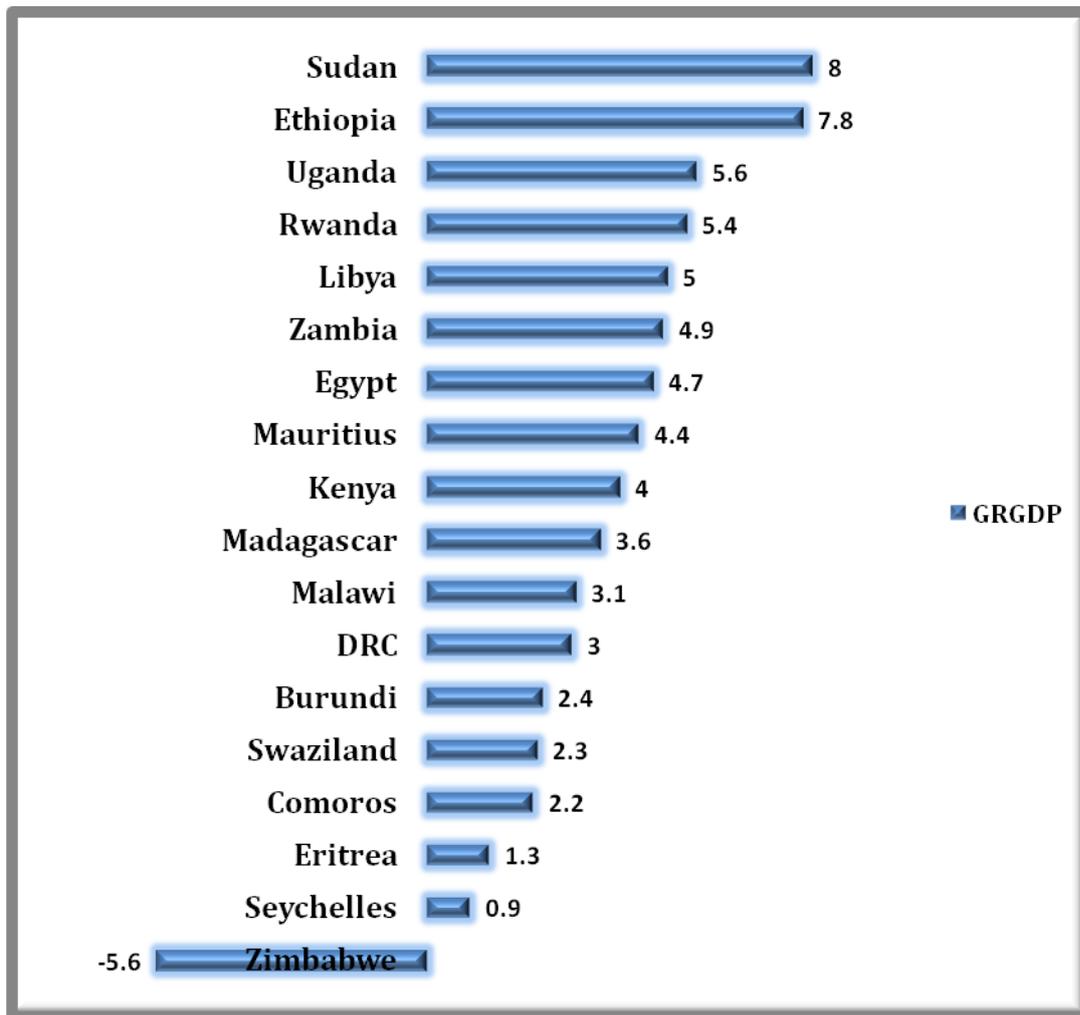
Source: The Author, using data from ADI (2007), Selected Statistics on African Countries, AfDB (2006, 2008), WDI (2008)

The five top performers of the region during 2000-2007 are Sudan with an average real GDP growth of 8 percent, Ethiopia (7.8 percent), Uganda (5.6 percent), Rwanda (5.4 percent) and Libya (5.0 percent); the five bottom performers are Swaziland with an average real GDP growth of 2.3 percent, Comoros (2.2 percent), Eritrea (1.3 percent), Seychelles (1.3 percent) and Zimbabwe (-5.6 percent). It comes out from the figure that apart from Sudan and Ethiopia, the rest of the countries in the region are still far from reaching the growth target of 7 percent. Countries in the region are still facing the challenge of not achieving the MDGs and need therefore to accelerate their growth.

We can draw a conclusion from this chapter that the countries under study form a heterogeneous group; some countries, the giants of the region, seem to attract the bulk of FDI

flowing to the region, while others attract just an insignificant amount of FDI. The same giants seem to have a bigger exporting capacity than the rest. We observe also that some countries have a good absorptive capacity that can enable them to benefit from the presence of the Multinationals Companies, unlike some others with a poor absorptive capacity. It would therefore be misleading to study them in a homogeneous framework. We present in chapter four the methodology to capture the heterogeneity dimension of the countries.

CHAPTER THREE: LITERATURE REVIEW

3.1 General Introduction

The relationship between FDI, Exports and economic growth has interested a number of scholars whose debates gave birth to an abundant economic literature but also full of controversies. As regards to that, the economic literature says that FDI inflows can promote exports in the host countries and that FDI is attracted to countries with a higher trade potential. It also says that export promotion can enhance economic growth and that economic growth can, in turn, promote exports. It further says that FDI inflows can promote economic growth in the host countries and that economic growth can be a determinant of FDI inflows. We review what the proponents advance to support those possible relationships between FDI, exports and economic growth.

3.2 Theoretical Literature

3.2.1 The concept of FDI

According to UNCTAD (2006), Foreign direct investment (FDI) is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate). Investments of MNCs can be of several types depending on the motives of investment or the modes of entry in the host country. In principle, four main motives influence investment decisions by Transnational Companies: market-seeking, efficiency-seeking, resource-seeking and created-asset seeking. The former three are "asset-exploiting strategies" and the latter is "asset-augmenting strategy".

According to Yan Gao et al. (2008), "market-seeking FDI" involves investing in a host country market in order to directly serve that market with local production and distribution rather than through exporting; and "resource-seeking FDI" involves investing in a host country market in order to achieve cost-minimization motives by obtaining resources either too costly to obtain or unavailable in the home-market. And as far as "efficiency-seeking FDI" is concerned, it involves investing in foreign operations to create the most cost-effective and competitive global production networks, it aims at reducing the cost of producing goods and services, while "created-asset seeking FDI" involves investing in foreign countries to acquire the assets of foreign companies to promote long-term strategic objectives. The first

three motives are termed as "asset-exploiting strategies", the firms utilize their existing competitive advantages to establish affiliates abroad.

The last motive is called the "asset-augmenting strategy" whereby in order to improve their competitiveness, firms exploit their limited competitive advantages to acquire created assets such as technology, brands, distribution networks, R&D expertise and facilities, and managerial competences that may not be available in the home economy (UNCTAD, 2006).

On the other hand, FDI can be distinguished depending on the modes of entry in the host country; depending on whether FDI involves new investment in physical capital, or whether it just involves acquiring the existing assets or merging with an existing local firm (UNCTAD, 2000). Direct investment undertaken by foreign firms in a host country can hence take the form of either "Greenfield investment" or "Mergers and Acquisitions" (M&As).

According to UNCTAD (2006), "Greenfield FDI" refers to investment projects that entail the establishment of new production facilities such as offices, buildings, plants and factories, as well as the movement of intangible capital (mainly in services). This type of FDI involves capital movements that affect the accounting books of both the direct investor of the home country and the enterprise receiving the investment in the host country. The latter (or foreign affiliate) uses the capital flows to purchase fixed assets, materials, goods and services, and to hire workers for production in the host country. As for "Cross-border M&As", they involve the partial or full takeover or the merging of capital, assets and liabilities of existing enterprises in a country by TNCs from other countries. M&As generally involve the purchase of existing assets and companies. The target company that is being sold and acquired is affected by a change in ownership of the company. There is no immediate augmentation or reduction in the amount of capital invested in the target enterprise at the time of the acquisition.

A further distinction of M&As can be made between "cross-border mergers", which occur when the assets and operations of firms from different countries are combined to establish a new legal identity, and "cross-border acquisitions", which occur when the control of assets and operations is transferred from a local to a foreign company (with the former becoming an affiliate of the latter). It is important to note here that in most of the cases, M&As are associated with the privatization of state enterprises and with the sales of bankrupt or near-bankrupt firms (UNCTAD, 2000).

A firm can decide to serve a foreign market either by exporting, licensing or by investing abroad (FDI enterprise) (UNCTAD, 2006). The choice among those three options will depend on many factors; a Multinational Corporation that is setting up production abroad has to compare the disadvantages related to that, like communication costs, differences in culture, language, legislation, exchange and sovereign risks, to the alternatives like exporting or licensing. Dunning (1979) argued that a MNC's choice between the three alternatives, that is, exporting, licensing or investing abroad, depends on the combination of the three following advantages: Ownership-specific advantages, Internalization advantages and Locational advantages in the target market, and that was called the OLI paradigm of international production (Camarero and Tamarit, 2003). Ownership-specific advantages are the firm-specific assets and can constitute production technologies, special skills in management, distribution, product design, marketing, brand names and trademarks, reputation, benefits of economies of scale, etc. (Vahter, 2004).

As far as the Locational or L-advantages (Country Specific Advantages[8]) are concerned, they are key factors in determining which will become host countries for the Multinational Companies. The country specific advantages can be separated into three classes:

(i) Economic advantages which consist of the quantities and qualities of the factors of production, transport and telecommunications costs, scope and size of the market, etc.; (ii) Political Advantages which include the common and specific government policies that influence inward Foreign Direct Investment flows, intra-firm trade and international production; (iii) Social, cultural advantages which include psychic distance between the home and host country, language and cultural diversities, general attitude towards foreigners and the overall position towards free enterprise. As for the Internalization or I-advantages, given that Ownership-specific advantages are present, it is in the best interest for the firm to use them itself, rather than selling them or licensing them to other firms.

According to Bredesen (1998), the OLI paradigm suggests that the greater the O- and I-advantages possessed by firms and the more the L-advantages of creating, acquiring or augmenting and exploiting these advantages from a location outside its home country, the more FDI will be undertaken. In case where firms possess substantial O- and I-advantages

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[8] http://www.investmentsandincome.com/investments/oli-paradigm.html

but the L-advantages favor the home country, then domestic investment will be preferred to FDI and foreign markets will be supplied by exports. When firms possess O-advantages which are best acquired, augmented and exploited from a foreign market (L-advantages), but by way of inter-firm alliances or by the open market, then FDI will be replaced by a transfer of at least some assets normally associated with FDI and a transfer of these assets or the right to their use.

3.2.2 The Theoretical relationship between FDI and Exports

3.2.2.1 Relationship between Outward FDI and Exports

In the economic literature, the relationship between FDI and exports is captured considering whether FDI is outward FDI or inward FDI. As far as the relationship between outward FDI and exports is concerned, the literature has focused on the question whether outward FDI and exports are complements or substitutes.

According to Johnson (2006), the classical trade theories of Ricardo and Heckscher-Ohlin-Samuelson in their strict form do not allow for any conclusions as for the relationship between outward FDI and exports since production factors are assumed to be immobile internationally. However, Mundell (1957), by relaxing the assumption of factor immobility internationally, assuming labour and capital to be mobile between countries and assuming there are no transportation costs, concludes that outward FDI and exports are perfect substitutes. To his view, international capital movement is explained largely by trade barriers (Pham, 2008).

Other authors support the substitutional relationship between outward FDI and exports. For instance, according to Vernon (1966), the location of production is determined by the product life-cycle, and eventually, increased competition would result in foreign production as a substitute for exports from the home country in order to reduce production costs. Vernon's model describes how a change in the location of production generates an outflow of FDI from the home country to host countries, replacing exports flows. Thus, Vernon's product cycle model suggests a substitutional relationship between outward FDI and exports (Johnson, 2006).

Moreover, OLI paradigm explains that a firm may choose FDI instead of exports when it possesses Ownership advantages, when the foreign market has Location advantages (access to a big domestic market or production resources) and when there is advantages of

Internalizing market access operations. In this case, FDI and trade can be substitutes as well as complementary depending on which of those advantages was the determinant for the investment decision. If for instance the host country does not have a location advantage, the MNC will serve the foreign market through exports; otherwise, the MNC will serve the foreign market through FDI, suggesting here a substitutional relationship between FDI and trade (Africano and Magalhães, 2005).

Horst (1976) provides a somewhat different example of a possible complementary relationship between FDI and exports. He argues that foreign investment is not limited to local production of final goods in the host country. The MNC investing in the host country also engages in non-manufacturing activities not directly related to production. These activities including advertising, retail distribution, technical assistance and adaption of the good to local preferences have the objective of increasing demand for the MNC good in the host country market. He uses the concept of 'ancillary goods' to describe such activities. As a result, demand for other kinds of goods is established, possibly generating an increase in exports from the MNCs home country to the host country (Johnson, 2006).

As for the new trade theory, it captures the relationship between FDI and trade by distinguishing between horizontal and vertical FDI. In the case of vertical FDI, MNCs decompose the production process into stages according to factory intensity and locate production activities in different areas so as to exploit differences in factor cost, therefore minimizing production costs. Through production fragmentations, MNCs vertically integrate product designs, production and marketing across different countries (segments of the production process are carried out in different countries). Disintegration of production leads to more trade as intermediate inputs cross borders several times during the manufacturing process. On the other hand, horizontal FDI means MNCs are locating production close to final markets. The production process is duplicated (the MNE produces the same product in multiple plants located in more than one country), and demand in foreign markets is served by local production. Unambiguously, horizontal FDI tends to reduce trade volume while vertical FDI stimulates trade.

Helpman (1984) and Markusen (1984) argue that, in the case of horizontal FDI, a substitutional relationship is expected depending on the degree of scale economies relative to trade costs. The MNC produces the good in the foreign country (host country) instead of

exporting it from the home country. For vertical FDI, FDI is expected to have a complementary relationship to trade. Vertical FDI does not substitute for exports. Instead, demand for intermediate goods from the MNE affiliate can result in an increase in exports to the host country (Xuan and Xing, 2008).

Markusen (2002), by incorporating the concept of the multinational enterprise into the standard theory of international trade showed that the relationship between capital movements (FDI) and trade depend on whether the multinational firms are horizontally or vertically integrated, and the type of integration is determined by factors such as transport costs or firm- and plant-level economies of scale. Markusen (2002) suggests that in the case of horizontal integration, FDI and trade are substitutes since the firm's dilemma is either to produce abroad or to export. For vertical FDI however, the substitutability between FDI and trade is more likely if the host country is small and differences in endowments are relatively large (Vukšić, 2007). According to Camarero and Tamarit (2003), Vertical integration is based on different factor endowments and, therefore is an efficiency-seeking FDI that may have mainly a complementarity relationship with trade. Horizontal integration is mainly based on the improvement of market access or market growth prospects and, thus it generates a market-seeking FDI that will have a substitutability relationship with trade.

The distinction between horizontal and vertical FDI has been extended in recent so-called "knowledge-capital models". These models are based on three central assumptions. First, the location of knowledge-based assets could be spread geographically; second, knowledge-based assets yield higher skill intensity relative to production; and third, knowledge-based assets could be used in multiple plants (Falk and Hake, 2008). Accordingly, the models predict several combinations of vertical and horizontal multinationals and imply that horizontal FDI is more prevalent for countries with similar factor endowment and with high trade costs. In addition, vertical FDI arises when countries differ substantially in terms of factor endowments and when trade costs are low. Trade and FDI between developed countries, therefore, could be regarded as substitutes while FDI and trade between developed and developing countries are likely to be complements. Knowledge-capital models consequently incorporate both a complementary and a substitutional relationship between FDI and trade (Camarero and Tamarit, 2003).

3.2.2.2 The relationship between Inward FDI and Exports

The previous part of this section has focused on the link between outward FDI and exports. The following text focuses on the relationship between inward FDI and exports. Ekholm et al. (2005) modelled a form of FDI where foreign direct investment is performed in order to create an export-platform in the host country. Export-platform FDI is one of the types of FDI and means that foreign affiliates of TNCs export most of their output so that the local market in the host country is of no significance to the TNC's location decision (Ruane and Ugur, 2006). According to Shao-Wei (2007), there are three different export-platform FDI, "home-country export-platform FDI", "third-country export-platform FDI" and "global export-platform FDI". The first refers to a situation where MNC foreign affiliates export their products back to the home country; the second refers to the situation where MNC foreign affiliates export their products to the third countries and the last refers to the situation where MNC foreign affiliates export their products both to home and third countries.

Clearly, what role do TNCs play in the export performance of host countries in which they are established? According to UNCTAD (2002), the role of TNCs in expanding exports of host developing countries derives from the additional capital, technology and managerial know-how that they bring with them, along with access to global, regional, and especially home-country markets. Firstly, by complementing host country's own resources, especially for countries in which domestic investment is limited by financial constraints, TNCs can help increase exports simply by bringing in additional capital and investing it in the exploitation of natural resources or low cost labour. In such cases, foreign affiliates contribute to the export performance of host countries by bridging the resource gap and taking the risk of developing new exports. The provision of capital has been an important aspect of the historical role of TNCs in building up developing-country exports of raw materials and labour-intensive manufacturing exports. Secondly, TNCs can expand exports in host countries by providing competitive assets for export-oriented production in technology intensive and dynamic products in world trade. Generally, such assets like technological ones are often firm-specific, costly, and are difficult to get for firms in developing countries. But such assets will be transferred by TNCs to their foreign affiliates or non-equity partners in host countries through training, skills development and knowledge transfer. And to the extent that foreign affiliates establish strong linkages (backward and forward) with local firms, by dissemination those assets will spillover to other local firms and the economy at large, boosting hence export

performance in the host country. Thirdly, besides their role of transferring resources, assets and capabilities, TNCs can increase the developing host countries' export performance by facilitating their access to new and larger markets. In fact, foreign affiliates have privileged access to TNCs' intra-firm markets and to TNCs' customers in global, regional and home-country markets. As in the case of technology, these links of foreign affiliates and contractual partners in host countries to markets can spill over to suppliers and other domestic firms. Furthermore, host countries may also benefit from the lobbying activities of TNCs in their home countries for favourable treatment of exports from competitive host countries.

Finally, TNCs can enhance export performance in host countries to the extent that export-oriented affiliates can provide training for the local workforce and upgrade technical and managerial skills that benefit the host economy. In developing countries without a strong industrial skill base, even simple operations need considerable training for new employees. The extent to which TNCs invest in employee training depends on the raw material the host country provides in terms of general education and training, technical skills, institutional support and others. This is a challenge for developing countries that have attracted FDI because the benefits from FDI will depend on the host country's ability to boost the human capital and technological infrastructure.

Furthermore, Shao-Wei (2007) gives two ways through which FDI affects the host country's export performance, directly from the export activities of foreign affiliates or indirectly from the expansion of exports by domestically-owned firms. Firstly, MNCs affiliates take advantage of the host country's factor endowments, such as relatively abundant resources or cheaper labour costs to increase export competitiveness in the global markets, hence boosting directly the host country's export performance. The view is also supported by the "Flying-Geese Model": FDI by shifting from higher labour cost countries to lower labour cost host countries, increases MNCs' export competitiveness and directly enhances the host country's export performance (Njong, 2008). However, according to Awokuse et al. (2008), the direct effects of FDI on host country's exports will depend on whether the multinational firms are vertically or horizontally integrated. Vertical FDI is based on relative endowments, hence it is attracted by factor cost differentials, that is, it is driven by trade costs. Here, the investors come to a host country for the resources where the country's comparative advantage lies. In this case, the MNCs affiliates target at lowering their costs of production and they are willing to export their products abroad from the host country. On the contrary, for horizontal FDI, the

MNCs affiliates aim at penetrating the domestic market, they come to a host country for its huge potential market, therefore it is more likely that they will sell their products in the promising market of the host country and will have little direct effect on the host country's exports.

Secondly, foreign affiliates can stimulate local firms' exports through the indirect effects of FDI through various channels. MNCs affiliates may improve local firms' competitiveness through the transfer and diffusion of technologies, management know-how, entrepreneurial skills and labour. Locally owned firms might also increase their efficiency by copying the operations of the foreign producers or may be forced to do so because of the foreign competition, and this is done through the horizontal linkages inside the MNC's industry.

Productivity spillovers can also be channelled into industries different from the one in which foreign investor operates through backward and forward linkages. Backward linkages occur when MNCs foreign affiliates source inputs from local firms, and forward linkages occur when foreign affiliates sell goods or services to domestic firms (Vukšić, 2007). On the other hand, according to Shao-Wei (2007), MNCs affiliates create opportunity for local firm's exports potential with inside or outside MNCs networks when MNCs take integration strategies between parent and its affiliates; in the meantime, local firms obtain access to the international markets by linking themselves to MNCs affiliates through sub-contracting and other arrangement. In addition, competition between MNCs and local firms provokes local firms' ambition to increase their exports. Competition effect involves the local firms' behaviour of "learning by watching" to protect the market share.

Similarly, Görg and Greenaway (2003) say that domestic firms can learn to export from multinationals. According to them, exporting generally involves fixed costs in the form of establishing distribution networks, creating transport infrastructure, learning about consumers' tastes, regulatory arrangements, etc. in overseas markets, fixed costs that MNEs will have already established and will exploit that advantage to export from the host country. Through collaboration, or more likely imitation, domestic firms can learn how to penetrate export markets.

However, FDI may also decrease local firms' exports when MNCs foreign affiliates' increase their purchase of inputs locally. In that case, some products originally destined to be exported by local firms may instead flow to MNCs foreign affiliates, in which these products are used

as inputs and processed into exports in case FDI is export-oriented, or to penetrate the market in the host country, in case FDI is market-seeking (Awokuse et al., 2008).

In addition, Dunning (1998) suggests that the relationship between FDI and exports depends on the motives of MNCs when undertaking the investment in a foreign country. Thus, if FDI is market-seeking, it would have positive influence on imports and no effects on exports in the host country. For resource-seeking FDI and efficiency-seeking, the situation is different; the MNCs undertaking those types of FDI increase exports in the host country (Vukšić, 2007). And according to Hijzen et al. (2006), Exports and Market-seeking or horizontal FDI, driven by proximity-concentration trade-off, are substitutes, whereas exports and efficiency-seeking or vertical FDI, driven by persistent differences in factors prices across countries, are complements.

In empirical literature, the case where FDI promotes exports in a host country is called "FDI-led export hypothesis". On the other hand, the reverse causality from exports to FDI can also exist; in fact, FDI is attracted to countries with a higher trade potential both in terms of imports and exports. And according to Fernando Ponce (2006), foreign direct investment fosters exports in host countries, and likewise, more trade through trade liberalization, encourages foreign direct investment when more markets are available for exporters.

The case where exports cause FDI inflows is known as "Export-driven FDI hypothesis". A "feedback relationship" between FDI inflows and exports can also exist; here FDI inflows promote exports and in turn, export promotion encourages FDI inflows, and the cycle continues.

3.2.3 Relationship between inward Foreign Direct Investment and Economic growth

3.2.3.1 Introduction

Because of globalization, flows of finance, information, skills, technology, goods and services between countries are increasing rapidly and FDI is one of the most dynamic of the increasing international resource flows to developing countries (Nunnenkamp, 2002). Among the different forms of capital flows, foreign direct investment is the most praised, in both theoretical and empirical literature. In fact, it is widely believed that FDI provides a stronger stimulus to economic growth in host countries than other types of capital inflows; the underlying argument is that FDI is more than just capital, as it offers access to internationally available technologies and management knowhow (Dunning, 1993; Zhang, 2001; Moudatsou,

2001; Schoors and Van der Tol, 2002; Görg and Greenaway, 2003; Girma and Görg, 2005; Ruane and Ugur, 2006; etc.). The rapid growth of East Asian countries (the New Industrialized Countries) in the last years is said to be the effect of the investments of the Multinational companies in those countries.

