THE DETERMINANTS OF FISH EXPORTS IN UGANDA

(1997-2012)

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THE DETERMINANTS OF FISH EXPORTS IN UGANDA

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DEDICATION

I dedicate this dissertation to my parents Mr. Baryaija Charles Salongo and Mrs Baryaija Agnes Nalongo for initiating me and our entire family to appreciate the value of education and by practically supporting us spiritually, morally and financially.

To my friends Mr. Kabona Charles and Mr. Aine Wesley for their words of wisdom and the conducive environment they offered me at their premises without which this work couldn't have been realized. I also recognize the immense contribution from Hajji Aziz Mustapha and the wife, Mr. Turuho Michael and Miss Anyait Ritah towards the success of this book. May the almighty God bless you always.

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May God bless you all.

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LIST OF ACRONYMS/ABBREVIATIONS

BMU	Beach Management Units
BoU	Bank of Uganda
CAGR	Compound Annual Growth Rate
DFR	Department of Fisheries Resources
DIR	Domestic Inflation Rate
ESS	Error sum of squares
EU	European Union
GDP	Gross Domestic product
GNP	Gross National product
JB	Jacque-Bera
LVFO	Lake Victoria Fisheries Organization
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDG	Millennium Development Goals
MFPED	Ministry Finance Planning and Economic Development
NEMA	National Environmental Management Authority
NTEs	Non Traditional Exports
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PPP	GDP Per capita
REER	Real Effective Exchange Rate
RER	Real Exchange Rate
UBOS	Uganda Bureau of Statistics
UEPB	Uganda Export Promotions Board
UFPEA	Uganda Fish Processors and Exports Association
UNCTAD	United Nations Conference on Trade and Development
UG Shs	Ugandan Shillings
USD	United States Dollar
US	United States of America
TOT	Terms of Trade

ABSTRACT

This study was sought to examine the determinants of fish exports in Uganda by utilizing the time series data collected for a period of 1997-2012 in which formal fish exports of Uganda showed a considerably stable increase until after the year 2005 when the fish exports started to drop. The study was undertaken basing on specific objectives; to determine the effect of Terms of Trade on fish exports; to examine the effect of GDP per capita on fish exports; to assess the effect of Real Exchange Rate on fish exports and to find out the effect of domestic inflation rate on fish exports.

In establishing the effect of the above selected determinants of fish exports, the study adopted a quantitative approach using econometric techniques like graphical analysis, normality test, multi-collinearity test, Augmented Dickey Fuller (ADF) test and the multiple linear regression model to establish the empirical impact of factors like terms of trade, GDP per capita, real exchange rate and domestic inflation rate on fish export. Secondary annual time series data from Uganda Bureau of Statistics (UBOS) was used to estimate the model.

The empirical results revealed that, terms of trade, GDP per capita have a significant influence in determining the growth of fish exports in Uganda, while real exchange rate and domestic inflation rate have got insignificant impact on the growth of fish exports in Uganda. It is therefore recommended that government aims to ensure favorable terms of trade of fish exports on the international market and also fight poverty among its citizens so as to boost growth of GDP per capita in the country. However concern should also be placed on these other factors studied (real exchange rate and domestic inflation rate), although proved insignificant in determining the performance of fish exports, if well strengthened, can also improve on the performance Uganda's fish export.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study was about factors that determine fish exports in Uganda. It strived to determine the reasons behind the nature of fish export trends from the year 1997 to year 2012. The fisheries sector in Uganda is an important resource not only for nutritional purposes but in economic terms through employment and foreign exchange. The sector in Uganda remains the most outstanding non-traditional export. Fish exports grew from a value of US$ 1.3 million in year 1990 to US$ 45 million in year 1996, but fell to US$ 29.9 million in year 1997, due to a temporary export ban by the European Union and there after fish exports increased reaching the peak in year 2005 and then gradually started declining. (Mubangizi 2006). This interesting phenomenon necessitated an investigation on what could be the factors causing such export fluctuations other than the ban.

1.1 Background to the study

According to the Food and Agriculture Organization (FAO)'s State of Fisheries and Aquaculture Report (2010), fish is the most internationally traded food commodity. FAO observed that world fish trade reached US$ 58.2 billion in year 2002 a 5% improvement relative to year 2000 and a 45% increase over year 1992 levels. World trade in fishery commodities reached a record total value of US$ 217.5 billion in the year 2010 from US$ 71.5 billion in the year 2004 and US$ 85.9 billion in year 2006. In real terms (adjusted for inflation), world exports of fish and fishery products increased by 17.3% during the period between years 2000-2004, confirming fish as one of the most highly traded food and feed commodities. The global trend of growing fish exports

can be attributed to the increase in consumption not only in the EU and the USA, but also in other regions of the world such as in Asia. The report revealed that the development of processing, packaging, handling and transportation of fish and fish products, as well as the growth of international distribution channels, are all factors that contribute to the increase of fish exports.