According to Nair-Reichert & Weinhold (2000), the theoretical literature as for the relationship between FDI inflows and economic growth, finds its foundation in the neo-classical models of growth or the endogenous growth models. In neoclassical models of growth, FDI increases the volume of investment and / or its efficiency, and leads therefore to the increase in long-run growth. The new endogenous growth models consider long run growth as a function of technological progress, and provide a framework in which FDI can permanently increase the rate of growth in the host economy through technology transfer, diffusion, and spillover effects. Similarly, according to UNCTAD (1999), inward FDI affects economic performances of host countries because of its impact on financial resources and investment in the host country, through its ability to enhance the technological capabilities in the host economy; to boost export competitiveness in the host country; to generate employment and strengthening the skills base in the host country, etc.

We present hereafter the view of the theoretical literature as for how MNCs' FDI affects the core areas of the economy.

3.2.3.2 The Impact of FDI in enhancing economic growth in Host countries

3.2.3.2.1 The impact of inward FDI on financial resources

According to Dupasquier and Osakwe (2005), one the contribution of FDI is to complement domestic savings by providing foreign savings. In fact, most of SSA countries have low savings rates thereby making it difficult to finance investment projects needed for accelerated growth and development. By engaging in FDI, MNCs help to fill that resource gap between domestic savings and investment requirements. FDI inflows include only part of the financing of foreign affiliates in host countries; FDI inflows are internal to a MNC system and are from a parent company or from retained earnings. Affiliates can however also raise funds through bonds, loans, etc. from the domestic capital markets of host countries or international markets, sources which are external to their corporate system. As long as these sources are in international capital markets, they increase the inflow of foreign financial resources and add to the host country's balance-of-payment receipts. According to UNCTAD

(1999), the flow of external resources to host countries due the presence of foreign firms is in general greater than that of FDI alone.

However, if TNCs remit profits they earn on investment projects in a host country instead of reinvesting them, FDI inflows can have a number of negative effects, such as crowding out domestic investors and, through transfer pricing, shifting funds out of the host country, which adds to a country's balance-of-payments expenses. In addition, depending on the mode of entry, Cross-border M&As and Greenfield FDI both add to the financial resources of a host country at the time of entry, to the extent that neither is financed by locally raised capital. FDI Inflows via Greenfield projects manifest themselves in new production facilities, while those via M&As transfer the ownership of local assets to foreign hands, placing investible resources in the hands of the former local owners in the form of cash or disposable shares. The effect on financial inflows will be the same if the size of the TNC investment is the same in both cases (UNCTAD, 2006).

3.2.3.2.2 The impact of inward FDI on domestic investments

According to UNCTAD (1999), there exist different sources of capital such as bank loans, bonds, portfolio equity capital, FDIs and so on. But FDI is the only source that internalizes foreign savings, meaning that firms bringing these savings undertake investment; the other sources of capital represent externalized forms of foreign savings that are used for investment by local firms. MNCs can affect investment in host countries directly through their own investment activities, and indirectly by affecting host country firms' investment. The direct contribution of foreign affiliates to host countries' total investment is normally examined by comparing investment of these affiliates proxied by FDI inflows with domestic firms' investment proxied by gross fixed capital formation.

As far as the indirect impact of FDI on host country firms' investments is concerned, the question is whether foreign investment leads to a decrease in domestic investment activity, which is termed "crowding-out", or in an increase in domestic investment termed as "crowding-in". According to UNCTAD (1999), crowding-out or crowding-in of domestic investment can occur via product markets or financial markets. In the first case, if TNCs finance their investment by borrowing in the host country under conditions of scarcity of financial resources, and hence cause a rise in domestic interest rates, they may make borrowing unaffordable for some domestic firms, thereby reducing the domestic investment. This crowding out in financial markets can take place regardless of the industry. Moreover, if

the capital flows coming into the country are relatively large, this may lead to an appreciation of the real exchange rate, making a host country's exports less competitive and discouraging investment for export markets.

In product markets however, crowding out takes place when firms are from the same industry. It is generally said that foreign affiliates are more efficient and competitive than local firms. Here, domestic firms might give up investment projects to avoid the prospects of competing with more efficient foreign competitors. The net effect on total host country investment will depend on what happens to the released resources. If they go to other activities in which local firms have greater competitive advantages, there will be no crowding-out of investment in the economy as a whole. It may also be that FDI forces local competitors to raise their efficiency and so leads to raising their investment and profitability.

Furthermore, UNECA (2006) adds that the preferential treatment provided to foreign investors in terms of tax breaks, cash grants, duty exemptions and subsidies, which are not available for local investors, can increase the competitiveness of foreign companies and contribute to crowding-out of domestic firms in the local market.

As far as the crowding-in effect of FDI is concerned, it takes place when investment by foreign affiliates stimulates new investment in downstream or upstream production, by other foreign or domestic producers. In fact, a multinational corporation may source raw materials from domestic suppliers or it may outsource particular activities to firms in the host country. In case the MNCs affiliate sources raw materials from domestic suppliers, local firms' investments will increase. However, it may happen that foreign affiliate-established linkages lead to crowding-in after the foreign affiliate has crowded-out its direct competitors. The net effect on the host country's investment will depend on the relative strengths of the two effects.

The effect of FDI on domestic investments may however depend on the motives of FDI, the mode of entry and activities undertaken by the MNC. The effect of FDI on domestic firms' investment may depend on whether the FDI is market-seeking, resource-seeking, efficiency-seeking or created-asset seeking. It is said that FDI flowing into the natural resources sector (resource-seeking FDI), its indirect effect on domestic firms' investment is likely to be marginal because such FDI creates few linkages with the local firms (UNECA, 2006).

The extent to which FDI affects the domestic firms' investment may also depend on the activities undertaken by the MNCs. For instance according to UNCTAD (1999), foreign affiliates introducing new goods and services to a domestic economy are more likely to have favourable indirect effects on capital formation than foreign investments in areas where domestic producers already exist. Crowding-in is more likely to occur when the investments are made in non-existing sectors, so that MNCs introduce new goods and services, which do not compete with domestic firms and displace them from the market. But crowding-out is likely to result if MNCs invest in established sectors competing with domestic producers. In this case, by taking away investment opportunities that were open to domestic investors prior to foreign investments, FDI reduces domestic investments that would have been undertaken by domestic producers.

Similarly, the extent to which FDI affects local firms' investments may depend on the mode of entry, whether they Cross-border M&As or Greenfield Investments. In case of Greenfield Investment, FDI involving the establishment of new production facilities such as offices, buildings, plants and factories, add directly to production capacity in the host country and, other things remaining the same, contributes to capital formation in the host country. However, for Cross-border M&As, involving the partial or full takeover or the merging of capital, assets and liabilities of existing enterprises in a country by TNCs from other countries, there is no immediate augmentation in the amount of capital invested in the target enterprise at the time of the acquisition or merging, involving just the transfer of the existing assets. However, over the longer term there is no difference in the impacts on capital formation of the two modes of entry since both forms can be followed by new sequential investment and can be sizeable even in case of M&As.

As far as the indirect effect of FDI on local firms' investments is concerned, Greenfield FDI are likely to crowd-out domestic investments more than M&As. Greenfield FDI are more likely to bring in newer technologies than in case of M&As, which involve taking over existing facilities. However, the crowding-in effect is likely to be greater in case of M&As FDI than in Greenfield FDI, since an acquired firm, as an established firm, is likely to have stronger linkages with other firms in the economy than a new foreign entrant (Greenfield FDI).

3.2.3.2.3 Effect of FDI on employment and job creation in the host country

According to UNECA (2006), one of the key benefits of foreign investment is job creation. FDI can affect directly or indirectly employment in host countries. However the extent to which MNCs affect employment in host countries may differ depending on the motive or the mode of entry of FDI.

Directly and depending on the mode of entry, it is said that Greenfield investment creates new jobs whereas Cross-border M&As may even lead to a reduction in employment. The reason is that Greenfield investment results in establishing new projects, thus creating new jobs, whereas M&As do not involve establishing new projects, involving just the partial or full takeover or the merging of capital, assets and liabilities of existing enterprises in a country by TNCs from other countries, don't hence lead to job creation. And in some cases, for efficiency purpose, M&As can even lead to a reduction in employment especially in developing countries where M&As occur in a privatisation process involving selling public sector companies to the private sector (Hunya and Geishecker, 2005). In fact, the Public sector is said to be overstaffed traditionally.

FDI can also affect employment in the host country indirectly depending on the intensity of local linkages the foreign affiliates have with local suppliers and distributors. These are Jobs created in vertically linked firms and through sub-contracting, which depends on the demand by foreign-owned companies for materials, services and components sourced locally. The indirect effect of FDI on employment is also likely to differ according to the mode of entry. While Greenfield FDI creates more employment than M&As directly, indirectly however, M&As FDI is likely to create more employment than Greenfield FDI since acquired firms would have generally established strong linkages with the local economy than Greenfield facilities (UNCTAD, 2000).

Employment effects of FDI are likely to vary also according to the motivation of the foreign investor. The MNCs acting in the natural resource sector (resource-seeking FDI) are not likely to create a big number of jobs because they are mostly using capital-intensive technology, whereas market-seeking FDI and efficiency-seeking FDI are likely to boost employment (UNECA, 2006).

According to UNECA (2006), in addition to the quantitative effects of FDI on the volume of employment in a host country, there are also the qualitative impacts of FDI on employment in terms of wages, job security and conditions of work. The literature asserts that Multinational Corporations would pay higher wages, offer greater job security and provide better conditions of work than their domestic counterparts, and this tends to be contagious to other local firms in the same industry with the foreign affiliate.

3.2.3.2.4 Spillover effects of inward FDI in the host country

Apart from the effects of FDI on financial resources, domestic investment, employment, wages, etc, host countries may also benefit from indirect effects of FDI termed "spillovers". In fact, the multinational companies engage in FDI when they possess some firm-specific competitive advantages that allow them to compete successfully in the foreign environment. They are non-tangible assets and can be in the form of technological know-how, management and marketing capabilities, trade contracts, co-ordinated network of relationships with suppliers and customers abroad etc (Vahter, 2004). MNCs will be naturally reluctant to sell their most valuable assets to unrelated firms that can become competitors or could leak to others that have not paid for it (Moudatsou, 2001). However, if multinationals transfer from parents to their foreign affiliates, then it is possible that some of these assets "spills over" to domestic firms in the host country through non- market transactions (Haskel et al., 2002).

However, from the viewpoint of host-country development, what matters is not just the transfer of those non-tangible assets from the parent firm to foreign affiliates, but their wider dissemination from those foreign affiliates to other local firms.

According to Gorg and Greenaway (2003), the adoption of those assets by the local economy will depend on "backwardness" and "contagion"; the former referring to the distance between two economies in terms of development (one transferring and another receiving), and the latter referring to the extent to which activities of the foreign firm pervades the local economy.

Girma et al. (2008) assert that the spillovers from inward foreign investment in form of technological spillovers, knowledge spillovers, R&D spillovers, etc, can work through a number of channels. Domestic firms can benefit from the presence of multinationals in the same industry, leading to "intra-industry" or "horizontal spillovers", and on the other hand, there may be spillovers from multinationals operating in other industries, leading to "inter-industry" or "vertical spillovers".

3.2.3.2.4.1 Horizontal (intra-industry) spillovers

The entry of foreign firms may lead to an increase in the productivity of the domestic firms in the same industry through various means. Sasidharan and Ramanathan (2007) give three channels namely "demonstration effects", "labour turnover" and "competition effect", through which the FDI affects the domestic firms' productivity hence promoting economic growth in the host country.

Firstly, "demonstration effects" refer to the imitation of foreign firms' technology by the domestic firms. Imitation here is the classic transmission mechanism for new products or processes. Imitation of foreign affiliates' technology by local firms will depend on product and process complexity, with simple manufactures and processes easier to imitate than more complex ones. The same principle applies to managerial or organisational innovations, though in principle, at any rate, these are easier to imitate.

Secondly, "Labour turnover" refers to the mobility of the workers from MNCs to domestic firms. MNCs will generally invest in training and it's quite impossible to lock-in those resources completely and as a result, workers will move from MNCs to existing local firms or to start new firms. Since these workers are carriers of MNC's technology, the labour turnover will generate productivity improvement via two mechanisms; first via a direct spillover to complementary workers, and second, workers that move may carry with them knowledge of new technology or new management techniques.

Thirdly, "Competition effects" refer to a situation in which entry of foreign firm forces the domestic firms to increase its efficiency by improving the existing means of production or adapt new means of production. Unless the MNC is a monopoly, it will produce in competition with existing local firms. Even if the latter are unable to imitate the MNC's technology or production processes, they are under pressure to use existing technology more efficiently, yielding productivity gains. Moreover, competition may also increase the speed of adoption of new technology or the speed with which it is imitated. However, competition from foreign firms can also lead to crowding out of domestic firms when the latter are unable to compete with the foreign firms in the industry, an effect termed as "market-stealing effect"

by Aitken and Harrison (1999)[9]. The positive competition effects occur only if domestic firms are not far below the technological frontier.

Madariaga and Poncet (2006) add that exports spillovers are an additional source of productivity gain. They argue that domestic firms can learn to export from multinationals. Exporting generally involves fixed costs in the form of establishing distribution networks, creating transport infrastructure, learning about consumers' tastes, regulatory arrangements and so on in overseas markets, fixed costs which are difficult to clear for local firms. Thus, through collaboration or more likely imitation, domestic firms will learn how to penetrate export markets.

3.2.3.2.4.2 Vertical (inter-industry) spillovers

As far as vertical spillovers are concerned, companies from sectors other than that of the foreign enterprise might be affected by its presence as well, if they are in direct business contact with it. This includes companies that supply or provide services for foreign firms, as well as companies that are supplied by foreign firms. MNCs need raw materials in their production process; they hence establish backward linkages with suppliers firms for sourcing. They also establish forward linkages with distributors and sales firms for their output. It is likely that foreign companies require higher standards from their suppliers.

On the other hand, it is also likely that higher standards are provided by foreign companies to domestic companies as well (Juraj Stancik, 2007). The creation of linkages with host-country firms provides channels for the transfer and diffusion of technology to host developing countries, which might improve the domestic companies' efficiency and performance (UNCTAD, 2006). However, the local supplying firms failing to meet the requirements of the MNCs in terms of technology or unable to meet the import competition will be forced to exit from the market. A negative vertical spillover will arise in that case and MNCs will have to source from international suppliers (Sasidharan and Ramanathan, 2007).

According to UNCTAD (2000), the extent to which vertical spillovers will be transmitted to the local economy will depend on the mode of entry of FDI. M&As FDI may lead to a better diffusion of technology transferred by TNCs than Greenfield FDI. This is because acquired

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[9] Cited by Sasidharan S. & A. Ramanathan (2007), Foreign Direct Investment and spillovers: evidence from Indian manufacturing, in *International Journal of Trade and Global Markets, Vol. 1, No. 1, 2007*

firms would have already established linkages with the local firms; if existing linkages by acquired firms are efficient, TNCs are likely to retain and strengthen them. Foreign affiliates established through M&As are therefore likely to have stronger local links than Greenfield FDI, for which it will take time and effort to develop such linkages; and this is true in the short- medium- and long-run, because of the cumulative effects of building capabilities, contacts and trust. And if, on the other hand, the local linkages of acquired firms are weak or inefficient, M&As FDI will lead to a lower diffusion of new technologies locally and there will be no difference from that of Greenfield affiliate sourcing overseas.

It is important to note here that the extent to which the foreign TNCs create linkages with the local economy depends also on the motivation of foreign investors. It is said that "efficiency-seeking FDI" and" market-seeking FDI" are often associated with the creation of linkages, while "resource-seeking FDI" and "asset-seeking FDI" tend to offer few such opportunities (UNCTAD, 2006).

3.2.3.3 The role of Economic Growth in attracting FDI: "Growth-driven FDI" Hypothesis

In empirical literature, the case where FDI is found to promote economic growth in the host country is called "FDI-led growth" hypothesis. However, the economic literature also recognises economic growth as one of the determinants of FDI inflows in the host country. Agiomirgianakis et al. (2006), advocate that the level of economic growth plays a significant role in attracting FDI, since rapid economic growth may create large domestic markets and businesses. UNCTAD (2000) emphasizes that some of foreign investors invest to developing countries mainly to serve the host countries' market; this is the case of market-seeking FDI. Domestic market size and market potentials might be the major determinants in attracting such type of FDI. The market size permits economies of scale exploitation and standard production factor specialization, resulting in cost minimisation and market growth, thereby improving the total supply side in the host economy. Bhasin et al. (1994)[10] claim that the size of the domestic market, as well as, growth prospects of recipient economy are highly taken into consideration when foreign investors decide to invest in a country. The market size here can be measured by the level of GDP, level of GDP per capita, level of GNP or level of GNP

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[10] Cited by Agiomirgianakis et al. (2006). The Determinants of FDI: A Panel data study for the OECD Countries.

per capita. And according to OLI paradigm (Camarero and Tamarit, 2003), MNCs with certain ownership advantages will invest in another country with locational advantages, and both advantages can be captured effectively by internalizing production, through FDI. The hypothesis of "growth-driven FDI" focuses on locational factors, such as market size (proxied by GDP), as the most significant factor in attracting FDI (Emrah Bilgiç, 2007). Other things being equal, a country's market size (measured by GDP) rises with economic growth, encouraging foreign firms to increase their investment. Rapid economic growth leads to high level of aggregate demand that stimulates greater demand for investments including FDI. Moreover, better economic performances in host countries provide a better infrastructural facilities and greater opportunities for making profits, and so greater incentive for FDI (Zhang, 2001). The case where rapid growth of an economy attracts more FDI by MNCs is known in empirical literature as "Growth-driven FDI" hypothesis. The possibility of a feedback relationship between FDI and economic growth is not to be ruled out either. FDI inflows may enhance economic growth of a host country and, economic growth in turn may attract FDI inflows and the cycle continues (Emrah Bilgiç, 2007).

3.2.3.4 Local Absorptive Capacity and FDI impact in the Host Country

By definition, the country's absorptive capacity means its ability to absorb FDI, and hence benefit from its potential externalities. In fact, it is said that the development of the absorptive capacity in a host country is a requirement in order to reap the benefits of FDI inflows (UNECA, 2006). According to Massoud (2008), a country's absorptive capacity is determined mainly by four factors namely, the human capital quality of the host country, the level of technology used in domestic production in the host country, the level of financial sector development, and the degree of openness of the host countries trade regime.

The human capital quality or the level of education in the host country is important because if the domestic work force lacks sufficient schooling, the transfer of skills from TNCs to their employees may be hindered. The effect of the technology gap on the country's ability to benefit from spillovers is subject to different views; it is argued by some economists like Glass and Saggi (1998)[11] that if the technology gap between host and home country is too big, the externalities will not spread to the local companies, the gap will be too wide to

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[11] Cited by Gorg & Greenaway (2003), Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?

bridge. However, some other economists like Findlay (1978) advocate that externalities have a larger magnitude when there is a large technology gap.

The level of financial sector development is also of crucial importance for a country to benefit from FDI externalities. A more developed financial system allows for instance foreign investors to borrow domestically to expand their activities and through the provision of systematic information on investment opportunities and returns to capital, an efficient financial system can alleviate the problems of information imperfections, which are more acute for foreign investors than for domestic investors. According to UNECA (2006), the importance of the financial system for a country's capacity to absorb foreign capital derives from the diverse functions that it plays in the economy. In addition to the traditional savings-mobilization role, the financial system also performs other functions that are vital to the proper functioning of a market economy, such as information production, price discovery, risk sharing, liquidity provision, promotion of contractual efficiency, promotion of corporate governance, and facilitating global integration.

Finally, the existence of an open trade regime would also determine the effect of FDI on growth as it is argued that the openness of trade regime involves the transfer of technology.

3.2.4 Relationship between Export promotion and economic growth

3.2.4.1 Introduction

The economic history of countries shows that countries in the world have followed different development strategies over time to achieve economic growth. Some have privileged the Import-Substitution strategy whereas others have privileged the Export-Promotion strategy. Lopez (1991) says that ''Import-Substitution is a trade policy where import substitutes enjoy greater incentives than exports''. Basically, Import-Substitution entails an attempt to replace commodities that are being imported, usually manufactured consumer goods, with domestic sources of production and supply. This was done by erecting tariff barriers or quotas on imported products and by trying to set up a local industry to produce these goods.

Ergashev et al. (1999) argue that Import-Substitution strategy chosen by some developing countries was based on the following facts among others: Firstly, the structure of production in developing countries was oriented to production of raw materials and primary goods. Secondly, if the developing countries pursue a free trade policy, their comparative advantages will be left in production of raw materials; thirdly, demand for raw materials is of low

elasticity both according to world incomes and prices. Hence, there is a slow growth in the revenues obtained from the exports of raw materials.

In general, the objective of such a development strategy was to protect infant industries not able to compete in world markets. The strategy was expected also to improve the balance of payments by lowering imports. However, the Import-Substitution strategy resulted in some undesired outcomes. Firstly, in the inward-oriented strategy, the values of interest rate, inflation and exchange rate are not determined by the market but by the government, which leads to an inefficient allocation of resources in the economy. Secondly, the production of final goods requires the import of intermediate goods which, in turn, damages the trade balance. Thirdly, many industries protected from competition remained inefficient and costly to operate; etc (Yilmazkuday, 2001). Small domestic markets did not generate sufficient demand for emerging industries to grow and take advantage of economies of scale. Instead of increasing the productivity of new industries, the strategies generated rent-seeking behaviour by firms that were insulated from international competition (UNECA, 2006). As a consequence, in the 1980s, most of the countries have rejected the inward-oriented strategy and embraced the outward-oriented strategy, turning from the Import-Substitution strategy in favour of the Export-Promotion strategy.

Lopez (1991) defines "export-promotion strategy also called outward-oriented strategy as a trade policy where the export sector receives as much incentives as import substitution industries" and ultra export-promotion, "a strategy where exports receive more incentives than import substitutes". In the outward-oriented policy, industries which have potential to develop and to compete with foreign rivals are encouraged and promoted, the objective being of expanding the country's exports.

However, according to Ergashev et al. (1999), export-promotion should not be understood simply as stimulating exports and paying no attention to import substitution. Export orientation should be understood as, at least, neutral state policy with regard to trade, while removing the inclination to import substitution. Such neutrality of trade regime means, that both the incentives for producing import substituting goods and those for producing export goods are equal. This can be achieved through the establishment of special incentives for exports by the state in order to compensate the more profitable conditions available for import substitution (in the sense of profitability for the manufacturers). In addition, Shafaeddin and Pizarro (2007) say that some scholars regard import-substitution a pre-

requisite for export promotion in industries which are characterised by the economies of scale and external economies of learning. Some others argue for the lack of demarcations between import-substitution and export promotion; and while in any industry import substitution precedes export promotion, a mixture of import-substitution and export promotion may be followed in various industries in each point in time.

Policies and strategies for export-promotion are designed to enhance the marketability of exportables through product diversification and quality improvement, to strengthen and improve the institutional framework for providing better support services to exporters and export-oriented industries and to establish backward linkages between export-oriented industries and primary sectors for the utilisation of local raw materials. Export-promotion policies aim also at attracting an increased number of entrepreneurs for setting up export-oriented industries and encouraging them through the provision of suitable incentive packages, as well as appropriate human resources development programmes for the promotion of entrepreneurial and managerial skills in the context of a competitive international environment. To expand and consolidate existing export markets as well as create new markets for exportables are also the objectives of such policies promoting exports.

Why would countries follow the export-oriented strategy? Should a country promote exports to speed up economic growth or should it primarily focus on economic growth, which in turn will generate exports? The theory gives three alternatives of possible relationship between export performance and economic growth. The first alternative is where the export performance enhances economic growth and that hypothesis is called the "Export-led growth hypothesis". The second alternative is where the economic growth causes the export promotion, called the "Growth-driven export hypothesis". The last alternative is the "feedback relationship" between exports and growth.

3.2.4.2 Theoretical Literature on "Export-led Growth" hypothesis

Scholars have given several and different arguments to support those alternatives of possible relationship between exports and economic growth. Yenteshwar Ram (2003) gives a number of reasons to support the Export-led growth hypothesis.

Firstly, an expansion in exports may signify an increase in external demand for a country's output and thus serve to increase total output.

Secondly, an expansion in exports may support specialisation in the production of export products. This, in turn may cause the general level of skills to rise in the exports sector increasing thus productivity levels. Consequently, there would be a rearrangement of resources from the relatively inefficient non-trade sector to the highly productive exports sector. This productivity change may then lead to higher output growth.

Thirdly, a rise in exports would raise foreign exchange earnings, making it easier for a country to import more inputs to meet domestic and external demand. Usage of more inputs especially raw materials and machinery would, in turn, lead to an expansion in the aggregate output level. Fourthly, an outward-oriented trade policy may also provide a country with access to advanced technologies, learning-by-doing gains and better management practices, which may result in further efficiency gains.

In supporting the export-led growth hypothesis, Awokuse (2002) advocates that Export expansion can be a catalyst for economic growth both directly, as a component of aggregate output, as well as indirectly through efficient resource allocation, greater capacity utilization, exploitation of economies of scale, and stimulation of technological improvement due to foreign market competition. He argues that exports provide foreign exchange that allows for increasing levels of imports of capital goods and intermediate goods that in turn raise the growth of capital formation and thus stimulate output growth. Furthermore, export growth through expanded market base allows for the exploitation of economies of scale for open economies and promotes the transfer and diffusion of technical knowledge in the long run which enhances the economic growth.

According to Medina-Smith (2001), promoting exports and achieving export expansion are beneficial for both developed and developing countries for many reasons, including the following: (i) they generate a greater capacity utilization; (ii) they take advantage of economies of scale; (iii) they bring about technological progress; (iv) they create employment and increase labour productivity; (v) they improve allocation of scarce resources throughout the economy; and (vi) they relax the current account pressures for foreign capital goods by increasing the country's external earnings and attracting foreign investment.

According to Sharma and Panagiotidis (2004), Export growth may effect output growth through positive externalities on non-exports, through the creation of more efficient management styles, improved production techniques, increased scale economies, improved allocative efficiency and better ability to generate dynamic comparative advantage. If there

are incentives to increase investment and improve technology this would imply a productivity differential in favour of the export sector. It is thus argued that an expansion of exports, even at the cost of other sectors, will have a net positive effect on the rest of the economy.

Kónya (2002) argues that trade theory provides several plausible explanations as to why the promotion of export activity leads to economic growth. For example, export promotion directly encourages the production of goods for exports. This may lead to further specialisation in order to exploit economies of scale and the nation's comparative advantages. Moreover, increased exports may permit the imports of high quality products and technologies, which in turn may have a positive impact on technological change, labour productivity, capital efficiency and, eventually, on the nation's production.

Wong Hock Tsen (2006) observes that there are many reasons to explain the export-led growth hypothesis. An increase in exports could imply that the demand of the country has risen and this could serve to increase output. An increase in exports could promote specialization in the production of export products which, in turn, may increase the productivity of the export sector leading to a reallocation of resources from the relatively inefficient non-trade sector to the higher productive export sector. The productivity change may also lead to economic growth. Exports that are based on comparative advantage would allow the exploitation of economies of scale which could lead to an increase in economic growth. An increase in exports could earn more foreign exchange which makes it easier to import inputs to meet domestic production and output expansion. Exports may also give access to advanced technologies, learning-by-doing gains and better management practices which, in turn, will stimulate technological diffusion into the economy and enhance economic growth.

 Vohra (2001) gives the beneficial effects of export performance on economic growth such as: (1) increasing specialization and the spillover effects of the export sector's growth; (2) greater capacity utilization; (3) the externality effect of exports in the diffusion of modern technology across other sectors and industries; and (4) the increasing effects of economies of scale, industrialization, and import of capital goods.

According to Moon (1997), the advocates of export-led growth hypothesis argue that exports expand aggregate demand, encourage full employment of resources, and earn revenues to pay for the imports which enhance consumption and facilitate technological progress. The author

argues that from a neo-classical point of view, the outward-oriented strategy is important to economic growth because trade helps liberate the dynamism of the market. Competing in external markets sharpens the entrepreneurial ability of local firms. They must market against the best, keep pace with productivity enhancements and push them further, and develop products the world wants.

Kagnew Wolde (2007) says that the proponents of export-led growth hypothesis give the following arguments: (i) Export expansion brings about technological progress resulting from foreign competition that is crucial for improvement of factor productivity and better use of resources; (ii) Export may benefit economic growth through generating positive externalities on non-exports, increased scale economies, improved allocative efficiency and better ability to generate dynamic comparative advantage; (iii) Exports ease foreign exchange constraints and can thereby provide greater access to international market. The foreign exchange earnings from exports allow the import of high quality intermediate inputs, mainly capital goods, for domestic production and exports, thus expanding the economy's production possibilities and (iv) export enables developing countries to relieve the import shortage they may face up to.

According to Ergashev et al.(1999), Export-oriented strategy of a country will lead to economic growth because it will (i) create more jobs than during import substitution, because of use of the available resources, which can be used at the least cost with the greatest efficiency; (ii) Increase national savings, because the growing incomes, obtained from exports are not limited by the growth of internal consumption; (iii) Increase the economies of scale of production due to larger markets provided by international trade, which will lead to deeper specialization and integration into the global economy; (iv) Increase the quality of management in the economy, as constant incentives will arise, the necessity to eliminate all kinds of internal distortions will strengthen, as well as the necessity to look for internal reserves; (v) Speed up technological development and increase the quality of "human capital". In the course of time the exporters obtain more knowledge in technologies, design, quality control and management, organization and management, especially under the influence of particular demand in industrial countries; (vi) Stimulate direct foreign investments and foreign loans, because the decisions of the investors and creditors are based on the solvency of the country, especially on the amount of its export receipts; (vii) Provide

the growth of foreign exchange receipts, necessary for importing the equipment which is not available in the country and cannot be produced in the country in the nearest future.

Ruane and Ugur (2006) advocate that the main benefits arising from export-promoting policies are: the increased real output through an increase in demand for a country's output via exports; promotion of specialization in the production of export goods which can increase the productivity level and general skill levels; and loosening of foreign exchange constraints, which can make it easier to import inputs and allow output expansion.

The literature on endogenous growth theory supplements the above arguments to support the Export-led growth hypothesis. According to endogenous growth theorists who emphasise the role of increasing returns to scale and the dynamic spillover effects of the export sector's growth, exports may increase long-run growth by allowing the economy to specialize in sectors with scale economies that arise from research and development, human capital accumulation, or learning-by-doing. In this context, increasing returns to scale are associated with the use of new technology and with the complementarities between human and physical capital. In addition, they show that a higher degree of openness allows smaller countries to absorb technology developed in advanced nations at a faster rate and thus grow more rapidly than economies with a lower degree of openness (Baharumshah and Rashid, 1999).

3.2.4.3 Theoretical Literature on "Growth-driven export" Hypothesis

Some authors advocate the "Growth-driven exports hypothesis". Among them, Krugman (1984) advances the idea that economic growth leads to the enhancement of skills and technology in the various sectors of an economy. The advancement of skills and technology creates a comparative advantage for the country in a number of products which facilitates an expansion in exports for those commodities, in which the nation has achieved a secure comparative advantage (Yenteshwar Ram, 2003).

Baharumshah and Rashid (1999) suggest that the causality may run from economic growth to exports. They postulate that economic growth leads to lower unit costs, which facilitates exports. They add that economic growth causes export growth if innovation and technical progress result in well-developed markets, which improves export performance in the trade sector. Producers are likely to sell goods in international markets if domestic production increases faster than domestic demand. According to Kónya (2002), the Growth-driven exports hypothesis is based on the idea that economic growth itself induces trade flows.

Economic growth can create comparative advantages in certain areas leading to further specialisation and facilitating exports.

Combination of the Export-led growth and the Growth-driven exports hypotheses gives a third hypothesis that suggests a bidirectional or feedback causal relationship between export and economic growth. In this case, export growth causes economic growth and growth affects export performance through technical progress and spin-off effects. The advocates of that idea postulate that exports may arise from the realisation of economies of scale, due to productivity gains. The rise in exports may enable further cost reductions which may result in further productivity gains and so on. According to Bhagwati (1988), increased trade produces more income, and more income facilitates more trade, the result being a virtuous circle (Wong Hock Tsen, 2006).

3.3 Empirical Literature

3.3.1 Introduction

Under this section, we review the empirical literature of studies that assessed the "FDI-led exports", "export-led growth" and "FDI-led growth" hypotheses, in various countries, developing and developed countries. The approaches used are different; most of the studies adopted Granger causality tests in individual country analysis or cross-country study, in a bivariate or multivariate framework. Some few used a panel data analysis in a static or dynamic regression. We review successively the studies that examined the "FDI-led exports hypothesis", "export-led growth hypothesis" and "FDI-led growth hypothesis".

3.3.2 Empirical literature on "FDI-led exports" hypothesis.

We consider here only studies that have analysed the relationship between inward FDI and exports, leaving out those that analysed the relationship between outward FDI and exports.
 Awokuse et al. (2008) examined whether FDI stimulates export performance for the case of China over the period 1995 to 2005. Using panel data including fourteen main FDI receiving and exporting manufacturing sectors, empirical results suggest that FDI has a statistically significant and positive impact on China's exports, which shows that FDI received by China is mainly export-oriented. Sharma (2000) investigated the determinants of export performance using annual data for the period 1970-1998 in India using a simultaneous equation framework. His empirical findings showed that although the coefficient of FDI had a positive sign, it was not statistically significant, rejecting hence the FDI-led exports

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hypothesis in that country. The findings therefore suggest that FDI in that country is not export-oriented.

Pacheco-López (2005) investigated the relationship between FDI inflows and exports and between FDI inflows and imports in Mexico over the period 1970-2000. The analysis did not reject the presence of long-run relationship between FDI and exports and between FDI and imports. In a bivariate framework using Granger causality test using a VECM, the results showed the evidence of feedback causality between FDI and exports; suggesting that FDI inflows encourage exports and that export performance stimulates FDI inflows in Mexico. Feedback causality was also found between FDI and imports.

Johnson (2006) examined the relationship between FDI and exports in the East Asian economies, China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan and Thailand for the period 1980 to 2003. The results using Time series regressions for individual economies as well as panel data estimation indicate that FDI inflows have a significant and positive effect on host country exports. Moreover, Granger causality tests indicate that FDI inflows cause export flows. His findings give evidence that export-platform FDI is present in the East Asian economies.

Shao-Wei, Lee (2007) investigated the impact of inward FDI on Taiwanese export performance from 1952-2005. The empirical results show no cointegration relationship between exports and inward FDI. The results from Granger causality tests in a bivariate VAR support the FDI-led export hypothesis in Taiwan. However, it was concluded that American FDI and Japanese FDI do not Granger cause Taiwanese exports, suggesting that American and Japanese FDI are not export-oriented. Jayanthakumaran and Shao-Wei Lee (2007) investigated the causal link between FDI and exports in China and Taiwan during the period 1979-2005 for China and 1952-2005 for Taiwan. Using a bivariate VAR framework, the empirical results supported a one-way causality between FDI and exports running from exports to FDI in China (export-driven FDI hypothesis). However, for Taiwan, their findings show that causality runs from FDI to exports (FDI-led export hypothesis), corroborating the findings of Shao-Wei, Lee (2007).

Pham (2008) investigated the relationship between FDI and trade (exports and imports) in Vietnam for the period 1990-2007 using a bivariate and multivariate VAR, he found the

existence of cointegration between FDI, exports and imports, and the results of Granger causality tests based on a VECM showed that there was a feedback causality between FDI and exports and between FDI and imports, suggesting that FDI in Vietnam is export-oriented. Xuan and Xing (2008) analyzed the impact of FDI on the exports of Vietnam using gravity model. They estimated the model with both the pooled regression and random effects methods. The coefficient of FDI was found to be positive and significant in both methods, suggesting that FDI in Vietnam contributed significantly to the increase of the country's exports, confirming hence the findings of Pham (2008).

We realised that most of the studies examining the relationship between FDI and exports, analysed the relationship between outward FDI and exports in home countries. Studies examining the link between inward FDI and exports in host countries are hence few.

3.3.3 Empirical literature on "Export-led growth" hypothesis

Bahmani-Oskooee et al. (2005) employed a panel data to assess the export-led growth hypothesis in 61 developing countries over the period 1960-99. Using panel cointegration technique, the results show that when export is used as dependent variable in the regression, there is evidence of cointegration, thus, a long-run relationship among the variables of the model. However, cointegration disappears when output is used as dependent variable. The implication of their findings is that growth oriented policies should also boost exports in the long-run.

Choong et al. (2005), using an Autoregressive Distributed Lag (ARDL) model, examined the short and long-run relationships between exports and economic growth in Malaysia. In a growth equation using annual time series data for the period 1960-2001, where real GDP, real exports, real imports, labour and exchange rate were the variables involved. Their findings show that export-led growth hypothesis in the Malaysian economy was supported in both the short- and long-run.

Abou-Stait (2005) examined the export-led growth hypothesis for Egypt for the period 1977-2003. The cointegration test shows that exports, imports and GDP were cointegrated and the results from Granger causality tests show that causality was running from exports to growth hence supporting the Export-led Growth (ELG) for Egypt. The impulse response functions

analysis showed that shocks to exports lead to a significant response in GDP, which, in return, supports the ELG.

Howard (2002) examined the relationship between exports, imports and income in the economy of Trinidad and Tobago. Using Granger causality and error correction modelling in a bivariate VAR framework, the results show that there was one-way granger causation from exports to income (GDP), supporting the export-led growth in that country. Moreover, feedback causation between exports and imports, and imports and income was also found.

Darrat (1986) applied the Granger causality test to investigate the direction of causality between exports and economic growth in four Asian countries namely Hong Kong, Korea, Singapore, and Taiwan. In a bivariate VAR involving two variables (real exports and growth rate of real GDP) for the period1960-1982, his findings show that no causal link was found between real exports and economic growth in Hong Kong, Korea, and Singapore. However, a one-way causality was found for Taiwan, causality running from economic growth to real exports (growth-driven exports). The findings suggest hence that the export-led growth hypothesis is not supported in those countries.

Bahmani-Oskooee et al. (2007) conducted a cross-country study on a sample of 44 developing countries to assess the export-led growth. The study used bounds testing approach to cointegration and error correction modelling introduced by Pesaran et al. (2001). Their empirical results show that in 6 countries (Algeria, Haiti, Honduras, Lesotho, Malawi, and Venezuela) no long-run relationship was found between output and export. In 8 countries (Central African, Chad, Egypt, Gabon, South Africa, Sri Lanka, Togo, and Trinidad and Tobago) a two-way causality between output and exports was found. In 18 countries (Bangladesh, Burundi, Congo Republic, Costa Rica, El Salvador, Ghana, Guatemala, Guyana, India, Jamaica, Madagascar, Mauritania, Niger, Nigeria, Philippines, Rwanda, Senegal, and Zambia), the results show that a one-way causality between output and export was found, causality running from exports to output. Finally, in 12 countries (Benin, Botswana, Burkina, Cote d'Ivoire, Dominican Republic, Ecuador, Kenya, Malaysia, Mexico, Morocco, Paraguay, and Thailand), the results supported the evidence of a one-way long-run causality between the two variables running from output to exports. Their results support the export-led growth hypothesis in 26 countries (60% of the sample) and the growth-driven export hypothesis is supported in 20 countries (45% of the sample).

Mohan and Nandwa (2007) examined the export-led growth hypothesis for Kenya using autoregressive distributed lag (ARDL) bounds technique and Granger causality test. Their results indicated that there was one-way long-run causality between GDP growth and exports running from exports to GDP growth supporting export-led growth hypothesis in Kenya, meaning that policies promoting exports are recommended in promoting and sustaining economic growth in Kenya.

Kónya (2002) assessed the relationship between exports and economic growth in OECD countries for the period 1960-1997, using Panel data Test and Bootstrap Critical Values. Two models have been used by the author, a bivariate model (GDP-exports) and a trivariate model (GDP-exports-openness), both without and with a linear trend. His findings indicated one-way causality from exports to GDP in Belgium, Denmark, Iceland, Ireland, Italy, New Zealand, Spain and Sweden, and two-way causality between exports and growth in Canada, Finland and the Netherlands. However for the case of Australia, Luxembourg, Switzerland, the UK and USA, no evidence of causality has been found.

Karagöz and Şen (2005) analysed the dynamic relationship between export growth and economic growth in Turkey using quarterly data from 1980 to 2004. Empirical findings show that a one-way long-run causality was found between export growth and economic growth in Turkish economy, causality running from export growth to economic growth, supporting hence the Export-led Growth hypothesis in that country. The error correction model used also shows that short-run bidirectional causality between export growth and economic growth was found.

Kaushik et al. (2008) investigated the relationship between economic growth, export growth, export instability and gross fixed capital formation in India during the period 1971-2005. Using Johansen cointegration method and a vector error correction model, the empirical results show that a unique long-run relationship was found between the variables, one-way causality between real exports and real GDP was also found, causality running from real exports to real GDP, supporting the export-led growth hypothesis in India.

Ram (2003) conducted a bivariate Granger causality test to assess the Export-led Growth hypothesis for the case of FIJI over the period 1971-2001. According to his results, one-way

causality running from real Exports growth to real GDP growth was found, supporting hence Export-led Growth for that country.

Njikam (2003) investigated the relationship between exports and economic growth in Sub-Saharan Africa. He chose a sample of 21 SSA countries. Using Hsiao Granger causality, he assessed the direction of causality between agricultural exports, manufactured exports and economic growth during the Import Substitution (IS) and Export Promotion (EP) periods separately. His findings showed that during IS period, one-way causality running from economic growth to agricultural exports was found in five countries (Senegal, Burkina-Faso, Mali, Sudan and Madagascar); uni-directional causality running from between manufactured exports to economic growth was also found in five country (Burkina-Faso, Mali, Central African Republic, Niger and Kenya). Feedback causality between economic growth and total exports was found in three countries (Cameroon, Côte-d'Ivoire and Benin); feedback causality between economic growth and agricultural exports was also found in one country (Ghana), and between economic growth and manufactured exports in three countries (Madagascar, DRC and Sierra-Leone). During the EP period, one-way causality running from agricultural exports to economic growth was found in nine countries (Cameroon, Côte-d'Ivoire, Ghana, Burkina-Faso, DRC, Madagascar, Malawi, Zambia and Gabon); one-way causality running from manufactured exports to economic growth was found in three countries (Cameroon, Mali and Malawi), one-way causality running from economic growth to agricultural exports was found in five countries (Mali, Senegal, Nigeria, Kenya and Tanzania), one-way causality running from economic growth to manufactured exports was found in six countries (Côte d'Ivoire, Ghana, Madagascar, Gabon, Benin and Togo); and feedback causality between economic growth and agricultural exports was found in three countries (Burkina-Faso, DRC and Madagascar).

Sharma and Panagiotidis (2004) investigated the export-led growth hypothesis using cointegration and causality examined the relationship between exports and economic growth in India for the period 1971-2001. In a multivariate framework, the study used the following variables: Gross domestic product, GDP net of exports, real exports, real imports, real gross domestic capital formation and employment in the formal sector. Their results show that from both cointegration and causality analysis, the export-led growth hypothesis has been rejected for the case of India. Awokuse (2002) examined the Export-led growth hypothesis for the case of Canada using a Vector Error Correction Model (VECM) and the augmented vector

autoregressive (VAR) methodology developed by Toda and Yamamoto (1995). In a multivariate framework, the author included in the growth equation, the variables real capital, labour, real exports, real terms of terms and foreign output shock. The results from both approaches used, indicated the presence of one-way causality running from real exports to real GDP, supporting hence the Export-led growth hypothesis for that case of Canada.

3.3.4 Empirical Literature on "FDI-led growth" hypothesis

Kholdy and Sohrabian (2005) investigated the links between financial markets, FDI and the economic growth using a panel of 25 countries over the period of 1975-2002. Using a Heterogeneous Panel Granger causality framework with fixed coefficients proposed by Hurlin and Venet (2001), their results show the hypothesis of Homogeneous non-causality (from FDI to economic growth) failed to be rejected, rejecting the FDI-led growth hypothesis for all the cross-sections. The results also show that the hypotheses of homogeneous non-causality and Homogeneous causality (from economic growth to FDI) were rejected, meaning that causality links were present only in some of the cross-sections. Heterogeneous causality tests show that the cross-sections for which the causal link was present are Kenya and Philippines.

Seetanah and Khaddar (2006) investigated the relationship between FDI and the economic performance for the case of 39 African countries over the period 1980-2000 using a panel data analysis. Results from the static random effects estimates show that FDI has a positive and significant effect on the level of economic growth. The positive link is also confirmed when using GMM panel estimates in a dynamic panel analysis.

Nair-Reichert and Weinhold (2000) used a panel of 24 developing countries over the period 1971-1995 to analyze the dynamic relationship between FDI and economic growth.
They used a mixed fixed and random (MFR) panel data estimation method to allow for cross country heterogeneity in the causal relationship between FDI and growth. Their findings suggest that there is some evidence that the efficacy of FDI in raising future growth rates is higher in more open economies. The relationship between FDI and economic growth was found also to be highly heterogeneous across countries.

Mutenyo (2008) assessed the impact of FDI on economic growth in 32 Sub Saharan African countries. He used both a static panel regression with fixed effect and a dynamic panel using

the GMM estimator. His findings show that FDI has a positive impact on economic growth but less efficient than private domestic investment.

Chowdhury and Mavrotas (2003) assessed the direction of causality between FDI and economic growth for three countries, Chile, Malaysia and Thailand for the period 1969-2000. Their empirical findings based on the Toda-Yamamoto causality test suggest a one-way causality link between FDI and economic growth running from economic growth to FDI in Chile and a feedback causality link between GDP and FDI for Malaysia and Thailand. The results have been confirmed using a bootstrap test with 1000 replications to check for the robustness of the first causality test results. Frimpong et al. (2006) examined the causal link between FDI and GDP growth for Ghana for the pre- and post-SAP periods, using Toda-Yamamoto Granger causality test. The study found no causality between FDI and growth for the total sample period and the pre-SAP period. However one-way causality running from FDI to GDP growth was found during the post-SAP period. Shan et al. (1997) examined the FDI-led growth hypothesis in the case of China one of the most FDI recipient countries in the world. The study is based upon quarterly time series data and a VAR model applying Toda-Yamamoto Granger causality tests. In order to avoid any possible specification bias leading to spurious causality, the authors went beyond the two-variable relationship and built a six-variable VAR model. Using the Toda-Yamamoto Granger causality methodology, the results indicated a bi-directional causality between FDI inflows and economic growth in the case of China. Parantap Basu et al. (2003), using a panel cointegration framework, explored the two-way link between FDI and growth for a panel of 23 developing countries. The results reveal a long-run cointegrating relationship between FDI and GDP after allowing for heterogeneous country effects. The cointegrating vectors reveal feedback causality between GDP and FDI for more open economies, whereas for relatively closed economies, long-run causality appears to be unidirectional running from GDP to FDI.