In the developing countries, the fishery net exports have shown a continuing rising trend over the past two decades, growing from USD 4.6 billion in year 1984 to USD 16.0 billion in year 1994 to US$ 17.4 billion in year 2002 and USD 20.4 billion in year 2004. In Bangladesh, fish trade accounts for 76% of the total agricultural export value although this is mainly from shrimp aquaculture 58% in Morocco and 62% in Peru. In Mauritania the fisheries sector generates 27% of the total state budget. (Thorpe *et al.* 2005).

In Uganda according to the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) Report (2010), Uganda is blessed with rich fisheries resources in its many lakes, rivers and wetlands. These resources if adequately utilized, could significantly contribute to the development of the fisheries sector and attainment of national goals of poverty eradication and economic growth. Fish emerged as a non-traditional export commodity in the late 1980's, with export earnings increasing from US$ 1 million in year 1989 to US$ 45 million in year 1996. In year 2001, 28,700 tons of factory processed fish were exported generating US$ 80.4 million and in year 2002, 25,200 tons were exported generating US$ 87.57 million.

In the year 2001 fish came second to coffee. Its proportional share export earnings rose from 5% to 17% from year 1994 to year 2001. In year 2002, this sector contributed about UShs 210,000 million or 2.4% of the gross domestic product. (MFPED, 2003). Ssebisubi (2010) ascertains the

contribution of fish to the economy citing a record high national gross domestic product (GDP) of $ 17.70 billion in the year 2010 bringing per capita GDP to $ 517 of which trade in fisheries and aquaculture contributed about 2.8%.

However Nyombi and Bolwig (2004) noted that cumulatively, export receipts have seen fish exports decline for a number of years. They observed that for example in year 2007, there was a 6% drop in export receipts from US$183 million to US$171 million in year 2008. They suggested reasons for the decline in fish exports to include; falling water levels, high investment costs and inadequate capital, limited technical knowledge on aquaculture husbandry, increased local and international demand which led to overfishing and sometimes the illegal export of immature fish to regional markets

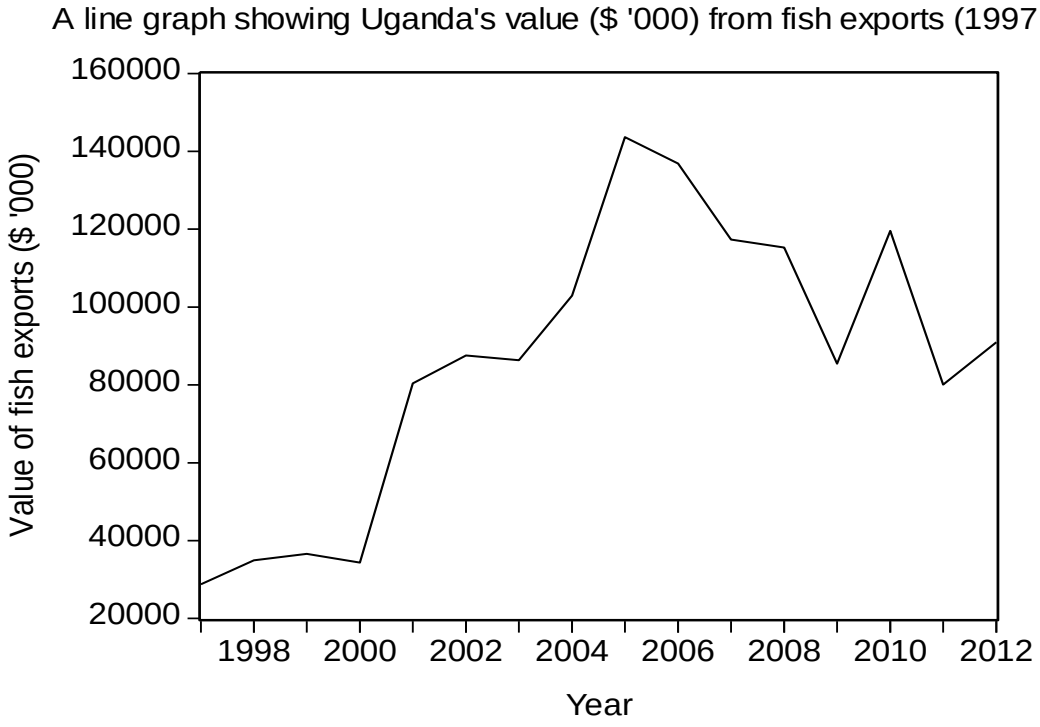
The Uganda Export Promotions Board (UEPB) Annual Report (2009) observed that, Uganda just like the rest of the world had an overall steady growth in fish exports ever since year 1991. Fish exports grew from a value of US $ 5.309 million in year 1991 to US$ 39.781 million in year 1996, but fell to US $ 28.80 million in year 1997 due to fish ban by the European Union on fish quality safety concerns. The report noted that Uganda achieved the highest peak of fish exports in year 2005 of 39,201 metric tons. Kabahenda and Hüsken (2009) attributed the decline since the year 2005 due to fishing pressure and serious pollution problems. This resulted in a 46% drop in revenues from fish exports in the period of year 2006 to 2009 from U.S. $141 million in the year 2006 to U.S. $75.6 million in the year 2009. Trends in Uganda's fish exports are illustrated in the table below;