Moudatsou (2001) analysed the causal link between inward FDI and economic growth in 14 European Union countries. His findings supported GDP-driven FDI hypothesis for 4 out of 14 investigated countries (Italy, Finland, Spain and Ireland) and FDI-led growth hypothesis is supported in 8 countries (Belgium, Denmark, Greece, France, Netherlands, Austria, Portugal and UK). Emrah Bilgiç (2007) tried to investigate the causal relationship between economic growth and FDI in Turkey during the period 1992:2-2006:3. His results based on Johansen

cointegration and Granger causality tests suggested that there was neither a long-run nor a short-run effect from FDI to economic growth or from economic growth to FDI.

Jayaraman and Choong (2006) examined the linkage between FDI and economic growth for the case of FIJI during the period of 1970-2001. Using Granger causality tests based on VECM, the results show a feedback causality between FDI and economic growth.

Athukorala (2003) assessed the evidence of the FDI-led growth hypothesis for the case of Sri-Lanka for the period 1959-2002. Using a VECM and Granger causality tests involving the following variables: foreign direct investment, gross domestic product, Domestic investment, export and import, his findings did not support any evidence of FDI-led growth hypothesis in that country. However, the growth-driven FDI hypothesis could not be rejected. However, Balamurali and Bogahawatte (2004) drew different conclusion. Using Granger causality tests based on a VECM over the period 1977-2003, their findings supported feedback causality between FDI and growth in Sri Lanka.

Mafusire (2001) used a VAR model to test for causation between Gross National product, exports and FDI for Zimbabwe. Using a Variance decomposition analysis for the period 1967-1994, his results concluded that causation between those variables can't be rejected and that significant strong feedback effects exist.

Though our review is not exhaustive, it seems that no study has been carried out to assess "FDI-led exports", "export-led growth" and "FDI-led growth" hypotheses in all the COMESA Countries as a Panel, most of those carried out are country-specific studies, and even Panel data studies carried out including some of the COMESA Countries ignored the heterogeneity issue which is likely to be present in the cross-section units. We hope therefore that this study, by using heterogeneous Panel Granger causality tests, will contribute to the understanding of the relationship between FDI inflows, exports and economic growth in COMESA Countries.

CHAPTER FOUR: PRESENTATION OF THE METHODOLOGY

4.1 Introduction

The main objective of this research is to study the causal relationships between FDI, Exports and economic growth in COMESA countries. In order to know the nature and the direction of causality between the variables, Granger causality tests are used. The concept of Granger causality (Granger, 1969) is based on the idea that a cause cannot come after its effect. A variable X is said to Granger-cause another variable Y, if the current value of Y is conditional on the past values of X, that is, if the history of X is likely to help predict Y better than the history of Y only (Konya, 2004). Thus, in Granger sense, causality analysis implies finding what is the cause and what is the effect between two variables.

In testing the hypotheses of this research and seeking to achieve its objectives, Panel data analysis is used to prevent some distortions in terms of size which might occur with time-series analysis due to limited number of observations. In fact, the use of panel data dimension has a number of advantages. It provides a large number of observations, increases the degrees of freedom, reduces the collinearity among explanatory variables and improves the efficiency of Granger causality tests (Yetkiner and Erdil, 2006).

Prior to testing Panel Granger causality between Foreign Direct Investments (FDI), Exports and economic growth, we first test for Panel unit root so as to establish the order of integration of series and Panel cointegration to check if there is any stable long-run relationship between the variables.

As far as unit root tests are concerned, a number of panel unit root tests have been developed, such as, Maddala and Wu (MW, 1999); Breitung (2000); Hadri (2000); Choi (2001); Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003). Those tests can be divided into two groups. One group of the tests Breitung (2000) and (Levin, Lin and Chu (2002) assume that there is a common unit root process (assume homogeneous autoregressive coefficients between the cross-sections). Another group of the tests like (IPS, 2003) and (MW, 1999) assume that the first order autoregressive parameter vary with cross-sections (individual unit root process). It is to be noted that, while other test procedures evaluate the null hypothesis of unit root, Hadri (2000) evaluates the null hypothesis of stationarity.

Although those panel unit root testing procedures differ, they have something in common. They are all constructed under the assumption that the individual time series in the panel are cross-sectionally independently distributed. They are called the first generation of Panel unit root tests. The second generation of Panel unit root tests allows for cross-sectional dependence. According to Barbieri (2006), it includes Choi (2002), Pesaran (2003, 2005), Bai and Ng (2002, 2004), Chang (2002, 2004), Moon and Perron (2004), etc. Cross-sectional dependence implies that the time series in the panel are contemporaneously correlated.

As far as panel cointegration tests are concerned, they can be classified into two groups; those which are residual-based (Residual-based LM test (McCoskey and Kao, 1998); Residual-based DF and ADF tests (Kao, 1999; Pedroni tests (1999, 2004)) and those which are likelihood-based (Larsson et al., 2001).

In this study, three Panel unit root testing procedures are considered for the case where the individual time-series in the panel are assumed to be independent (Maddala-Wu (MW, 1999), (Hadri, 2000), and Im-Pesaran-Shin (IPS, 2003)) and one that allows for cross-sectional dependence (Pesaran, 2005). A common characteristic of those tests is that they allow for heterogeneity between the cross-section units. They also assume the presence of individual unit roots.

For Panel cointegration tests, we use the residual-based test of Pedroni (2004) and another recent Panel cointegration test based on ECM, developed by Westerlund (2007), because they allow for heterogeneous cointegrating vectors.

4.2 Heterogeneous Panel Unit Root Tests

4.2.1 Im, Pesaran and Shin (IPS, 2003)

IPS is a unit root testing procedure for panels that allows for simultaneous stationary and non-stationary data series. IPS test requires a balanced panel and uses a likelihood framework. It allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups. The IPS test is based on the estimation of the following ADF regression for each cross-section:

$$\Delta y_{it} = \rho_i y_{it-1} + \alpha d_{it} + \sum_{j=1}^{p_i} \lambda_j \Delta y_{it-j} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

where i = 1, 2... N and t = 1, 2... T, p_i is the number of lags in the ADF regression, ε_{it} are assumed to be independently and normally distributed random variables for all i and t with

zero means and finite heterogeneous variances σ_i^2. Both λ_i and the lag order ρ_i are allowed to vary across-sections. d_{it} represents the exogenous variables in the model.

The null hypothesis of the test (i.e. all series in the panel are non-stationary processes) is as follows: $H_0 : \rho_i = 0, \forall i$, and the alternative that allows for some (but not all) of individual series to have unit roots is: $Ha : \rho_i < 0$ for i = 1, 2,...,N_1; $\rho_i = 0$ for i =$N_1 + 1, N_1 + 2,...,N$. The null hypothesis is rejected if there is a subset (N_1) of stationary individuals.

IPS compute separate unit root tests for the N cross-section units and define their t-bar statistic as a simple average of the individual ADF statistics, t_{iT} , for the null as:

$$\bar{t} = \frac{1}{N} \sum_{i=1}^{N} t_{iT} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

IPS test assumes that t_{iT} are iid and have finite mean and variance.

Im, Pesaran and Shin (1997, 2003) have proposed the following panel unit root test statistic, t_{IPS} which is applicable to heterogeneous cross-sectional panels:

$$t_{IPS} = \frac{\sqrt{N}\left(\bar{t}_{NT} - E\left(\bar{t}_{NT}\right)\right)}{\sqrt{Var\left(\bar{t}_{NT}\right)}} \ \square \ N(0,1)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

where N is the number of cross-sections, $\bar{t}$ is the mean of the computed Augmented Dickey-Fuller (ADF) statistics for individual countries included in the panel, ρ_i, is the auto-regressive root, $E\left(\bar{t}_{NT}\right)$ and $Var\left(\bar{t}_{NT}\right)$ denote respectively, the moments of mean and variance tabulated obtained from Monte Carlo simulation and tabulated by IPS (1997,2003). The statistic t_{IPS} approaches in probability a standard normal distribution as N and T tends to infinity.

IPS's simulations show that, if there is no serial correlation, the t-bar test has the correct size and is very powerful, even for small values of T (T = 10); its power rises monotonically with N and T . But when the disturbances in the dynamic panel are serially correlated, size and power of the t-bar test are reasonably satisfactory. However, T and N have to be sufficiently large.

It is to be noted that special care is needed when interpreting the results of this panel unit root tests. Due to the heterogeneous nature of the alternative hypothesis, rejection of the null hypothesis does not necessarily imply that the unit root null is rejected for all i, but only that the null hypothesis is rejected for $N_1 < N$ members of the group such that as $N \rightarrow \infty$,

$N_1/N \to \delta > 0$. The test does not provide any guidance as to the magnitude of δ , or the identity of the particular panel members which the null hypothesis is rejected.

4.2.2 The Fisher's type test: Maddala and Wu (1999) and Choi (2001) test.

To test for unit root in panel data, Maddala and Wu (1999) and Choi (2001) suggest to use a non parametric Fisher-type test which is based on a combination of the p-values of the test-statistics for a unit root in each cross-sectional unit (the ADF-test or the PP-test). Both IPS and Fisher tests combine information based on individual unit root tests.

Among others, the advantage of the Fisher's type test is that it does not require the panel to be balanced unlike Levin, Lin and Chu (2001) and IPS (2003).

The proposed Fisher type test is:

$P = -2\sum_{i=1}^{N} \ln P_i$, which combines the p-value from unit root tests for each cross-section i to test for unit root in panel data. Under null hypothesis of unit root, P is distributed as $\chi^2(2N) \, as \, T_i \to \infty$ for all N.

And the Z-statistic proposed by Choi (2001) is given by the following formula:

$$Z = \frac{1}{2\sqrt{N}} \sum_{i=1}^{N} \left(-2\ln p_i - 2 \right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

4.2.3 Hadri (2000) test

The previous test procedures (IPS, 2003) and MW (1999) evaluate the null hypothesis of unit root but; Hadri (2000) developed a residual based Lagrange Multiplier test which is an extension of stationarity test for time series of Kwiatkowski *et* al. (1992), which evaluates the null hypothesis of stationarity. Hadri (2000) proposes a parametrization which provides an adequate representation of both stationary and non-stationary variables and permits an easy formulation for a residual based LM test of stationarity. More specifically, Hadri adopts the following components representation:

$$y_{it} = z_{it}^{'}\gamma + r_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

where z_{it} is the deterministic component, r_{it} is a random walk:

$$r_{it} = r_{it-1} + u_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

$u_{it} \; iid(0,\sigma_u^2)$ and ε_{it} is a stationary process. The null hypothesis of trend stationary corresponds to the hypothesis that the variance of the random walk equals zero.

Equation (5) can be written as: $y_{it} = z_{it}' \gamma + e_{it}$ ....(7)

where $e_{it} = \sum_{j=1}^{t} u_{ij} + \varepsilon_{it}$ ....(8)

Let $\bar{e}_{it}$ be the residuals from the regression in (7), σ_e^2 be a consistent estimator of the error variance under H$_0$ and let S_{it} be the partial sum process of the residuals:

$$S_{it} = \sum_{j=1}^{t} \bar{e}_{ij}$$ ....(9)

The LM statistic can thus be defined as: $LM = \frac{1}{\sigma_e^2} \frac{1}{NT^2} \left(\sum_{i=1}^{N} \sum_{t=1}^{T} S_{it}^2 \right)$ ....(10)

which is consistent and has an asymptotic normal distribution as $T, N \to \infty$. It should be noted that the LM statistic is based on averaging the individual KPSS test statistics.

According to Barbieri (2006), Monte Carlo simulations show that T and N dimensions are very important for the test size. Test size is close to the nominal 5% level if T >10 and it is the correct size if T > 25.

4.2.4 Cross-section Augmented DF (CADF) test

Finally, the Cross-section Augmented DF (CADF) test proposed by Pesaran (2005) is also used; it deals with the case where cross-sectional dependence arises from the presence of a single common factor among the cross-sectional units. CADF test is based on the estimation of the following p_{th} order cross-section/time-series augmented regression:

$$\Delta y_{it} = a_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + \sum_{j=0}^{p} d_{ij} \Delta \bar{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij} \Delta y_{i,t-j} + \varepsilon_{it}$$ ....(11)

$\bar{y}_t$ is the cross-section mean of y_{it} and helps asymptotically filtering out the effects of the unobserved common factor.

The test averages the individual so-called CADF t-statistics for all cross-sectional units in a heterogeneous panel, where the individual CADF t-statistics are given by the OLS t-ratio of b_i. It is said that this test has better size properties than alternative methodologies (Luiz de Mello, 2007).

4.3 Heterogeneous Panel Cointegration

4.3.1 Pedroni (2004) panel cointegration tests

The concept of cointegration implies the existence of a long-run relationship between economic variables. If the variables are cointegrated, they move together over time so that short-term disturbances will be corrected in the long-term (Mahmoud and Fatima, 2007).

In order to test for cointegration in panel setting, Pedroni (2004) extended the Engle and Granger (1987) two-step strategy to panels by relying on ADF and PP principles. First, the cointegration equation is estimated separately for each panel member and second, the residuals are examined with respect to the unit root feature. If the null hypothesis of unit root is rejected, the long run equilibrium exists, but the cointegration vector may be different for each cross section. In addition, deterministic components are allowed to be individual specific (Dreger et al., 2005).

Pedroni (2004) framework allows for unbalanced panels and heterogeneity in the slope coefficients, as well as fixed effects and trends in the data (Luiz de Mello, 2007).

Pedroni (2004) developed seven statistics based on the estimated residuals from the following long run model:

$$y_{it} = \alpha_i + \sum_{j=1}^{m} \beta_{ij} x_{ijt} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(12)$$,

where $\varepsilon_{it} = \rho_i \varepsilon_{it-1} + w_{it}$ are the estimated residuals from the panel regression. The null hypothesis of no cointegration tested is: H0: $\rho_i = 1, \forall i$

Among the seven Pedroni's statistics, four are obtained by pooling the residuals along the within-dimension of the panel. They are termed "panel statistics" and include the "panel-v", "panel rho(r)", "panel non-parametric (PP)" and "panel parametric (ADF)" statistics. On the other hand, the rest three test statistics are obtained by pooling the residuals along the between-dimension of the panel. They are termed "group mean statistics" and include "group-rho", "group-PP", and "group-ADF" statistics.

The difference between "panel cointegration" and "group mean panel cointegration" tests lies in the setting of the alternative hypothesis. For the "panel cointegration statistics", the alternative hypothesis is given by: $Ha : \rho_i = \rho < 1, \forall i$ and for the "group mean panel cointegration statistics", the alternative hypothesis is given by: $Ha : \rho_i < 1, \forall i$.

The "group mean panel cointegration statistics" allow thus for heterogeneous coefficients under the alternative hypothesis.

Nikolov (2007) points out that caution is needed when performing Pedroni (2004) due to possible size and power distortions of the tests in short panels. According to Bénassy-Quéré et al. (2005), simulations made by Pedroni (1997) show that, in small samples $(T \approx 20)$, the parametric panel and group ADF-statistic tests perform best, followed by the panel v test, while the group rho-statistic test performs worse.

4.3.2 Westerlund (2007) ECM-based Panel cointegration tests

Westerlund (2007) developed four panel cointegration test statistics (Ga, Gt, Pa and Pt) based on Error Correction Model (ECM). By considering the following Error-Correction Model where all the variables are assumed to be I (1), Westerlund (2007) tests for the absence of cointegration by determining whether there exists error-correction for individual panel members or for the panel as a whole.

$$\Delta y_{it} = C + \alpha_{i1}\Delta y_{it-1} + ... + \alpha_{ip}\Delta y_{it-p} + \beta_{i0}\Delta x_{it} + \beta_{i1}\Delta x_{it-1} + ... + \beta_{ip}\Delta x_{it-p} + \lambda_i(y_{it-1} - \varphi_i x_{it-1}) + \varepsilon_{it} ....(13)$$

λ_i gives an estimate of the speed of error-correction towards the long-run equilibrium. The Ga and Gt test statistics test the null hypothesis of H0: $\lambda_i = 0$ for all i against the alternative Ha: $\lambda_i < 0$ for at least one i. These statistics start from a weighted average of the individually estimated λ_i and their t-ratios respectively. On the other hand, the Pa and Pt test statistics pool information over all the cross-sectional units to test the null hypothesis of H0: $\lambda_i = 0$ for all i against the alterative of Ha: $\lambda_i < 0$ for all i. The rejection of the null hypothesis is therefore taken as the presence of cointegration for the panel as a whole. Westerlund (2007) allows for a completely heterogeneous specification of both long- and short-run parts of the error correction model.

After panel unit root and cointegration tests, panel Granger causality tests are conducted by taking into account the heterogeneity dimension which might be present between the cross-section units. This is because, failure to analyze the presence of that heterogeneity in Panel Granger causality could easily lead to faulty conclusions, inferring a causal relationship in all the cross-section units yet it is only present in a subset of cross-section units or rejecting the presence of a causal relationship for all the cross-section units yet it is present at least in a subset of the cross-section units (Kidd et al., 2006). We therefore use a method of Panel

Granger causality which takes into account that heterogeneity dimension of the cross-sections, method developed by Hurlin and Venet (2001, 2003) and Hurlin (2004, 2007, 2008).

4.4 Heterogeneous Panel Granger causality tests

Using Granger tests with panel data generates two important inferential issues, both dealing with the potential heterogeneity of the individual cross-sections. The first potential type of cross-section variation is due to distinctive intercepts, and this type of variation is addressed with a fixed effects model. The other type of Heterogeneity is the causal variation across units and was ignored until recently (Kidd et al., 2006). In fact, the traditional Panel Causality tests models like Hsiao (1986), Hsiao (1989) and Holtz-Eakin et al. (1988) ignore that heterogeneity problem in the cross-sections but was recently addressed by Hurlin & Venet (2001), Reichart and Weinhold (2001), Hurlin (2004) and Hurlin (2008).

In order to take into account that heterogeneity dimension of the cross-sections in the Panel Granger Causality, Hurlin and Venet (2001), Hurlin and Venet (2003), Hurlin (2004), Hurlin (2007) and Hurlin (2008) proposed an extension of the Granger (1969) causality definition to panel data models with fixed coefficients. Given the heterogeneity of the data generating process, they proposed four definitions of causality relationships.

For two variables X and Y, Hurlin and Venet (2001) represent a VAR model framework in a Panel data with fixed effects as follows:

$$X_{i,t} = \sum_{k=1}^{p} \alpha^k X_{i,t-k} + \sum_{k=0}^{p} \beta_i^k Y_{i,t-k} + \upsilon_{i,t}$$ ....(14)

$$Y_{i,t} = \sum_{k=1}^{p} \lambda^k Y_{i,t-k} + \sum_{k=0}^{p} \varphi_i^k X_{i,t-k} + \upsilon_{i,t}$$ ....(15)

where $\upsilon_{i,t} = \mu_i + \varepsilon_{i,t}$, μ_i are the individual effects and $\varepsilon_{i,t}$ are the disturbance terms and are i.i.d. $(0, \sigma_\varepsilon^2)$. Unlike the previous Panel models, the model (Hurlin and Venet, 2001) assumes that the autoregressive coefficients (α^k and λ^k) and the regression coefficients slopes (β_i^k and φ_i^k) are constant $\forall$ k $\in$ [1, p]. It also assumes that parameters (α^k and λ^k) are identical for all individuals, whereas the regression coefficients slopes (β_i^k and φ_i^k) can have an individual dimension.

For each equation, Hurlin & Venet (2001), Hurlin and Venet (2003), Hurlin (2004), Hurlin (2007) and Hurlin (2008) proposed the following definitions of causality relationships.

4.4.1 Homogenous Non-Causality (HNC) hypothesis

Homogeneous Non-Causality implies that there does not exist any individual causality relationships, non-causality is homogeneous in all the cross-sections of the panel.

For equation (14) for instance, this implies testing whether or not the regression slope coefficients associated to $Y_{i,t-k}$ are null for all individual i and all lag k.

The null hypothesis of the HNC hypothesis is written as follows: $H0 : \beta_i^k = 0, \forall i = 1,...,N, \forall k = 1,...,p$ and the alternative is given by:

$$Ha: \quad \beta_i^k = 0 \quad \forall k = 1,...,p, \quad \forall i = 1,...,N_1$$
$$\beta_i^k \neq 0 \quad \forall k = 1,...,p, \quad \forall i = N_1 + 1, N_1 + 2,...,N$$

Under the alternative hypothesis, there exists a subgroup of units (cross-sections) with dimension N_1 for which the variable Y does not Granger cause the variable X and an another subgroup (dimension $N - N_1$) for which the variable Y Granger causes X, since at least one regression slope coefficient associated to $Y_{i,t-k}$ is different from zero. If $N_1 = N$ there is no causality for all the individual of the panel, and we get the HNC in this case. In the opposite case if $N_1 = 0$, there is causality for all the individual of the sample. In this case we get a homogenous result as far as causality is concerned. The DGP may be not homogenous, but the causality relations are observed for all individuals. On the contrary, if $N_1 > 0$, then the causality relationships is heterogeneous: the DGP and the causality relations are different according the individuals of the sample (Hurlin, 2004).

In order to test the null hypothesis of HNC, Hurlin and Venet (2003), Hurlin (2004), Hurlin (2007) and Hurlin (2008) propose to use the average of individual Wald statistics associated to the test of the non causality hypothesis for units i = 1,...,N.

The average Wald statistic F_{HNC} associated to the null Homogenous Non Causality (HNC) hypothesis is defined as:

$$W_{N,T}^{HNC} = \frac{1}{N} \sum_{i=1}^{N} W_{i,T} \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\text{(16)}$$

where $W_{i,T}$ denotes the individual Wald statistics for the ith cross-section unit associated to the individual test H0 : $\beta_i = 0$.

In addition to the average Wald statistic, Hurlin (2008) proposes the Asymptotic standardized statistic (Z_N^{HNC}) and the Approximated standardized statistic $(\overline{Z}_N^{HNC})$.

The Asymptotic standardized statistic (Z_N^{HNC}) is defined as:

$$Z_N^{HNC} = \frac{\sqrt{N}[W_{N,T}^{HNC} - N^{-1}\sum_{i=1}^{N}E(W_{i,T})]}{\sqrt{N^{-1}\sum_{i=1}^{N}Var(W_{i,T})}} \rightarrow N(0,1) \text{..............(17)}$$

where $E(W_{i,T})$ and $Var(W_{i,T})$ respectively denote the mean and the variance of the statistic $W_{i,T}$.

Hurlin (2007) makes the following approximations:

$$N^{-1}\sum_{i=1}^{N}E(W_{i,T}) \square E(\overline{W}_{i,T}) = K * \frac{(T-2k-1)}{(T-2k-3)} \text{..............(18)}$$

$$N^{-1}\sum_{i=1}^{N}Var(W_{i,T}) \square Var(\overline{W}_{i,T}) = 2K * \frac{(T-2K-1)^2 *(T-K-3)}{(T-2K-3)^2 *(T-2K-5)} \text{..............(19)}$$

The Approximated standardized statistic $(\overline{Z}_N^{HNC})$ is defined hence as:

$$\overline{Z}_N^{HNC} = \frac{\sqrt{N}[W_{N,T}^{HNC} - E(\overline{W}_{i,T})]}{\sqrt{Var(\overline{W}_{i,T})}} \rightarrow N(0,1) \text{..............(20)}$$

We note that $E(\overline{W}_{i,T})$ and $Var(\overline{W}_{i,T})$ are given in Hurlin (2004) for lags 1 up to 4.

If the value of $(\overline{Z}_N^{HNC})$ is superior to the normal critical value for a given level of risk, the Homogeneous Non-Causality (HNC) hypothesis is rejected.

If the hypothesis fails to be rejected, this implies that the variable Y is not causing X in all the N cross-sections of the sample, the non-causality is homogeneous and testing procedure goes no further. But if the HNC is rejected, the next step is to test whether the causality is homogeneous in all the cross-sections (Hurlin and Venet, 2001).

4.4.2 Homogeneous Causality (HC) hypothesis

Homogeneous Causality implies that there exist N causality relationships, Causality is homogeneous in all the cross-section units of the panel. For equation (14) for instance, this implies testing if the regression slope coefficients associated to $Y_{i,t-k}$ are identical for each lag k and for each individual i. The null and the alternative hypotheses of the HC hypothesis are written as follows: $H_0 : \beta_i^k = \beta_j^k \ \forall(i,j) \ \forall k = 1,...,p$

$$Ha : \beta_i^k \neq \beta_j^k$$

In order to test the HC hypothesis, the following F-statistic is to be computed:

$$F_{hc} = \frac{(RSS_0 - RSS_1) / [p(N-1)]}{RSS_1 / [NT - N(1+p) - p]} \text{..............(21)}$$

Where RSS_0 denotes the restricted residual sum of squared obtained under H_0 from the within estimator, and RSS_1 corresponds to the residual sum of squares of the model without any restriction (Hurlin and Venet, 2003). The value of RSS_1 got under the alternative $\beta_i^k \neq \beta_j^k$ is computed as the sum of the residual sum of squares of individual estimations:

$$RSS_1 = \sum_{i=1}^{N} RSS_{1,i} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(22)$$

If the homogenous causality hypothesis is accepted, it implies that the variable Y is causing X in all the N cross-sections of the sample, and that the autoregressive processes are completely homogeneous.

4.4.3 Heterogeneous Causality hypothesis

If the HC hypothesis is rejected, this means that the causality between X and Y is heterogeneous between the cross-sections of the panel, this means that causality exists in some of the cross-sections and implies testing in which of the N individuals of the panel, the causality exists. Hurlin and Venet (2001) propose here to use a usual Granger causality test for each cross-section unit of the panel. But since most of the time, macroeconomic variables are non-stationary and cointegrated, we propose another method at this stage which is suitable in estimating non-stationary heterogeneous panels. The method is called the Pooled Mean Group (PMG) and was developed by Pesaran, Shin and Smith (1999).

The Pool Mean Group (PMG) estimation is basically a dynamic error-correction model that allows the short-run parameters to vary across the cross-sections (countries) while restricting long-run elasticities to be identical across countries.

An alternative technique, the Mean Group (MG) estimator, also discussed in Pesaran et al. (1999) involves simply the estimation of separate equations for each cross-section and the computation of the mean of the estimates, without imposing any constraint on the parameters. In order to choose between PMG and MG, the test of the homogeneity of the long-run coefficients is provided by a Hausman test, and is based on the null that the two set of coefficients generated by the PMG and MG estimators are not statistically different (Mahony and Vecchi, 2003).

To illustrate the method, we start with the following long-run relationship:

$$grgdp_{it} = \partial_{0i} + \partial_{1i} fdir_{it} + \partial exr_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(23)$$

For simplicity, assuming a maximum lag order of one, we can re-write equation (23) as an autoregressive distributed lag model (ARLD) (1, 1, 1) as follows:

$$grgdp_{it} = \varphi_{0i} + \lambda_i grgdp_{i,t-1} + \delta_{10i} fdir_{it} + \delta_{11i} fdir_{i,t-1} + \delta_{20i} exr_{it} + \delta_{21i} exr_{i,t-1} + \mu_{it} \dots\dots\dots\dots\dots\dots(24)$$

Rewriting equation (24) in an Error-correction form gives:

$$\Delta grgdp_{it} = \psi_i(grgdp_{i,t-1} - \alpha_{0i} - \alpha_{1i} fdir_{it-1} - \alpha_{2i} exr_{it-1}) - \delta_{11i}\Delta fdir_{it} - \delta_{21i}\Delta exr_{it} + e_{it}\dots\dots\dots\dots(25)$$

where $\alpha_{0i} = \dfrac{\varphi_{0i}}{1-\lambda_i}$, $\alpha_{1i} = \dfrac{(\delta_{10i} + \delta_{11i})}{1-\lambda_i}$, $\alpha_{2i} = \dfrac{(\delta_{20i} + \delta_{21i})}{1-\lambda_i}$ and $\psi_i = -(\lambda_i - 1)$.

ψ_i is called the speed of adjustment and must be negative and significant, for the error-correction model to be valid. The equation (25) merely illustrates the (ARLD) (1, 1, 1), but in practice the method requires specifying the most appropriate lag order.

Depending on the lag order, testing causality in a PMG Model can be done in the following ways:

Short-run causality: This implies testing the significance of the coefficients of the lagged difference of the variables (using Wald restriction test),

Long-run causality: This implies testing the significance of the speed of adjustment (speed of adjustment must also be negative),

Strong causality: Implies testing the joint significance of the coefficients of the lagged difference of the variables and the speed of adjustment (using Wald restriction test).

We use thus the methodologies of Hurlin and Venet (2001, 2003), Hurlin (2004, 2007, 2008) and Pesaran et al. (1999) in examining the causal links between FDI, Exports and Economic growth in COMESA countries. The following variables are involved: Growth rate of Real GDP, inward FDI ratio (percentage of GDP) and Exports of goods and services ratio (percentage of GDP).

Since some panel testing procedures like Im, Pesaran and Shin (2003) and Pesaran (2005) require a balanced panel, we thus use a panel of 16 COMESA countries: Burundi, Comoros, DRC, Egypt, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe for the period 1983-2007 where it is possible to get data for all the cross-section units and for all the periods. The desire of having as many observations as possible obliges us to exclude Djibouti, Eritrea and Rwanda because of missing data for some variables for some periods.

The annual data of the above variables are from ''Africa Development Indicators, 2007'' (CD-ROM of World Bank), "Global Development Finance, 2007'' (CD-ROM of World Bank), "Selected Statistics for African Countries" (ADB, 2006, 2008), "World Development Indicators*"* (WDI, 2008) and online database available on UNCTAD website.

CHAPTER FIVE: EMPIRICAL ANALYSIS OF THE CAUSAL LINKS BETWEEN FDI, EXPORTS AND ECONOMIC GROWTH IN COMESA COUNTRIES

5.1 Presentation and Interpretation of the Results

5.1.1 Introduction

The theoretical literature concerning the nexus FDI-Exports-Economic growth suggests that the relationship between FDI and economic growth would lead either to "FDI-led growth" hypothesis or to "Growth-driven FDI" hypothesis, and the relationship between exports and economic growth would lead either to "Export-led growth" hypothesis or to "Growth-driven exports" hypothesis, whereas the relationship between FDI and exports would lead either to "FDI-led exports" hypothesis or to "Exports-driven FDI" hypothesis. However, the independence between those variables can also occur. The role of econometric analysis being of judging the theory, the purpose of this chapter is hence to find out empirically the actual causal relationship between them in COMESA countries. The chapter is organised as follows: Section one presents the results for Panel Unit root tests, Section two presents the results for Panel cointegration tests and Section three presents the results for Heterogeneous Panel Granger Causality tests.

5.1.2 Presentation and Interpretation of the Panel Unit root tests Results

The following panel unit root tests were conducted: Im, Pesaran and Shin (2003), Fisher-type test (Augmented Dickey-Fuller) as proposed by Maddala and Wu (1999), the test by Hadri (2000) and the cross-sectionally augmented ADF (CADF) test proposed by Pesaran (2005). The first three tests assume that the individual time series in the panel are cross-sectionally independently distributed and the last one (CADF) assumes rather that the individual time series in the panel are cross-sectionally dependently distributed. All the tests but Hadri (2000) test the null hypothesis of the presence of unit root. However, they all assume the individual unit roots for all series.

Table 9: IPS and MW Panel Unit Root Tests

Series	IPS-test		MW-test
	t-bar	W[t-bar]	Fisher-ADF
GRGDP	-2.22	-1.08 (0.13)	38.05 (0.21)
ΔGRGDP	-3.30♣	-5.61♣(0.00)	336.10♣ (0.00)
FDIR	-1.74	1.94 (0.97)	20.78 (0.93)
ΔFDIR	-3.49♣	-6.02♣ (0.00)	91.28♣ (0.00)
EXR	-2.11	0.28 (0.61)	26.95 (0.72)
ΔEXR	-3.82♣	-7.53♣ (0.00)	156.44♣ (0.00)

The results in Table 9 show that t-bar and W[t-bar] test statistics of IPS(2003) and Fisher-ADF test statistic of MW(1999) fail to reject the null hypothesis of the presence of unit root in levels of the series; GRGDP, FDIR and EXR are hence non-stationary variables. However, the same IPS and MW tests strongly reject the null hypothesis of unit root at 1 per cent when the variables are transformed in first difference; GRGDP, FDIR and EXR are stationary in first difference, hence generated by an I (1) process.

Table 10: Hadri (2000) panel unit root test

Series	Test specification	Levels		First differences	
		Z(mu)	Z(tau)	Z(mu)	Z(tau)
GRGDP	Homo	7.21♠ (0.00)	4.90♠ (0.00)	-3.63(0.99)	-4.24(1.00)
	Hetero	6.43♠ (0.00)	4.94♠ (0.00)	-3.19(0.99)	-3.49(0.99)
	SerDep	3.19♠ (0.00)	6.87♠ (0.00)	0.78(0.21)	9.33♠ (0.00)
FDIR	Homo	40.63♠ (0.00)	30.48♠ (0.00)	2.47♠ (0.00)	-0.57(0.71)
	Hetero	33.87♠ (0.00)	23.53♠ (0.00)	6.17♠ (0.00)	4.61♠ (0.00)
	SerDep	5.25♠ (0.00)	6.75♠ (0.00)	3.10♠ (0.00)	6.57♠ (0.00)
EXR	Homo	23.75♠ (0.00)	26.01♠ (0.00)	1.60*(0.053)	-0.87(0.80)
	Hetero	16.50♠ (0.00)	14.36♠ (0.00)	0.19(0.42)	-0.56(0.71)
	SerDep	4.04♠ (0.00)	7.05♠ (0.00)	3.38♠ (0.00)	7.54♠ (0.00)

Hadri (2000) test has advantages over IPS (2003) and MW (1999) in that Hadri (2000) tests the null hypothesis of stationarity while the other two test the null hypothesis of unit root. Table 10 shows that the Z(mu) and Z(tau) test statistics strongly reject the null hypothesis of stationarity of all the series in levels in our panel, and for all the test specifications provided by Hadri (2000). However, for the first difference of the series, the results seem to be somehow mixed depending on the test specifications. The Z(mu) and Z(tau) test statistics fail to reject the null hypothesis of stationarity for the first difference of GRGDP and EXR, except when serial dependence in errors is accounted for. For the first difference of FDIR,

only Z(tau) test statistic fails to reject the null of stationarity and it is when the test allows the disturbances across units to be homoskedastic.

However, all the preceding panel unit root testing procedures assume that the individual time series in the panel are cross-sectionally independently distributed which is not the case most of the time. To test whether the individual time series in our panel are cross-sectionally independent, we use three tests which have been developed by Friedman (1937), Breusch-Pagan (1980), Frees (1995, 2004) and Pesaran (2004). After the Fixed effect model (one can alternatively start with the Random effect model) which is the starting point for the test of cross-sectional dependence, we present the results of the tests in the following table:

Table 11: Tests of Cross-Sectional dependence

Friedman test		B-P LM test		Frees test				Pesaran test	
Stat	P-val	Stat	P-val	Stat	CV1%	CV5%	CV10%	Stat	P-val
44.35♠	0.00	169.03♠	0.00	0.25♠	0.19	0.13	0.10	3.39♠	0.00

Note: *B-P denotes Breusch –Pagan, the null hypothesis of all the tests is the Cross-Sectional independence, (♠) denotes the rejection of the null hypothesis at 1%, the Stata routines used "xtcsd" for Friedman, Frees and Pesaran tests, and "xttest2" for Breusch-Pagan test are found in Statistical Software Components (SSC) archive.*

Table 11 shows that Friedman's, Breusch-Pagan, Frees' and Pesaran's tests strongly reject the null hypothesis of cross-sectional independence at 1 per cent, inferring hence that the individual time series in our panel are cross-sectionally dependent, indicating the existence of a strong mutual correlation among COMESA Countries for FDI, Exports and Economic growth. We then complement the Panel unit root tests conducted previously by another one, the Cross-sectionally ADF test (CADF test) proposed by Pesaran (2005) which assumes the cross-sectional dependence of individual time series in the panel, to check whether CADF test results corroborate with the IPS (2003), MW (1999) and Hadri (2000) tests results we came up with previously.

Table 12: Panel unit root tests in the presence of cross-section dependence (CADF test of Pesaran, 2005)

Series	Constant			Constant & Trend		
	t-bar	Z[t-bar]	P-Value	t-bar	Z[t-bar]	P-Value
GRGDP	-1.65	0.37	0.64	-2.38	-0.30	0.38
Δ**GRGDP**	-4.80♠	-12.61♠	0.00	-3.44♠	-4.88♠	0.00
FDIR	-1.95	-0.83	0.20	-1.88	1.83	0.96
Δ**FDIR**	-2.31	-2.33♣	0.01	-2.61	-1.30*	0.09
EXR	-2.01	-1.10	0.13	-2.51	-0.88	0.18
Δ**EXR**	-3.26♠	-6.24♠	0.00	-3.41♠	-4.74♠	0.00

The CADF tests results in Table 12 show that t-bar and Z[t-bar] test statistics fail to reject the null hypothesis of unit root for all the variables in the panel, for whichever deterministic term chosen, constant or constant & trend. The Cross-sectionally ADF (CADF) test confirms hence that the levels of the variables of our panel, GRGDP, FDIR, and EXR are non-stationary. When the variables are transformed in first difference, the same test statistics t-bar and Z[t-bar] strongly reject the null hypothesis of the presence of unit root in the series, and this for whichever deterministic term chosen.

We conclude this section by saying that the variables of our panel, Growth of Real GDP (GRGDP), Foreign Direct Investment ratio (FDIR) and Exports of goods & services ratio (EXR) are non-stationary processes I(1). Since our variables are non-stationary but I (1), we can proceed by testing whether they follow the same path in the long-run, in other words, whether they are cointegrated. That is the task of the next section.

5.1.3 Presentation and interpretation of the Panel Cointegration tests results

We use the Pedroni (2004) residual-based panel cointegration tests for heterogeneous panels and the Error Correction Model-based panel cointegration tests of Westerlund (2007) and we conduct the panel cointegration tests between the variables considering two cases, the bivariate case and multivariate case. Among the seven test statistics developed by Pedroni (2004), four are called "Panel cointegration statistics" (Panel v-Stat, Panel Rho-Stat, Panel PP-Stat and Panel ADF-stat) and the remaining three are called "group mean panel cointegration statistics" (Group Rho-Stat, Group PP-stat and Group ADF-Stat). However, caution is needed when applying Pedroni (2004) tests. In fact, it is said that Pedroni's tests are less reliable in small samples like ours, where T = 25, and that in such samples the Panel ADF-statistic and group ADF-statistic tests perform best while the Group Rho-statistic test performs worse (Nikolov, 2007). For Pedroni (2004) panel cointegration tests, we therefore consider mainly the Panel ADF-statistic and Group ADF-statistic tests in our analysis.

5.1.3.1 Panel Cointegration Tests: The Bivariate Case

We start with the bivariate case by testing whether there is a long-run relationship between Economic growth and Foreign Direct Investment (FDI) in our panel of COMESA Countries. The following table shows the results of Pedroni's panel cointegration tests between economic growth and FDI.

Table 13: Pedroni panel cointegration tests between GRGDP and FDIR

Panel cointegration Stat				Group mean cointegration Stat		
v-Stat	Rho-Stat	PP-Stat	ADF-Stat	Rho-Stat	PP-Stat	ADF-Stat
-2.02	-7.21♠	-14.11♠	-13.44♠	-4.43♠	-13.42♠	-12.45♠
(0.97)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: *The null hypothesis of the test is that there is no cointegration between the variables, the P-values are in parentheses, (♠) denotes the rejection of the null hypothesis at 1%. We consider Constant & Trend as the deterministic terms, the test is conducted with the package Eviews 6 and the AIC lag length is selected automatically by the Software.*

Table 13 shows that all the test statistics, panel cointegration tests and Group mean cointegration tests, except the panel v-Statistic, strongly reject the null hypothesis of no cointegration. Basing on Pedroni (2004) cointegration tests, we hence conclude that there is a long-run relationship between economic growth and FDI in the sample of COMESA Countries.

In addition to Pedroni (2004), we use another very recent panel cointegration testing procedure developed by Westerlund (2007) which is based on an Error-Correction Model. Westerlund (2007) tests for the absence of cointegration by determining whether there exists an error correction for individual panel members or for the panel as a whole. Westerlund (2007) developed four test statistics (Gt, Ga, Pt and Pa). The following are the results of Westerlund (2007) panel cointegration tests between economic growth and FDI (see Table 14).

Table 14: Westerlund panel cointegration tests between GRGDP and FDIR

Statistic	Value	Z-Value	P-Value	Robust P-Value
Gt	-4.25	-9.43	0.00	0.00
Ga	-22.36	-6.29	0.00	0.13
Pt	-14.56	-7.11	0.00	0.03
Pa	-23.06	-9.45	0.00	0.07

Note: *The test requires choosing the lag and leading lengths, we choose the lag and lead length of 2 and we set the width of the Bartlett kernel window to 2; the Stata routine used "xtwest" is found in Statistical Software Components (SSC) archive. The "Xtwest", Stata command for ECM-based panel cointegration test has been*

developed by Persyn and Westerlund (2008). The robust P-Values of the test statistics are obtained here by bootstrapping using 500 replications.

The Westerlund (2007) cointegration test results show that if we consider the simple P-values, the null hypothesis of no cointegration is strongly rejected for all the test statistics at 1 per cent, and when we consider the robust P-values obtained after bootstrapping using 500 replications, the results show that Gt and Pt test statistics reject the null hypothesis of no cointegration at 5 per cent and Pa test statistics rejects the null hypothesis of no cointegration at 10 per cent. However, Ga test statistic fails to reject the null hypothesis of no cointegration even at 10 per cent. As Much as the Westerlund (2007) test results are somehow mixed, especially when considering the Robust P-values, we conclude that there exists a long-run relationship between economic growth and FDI in COMESA Countries.

We now test for the panel cointegration between Economic growth and Exports of goods and services in COMESA Countries. The following table presents the results given by Pedroni (2004) panel cointegration tests.

Table 15: Pedroni panel cointegration tests between GRGDP and EXR

Panel cointegration Stat				Group mean cointegration Stat		
v-Stat	Rho-Stat	PP-Stat	ADF-Stat	Rho-Stat	PP-Stat	ADF-Stat
-3.414	-6.38♠	-13.08♠	-12.26♠	-4.00♠	-12.62♠	-10.77♠
(0.999)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: *The null hypothesis of the test is that there is no cointegration between the variables, the p-values are in parentheses, and (♠) denotes the rejection of the null hypothesis at 1%. We consider Constant & Trend as the deterministic terms, the test is conducted with the package Eviews 6 and the AIC lag length is selected automatically by the Software.*

The results show that all the test statistics, panel cointegration tests and Group mean cointegration tests, except the panel v-Statistic, strongly reject the null hypothesis of no cointegration (see Table 15). We can hence say that, in COMESA Countries, economic growth and exports of goods and services have a long-run relationship.

We also conduct the Westerlund (2007) panel cointegration tests to confirm the Pedroni (2004) test results. Table 16 presents the Westerlund (2007) panel cointegration test results.

Table 16: Westerlund panel cointegration tests between GRGDP and EXR

Statistic	Value	Z-Value	P-Value	Robust P-Value
Gt	-3.40	-5.21	0.00	0.13
Ga	-23.59	-7.03	0.00	0.09
Pt	-14.14	-6.62	0.00	0.01
Pa	-24.05	-10.11	0.00	0.03

Note: *We use the lag and lead length of 2 and we set the width of the Bartlett kernel window to 2, the robust P-Values of the test statistics are obtained by bootstrapping using 500 replications.*

The results show that if we consider the simple P-values, all the Westerlund (2007) test statistics strongly reject at 1 per cent, the null hypothesis of no cointegration between economic growth and exports of goods and services. But if consider the robust P-values, all the test statistics but Gt reject the null hypothesis of no cointegration. Pt and Pa test statistics reject the null hypothesis at 5 per cent and Ga test statistic rejects the null hypothesis of no cointegration at 10 per cent. Westerlund (2007) test results confirm Pedroni (2004) test results; we hence conclude that there exists a long-run relationship between economic growth and exports of goods and services in COMESA Countries.

We now test for the panel cointegration between Foreign Direct investment and Exports of goods and services in COMESA Countries, using Pedroni (2004) and Westerlund (2007) panel cointegration tests. The following Table presents the Pedroni (2004) cointegration test results.

Table 17: Pedroni panel cointegration tests between EXR and FDIR

Panel cointegration Stat				Group mean cointegration Stat		
v-Stat	Rho-Stat	PP-Stat	ADF-Stat	Rho-Stat	PP-Stat	ADF-Stat
-0.53	0.57	-0.84	-4.32♠	0.17	-5.17♠	-5.43♠
(0.70)	(0.71)	(0.19)	(0.00)	(0.43)	(0.00)	(0.00)

Note: *The null hypothesis of the test is that there is no cointegration between the variables, the p-values are in parentheses, and (♠) denotes the rejection of the null hypothesis at 1%, we consider Constant & Trend as the deterministic terms, the test is conducted with the package Eviews 6 and the AIC lag length is selected automatically by the Software.*

As indicated in Table 17, the null hypothesis of no cointegration between exports of goods and services and FDI is rejected only by Panel ADF-statistic, Group PP-statistic and Group ADF-statistic. But like we have already mentioned, since Panel ADF-statistic and Group ADF-statistic perform best in samples like ours, we can thus say that exports of goods and services and FDI are cointegrated in COMESA Countries.

The following are the results of Westerlund (2007) panel cointegration tests between exports of goods and services and FDI.

Table 18: Westerlund panel cointegration tests between EXR and FDIR

Statistic	Value	Z-Value	P-Value	Robust P-Value
Gt	-3.26	-4.51	0.00	0.29
Ga	-16.69	-2.88	0.00	0.55
Pt	-12.80	-5.067	0.00	0.07
Pa	-16.51	-5.064	0.00	0.20

Note: *We use the lag and lead length of 2 and we set the width of the Bartlett kernel window to 2, the robust P-Values of the test statistics are obtained by bootstrapping using 500 replications.*

The results presented in Table 18 show that if we consider the simple p-values, all the test statistics strongly reject the null hypothesis of no cointegration at 1 per cent; but if we consider the robust p-values, only Pt test statistic rejects the null hypothesis of no cointegration at 10 per cent, the rest of the test statistics fail to reject the null hypothesis. Nonetheless, we can still say that exports of goods and services and FDI are cointegrated in COMESA Countries.

5.1.3.2 Panel Cointegration Tests: The Multivariate Case

We consider now the multivariate case by testing the cointegration between the three variables, economic growth, Foreign Direct investment (FDI) and Exports of goods and services for the case of COMESA Countries. The following Table presents the Pedroni (2004) panel cointegration test results.

Table 19: Pedroni panel cointegration tests between GRGDP, FDIR and EXR

Panel cointegration Stat				Group mean cointegration Stat		
v-Stat	Rho-Stat	PP-Stat	ADF-Stat	Rho-Stat	PP-Stat	ADF-Stat
-2.79	-4.26♠	-13.13♠	-11.68♠	-2.38♠	-12.49♠	-9.72♠
(0.99)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: *The null hypothesis of the test is that there is no cointegration between the variables, the P-values are in parentheses, and (♠) denotes the rejection of the null hypothesis at 1%, we consider Constant & Trend as the deterministic terms, the test is conducted with the package Eviews 6 and the AIC lag length is selected automatically by the Software.*

The results in Table 19 show that all the test statistics but Panel v-statistic, strongly reject the null hypothesis of no cointegration at 1 per cent. We hence conclude that there exists a long-run relationship between economic growth, FDI and exports of goods & services in COMESA Countries.