Table 1.1Trend of Fish Exports in Uganda (Volume and Value) for the period 1997-2012

Year	Fish Exports; Volume (metric tons)	Fish Exports; Value (US$'000)
1997	9,839	28,800
1998	13,805	34,921
1999	13,380	36,608
2000	15,876	34,363
2001	28,672	80,398
2002	25,169	87,574
2003	25,111	86,343
2004	30,057	102,917
2005	39,201	143,618
2006	32,855	136,851
2007	28,394	117,364
2008	23,430	115,306
2009	17,346.70	85,436.30
2010	23,967	119,600
2011	15,500	80,050.01
2012	18,472	90,982

Source: DFR (2011) and MFPED (2012)

Figure 1.



Source: UEPB (2012)

The Department of Fisheries Resources (2011) report found out that Uganda's fish exports increased relatively steadily from 1,664 metric tons valued at $1.4m in the year 1990, to 39,201 metric tons valued at $143.6m in the year 2005. However contrary to the general rising world fish export trends, Uganda's fish export figures declined by 16.2% from 39,201 metric tons in year 2005 to 32,855 metric tons in year 2006 and the decline continued steadily in the subsequent years with a minimum of 15,500 metric tons recorded in year 2011.

Although different studies have attempted to find out the cause for the declining trend of fish exports in Uganda, the studies are not satisfactory and have not critically looked at the cause of the decline mainly from the year 2005 and the period there after, in which there was steady and high decline in Uganda's fish exports. For example Namisi (2001) in his study about the socio-economic implications of the fish export trade on Lake Victoria discovered that increasing per capita income of the locals, too many fishing vessels and too many fishers using inappropriate fishing methods are some of the contributory factors to the low level of fish exports in Uganda. However, this study investigated Terms of Trade, GDP per capita, Real Exchange Rate and domestic inflation and their impact on fish exports in Uganda.

1.2 Problem statement

MAAIF (2010) and UEPB (2009) all concur that despite the rising trend of fish exports globally; Uganda's fish exports have continued to experience unstable and downward trend from the year 2005, despite the lift of the ban on its fish exports and a relatively stable demand in its major markets of the EU. The reports blame the drop of fish exports on the decline in fish stock of Nile perch as a result of over fishing by Uganda's oversubscribed fishing industry. They add that the high domestic prices of undersized fish coupled with the scarcity of export grade Nile perch has seen a number exporting firms fall out of business hence a decline in fish exports.

On the other hand, Bagumire (2009) attributed the reduction in fish trade volumes and revenue to trade barriers, reduced demand, prices and profitability plus the effect of fluctuating foreign exchange rates. But Musinguzi and Obwona (2000) using a fish exports growth function, found out that Uganda's exports are significantly and positively affected by output and balance of trade but are not seriously affected by real exchange rate. However, the studies do not look at domestic inflation and GDP per capita as having a significant impact on fish exports.

Therefore apart from the varying contradictions between different researchers about the determinants of fish exports in Uganda, the sudden drop of Uganda's fish exports from the year 2005 and beyond has not been well explained. Notably the UEPB report (2009), found out that the formal fish exports of Uganda considerably increased in the year 1997 to the tune of 9,839 metric tons from 4,751 in the year 1991 and that this followed a continuous annual growth trend up to the year 2005 after which the fish exports values dropped sharply by 16.2% from 39,201 metric tons to 32,855 metric tons in year 2006. Fish exports further declined by 17.5% in year 2007 from 28,394 metric tons to 23,430 metric tons in year 2008 and down to 15,500 metric tons in the year 2011. Hence the prolonged declining trend in fish exports of Uganda prompts the need for further research in order to identify its plausible causes as information needed by the relevant authorities in order to design corrective policies to address the problem.