Table 20 presents the results of Westerlund (2007) panel cointegration tests between economic growth, FDI and exports of goods & services.

Table 20: Westerlund panel cointegration tests between GRGDP, EXR and FDIR

Statistic	Value	Z-Value	P-Value	Robust P-Value
Gt	-3.46	-4.44	0.00	0.00
Ga	-8.08	3.02	0.99	0.30
Pt	-14.11	-5.50	0.00	0.00
Pa	-8.82	0.98	0.83	0.08

Note: *We use the lag and lead length of 1 and we set the width of the Bartlett kernel window to 2, the robust P-Values of the test statistics are obtained by bootstrapping using 500 replications.*

The results show that if we consider the simple p-values, only Gt and Pt test statistics reject the null hypothesis of no cointegration at 1 per cent; but if we consider the robust P-values, the null hypothesis of no cointegration is rejected by Gt and Pt at 1 per cent and by Pa at 10 per cent. Pt fails however to reject the null hypothesis; we conclude nonetheless that economic growth, FDI and exports of goods and services are cointegrated in COMESA Countries.

We conclude this section by saying that whether we consider the bivariate case or the multivariate case, the Pedroni (2004) and Westerlund (2007) panel cointegration tests support the existence of a long-run relationship between economic growth, FDI and Exports of goods and services in COMESA Countries.

5.1.4 Presentation and Interpretation of Panel Causality Tests Results

After the panel unit root and panel cointegration tests, we now look at the panel causality tests using the methodology that takes into account the possible presence of heterogeneity in the panel. We follow Hurlin and Venet (2001, 2003), Hurlin (2004, 2007, 2008) as presented in the methodology and assess the hypotheses of Homogeneous Non-Causality and Homogeneous Causality. We afterwards follow Pesaran, Shin and Smith (1999) and use the "Pooled Mean Group (PMG)" estimator, in examining causality in heterogeneous panel.

5.1.4.1 Homogenous Non-Causality test results

Testing for Homogeneous Non-Causality (HNC) hypothesis implies testing whether the variable X is not causing Y in all the N cross-sections (countries) of the sample. If the HNC hypothesis fails to be rejected, this means that the non-causality is homogeneous and testing procedure goes no further. Table 21 presents the Homogeneous Non-Causality test results

based on the two statistics as proposed by Hurlin (2004) and Hurlin (2008), the Average Wald statistic (W_{HNC}), and the Approximated standardized statistic ($\overline{Z}_{HNC}$).

Table 21: Homogeneous Non-Causality test

Causality direction	K = 1		K = 2		K = 3	
	W_{HNC}	$\overline{Z}_{HNC}$	W_{HNC}	$\overline{Z}_{HNC}$	W_{HNC}	$\overline{Z}_{HNC}$
FDIR → GRGDP	1.899	1.903♣	2.920	1.127	4.034	0.815
GRGDP → FDIR	2.081	2.337♠	3.307	1.750♠	5.503	2.645♠
EXR → GRGDP	2.152	2.506♠	2.962	1.195	4.551	1.459*
GRGDP → EXR	0.591	-1.212	1.949	-0.436	4.161	0.973
FDIR →EXR	5.171	9.697♠	5.658	5.536♠	6.625	4.042♠
EXR → FDIR	1.336	0.562	1.733	-0.784	3.373	-0.008

Note: *$\overline{Z}_{HNC}$ follow a standard normal distribution with N (0, 1), the moments $E(\overline{W}_{i,T})$ and $Var(\overline{W}_{i,T})$ used to compute them are given in Hurlin (2004). (♠), (♣) and (*) denote the rejection of the null hypothesis at 1%, 5% and 10% respectively. K is the number of lags*

The results show that the Approximated standardized test statistic rejects the Homogeneous Non-Causality hypothesis from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports. The rejection of the HNC is robust for all lags for causality from economic growth to FDI and from FDI to exports. However, for causality from FDI to economic growth and from exports to economic growth, the rejection of the HNC is not robust for all lags. The HNC from FDI to economic growth is only rejected for lag 1, whereas the HNC from exports to economic growth is rejected for lag 1 and lag 3. The results show, however, that for all lags the Approximated standardized test statistic fails to reject the hypothesis of HNC, for causality from economic growth to exports and from exports to FDI. These results imply that causality from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports, exists at least in one of the cross-section units (countries) of our panel; and that there is no causality from economic growth to exports and from exports to FDI in all the countries of our panel in short-run.

Since the HNC is rejected when the direction of causality is from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports, we proceed and test for Homogeneous Causality hypothesis.

5.1.4.2 Homogeneous Causality Test Results

The testing for the Homogeneous Causality (HC) hypothesis implies testing whether the variable X is causing Y in all the N cross-sections (countries) of the sample. If the HC hypothesis fails to be rejected, this means that the causality is homogeneous and testing procedure goes no further. Table 22 presents the test results for Homogeneous Causality hypothesis.

Table 22: Homogeneous Causality test

Causality direction	K = 1	K = 2	K = 3
	F_{HC}	F_{HC}	F_{HC}
FDIR → GRGDP	16.45♠	5.14♠	4.27♠
GRGDP → FDIR	6.69♠	4.39♠	5.35♠
EXR → GRGDP	5.82♠	4.34♠	4.39♠
GRGDP → EXR	-	-	-
FDIR →EXR	17.90♠	11.65♠	11.95♠
EXR → FDIR	-	-	-

Note: *F_{HN} are the computed Fisher statistics with [K (N − 1)] and [N (T − 2K − 1)] degrees of freedom, where K is the number of lags. (♠) denotes the rejection of the null hypothesis at 1 per cent.*

The results show that for all lags, the Homogeneous Causality hypothesis is strongly rejected. This implies that causality from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports is not homogeneous, it is hence heterogeneous. This means that causality is only present in some cross-section units (countries) of the panel and absent in some others.

5.1.4.3 Heterogeneous Causality tests results

Since the Homogeneous Causality hypothesis is rejected, we then proceed to find out in which cross-sections (countries) of the panel, the causal links are present and in which they are absent. Since in our panel the variables have been found to be non-stationary but cointegrated, it is appropriate to use an error-correction model in examining the causal links between the variables. Two procedures are commonly used in the estimation of non-stationary panels; the Group Mean (GM) estimation of Pesaran & Shin (1995) or the Pooled Mean Group (PMG) estimation of Pesaran, Shin & Smith (1999). The Pool Mean Group

(PMG) estimation is basically a dynamic error-correction model that allows the short-run parameters and error variances to differ across the cross-section units (countries) while restricting long-run coefficients to be identical across the cross-section units (countries), whereas the Mean group (MG) estimator involves simply the estimation of separate equations for each country and the computation of the mean estimates, without imposing any constraint on the parameters (Yongfu Huang, 2006). Since the two procedures are different, we need to choose between these two specification procedures by testing the homogeneity of the long-run coefficients using the Hausman test. It is based on the null hypothesis that the two set of coefficients generated by the PMG and MG estimators are not statistically different. Under the null hypothesis, the PMG estimators are consistent and more efficient than the MG estimators (Pesaran et al., 1999).

The following are the Error-Correction forms of the equations where λ_i, δ_i and ψ_i are the Error Correction Terms, showing the speed of adjustment towards the long-run equilibrium.

$$\Delta GRGDP_{it} = \sum_{j=1}^{p} \phi_{ij} \Delta GRGDP_{it-j} + \sum_{j=1}^{p} \alpha_{ij} \Delta FDIR_{it-j} + \sum_{j=1}^{p} \beta_{ij} \Delta EXR_{it-j}$$
$$+ \lambda_i (GRGDP_{it-1} - \varphi_{0i} - \varphi_{1i} FDIR_{it-1} - \varphi_{2i} EXR_{it-1}) + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(26)$$

$$\Delta FDIR_{it} = \sum_{j=1}^{p} \sigma_{ij} \Delta GRGDP_{it-j} + \sum_{j=1}^{p} \vartheta_{ij} \Delta FDIR_{it-j} + \sum_{j=1}^{p} \mu_{ij} \Delta EXR_{it-j}$$
$$+ \delta_i (FDIR_{it-1} - \partial_{0i} - \partial_{1i} GRGDP_{it-1} - \partial_{2i} EXR_{it-1}) + \varepsilon'_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(27)$$

$$\Delta EXR_{it} = \sum_{j=1}^{p} \omega_{ij} \Delta GRGDP_{it-j} + \sum_{j=1}^{p} \rho_{ij} \Delta FDIR_{it-j} + \sum_{j=1}^{p} \theta_{ij} \Delta EXR_{it-j}$$
$$+ \psi_i (EXR_{it-1} - \gamma_{0i} - \gamma_{1i} FDIR_{it-1} - \gamma_{2i} GRGDP_{it-1}) + \varepsilon''_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(28)$$

In each of the above equations (26, 27 28), the part in parentheses represents the long-run equations, and the other part, representing the short-run. For the case of PMG, the long-run coefficients are constrained to be homogeneous across the cross-sections while the short-run coefficients and the speeds of adjustment (λ_i, δ_i and ψ_i) are left to vary across the cross-sections. For MG however, no constraints are put on coefficients whether in short or long-run. Table 23 presents the Hausman tests results between PMG and MG for the above three equations.

Table 23: Hausman Test between PMG and MG

H0: The difference in coefficients is not systematic	
Equations (dependent variable)	**Hausman stat (χ^2)**
GRGDP Equation	1.88 (0.39)
FDIR Equation	4.81 (0.09)
EXR Equation	2.55 (0.27)

Note: *After running the PMG and MG estimations successively, the Stata command used for Hausman test is "hausman mg pmg, sigmamore". The P-values are in parentheses.*

Hausman test results show that at 5 per cent, the null hypothesis of the homogeneity of the long-run coefficients cannot be rejected; the PMG estimators are hence consistent and more efficient than MG estimators in all the three equations. Therefore in order to assess the causality between Economic growth, FDI and Exports in COMESA Countries, we use the PMG estimation.

Using the PMG estimation, we assess for each cross-section unit (country) of the panel, three kinds of causality, "short-run causality", "long-run causality" and "strong causality". The "short-run causality" is captured by testing the significance of the coefficients of the lagged difference of the variables (regressors), the "long-run causality", captured by testing the significance of the speed of adjustment (must be negative as well), and the "strong causality", by testing the joint significance of the coefficients of the lagged difference of the variables (regressors) and the speed of adjustment.

We would be tempted here not to assess the causality from economic growth to exports and from exports to FDI, since the Non-Causality has been found to be homogeneous in all the cross-section units (COMESA countries) of our panel. But as pointed out by Hurlin and Venet (2008), this does not mean that there is no impact of economic growth on export performance or that there is no impact of export performance on FDI inflows in COMESA Countries. According to Hurlin and Venet (2008), their causal link might be tied to a third variable to be identified in a simple bivariate Granger causality test, or might not be the kind of a short-run causality but a long-run one.

We then examine the causality links using an ECM in a multivariate framework using PMG estimator, method appropriate for non-stationary heterogeneous panels, to see if their causal relationship can be identified in long-run. We use the Newton-Raphson algorithm in the

estimation of PMG and the number of lags included is equal to 2. Table 24 presents the results from PMG estimation of heterogeneous causality tests between FDI and Exports, assessing the "FDI-led Export" hypothesis in COMESA Countries.

Table 24: Heterogeneous causality test results: From FDIR to EXR

Countries	Null hypothesis: FDIR does not cause EXR		
	S-R causality (χ^2)	**L-R causality** (z-stat)	**Strong causality** (χ^2)
	$\rho_{i1} = ... = \rho_{ip} = 0$	$\psi_i = 0$	$\rho_{i1} = ... = \rho_{ip} = \psi_i = 0$
Burundi	1.49 (0.47)	-1.77* (0.07)	3.40 (0.33)
Comoros	0.04 (0.98)	-1.16 (0.24)	1.35 (0.71)
DRC	1.84 (0.39)	-1.96♣ (0.04)	4.75 (0.19)
Egypt	9.22♣ (0.01)	-7.52♠ (0.00)	58.57♠ (0.00)
Ethiopia	3.60 (0.16)	0.77 (0.44)	3.66 (0.30)
Kenya	1.10 (0.57)	-4.26♠ (0.00)	23.77♠ (0.00)
Libya	0.48 (0.78)	-0.47 (0.63)	1.89 (0.59)
Mauritius	10.92♠ (0.00)	-1.32 (0.18)	14.10♠ (0.00)
Madagascar	27.41♠ (0.00)	-0.31 (0.75)	27.79♠ (0.00)
Malawi	0.68 (0.71)	0.18 (0.85)	0.68 (0.87)
Seychelles	4.40 (0.11)	-3.64♠ (0.00)	28.20♠ (0.00)
Sudan	10.04♠ (0.00)	1.48 (0.14)	11.27♣ (0.01)
Swaziland	2.89 (0.23)	-4.03♠ (0.00)	20.02♠ (0.00)
Uganda	5.84* (0.053)	0.65 (0.51)	7.81* (0.050)
Zambia	1.25 (0.53)	-0.85 (0.39)	1.84 (0.60)
Zimbabwe	7.72♣ (0.02)	-3.93♠ (0.00)	17.58♠ (0.00)

Note: *The Stata routine used "xtpmg" to estimate the PMG model was developed by E.F. Blackburne III & M.W. Frank (2007), and is found in Statistical Software Components (SSC) archive. The P-values are in parentheses, and (♠), (♣) and (*) denote the rejection of the null hypothesis at 1%, 5% and 10% respectively.*

Causality test results from the above Table show that causality running from FDI to exports was found only in short-run for Mauritius, Madagascar, Sudan and Uganda; it was found only in long-run in Burundi, DRC, Kenya, Seychelles, Swaziland, it was found to be both short- and long-run in Egypt and Zimbabwe only. In addition, causality running from FDI to exports was found to be strong in Egypt, Kenya, Mauritius, Madagascar, Seychelles, Sudan, Swaziland, Uganda and Zimbabwe.

Without taking into account the kind of causality, the results show globally that FDI is causing exports in 11 countries of the panel: Burundi, DRC, Egypt, Kenya, Mauritius, Madagascar, Seychelles, Sudan, Swaziland, Uganda and Zimbabwe, supporting hence the

FDI-led exports hypothesis in those countries. However, no causality running from FDI to exports was found in Comoros, Ethiopia, Libya, Malawi and Zambia.

Table 25 presents the results from PMG estimation of heterogeneous causality tests between FDI and Exports, assessing the "Export-driven FDI" hypothesis in COMESA Countries.

Table 25: Heterogeneous causality test results: From EXR to FDIR

Countries	Null hypothesis: EXR does not cause FDIR		
	S-R causality (χ^2)	**L-R causality** (z-stat)	**Strong causality** (χ^2)
	$\mu_{i1} = ...\mu_{ip} = 0$	$\delta_i = 0$	$\mu_{i1} = ...\mu_{ip} = \delta_i = 0$
Burundi	2.67 (0.26)	-1.35 (0.17)	4.47 (0.21)
Comoros	1.32 (0.51)	-3.72♠ (0.00)	14.36♠ (0.00)
DRC	5.95* (0.051)	-1.04 (0.29)	6.20 (0.10)
Egypt	2.40 (0.30)	-3.32♠ (0.00)	21.98♠ (0.00)
Ethiopia	1.16 (0.56)	-0.49 (0.62)	1.28 (0.73)
Kenya	10.60♠ (0.00)	-2.37♠ (0.02)	11.81♠ (0.00)
Libya	16.28♠ (0.00)	-5.10♠ (0.00)	44.46♠ (0.00)
Mauritius	3.28 (0.19)	0.33 (0.74)	4.00 (0.26)
Madagascar	12.39♠ (0.00)	-1.93* (0.054)	14.14♠ (0.00)
Malawi	1.65 (0.43)	-2.70♠ (0.00)	7.91♣ (0.04)
Seychelles	7.42♣ (0.02)	-4.17♠ (0.00)	20.06♠ (0.00)
Sudan	2.51 (0.28)	-2.04♣ (0.04)	4.45 (0.21)
Swaziland	1.39 (0.49)	-2.41♣ (0.01)	11.60♠ (0.00)
Uganda	0.18 (0.91)	-0.43 (0.66)	0.35 (0.95)
Zambia	10.18♠ (0.00)	-1.60 (0.11)	12.59♠ (0.00)
Zimbabwe	2.36 (0.30)	-2.91♠ (0.00)	10.52♣ (0.01)

Note: *The P-values are in parentheses, and (♠), (♣) and (*) denote the rejection of the null hypothesis at 1%, 5% and 10% respectively.*

Causality test results from the above Table show that causality running from exports to FDI was found only in short-run for DRC and Zambia; it was found only in long-run in Comoros, Egypt, Malawi, Sudan, Swaziland, and Zimbabwe; it was found to be both short-and long-run in Kenya, Libya, Madagascar and Seychelles. In addition, causality running from exports to FDI was found to be strong in Comoros, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Swaziland, Zambia and Zimbabwe.

Without taking into account the kind of causality, the results show globally that exports are causing FDI inflows in 12 countries of the panel: Comoros, DRC, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Sudan, Swaziland, Zambia and Zimbabwe, supporting

hence the Export-driven FDI hypothesis in those countries. However, no causality running from exports to FDI was found in Burundi, Ethiopia, Mauritius and Uganda.

To sum up, our findings as for the causal links between Inward FDI and Exports in COMESA Countries, suggest that:

➢ In 18.75% of the COMESA Countries, causality is found to be unidirectional, running from FDI to Exports;

➢ In 25.0% of the COMESA Countries, causality is found to be unidirectional, running from Exports to FDI;

➢ In 50% of the COMESA Countries, feedback causality is found;

➢ In 6.25% of the COMESA Countries, no causality is found;

➢ The "FDI-led Exports" hypothesis is supported in 68.75% of the COMESA Countries; and

➢ The "Export-driven FDI" hypothesis is supported in 75% of the COMESA Countries.

Table 26 presents the results from PMG estimation of heterogeneous causality tests between Exports and economic growth, assessing the "Exports-led growth" hypothesis in COMESA Countries.

Table 26: Heterogeneous causality test results: From EXR to GRGDP

Countries	Null hypothesis: EXR does not cause GRGDP		
	S-R causality (χ^2)	**L-R causality** (z-stat)	**Strong causality** (χ^2)
	$\beta_{i1} = ... = \beta_{ip} = 0$	$\lambda_i = 0$	$\beta_{i1} = ... = \beta_{ip} = \lambda_i = 0$
Burundi	5.98* (0.050)	-2.33♣ (0.02)	12.35♣ (0.00)
Comoros	3.00 (0.22)	-4.83♣ (0.00)	29.29♣ (0.00)
DRC	0.58 (0.74)	-1.20 (0.23)	3.42 (0.33)
Egypt	1.62 (0.44)	-4.14♣ (0.00)	20.72♣ (0.00)
Ethiopia	1.19 (0.55)	-3.09♣ (0.00)	9.95♣ (0.02)
Kenya	2.69 (0.26)	-1.99♣ (0.04)	6.74* (0.08)
Libya	11.51♣ (0.00)	-2.90♣ (0.00)	13.70♣ (0.00)
Mauritius	12.03♣ (0.00)	-3.50♣ (0.00)	18.08♣ (0.00)
Madagascar	5.71* (0.057)	-1.68* (0.09)	16.40♣ (0.00)
Malawi	3.69 (0.15)	-2.87♣ (0.00)	15.15♣ (0.00)
Seychelles	4.68* (0.09)	-2.54♣ (0.01)	9.35♣ (0.02)
Sudan	4.12 (0.12)	-6.04 (0.00)	43.19♣ (0.00)
Swaziland	0.60 (0.73)	-1.27 (0.20)	1.76 (0.62)
Uganda	1.10 (0.57)	-3.90♣ (0.00)	19.67♣ (0.00)
Zambia	1.96 (0.37)	-2.98♣ (0.00)	10.31♣ (0.01)
Zimbabwe	11.75♣ (0.00)	-2.54♣ (0.01)	13.44♣ (0.00)

Causality test results from the above table show that causality running from exports to economic growth , though absent in short-run is present in long-run in countries like Comoros, Egypt, Ethiopia, Kenya, Malawi, Sudan, Uganda and Zambia; it is found to be both short-and long-run in countries like Burundi, Libya, Mauritius, Madagascar, Seychelles and Zimbabwe. In addition, causality running from exports to economic growth was found to be strong in all the countries where it is present.

Without taking into account the kind of causality, the results show globally that exports are causing economic growth in 14 countries of the panel: Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, supporting hence the "Export-led growth" hypothesis; in those countries. However, no causality running from exports to economic growth was found in DRC and Swaziland.

Table 27 presents the results from PMG estimation of heterogeneous causality tests between Exports and economic growth, assessing the "Growth-driven export" hypothesis in COMESA Countries.

Table 27: Heterogeneous causality test results: From GRGDP to EXR

Countries	Null hypothesis: GRGDP does not cause EXR		
	S-R causality (χ^2)	L-R causality (z-stat)	Strong causality (χ^2)
	$\omega_{i1}=...=\omega_{ip}=0$	$\psi_i=0$	$\omega_{i1}=...=\omega_{ip}=\psi_i=0$
Burundi	4.04 (0.13)	-1.77* (0.07)	6.50* (0.08)
Comoros	0.12 (0.93)	-1.16 (0.24)	1.35 (0.71)
DRC	1.63 (0.44)	-1.96♣ (0.04)	10.91♣ (0.01)
Egypt	5.86* (0.053)	-7.52♠ (0.00)	58.88♠ (0.00)
Ethiopia	2.13 (0.34)	0.77 (0.44)	2.36 (0.50)
Kenya	2.94 (0.23)	-4.26♠ (0.00)	24.94♠ (0.00)
Libya	1.23 (0.53)	-0.47 (0.63)	1.51 (0.67)
Mauritius	3.94 (0.13)	-1.32 (0.18)	5.64 (0.13)
Madagascar	1.96 (0.37)	-0.31 (0.75)	2.03 (0.56)
Malawi	4.02 (0.13)	0.18 (0.85)	4.27 (0.23)
Seychelles	0.70 (0.71)	-3.64♠ (0.00)	13.56♠ (0.00)
Sudan	6.04♣ (0.04)	1.48 (0.14)	10.49♣ (0.01)
Swaziland	0.53 (0.76)	-4.03♠ (0.00)	16.58♠ (0.00)
Uganda	3.38 (0.18)	0.65 (0.51)	3.63 (0.30)
Zambia	0.82 (0.66)	-0.85 (0.39)	1.51 (0.67)
Zimbabwe	0.34 (0.84)	-3.93♠ (0.00)	16.06♠ (0.00)

Note: *The P-values are in parentheses, and (♠), (♣) and (*)* denote the rejection of the null hypothesis at 1%, 5% and 10% respectively.

Causality test results from Table 27 show that causality running from economic growth to exports, is present in short-run and absent in long-run in Sudan, in other countries like Burundi, DRC, Kenya, Seychelles, Swaziland and Zimbabwe, though absent in short-run it is present in long-run; it is found to be both short-and long-run in Egypt only. In addition, causality running from economic growth to exports was found to be strong in Burundi, DRC, Egypt, Kenya, Seychelles, Sudan, Swaziland and Zimbabwe.

Without taking into account the kind of causality, the results show globally that economic growth is causing export performance in 8 countries of the panel: Burundi, DRC, Egypt, Kenya, Seychelles, Sudan, Swaziland and Zimbabwe, supporting hence the "Growth-driven exports" hypothesis; implying that economic growth would be a prior condition of exports performance in those countries. However, no causality running from economic growth to exports was found in Comoros, Ethiopia, Libya, Mauritius, Madagascar, Malawi, Uganda and Zambia, implying that economic growth is not a prerequisite for exports performance in those countries.