1.3 Objectives of the study

1.3.1 General Objective of the study

The general objective of the study was to assess the determinants of fish exports in Uganda from the period of year 1997 to year 2012.

1.3.2 Specific objectives of the study

i. To determine the impact of Terms of Trade on the level of fish exports in Uganda.
ii. To examine the impact of GDP per capita on the level of fish exports in Uganda.
iii. To assess the effect of Real Exchange Rate on the level of fish exports in Uganda.
iv. To assess the impact of Inflation Rate on the level of fish exports in Uganda.

1.4 Research hypotheses

To achieve the above objectives the following hypotheses were tested.

i. Terms of Trade have no significant impact on the level of fish exports in Uganda.
ii. GDP per capita has no significant impact on the level of fish exports in Uganda.
iii. Real Exchange Rate has no significant impact on the level of fish exports in Uganda.
iv. Inflation Rate has no significant impact on the level of fish exports in Uganda.

1.5 Scope of the study

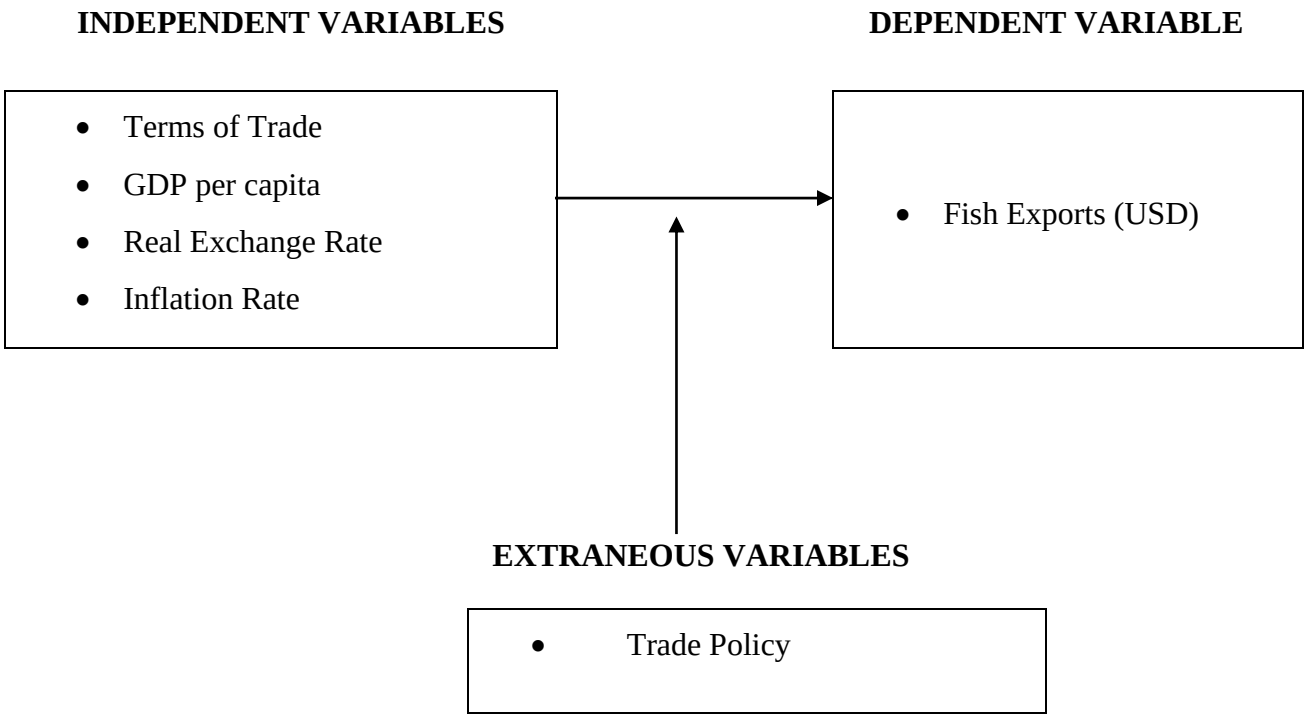
The study focused on the determinants of fish exports in Uganda. It covered the period between years 1997 to year 2012. The study starts from year 1997 because that is when there was a considerable increase in fish exports until year 2005 when the fish exports started to drop.

1.6 Significance of the study

The understanding of the determinants fish exports in Uganda is paramount to all economists. This study will provide the researcher with in-depth empirical and theoretical understanding about the factors behind the general performance of fish exports in Uganda. It will contribute to practical learning of the researcher on how to carry out econometric analyses using time series data and various statistical packages like E-views and Stata and how to draw inferences and recommendations from findings. The findings of this study will also provided useful information

to the government economic planning authorities, fish exporting companies and other researchers about the impact of Terms of Trade, GDP per capita, Real Exchange Rate and Inflation rate on the level of fish exports in Uganda.