To sum up, our findings as for the causal links between Exports and economic growth in COMESA Countries, suggest that:

- ➤ In 50% of the COMESA Countries, causality is found to be unidirectional, running from Exports to economic growth;
- ➤ In 12.5% of the COMESA Countries, causality is found to be unidirectional, running from economic growth to Exports;
- ➤ In 37.5% of the COMESA Countries, feedback causality is found;
- ➤ The "Export-led growth" hypothesis is supported in 87.5% of the COMESA Countries; and
- ➤ The "Growth-driven Export" hypothesis is supported in 50% of the COMESA Countries.

Table 28 presents the results from PMG estimation of heterogeneous causality tests between FDI and economic growth, assessing the "FDI-led growth" hypothesis in COMESA Countries.

Table 28: Heterogeneous causality test results: From FDIR to GRGDP

Countries	Null hypothesis: FDIR does not cause GRGDP		
	S-R causality (χ^2)	L-R causality (z-stat)	Strong causality (χ^2)
	$\alpha_{i1} = ... = \alpha_{ip} = 0$	$\lambda_i = 0$	$\alpha_{i1} = ... = \alpha_{ip} = \lambda_i = 0$
Burundi	0.71 (0.69)	-2.33♣ (0.02)	5.84 (0.11)
Comoros	14.56♠ (0.00)	-4.83♠ (0.00)	37.35♠ (0.00)
DRC	0.17 (0.91)	-1.20 (0.23)	1.60 (0.66)
Egypt	2.45 (0.29)	-4.14♠ (0.00)	18.91♠ (0.00)
Ethiopia	1.16 (0.56)	-3.09♠ (0.00)	11.97♠ (0.00)
Kenya	1.88 (0.39)	-1.99♣ (0.04)	5.41 (0.14)
Libya	3.13 (0.20)	-2.90♠ (0.00)	10.49♣ (0.01)
Mauritius	2.70 (0.25)	-3.50♠ (0.00)	17.02♠ (0.00)
Madagascar	26.90♠ (0.00)	-1.68* (0.09)	35.09♠ (0.00)
Malawi	0.36 (0.83)	-2.87♠ (0.00)	8.90♠ (0.03)
Seychelles	1.26 (0.53)	-2.54♣ (0.01)	8.69♣ (0.03)
Sudan	8.89♣ (0.01)	-6.04♠ (0.00)	46.10♠ (0.00)
Swaziland	0.87 (0.64)	-1.27 (0.20)	3.16 (0.36)
Uganda	0.90 (0.63)	-3.90♠ (0.00)	17.00♠ (0.00)
Zambia	5.05* (0.08)	-2.98♠ (0.00)	10.11♣ (0.01)
Zimbabwe	10.71♠ (0.00)	-2.54♣ (0.01)	12.17♠ (0.00)

Note: *The P-values are in parentheses, and (♠), (♣) and (*) denote the rejection of the null hypothesis at 1%, 5% and 10% respectively.*

The causality test results show that in some countries, causality running from FDI to economic growth is absent is short-run but present in long-run. For instance, for countries like Burundi, Egypt, Ethiopia, Kenya, Libya, Mauritius, Malawi, Seychelles, Uganda, that causality was found to be present in long-run but absent in short-run. For other countries like Comoros, Madagascar, Sudan, Zambia and Zimbabwe, causality was found to be both, short- and long-run. Furthermore, causality from FDI to economic growth was found to be strong in countries like Comoros, Egypt, Ethiopia, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe.

Without caring about the kind of causality, whether it is short-run, long-run or strong causality, the results show globally that FDI is causing economic growth in 14 countries of the panel: Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, supporting hence the "FDI-led growth" hypothesis, implying that MNCs' activities boost economic growth in those countries. It's not surprising since most of those countries have a good absorptive capacity, in

terms of low technology gap (Libya, Mauritius, Seychelles and Egypt), financial sector development (Mauritius, Egypt, Kenya, Libya, Zimbabwe, Seychelles, Burundi, Ethiopia and Madagascar) and human capital development (Libya, Egypt and Mauritius).

However, we found no causality running from FDI to economic growth for DRC and Swaziland. DRC and Swaziland, being mineral-rich countries, attract mostly resource-seeking FDI; the MNCs engaging that kind of FDI in those countries create few linkages with the local economy, hence few spillovers.

Table 29 presents the results from PMG estimation of heterogeneous causality tests between FDI and economic growth, assessing the "Growth-driven FDI" hypothesis in COMESA Countries.

Table 29: Heterogeneous causality test results: From GRGDP to FDIR

Countries	Null hypothesis: GRGDP does not cause FDIR		
	S-R causality (χ^2)	L-R causality (z-stat)	Strong causality (χ^2)
	$\sigma_{i1}=...=\sigma_{ip}=0$	$\delta_i=0$	$\sigma_{i1}=...=\sigma_{ip}=\delta_i=0$
Burundi	4.78* (0.09)	-1.35 (0.17)	5.33 (0.15)
Comoros	3.31 (0.19)	-3.72♠ (0.00)	18.52♠ (0.00)
DRC	0.58 (0.75)	-1.04 (0.29)	1.41 (0.70)
Egypt	11.54♠ (0.00)	-3.32♠ (0.00)	26.30♠ (0.00)
Ethiopia	0.59 (0.74)	-0.49 (0.62)	0.89 (0.82)
Kenya	2.56 (0.27)	-2.37♠ (0.02)	12.66♠ (0.00)
Libya	0.15 (0.92)	-5.10♠ (0.00)	26.54♠ (0.00)
Mauritius	4.04 (0.13)	0.33 (0.74)	4.15 (0.24)
Madagascar	3.49 (0.17)	-1.93* (0.054)	8.07♠ (0.04)
Malawi	0.74 (0.68)	-2.70♠ (0.00)	9.53♠ (0.02)
Seychelles	1.77 (0.41)	-4.17♠ (0.00)	21.41♠ (0.00)
Sudan	2.53 (0.28)	-2.04♣ (0.04)	4.55 (0.20)
Swaziland	0.48 (0.78)	-2.41♠ (0.01)	6.47* (0.09)
Uganda	0.73 (0.69)	-0.43 (0.66)	0.91 (0.82)
Zambia	0.51 (0.77)	-1.60 (0.11)	3.19 (0.36)
Zimbabwe	0.20 (0.90)	-2.91♠ (0.00)	8.68♠ (0.03)

Note: *The P-values are in parentheses, and* (♠), (♣) *and* (*) denote the rejection of the null hypothesis at 1%, 5% and 10% respectively.

The causality test results show that, for Burundi, causality running from economic growth to FDI is found only in short-run, it is found only in long-run for Comoros, Kenya, Libya, Madagascar, Malawi, Seychelles, Sudan, Swaziland and Zimbabwe, and both short-and long-run for Egypt only. In addition, causality running from economic growth to FDI was found to

be strong in countries like Comoros, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Swaziland and Zimbabwe. Without caring about the kind of causality whether it is short-run, long-run or strong causality, the results show globally that economic growth is causing FDI inflows in 11 countries of the panel: Burundi, Comoros, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Sudan, Swaziland and Zimbabwe, supporting hence the "Growth-driven FDI" hypothesis, implying that growth performance of those countries would attract FDI. However, we found no causality running from economic growth to FDI for DRC, Ethiopia, Mauritius, Uganda and Zambia, implying that economic growth is not a prerequisite to attract FDI in those countries.

To sum up, our findings as for the causal links between FDI and economic growth in COMESA Countries, suggest that:

➤ In 25.0% of the COMESA Countries, causality is found to be unidirectional, running from FDI to economic growth;

➤ In 6.25% of the COMESA Countries, causality is found to be unidirectional, running from economic growth to FDI;

➤ In 62.5% of the COMESA Countries, feedback causality is found;

➤ In 6.25% of the COMESA Countries, no causality is found;

➤ The "FDI-led growth" hypothesis is supported in 87.5% of the COMESA Countries; and

➤ The "Growth-driven FDI" hypothesis is supported in 68.75% of the COMESA Countries.

5.2 Discussion of the Results

The general objective of this study was to examine the causal links between FDIs, exports and economic growth in COMESA Countries. The following hypotheses were to be assessed:

1. FDI inflows cause export expansion in COMESA countries.
2. Export expansion causes economic growth in COMESA countries.
3. FDI inflows cause economic growth in COMESA countries.

Our empirical findings indicate that the first hypothesis of the study ("*FDI inflows cause export expansion in COMESA Countries*") is confirmed in eleven countries of the panel; Burundi, DRC, Egypt, Kenya, Mauritius, Madagascar, Seychelles, Sudan, Swaziland, Uganda and Zimbabwe, supporting the "*FDI-led exports hypothesis*" in those countries. Those findings suggest hence that FDI in those countries would be *export-oriented*. However, the

findings show that the first hypothesis is rejected in five countries of the panel; Comoros, Ethiopia, Libya, Malawi and Zambia.

On the other hand, a reverse causality running from exports to FDI was found in twelve countries of the panel; Comoros, DRC, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Sudan, Swaziland, Zambia and Zimbabwe; suggesting that expansion of trade through exports would attract FDI in those countries.

The causality between FDI and exports was found to be feedback in DRC, Egypt, Kenya, Madagascar, Seychelles, Sudan, Swaziland and Zimbabwe; implying that in those countries, a shock on one of the two variables will affect the other and vice versa, the cycle will continue once the shock occurs. No causal link was found between FDI and exports in Ethiopia, suggesting that FDI and exports are independent in that country. A shock on one of the two variables will not affect the other and vice versa.

The findings on the causal links between exports and economic growth indicate that the second hypothesis of the study ("*Export expansion causes economic growth in COMESA countries*") is confirmed in 14 countries of the panel; Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, supporting hence the *"Export-led growth hypothesis"* in those countries. However, the findings reject the hypothesis in two countries of the panel, DRC and Swaziland.

A reverse causality running from economic growth to exports was found in 8 countries of the panel; Burundi, DRC, Egypt, Kenya, Seychelles, Sudan, Swaziland and Zimbabwe, supporting hence the *"Growth-driven exports hypothesis"* in those countries, suggesting that economic growth is a prerequisite for export expansion in those countries.

The causality between exports and economic growth was found to be feedback in Burundi, Egypt, Kenya, Seychelles and Sudan; implying that in those countries, a shock on one of the two variables will affect the other and vice versa, the cycle will continue once the shock occurs. We note that our findings here corroborate with Bahmani-Oskooee et al. (2007) for Egypt, Madagascar and Zambia but contradict for Burundi, Kenya and Malawi for which they found respectively Export-Led Growth hypothesis, Growth-Driven Exports hypothesis and no causality between exports and growth. Moreover, our findings here contradict as well the findings of Mohan & Nandwa (2007) whose study supported Export-Led Growth hypothesis for Kenya.

The results on the causal links between FDI and economic growth in COMESA Countries show that the third hypothesis of the study ("*FDI inflows cause economic growth in COMESA countries*") is confirmed in 14 countries of the panel; Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, supporting hence the "*FDI-led growth hypothesis*" in those countries. The hypothesis is however rejected in two countries of the panel, DRC and Swaziland.

A reverse causality running from economic growth to FDI was found in one of the countries of the panel; Swaziland, supporting the "*growth-driven FDI hypothesis*", suggesting hence that economic performance would attract FDI in that country.

The causality between FDI and economic growth was found to be feedback in Burundi, Comoros, Egypt, Kenya, Libya, Madagascar, Malawi, Seychelles, Sudan and Zimbabwe implying that in those countries, a shock on one of the two variables will affect the other and vice versa, the cycle will continue once the shock occurs. No causal link was found between FDI and economic growth in DRC, suggesting that FDI and economic growth are independent in that country. A shock on one of the two variables won't affect the other and vice versa.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

6.1 General Summary and Conclusions

COMESA is a regional economic community comprising 19 countries at present, 13 of them being listed by the World Bank among the poorest in the world. While countries are looking forward to meeting the MDGs by 2015, it should be a priority for developing countries and COMESA countries in particular, to boost and accelerate their economic growth. To achieve rapid growth, attracting FDI and promoting exports have been prescribed by international institutions such as the United Nations, World Bank, etc., as the remedy, basing on the rapid growth of the Asian Newly Industrialised Countries in the last decades, which was a result of high FDI inflows and exports promotion strategy. The figures on FDI and exports show that COMESA countries are trying to attract FDI and to promote exports. However, we wonder whether those policies promoting FDI and exports are a panacea to economic growth issue in COMESA Countries. The examination of the nature and direction of the causal links between FDI, exports and economic growth is hence needed.

The general objective of this study was thus to examine the causal links between FDI, exports and economic growth in COMESA Countries.

The specific objectives were:

> ➢ To explore the causal relationship between FDI and Exports for the case of COMESA Countries.

> ➢ To examine the causal link between Exports and Economic Growth for the case of COMESA Countries.

> ➢ To explore the causal link between FDI and Economic growth for the case of COMESA Countries.

This study used annual data for a panel of 16 COMESA Countries: Burundi, Comoros, DRC, Egypt, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe for the period 1983-2007. The following variables were involved; the Ratio of Inward FDI (percentage of GDP), the Ratio of exports of goods and services (percentage of GDP) and the Growth rate of Real GDP.

The Second Chapter exposed some salient features of Foreign Direct Investment, exports and economic growth in COMESA countries. It was realized that some countries (Egypt, Sudan and Libya), the giants of the region, attract the bulk of FDI flowing to the region (the three,

attracting together more than 70% of total FDI flowing to the region); while others (Comoros, Burundi, Eritrea, Rwanda, etc) attract just an insignificant amount of FDI. The largest exporting countries seem to be the same giants of the region; Egypt and Libya exporting more than 60% of the total COMESA exports. It was also seen under this chapter that some countries have a good absorptive capacity that can enable them to benefit from the presence of the Multinationals Companies, unlike some others with a poor absorptive capacity.

For the period 1980-2007, the five largest economies of the region were found to be Egypt, Libya, Sudan, Kenya and Ethiopia while the five smallest economies are Swaziland, Burundi, Djibouti, Seychelles and Comoros. The recent five top performers (period 2000-2007) in terms of growth are Sudan (8 percent), Ethiopia (7.8 percent), Uganda (5.6 percent), Rwanda (5.4 percent) and Libya (5 percent).

The Third Chapter provided the review of the literature, theoretical and empirical, on the relationship between FDI, exports and economic growth. The economic literature says that FDI inflows can promote exports in the host countries and that FDI is attracted to countries with a higher trade potential. It also says that export promotion can enhance economic growth and that economic growth can in turn promote exports. It further says that FDI inflows can promote economic growth in the host countries and that economic growth can be a determinant of FDI inflows. We thus reviewed what the proponents advance to support those possible relationships between FDI, exports and economic growth. We reviewed as well the empirical literature of the studies that have assessed the "FDI-led exports", "Export-led growth" and "FDI-led growth" hypotheses, for several countries. Though our review has not been exhaustive, we realized that no study has been carried out to assess "FDI-led exports", "export-led growth" and "FDI-led growth" hypotheses in all the COMESA Countries as a Panel, most of those carried out were country-specific studies, and even Panel data studies carried out including some of the COMESA Countries omitted the heterogeneity issue which is likely to be present in the cross-sections.

The fourth Chapter introduced the methods and procedures used in this study; heterogeneous panel unit root tests, heterogeneous cointegration tests and heterogeneous panel causality tests. The heterogeneous panel unit root tests that were presented and used in this study are Im, Pesaran and Shin (2003) test, Fisher's tests of Maddala and Wu (1999), Hadri (2000) test, that assume that the individual time-series in the panel are cross-sectionally independent, and CADF test of Pesaran (2005) that assumes that the individual time-series are cross-sectionally

dependent. The heterogeneous panel cointegration tests presented and that we used are the residual-based panel cointegration tests of Pedroni (2004) and the ECM-based panel cointegration tests of Westerlund (2007). Finally, the heterogeneous panel causality tests presented and used in this study are those of Hurlin and Venet (2001, 2003), Hurlin (2004, 2007, 2008) for testing Homogeneous Non-Causality and Homogeneous Causality hypotheses; we used further the Pooled Mean Group (PMG) estimation of Pesaran et al. (1999) for Heterogeneous Non-Causality tests.

The fifth chapter presented the results of our empirical analysis. In general, IPS (2003), MW (1999) and Hadri (2000) tests showed that our variables in the panel are non-stationary, following a I (1) process. The cross-sectional dependence tests of Friedman (1937), Breusch-Pagan (1980), Frees (2004) and Pesaran (2004) showed that individual time series in our panel are cross-sectionally dependent, indicating the existence of a strong mutual correlation among COMESA Countries for FDI, Exports and Economic growth. The previous panel unit tests were hence complemented by the Cross-sectional DF test of Pesaran (2005) and confirmed that the variables in our panel are non-stationary, becoming stationary after one differentiation.

The Pedroni (2004) and Westerlund (2007) panel cointegration tests were performed in a bivariate and multivariate frameworks; their results supported that there is a long-run relationship between FDI, Exports and Economic growth in COMESA Countries.

Lastly, the causality test results showed that Homogeneous Non-Causality hypothesis (HNC) was rejected from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports. The results showed further that the HNC hypothesis failed to be rejected for causality from economic growth to exports and from exports to FDI. The Homogeneous Causality hypothesis test results showed that causality from FDI to economic growth, from economic growth to FDI, from exports to economic growth and from FDI to exports is not homogeneous, instead it is heterogeneous. This means that causality is only present in some cross-section units (countries) of the panel and absent in some others.

The Pooled Mean Group (PMG) estimation was used for Heterogeneous Causality tests in order to know in which COMESA countries the causal links between FDI, exports and economic growth are present and in which they are absent. Our findings as for the causal links between Inward FDI and Exports in COMESA countries, revealed that in 18.75% of the

COMESA countries, causality is unidirectional, running from FDI to Exports; in 25.0% of the COMESA countries, causality is unidirectional, running from Exports to FDI; in 50% of the COMESA countries, causality is feedback; in 6.25% of the COMESA countries, no causality is found; the FDI-led Exports hypothesis is supported in 68.75% of the COMESA countries and the Export-driven FDI hypothesis is supported in 75% of the COMESA countries.

The results, as for the causal links between FDI and economic growth in COMESA countries, revealed that in 25% of the COMESA countries, causality is unidirectional, running from FDI to economic growth; in 6.25% of the COMESA countries, causality is unidirectional, running from economic growth to FDI; in 62.5% of the COMESA countries, causality is feedback; in 6.25% of the COMESA countries, no causality is found; the FDI-led growth hypothesis is supported in 87.5% of the COMESA countries and the Growth-driven FDI hypothesis is supported in 68.75% of the COMESA countries.

Our findings as for the causal links between Exports and economic growth in COMESA countries, revealed that in 50% of the COMESA countries, causality is unidirectional, running from Exports to economic growth; in 12.5% of the COMESA countries, causality is unidirectional, running from economic growth to Exports; in 37.5% of the COMESA countries, causality is feedback; the Export-led growth hypothesis is supported in 87.5% of the COMESA countries and the Growth-driven Export hypothesis is supported in 50% of the COMESA countries.

6.2 Policy Implications and Recommendations

The "FDI-led exports", "Export-led growth" and "FDI-led growth" hypotheses have been, to a great extent, supported for COMESA countries in this study.

The "FDI-led exports" hypothesis has been supported in 11 countries of the panel; Burundi, DRC, Egypt, Kenya, Mauritius, Madagascar, Seychelles, Sudan, Swaziland, Uganda and Zimbabwe, implying that attracting MNCs in those countries especially export-oriented would promote exports.

The "Export-led growth" hypothesis has been confirmed in 14 countries of the panel; Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, implying that policies promoting exports would enhance economic growth in those countries. The creation of Export Processing Zones

(EPZs) is hence recommended in order to promote exports in those countries, which would in turn enhance economic growth.

The "FDI-led growth" hypothesis has also been confirmed in 14 countries of the panel; Burundi, Comoros, Egypt, Ethiopia, Kenya, Libya, Mauritius, Madagascar, Malawi, Seychelles, Sudan, Uganda, Zambia and Zimbabwe, implying that MNCs' activities boost economic growth in those countries. More incentives should thus be given to foreign firms in order to promote and sustain economic growth in those countries.

As much as the "Growth-driven FDI" hypothesis has not been confirmed in all the COMESA Countries, it has been supported at least in 68.75% of the COMESA Countries. Therefore, COMESA, as a regional integration, by removing the cross-border trade and investment barriers between countries, would attract more FDI especially market-seeking FDI. Market size and growth, being the determinants of such FDI, the size of the market would be redefined as the region's market, and the possibility of accessing a market wider than that of a single country for tradable goods and services would become an inducement to invest in the region.

6.3 Limitations and Suggestions for Further Research

The use of a balanced panel constrained us to have few observations because of missing data for some countries for some periods. Though our analysis was based on a panel, we think our results would have been improved if we had had a large number of observations; in fact some panel tests like Pedroni (2004) perform worse in small samples. Therefore if higher frequency data, quarterly or monthly, can be available, the investigation of the causal links between FDIs, exports and economic growth in COMESA Countries can be revisited in future research.

The Homogeneous Non-Causality and Homogeneous Causality tests of Hurlin and Venet (2001, 2003), Hurlin (2004, 2007, 2008) are based on a bivariate framework, which can make some causal relationships to remain hidden. Therefore, future research performing those tests within a multivariate framework would bring some added value.

The study takes FDI in general without distinguishing whether it is Greenfield or Mergers & Acquisitions; the future research distinguishing between them would therefore bring some new elements in this area of research.