1.7 Conceptual framework



Source: Developed by the author as guided by the literature reviewed

According to Musinguzi and Obwona, (2000) Terms of trade have a significant effect on export growth rate. Musinguzi and Obwona, (2000) regressed export growth on real exchange rate, Terms of Trade and lagged export growth. They found out that terms of trade had a marginal but statistically significant impact on export growth. On the hand, Bagumire (2009) attributed the reduction in fish trade volumes and revenue to trade barriers, reduced demand, prices and profitability plus the effect of fluctuating foreign exchange rates. Namisi (2001) in his study about the socio-economic implications of the fish export trade on Lake Victoria discovered that

increasing per capita income of the locals, too many fishing vessels and too many fishers using inappropriate fishing methods are some of the contributory factors to the low level of fish exports in Uganda.

1.8 Operational definitions of terms

Exports refer to outward flows comprising of goods and services leaving the economic territory of a country to the rest the world. In this study, the researcher used Uganda annual fish export earnings valued in US Dollars for the period of the year 1997 to the year 2012. Data was acquired from the Ministry of Finance Planning and Economic Development.

Terms of trade is an index of the price of a country's exports in terms of its imports measured relative to the base year. It is the quantity of foreign goods and services (imports) that a country can purchase from the proceeds of the sale of its goods and services (exports) of a given quantity. It measures a country's trading clout and is expressed as the ratio of an index of export prices to an index of import prices. Terms of trade of a country improve when the prices of its exports rise in comparison with the prices of its imports, vice versa. It is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year. In this study the researcher used annual computed terms of trade from Uganda Bureau of Statistics annual statistical abstracts.

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. The researcher used annual computed GDP per capita measured in US Dollars, from the Ministry of Finance Planning and Economic Development.

Real exchange rate refers to the purchasing power of two currencies relative to one another. While two currencies may have a certain exchange rate on the foreign exchange market, this does not mean that goods and services purchased with one currency cost the equivalent amounts in another currency. Real exchange rate is an annual average based on monthly averages determined by country authorities or on rates determined largely by market forces in the legally sanctioned exchange market**.** In this study, the researcher used annual average computed real exchange rates from the year 1997 to the year 2012, from the Bank of Uganda report publications.

Inflation refers to the continuous (persistent) rise in the general price level of goods and services in the economy in a given period of time. It is usually measured by some broad index (such as Consumer Price Index) over months or years, and mirrored in the correspondingly decreasing purchasing power of the currency. Inflation is therefore a measure of price changes for a group of items in a determined and fixed consumption basket of goods and services. In this study, the researcher used annual average computed inflation rates measured in percentages from the year 1997 to the year 2012, from the Bank of Uganda report publications.

1.9 Organisation of the study

The study was organized in five chapters, that is; Introduction, Literature review, Methodology, Presentation, analysis and interpretation of findings and Summary of the findings, conclusions and policy recommendations respectively. The introductory chapter comprised of the background of the study, statement of the problem, objectives of the study, and research hypotheses. The chapter also included the scope of the study, significance of the study, conceptual framework and operational definitions of terms. Chapter two highlighted the related

literature about Terms of Trade, GDP per capita, Real Exchange Rate and Domestic inflation rate and their impact on fish exports earnings in Uganda.

Chapter three (methodology) looked at the approaches and procedures in which the research was conducted. The approaches and procedures in the methodology were used in chapter four to present and analyse the findings. They included univariate, bivariate and multivariate analyses. Under univariate analysis the study carried out the following tests; measure of central tendency, graphical analysis, normality test and unit root test. Under bivariate analysis, the study tested multi-collinearity using the paired correlation matrix model estimation. Under multivariate analysis, a multiple linear regression model was used to ascertain the extent of the impact of terms of trade, GDP per capita, real exchange rate and domestic inflation rate on fish exports. The study also carried out interpretations of diagnostic tests, model parameter coefficients analysis, test for joint significance of the regression parameter coefficient and normality test of the residuals. Under chapter five, the study summarized and discussed the research findings. Also conclusions and policy recommendations were made about the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter identifies and highlights the existing related literature about the determinants of the performance of fish exports that guided the researcher in his study. The chapter investigates the effects and relationships of the factors that contribute to fish export performance which include; Terms of Trade, GDP per capita, Real Exchange Rate and Domestic inflation rate especially in developing countries. The chapter is presented based on the objectives of the study with empirical data from various studies which bring out the dynamic relationships between these factors and fish exports.

2.1 Theoretical review of determinants of Uganda's Fish Exports

Thorvaldur (1998) in his study about Export, Inflation and growth summarized the high-export countries as generally characterized by small population, large per capita GNP, small agriculture, relatively modest inflation, less-than-average dependence on primary exports, more-than-average investment and average growth of real per capita GNP.

In Uganda, Nyombi and Bolwig (2004) noted that cumulatively, export receipts have seen fish exports decline for a number of years. He observed that for example in year 2007, there was a 6% drop in export receipts from US$183 million to US$171 million in year 2008.

He suggested reasons for the decline in fish exports to include; falling water levels, high investment costs and inadequate capital, limited technical knowledge on aquaculture husbandry, increased local and international demand which led to overfishing and sometimes the illegal export of immature fish to regional markets. Also included are the increasing costs of production resulting from an appreciated shilling, high freight charges and soaring petroleum prices. However Nyombi and

Bolwig (2004) did not cover some of the macroeconomic effects like Terms of Trade, GDP per capita, Real Exchange Rate and Domestic inflation on the level of fish exports which this study tried to extensively investigate.

2.2 Terms of Trade and fish exports

According to Musinguzi and Obwona, (2000) Terms of trade have a significant effect on export growth rate. Musinguzi and Obwona, (2000) regressed export growth on real exchange rate, Terms of Trade and lagged export growth. They found out that terms of trade had a marginal but statistically significant impact on export growth. Jayant Parimal (2006) also associated deteriorating terms of trade with contraction of export earnings. He cited an example of Burundi which is dependent on coffee and tea to an extent of 87%. When its coffee and tea prices fell by 37% and 20% respectively, its annual exports fell from $154 million to $90 million. In Uganda Kasekende and Atingi-Ego (1999) using an export model on Real exchange rates and world market prices for exports (proxied by terms of trade) found out that a 1% devaluation of real exchange rate leads to a 0.17% rise in Uganda's exports. They also found that 1% rise in terms of trade results in a 1.82% rise in Uganda's exports. Basically their model suggests that the short run exports are being driven by changes in terms of trade.

Favorable terms of trade are associated with increased export growth rates and unfavorable terms with low export growth rates. Svedberg (1990) argued that in the 1990's, Sub Saharan Africa had unfavorable terms of trade which negatively impacted on exports. Townsend (1999) while analyzing the performance of African countries in terms of terms of trade and barter terms of trade noted that in most African countries the external net income terms of trade had increased at a greater rate than that of the barter terms of trade. He observed that in Zimbabwe, Mali and

Mozambique, the external barter terms of trade had deteriorated while the external net income terms of trade had improved because of the larger percentage increase in the volume of the agricultural commodities exported. He noted that the reverse was true in other cases like Madagascar where the increase in external barter terms of trade has been eroded by the decline in volumes exported. He however noted that in some cases the terms of trade improvement had been phenomenal, for instance Uganda had a growth rate of 8% and 22% per annum in its barter and net income terms of trade in the year 1992 and year 1998 respectively.

OECD (2005) reported that Uganda depends on a few agricultural exports, coffee, fish, tea and cotton which are liable to sharp terms of trade shock. It noted that in the year 2004, the country experienced widening trade deficits due mainly to a substantial increase in public and private transfers. Also the volume of export of fish and fish products gained due to investment in processing facilities, reduction in informal exports and greater market access. It further reported that in the year 2005 the government of Uganda had projected that fish would soon surpass coffee as Uganda's largest export which would make Uganda less subject to terms of trade shocks, because fish may be less vulnerable than coffee to price fluctuations. The MFPED (1995) reported that exports in Uganda increased from year 1991-1994 due to the dramatic improvement in terms of trade for coffee due to triple coffee prices following the frost that hit the Brazilian coffee.

Kean et al (2010), in their MDG gap task force report postulated that traditional commodities in Uganda continue to dominate total export. They noted that for example Coffee accounted for 26% of the total value of exports in the year 2008, down from almost 30% in the year 2001 which they said caused improvements in Uganda's terms of trade and exchange rate between the

years 2004-2008. They further reported that Uganda is close to a commodity currency, which means that exchange rate movements tend to correspond closely to the price developments of its major export, coffee. They gave an example between the year 2007 and year 2008 when as the price of coffee increased Uganda's nominal exchange rate appreciated.