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Appendix 1: Study Sample of the COMESA Countries*

Burundi	Ethiopia	Madagascar	Swaziland
Comoros	Kenya	Malawi	Uganda
DRC	Libya	Seychelles	Zambia
Egypt	Mauritius	Sudan	Zimbabwe

Djibouti, Eritrea and Rwanda were excluded because of missing data for some periods

Appendix 2: Variables description

Variables	Description	Source
GRGDP	Growth of Real GDP (Percentage)	Africa Development Indicators (ADI, 2007) CD-ROM of World Bank, World Development Indicators, (WDI, 2008), World Bank.
FDIR	Ratio of Inward Foreign Direct Investment Stocks (Percentage of GDP)	Database online from UNCTAD website for Inward FDI Stocks, and Africa Development Indicators (WB, 2007) and Selected Statistics for African Countries (AfDB, 2008) for GDP
EXR	Ratio of Exports of goods and services (Percentage of GDP)	World Development Indicators (WDI, 2008), World Bank

Appendix 3: Panel Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Obs.
GRGDP	Overall	2.91	4.71	-13.47	14.66	N = 400
	Between		1.85	-0.63	5.34	n = 16
	Within		4.36	-12.13	14.03	T = 25
FDIR	Overall	17.67	21.47	0.14	122.43	N = 400
	Between		20.08	2.74	78.98	n = 16
	Within		9.05	-13.86	61.11	T = 25
EXR	Overall	30.29	22.48	3.00	136.00	N = 400
	Between		21.52	9.36	74.96	n = 16
	Within		8.40	7.69	93.29	T = 25

Appendix 4: Summary of Causality test results between FDIR and GRGDP

Countries	Direction of causality			
	FDIR $\Rightarrow$ GRGDP	GRGDP $\Rightarrow$ FDIR	FDIR $\Leftrightarrow$ GRGDP	No Causality
Burundi			✓	
Comoros			✓	
DRC				✓
Egypt			✓	
Ethiopia	✓			
Kenya			✓	
Libya			✓	
Mauritius	✓			

Countries				
Madagascar			✓	
Malawi			✓	
Seychelles			✓	
Sudan			✓	
Swaziland		✓		
Uganda	✓			
Zambia	✓			
Zimbabwe			✓	
Score	4	1	10	1
%	25.0%	6.25%	62.5%	6.25%

Note: $\Rightarrow$ denotes a one-way causality, and $\Leftrightarrow$ denotes feedback causality

Appendix 5: Summary of Causality test results between EXR and GRGDP

Countries	Direction of causality			
	EXR$\Rightarrow$GRGDP	GRGDP$\Rightarrow$EXR	EXR$\Leftrightarrow$GRGDP	No Causality
Burundi			✓	
Comoros	✓			
DRC		✓		
Egypt			✓	
Ethiopia	✓			
Kenya			✓	
Libya	✓			
Mauritius	✓			
Madagascar	✓			
Malawi	✓			
Seychelles			✓	
Sudan			✓	
Swaziland		✓		
Uganda	✓			
Zambia	✓			
Zimbabwe			✓	
Score	8	2	6	0
%	50.0%	12.5%	37.5%	0.0%

Note: $\Rightarrow$ denotes a one-way causality, and $\Leftrightarrow$ denotes feedback causality

Appendix 6: Summary of Causality test results between FDIR and EXR

Countries	Direction of causality			
	FDIR$\Rightarrow$EXR	EXR$\Rightarrow$FDIR	FDIR$\Leftrightarrow$EXR	No Causality
Burundi	✓			
Comoros		✓		
DRC			✓	
Egypt			✓	

Ethiopia				✓
Kenya			✓	
Libya		✓		
Mauritius	✓			
Madagascar			✓	
Malawi		✓		
Seychelles			✓	
Sudan			✓	
Swaziland			✓	
Uganda	✓			
Zambia		✓		
Zimbabwe			✓	
Score	**3**	**4**	**8**	**1**
%	**18.75%**	**25.0%**	**50.0%**	**6.25%**

Note: $\Rightarrow$ denotes a one-way causality, and $\Leftrightarrow$ denotes feedback causality

Appendix 7: Summary of all Causality tests results

Hypotheses	Percentage of realization in COMESA Countries
FDI-led Growth	87.5%
Growth-driven FDI	68.75%
Export-led Growth	87.5%
Growth-driven Exports	50.0%
FDI-led Exports	68.75%
Export-driven FDI	75.0%

```
Stata Do-file Used in empirical analysis

version 9.1
clear
set matsize 500
capture log close
set mem 200m
log using Arcades.log, replace
set more off
use "C:\Users\HP\Documents\Panel data analysis-thesis-April.dta", clear
tsset id period

*/Panel unit root tests, assuming cross-sectional independence

*/Using the levels of the variables

ipshin grgdp, trend lag(4)
xtfisher grgdp, trend lag(4)
hadrilm grgdp
ipshin fdir, trend lag(1)
xtfisher fdir, trend lag(1)
hadrilm fdir
ipshin exr, trend lag(1)
xtfisher exr, trend lag(1)
hadrilm exr

*/Using the first differences of the variables

ipshin d.grgdp, trend lag(4)
xtfisher d.grgdp, trend lag(4)
hadrilm d.grgdp
ipshin d.fdir, trend lag(1)
xtfisher d.fdir, trend lag(1)
hadrilm d.fdir
ipshin d.exr, trend lag(1)
xtfisher d.exr, trend lag(1)
hadrilm d.exr

*/Tests of cross-sectional dependence

xtreg grgdp fdir exr, fe
xtcsd, friedman
xtcsd, frees
xtcsd, pesaran abs
xttest2

*/Panel unit root test in the presence of cross-section dependence, CADF
test (Pesaran, 2005)

*/Using the levels of the variables

pescadf grgdp, trend lag(3)
pescadf fdir, trend lag(1)
pescadf exr, trend lag(1)

*/Using the first differences of the variables

pescadf d.grgdp, trend lag(3)
pescadf d.fdir, trend lag(1)
pescadf d.exr, trend lag(1)

*/Panel cointegration tests

*/Pedroni(2004)residual-based panel cointegration tests were performed in
Eviews 6

*/Westerlund (2007) ECM-based panel cointegration tests: Bivariate case
```

```
xtwest grgdp fdir, westerlund constant trend lags(2) leads(2) lrwindow(2)
bootstrap(500)
xtwest grgdp exr, westerlund constant trend lags(2) leads(2) lrwindow(2)
bootstrap(500)
xtwest exr fdir, westerlund constant trend lags(2) leads(2) lrwindow(2)
bootstrap(500)

*/Westerlund(2007)ECM-based panel cointegration tests:Multivariate case

xtwest grgdp fdir exr, constant trend lags(1) leads(1) lrwindow(2)
bootstrap(500)

*/Panel causality tests
*/Homogeneous Non-Causality (HNC) hypothesis tests were performed using
Eviews 6
*/Homogeneous Causality (HC) hypothesis tests were performed using Eviews
6
*/Heterogeneous Panel causality tests

*/Pooled Mean Group (PMG) and Mean Group(MG) estimations of GRGDP equation

xtpmg d.grgdp l.d.grgdp l2.d.grgdp l.d.fdir l2.d.fdir l.d.exr l2.d.exr,
lr(l.grgdp fdir exr) full tech(nr) ec(ec) replace

xtpmg d.grgdp l.d.grgdp l2.d.grgdp l.d.fdir l2.d.fdir l.d.exr l2.d.exr,
lr(l.grgdp fdir exr) full mg tech(nr) ec(ec) replace

*/Hausman test between PMG and MG

hausman mg pmg, sigmamore

*/Pooled Mean Group (PMG) and Mean Group(MG)estimations of FDIR equation

xtpmg d.fdir l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp l.d.exr l2.d.exr,
lr(l.fdir grgdp exr)full tech(nr)ec(ec) replace

xtpmg d.fdir l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp l.d.exr l2.d.exr,
lr(l.fdir grgdp exr)mg full tech(nr)ec(ec) replace

*/Hausman test between PMG and MG

hausman mg pmg, sigmamore

*/Pooled Mean Group (PMG) and Mean Group(MG)estimations of EXR equation

xtpmg d.exr l.d.exr l2.d.exr l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp ,
lr(l.exr fdir grgdp)full tech(nr)ec(ec) replace

xtpmg d.exr l.d.exr l2.d.exr l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp,
lr(l.exr fdir grgdp)mg full tech(nr)ec(ec) replace

*/Hausman test between PMG and MG

hausman mg pmg, sigmamore

*/Heterogeneous causality test results: From FDIR to EXR

xtpmg d.exr l.d.exr l2.d.exr l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp ,
lr(l.exr fdir grgdp)full tech(nr)ec(ec) replace

*/Short-run Causality (Restriction Wald tests of the lagged difference of
fdir)

test[id_1]l.d.fdir=[id_1]l2.d.fdir=0
test[id_2]l.d.fdir=[id_2]l2.d.fdir=0
test[id_3]l.d.fdir=[id_3]l2.d.fdir=0
test[id_4]l.d.fdir=[id_4]l2.d.fdir=0
test[id_5]l.d.fdir=[id_5]l2.d.fdir=0
test[id_6]l.d.fdir=[id_6]l2.d.fdir=0
```

```
test[id_7]l.d.fdir=[id_7]l2.d.fdir=0
test[id_8]l.d.fdir=[id_8]l2.d.fdir=0
test[id_9]l.d.fdir=[id_9]l2.d.fdir=0
test[id_10]l.d.fdir=[id_10]l2.d.fdir=0
test[id_11]l.d.fdir=[id_11]l2.d.fdir=0
test[id_12]l.d.fdir=[id_12]l2.d.fdir=0
test[id_13]l.d.fdir=[id_13]l2.d.fdir=0
test[id_14]l.d.fdir=[id_14]l2.d.fdir=0
test[id_15]l.d.fdir=[id_15]l2.d.fdir=0
test[id_16]l.d.fdir=[id_16]l2.d.fdir=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of fdir and of the speed of adjustment)

```
test[id_1]l.d.fdir=[id_1]l2.d.fdir=[id_1]ec=0
test[id_2]l.d.fdir=[id_2]l2.d.fdir=[id_2]ec=0
test[id_3]l.d.fdir=[id_3]l2.d.fdir=[id_3]ec=0
test[id_4]l.d.fdir=[id_4]l2.d.fdir=[id_4]ec=0
test[id_5]l.d.fdir=[id_5]l2.d.fdir=[id_5]ec=0
test[id_6]l.d.fdir=[id_6]l2.d.fdir=[id_6]ec=0
test[id_7]l.d.fdir=[id_7]l2.d.fdir=[id_7]ec=0
test[id_8]l.d.fdir=[id_8]l2.d.fdir=[id_8]ec=0
test[id_9]l.d.fdir=[id_9]l2.d.fdir=[id_9]ec=0
test[id_10]l.d.fdir=[id_10]l2.d.fdir=[id_10]ec=0
test[id_11]l.d.fdir=[id_11]l2.d.fdir=[id_11]ec=0
test[id_12]l.d.fdir=[id_12]l2.d.fdir=[id_12]ec=0
test[id_13]l.d.fdir=[id_13]l2.d.fdir=[id_13]ec=0
test[id_14]l.d.fdir=[id_14]l2.d.fdir=[id_14]ec=0
test[id_15]l.d.fdir=[id_15]l2.d.fdir=[id_15]ec=0
test[id_16]l.d.fdir=[id_16]l2.d.fdir=[id_16]ec=0
```

*/Heterogeneous causality test results: From GRGDPR to EXR
*/Short-run Causality (Restriction Wald tests of the lagged difference of grgdp)

```
test[id_1]l.d.grgdp=[id_1]l2.d.grgdp=0
test[id_2]l.d.grgdp=[id_2]l2.d.grgdp=0
test[id_3]l.d.grgdp=[id_3]l2.d.grgdp=0
test[id_4]l.d.grgdp=[id_4]l2.d.grgdp=0
test[id_5]l.d.grgdp=[id_5]l2.d.grgdp=0
test[id_6]l.d.grgdp=[id_6]l2.d.grgdp=0
test[id_7]l.d.grgdp=[id_7]l2.d.grgdp=0
test[id_8]l.d.grgdp=[id_8]l2.d.grgdp=0
test[id_9]l.d.grgdp=[id_9]l2.d.grgdp=0
test[id_10]l.d.grgdp=[id_10]l2.d.grgdp=0
test[id_11]l.d.grgdp=[id_11]l2.d.grgdp=0
test[id_12]l.d.grgdp=[id_12]l2.d.grgdp=0
test[id_13]l.d.grgdp=[id_13]l2.d.grgdp=0
test[id_14]l.d.grgdp=[id_14]l2.d.grgdp=0
test[id_15]l.d.grgdp=[id_15]l2.d.grgdp=0
test[id_16]l.d.grgdp=[id_16]l2.d.grgdp=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of grgdp and of the speed of adjustment)

```
test[id_1]l.d.grgdp=[id_1]l2.d.grgdp=[id_1]ec=0
test[id_2]l.d.grgdp=[id_2]l2.d.grgdp=[id_2]ec=0
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test[id_4]l.d.grgdp=[id_4]l2.d.grgdp=[id_4]ec=0
test[id_5]l.d.grgdp=[id_5]l2.d.grgdp=[id_5]ec=0
test[id_6]l.d.grgdp=[id_6]l2.d.grgdp=[id_6]ec=0
test[id_7]l.d.grgdp=[id_7]l2.d.grgdp=[id_7]ec=0
test[id_8]l.d.grgdp=[id_8]l2.d.grgdp=[id_8]ec=0
```

```
test[id_9]l.d.grgdp=[id_9]l2.d.grgdp=[id_9]ec=0
test[id_10]l.d.grgdp=[id_10]l2.d.grgdp=[id_10]ec=0
test[id_11]l.d.grgdp=[id_11]l2.d.grgdp=[id_11]ec=0
test[id_12]l.d.grgdp=[id_12]l2.d.grgdp=[id_12]ec=0
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test[id_14]l.d.grgdp=[id_14]l2.d.grgdp=[id_14]ec=0
test[id_15]l.d.grgdp=[id_15]l2.d.grgdp=[id_15]ec=0
test[id_16]l.d.grgdp=[id_16]l2.d.grgdp=[id_16]ec=0
```

*/Heterogeneous causality test results: From EXR to GRGDP

xtpmg d.grgdp l.d.grgdp l2.d.grgdp l.d.fdir l2.d.fdir l.d.exr l2.d.exr, lr(l.grgdp fdir exr)full tech(nr) ec(ec) replace

*/Short-run Causality (Restriction Wald tests of the lagged difference of exr)

```
test[id_1]l.d.exr=[id_1]l2.d.exr=0
test[id_2]l.d.exr=[id_2]l2.d.exr=0
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test[id_7]l.d.exr=[id_7]l2.d.exr=0
test[id_8]l.d.exr=[id_8]l2.d.exr=0
test[id_9]l.d.exr=[id_9]l2.d.exr=0
test[id_10]l.d.exr=[id_10]l2.d.exr=0
test[id_11]l.d.exr=[id_11]l2.d.exr=0
test[id_12]l.d.exr=[id_12]l2.d.exr=0
test[id_13]l.d.exr=[id_13]l2.d.exr=0
test[id_14]l.d.exr=[id_14]l2.d.exr=0
test[id_15]l.d.exr=[id_15]l2.d.exr=0
test[id_16]l.d.exr=[id_16]l2.d.exr=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of exr and of the speed of adjustment)

```
test[id_1]l.d.exr=[id_1]l2.d.exr=[id_1]ec=0
test[id_2]l.d.exr=[id_2]l2.d.exr=[id_2]ec=0
test[id_3]l.d.exr=[id_3]l2.d.exr=[id_3]ec=0
test[id_4]l.d.exr=[id_4]l2.d.exr=[id_4]ec=0
test[id_5]l.d.exr=[id_5]l2.d.exr=[id_5]ec=0
test[id_6]l.d.exr=[id_6]l2.d.exr=[id_6]ec=0
test[id_7]l.d.exr=[id_7]l2.d.exr=[id_7]ec=0
test[id_8]l.d.exr=[id_8]l2.d.exr=[id_8]ec=0
test[id_9]l.d.exr=[id_9]l2.d.exr=[id_9]ec=0
test[id_10]l.d.exr=[id_10]l2.d.exr=[id_10]ec=0
test[id_11]l.d.exr=[id_11]l2.d.exr=[id_11]ec=0
test[id_12]l.d.exr=[id_12]l2.d.exr=[id_12]ec=0
test[id_13]l.d.exr=[id_13]l2.d.exr=[id_13]ec=0
test[id_14]l.d.exr=[id_14]l2.d.exr=[id_14]ec=0
test[id_15]l.d.exr=[id_15]l2.d.exr=[id_15]ec=0
test[id_16]l.d.exr=[id_16]l2.d.exr=[id_16]ec=0
```

*/Heterogeneous causality test results: From FDIR to GRGDP
*/Short-run Causality (Restriction Wald tests of the lagged difference of fdir)

```
test[id_1]l.d.fdir=[id_1]l2.d.fdir=0
test[id_2]l.d.fdir=[id_2]l2.d.fdir=0
test[id_3]l.d.fdir=[id_3]l2.d.fdir=0
test[id_4]l.d.fdir=[id_4]l2.d.fdir=0
test[id_5]l.d.fdir=[id_5]l2.d.fdir=0
test[id_6]l.d.fdir=[id_6]l2.d.fdir=0
test[id_7]l.d.fdir=[id_7]l2.d.fdir=0
test[id_8]l.d.fdir=[id_8]l2.d.fdir=0
```

```
test[id_9]l.d.fdir=[id_9]l2.d.fdir=0
test[id_10]l.d.fdir=[id_10]l2.d.fdir=0
test[id_11]l.d.fdir=[id_11]l2.d.fdir=0
test[id_12]l.d.fdir=[id_12]l2.d.fdir=0
test[id_13]l.d.fdir=[id_13]l2.d.fdir=0
test[id_14]l.d.fdir=[id_14]l2.d.fdir=0
test[id_15]l.d.fdir=[id_15]l2.d.fdir=0
test[id_16]l.d.fdir=[id_16]l2.d.fdir=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of fdir and of the speed of adjustment)

```
test[id_1]l.d.fdir=[id_1]l2.d.fdir=[id_1]ec=0
test[id_2]l.d.fdir=[id_2]l2.d.fdir=[id_2]ec=0
test[id_3]l.d.fdir=[id_3]l2.d.fdir=[id_3]ec=0
test[id_4]l.d.fdir=[id_4]l2.d.fdir=[id_4]ec=0
test[id_5]l.d.fdir=[id_5]l2.d.fdir=[id_5]ec=0
test[id_6]l.d.fdir=[id_6]l2.d.fdir=[id_6]ec=0
test[id_7]l.d.fdir=[id_7]l2.d.fdir=[id_7]ec=0
test[id_8]l.d.fdir=[id_8]l2.d.fdir=[id_8]ec=0
test[id_9]l.d.fdir=[id_9]l2.d.fdir=[id_9]ec=0
test[id_10]l.d.fdir=[id_10]l2.d.fdir=[id_10]ec=0
test[id_11]l.d.fdir=[id_11]l2.d.fdir=[id_11]ec=0
test[id_12]l.d.fdir=[id_12]l2.d.fdir=[id_12]ec=0
test[id_13]l.d.fdir=[id_13]l2.d.fdir=[id_13]ec=0
test[id_14]l.d.fdir=[id_14]l2.d.fdir=[id_14]ec=0
test[id_15]l.d.fdir=[id_15]l2.d.fdir=[id_15]ec=0
test[id_16]l.d.fdir=[id_16]l2.d.fdir=[id_16]ec=0
```

*/Heterogeneous causality test results: From GRGDP to FDIR

```
xtpmg d.fdir l.d.fdir l2.d.fdir l.d.grgdp l2.d.grgdp l.d.exr l2.d.exr,
lr(l.fdir grgdp exr)full tech(nr)ec(ec) replace
```

*/Short-run Causality (Restriction Wald tests of the lagged difference of grgdp)

```
test[id_1]l.d.grgdp=[id_1]l2.d.grgdp=0
test[id_2]l.d.grgdp=[id_2]l2.d.grgdp=0
test[id_3]l.d.grgdp=[id_3]l2.d.grgdp=0
test[id_4]l.d.grgdp=[id_4]l2.d.grgdp=0
test[id_5]l.d.grgdp=[id_5]l2.d.grgdp=0
test[id_6]l.d.grgdp=[id_6]l2.d.grgdp=0
test[id_7]l.d.grgdp=[id_7]l2.d.grgdp=0
test[id_8]l.d.grgdp=[id_8]l2.d.grgdp=0
test[id_9]l.d.grgdp=[id_9]l2.d.grgdp=0
test[id_10]l.d.grgdp=[id_10]l2.d.grgdp=0
test[id_11]l.d.grgdp=[id_11]l2.d.grgdp=0
test[id_12]l.d.grgdp=[id_12]l2.d.grgdp=0
test[id_13]l.d.grgdp=[id_13]l2.d.grgdp=0
test[id_14]l.d.grgdp=[id_14]l2.d.grgdp=0
test[id_15]l.d.grgdp=[id_15]l2.d.grgdp=0
test[id_16]l.d.grgdp=[id_16]l2.d.grgdp=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of grgdp and of the speed of adjustment)

```
test[id_1]l.d.grgdp=[id_1]l2.d.grgdp=[id_1]ec=0
test[id_2]l.d.grgdp=[id_2]l2.d.grgdp=[id_2]ec=0
test[id_3]l.d.grgdp=[id_3]l2.d.grgdp=[id_3]ec=0
test[id_4]l.d.grgdp=[id_4]l2.d.grgdp=[id_4]ec=0
test[id_5]l.d.grgdp=[id_5]l2.d.grgdp=[id_5]ec=0
test[id_6]l.d.grgdp=[id_6]l2.d.grgdp=[id_6]ec=0
```

```
test[id_7]l.d.grgdp=[id_7]l2.d.grgdp=[id_7]ec=0
test[id_8]l.d.grgdp=[id_8]l2.d.grgdp=[id_8]ec=0
test[id_9]l.d.grgdp=[id_9]l2.d.grgdp=[id_9]ec=0
test[id_10]l.d.grgdp=[id_10]l2.d.grgdp=[id_10]ec=0
test[id_11]l.d.grgdp=[id_11]l2.d.grgdp=[id_11]ec=0
test[id_12]l.d.grgdp=[id_12]l2.d.grgdp=[id_12]ec=0
test[id_13]l.d.grgdp=[id_13]l2.d.grgdp=[id_13]ec=0
test[id_14]l.d.grgdp=[id_14]l2.d.grgdp=[id_14]ec=0
test[id_15]l.d.grgdp=[id_15]l2.d.grgdp=[id_15]ec=0
test[id_16]l.d.grgdp=[id_16]l2.d.grgdp=[id_16]ec=0
```

*/Heterogeneous causality test results: From EXR to FDIR
*/Short-run Causality (Restriction Wald tests of the lagged difference of exr)

```
test[id_1]l.d.exr=[id_1]l2.d.exr=0
test[id_2]l.d.exr=[id_2]l2.d.exr=0
test[id_3]l.d.exr=[id_3]l2.d.exr=0
test[id_4]l.d.exr=[id_4]l2.d.exr=0
test[id_5]l.d.exr=[id_5]l2.d.exr=0
test[id_6]l.d.exr=[id_6]l2.d.exr=0
test[id_7]l.d.exr=[id_7]l2.d.exr=0
test[id_8]l.d.exr=[id_8]l2.d.exr=0
test[id_9]l.d.exr=[id_9]l2.d.exr=0
test[id_10]l.d.exr=[id_10]l2.d.exr=0
test[id_11]l.d.exr=[id_11]l2.d.exr=0
test[id_12]l.d.exr=[id_12]l2.d.exr=0
test[id_13]l.d.exr=[id_13]l2.d.exr=0
test[id_14]l.d.exr=[id_14]l2.d.exr=0
test[id_15]l.d.exr=[id_15]l2.d.exr=0
test[id_16]l.d.exr=[id_16]l2.d.exr=0
```

*/Long-run causality (z-test for the significance of the speed of adjustment)

*/Strong causality (Restriction Wald tests of the lagged difference of exr and of the speed of adjustment)

```
test[id_1]l.d.exr=[id_1]l2.d.exr=[id_1]ec=0
test[id_2]l.d.exr=[id_2]l2.d.exr=[id_2]ec=0
test[id_3]l.d.exr=[id_3]l2.d.exr=[id_3]ec=0
test[id_4]l.d.exr=[id_4]l2.d.exr=[id_4]ec=0
test[id_5]l.d.exr=[id_5]l2.d.exr=[id_5]ec=0
test[id_6]l.d.exr=[id_6]l2.d.exr=[id_6]ec=0
test[id_7]l.d.exr=[id_7]l2.d.exr=[id_7]ec=0
test[id_8]l.d.exr=[id_8]l2.d.exr=[id_8]ec=0
test[id_9]l.d.exr=[id_9]l2.d.exr=[id_9]ec=0
test[id_10]l.d.exr=[id_10]l2.d.exr=[id_10]ec=0
test[id_11]l.d.exr=[id_11]l2.d.exr=[id_11]ec=0
test[id_12]l.d.exr=[id_12]l2.d.exr=[id_12]ec=0
test[id_13]l.d.exr=[id_13]l2.d.exr=[id_13]ec=0
test[id_14]l.d.exr=[id_14]l2.d.exr=[id_14]ec=0
test[id_15]l.d.exr=[id_15]l2.d.exr=[id_15]ec=0
test[id_16]l.d.exr=[id_16]l2.d.exr=[id_16]ec=0
```

log close

*/Cross-Section Identifiers

id_1: Burundi
id_2: Comoros
id_3: DRC
id_4: Egypt
id_5: Ethiopia
id_6: Kenya
id_7: Libya
id_8: Mauritius
id_9: Madagascar

```
id_10: Malawi
id_11: Seychelles
id_12: Sudan
id_13: Swaziland
id_14: Uganda
id_15: Zambia
id_16: Zimbabwe
```