2.3 GDP per capita and fish exports

Sharma (2001) discovered that Gross Domestic Product (GDP) has a positive impact on exports and that the effect of GDP growth on exports is highly significant with positive sign. However, Niringiye (2009), disagrees with Sharma arguing that in Uganda whereas, the overall agriculture and its subsectors such as food crops, livestock and forestry's share in GDP falls as GDP per capita rises the fishing sector share in GDP does not exhibit a significant relationship with per capita income. The findings also show that whereas the share of non-monetary agriculture, nonmonetary food crops, and non-monetary livestock's share in GDP exhibit a negative relationship with GDP per capita income, the share in GDP of monetary agriculture, monetary food crops, cash crops, monetary and non monetary forestry and fishing exhibit no significant relationship with GDP per capita. Ngeno (2000) using empirical analysis to determine export performance in Kenya disagrees with Niringiye (2009) that GDP significantly increases export growth. Delgado et al (2003) agrees with Ngeno (2000) that GDP significantly increases export growth and in their study they projected a decline in net fish exports from developing countries to high income countries during the years 1997-2020, was due to general income increases in developing countries and the emergence of a middle class able to purchase high value fish.

Ahmad, J. et al (1996) while analyzing the causality between exports and GDP of Namibia found out that these two variables (exports and GDP) move together. He discovered that countries which do well in their export performance also do well in their GDP performance and vice versa.

He noted that there are two cointegration vectors between exports and GDP as well as between exports and GDP per capita. The study also tested if exports, imports and GDP are cointegrated. The test results revealed evidence of cointegration between exports and GDP or GDP per capita. It also revealed that exports, imports and GDP per capita are cointegrated. The results also show that there is bi-directional causality between exports and imports. In line with Ahmad, Melissa et al (2010) noted that Uganda' PPP-adjusted GDP per capita grew at a Compound Annual Growth Rate (CAGR) of 5% in 2009, well above the 3.1% of EAC which he attributed to increase in investment and exports to the EU. On the other hand, Arsson (2007) while studying the relationship between growth in the fishing industry and total GDP of the Icelandic economy revealed a rather stable relationship. He however found out that fluctuations started breaking up the relationship during the mid 1990s whereby the growth in marine export decreased when GDP rose and vice versa. He attributed this trend partly due to the increasing importance of the service sector, as known from other developed economies.

Nyombi and Bolwig (2004) found out that increase in population and per capita income substantially increases total demand for fish in Uganda. They further noted that the income elasticity of demand for fish is high compared to other food items. They assumed that if Uganda was to maintain its then real GDP growth rate of 5.0% per year, in the years 1998-2002, Uganda would expect a significant increase in fish consumption from the combination of high income growth and high income elasticity of demand. While analyzing Uganda's annual population growth rate of 3.4% in the year 2002, Nyombi and Bolwig (2004), anticipated an increase in Uganda's population hence predicting a very significant increase in the total domestic demand for fish to the year 2015. According to NARO (1996), it predicted that Uganda would have an annual deficit of 124,000 tons of fish by the year 2010 considering the 2004 production levels.

Delgado and Courbois (1997) also found out that consumption of fish and fishery products increases rapidly with income. FAO (1997) also concurs with Delgado that among developed countries, total expenditure on fish especially in the U.S is seen to be highly sensitive to income. It reports that under income growth, U.S consumers substitute higher priced calories for lower priced ones, rather than increase their caloric intake. It adds that it is likely that choice seafood items are being substituted for meat.

Delgado et al (2003) discovered that across countries, per capita fish consumption is significantly correlated with average per capita national income. They quoted Consumer theory which suggests that as individuals become wealthier, they tend to substitute higher-priced calories for lower-priced ones, once basic food needs are met. They added the demand for fish products at the household level, as well as at the national level, are quite responsive to changes in income. They reviewed the studies by Asche and Bjorndal (1999) which showed income elasticities of demand for fisheries products to be generally high, often over 1.0. they noted that an income elasticity of 1.2, for example, implies that a 1% rise in income is associated with a 1.2% rise in fish consumption. Theory suggests that these income responses will be greater for lower income groups, and greater for luxury goods.

2.4 Real Exchange Rate and fish exports

Nimrod (2008) postulated that the performance of a country's exports is highly dependent on its exchange regime and more specifically the real exchange rate. He noted that various studies have shown that the demand for a country's exports increases when its export prices fall in relation to the world prices. The depreciation of its currencies particularly the dollar, makes its exports cheaper on the international market. Sharma (2001) is in agreement with Nimrod when he

discovered that the demand for Indian exports increased when its prices fell and vice versa. He said that the appreciation of the Indian Rupee at one time adversely affected Indian exports.

An investigation of the impact of trade liberalization on exports volumes by Kasekende and Atingi-Ego (1999) found no significant relationship between real exchange rate and export Volumes. It further argued that a comparative exchange rate is associated with export growth. In Tanzania, Helleiner (2002) discovered that a competitive real exchange rate is associated with non-traditional exports success. He conducted a time series study on Non Traditional Exports (NTEs) and found a statistical significant relationship between real devaluation and export growth of nontraditional exports.

In Uganda, Kihangire (2005) investigated the effects of exchange rate variability on Uganda's tropical freshwater fish exports. The empirical evidence suggested Uganda's exports of fish were negatively and significantly correlated with exchange rate volatility. Bagumire (2009) discovered both positive and negative effects of fluctuating foreign exchange rates on the fishing company revenues. For example he noted that in Uganda between the year 2007/2008 and the year 2008/2009 the dollar exchange rate changed from 4% to 14% respectively. He attributed this sharp increase to the onset of the global economic and financial crisis. He explained that the positive effects of fluctuating foreign exchange on fish exports would take place when a stronger foreign currency would exchange for more local shillings because since the payments for exports are received in foreign currency and the fish raw materials are procured in local currency, the Uganda shilling would easily offset the high prices of raw material fish. He on the other hand he observed that the negative effects of fluctuating foreign exchange on fish exports would occur when the shilling was stronger as was the case in the year 2008, which disadvantaged exporters,

because they would get less revenue on conversion of the exports earnings to local currency hence, making the cost of raw material expensive.

Thorvaldur (1998) proved that the real exchange rate which reflects the underlying relative movements of prices at home and abroad, have a significant effect on the export performance of the lowest performers. Results for all periods indicated, for example that, an overvalued real exchange rate is seriously detrimental to export performance, while on an average a 1% real depreciation could increase exports by 6% to 10 %. However he highlighted that, this is not an argument for competitive devaluations of nominal exchange rates, but rather it points to the importance of the pursuit of productive gains to maintain external competitiveness. He stated more that, an overvalued currency, sometimes as a result of fixed exchange rates that are used as a nominal anchor to control inflationary pressures, translated into a direct loss of price competitiveness for exporting firms. He further noted that, real interest rates, an element in the relative price movements that drive the real exchange rate, are found to affect significantly the export performance of good performers, with high rates increasing producer costs and hence impacting negatively on export competitiveness.

In Uganda, John Sender (2009) while carrying out an impact assessment on the global economic crisis on Uganda in the year 2009 found out that the depreciation of the shilling is caused by the widening trade deficit associated with a decline in the export value as well as a very strong outflow of portfolio investment. He noted that Uganda operates a flexible exchange rate policy, with the Ugandan shilling allowed to fluctuate freely in line with economic fundamentals. He however observed that, where necessary the BoU intervenes to smooth short-run volatility. He

cited the years from 2005 to 2006 when the Uganda shilling depreciated 4.8 per cent which prompted the BoU to intervene in the foreign exchange market to restore stability.

Tumusiime-Mutebile (2009) argues that the depreciation was caused by global investment funds and financial institutions engaged in the Ugandan money and capital market that pulled out of developing countries to reduce the risk in their portfolios.

Elbadawi (1997) found out that while the levels of the Real Effective Exchange Rate (REER) do not significantly explain export performance, indices of competitiveness do. He argues that so long as countries avoid over-valuation, then a "correctly" valued RER or one that is under-valued could encourage export performance. In the case of Uganda, Ssemogerere and Ddamulira (1998) highlight the anti-export incentive effect generated by the high inflation rates and fixed exchange rate system in the 1970s. In Kenya, Mwega (1993) finds that the level of the real exchange rate does not explain the performance in non-traditional exports, which is consistent with the results in a much wider study by Elbadawi (1997). However both authors point out that undervaluation has positively influenced non-traditional exports.

Goldstein and Khan (1978) while studying the demand and supply of fish exports discovered that fish export volumes are negatively and significantly correlated with real exchange rate. They used the traditional standard export volumes equation which takes into account demand factors such as growth of overseas markets and domestic prices. They further asserted that if the price of fish exports increase relative to domestic price, fish export production becomes profitable and the supply of fish exports rises. Kasekende and Atingi-Ego (1999) investigated the impact of trade liberalization on key markets in Sub Saharan Africa focusing on the case of Uganda. Using annual data from the years 1970-1996, they modeled Uganda's exports as a positive function of

real exchange rate, terms of trade and income of trading partner countries and found out that Uganda's exports were positively and significantly correlated with both terms of trade and the error correction term lagged three periods but that exports were invariant to the REER.

Edwards and Golub (2004) investigated the determinants of export supply in South Africa and found out that foreign prices, domestic prices and exchange rate have a strong impact on manufacturing export performance in South Africa. They discovered a positive and significant coefficient on the relative price variable and the real effective exchange rate. They concluded that 1% increase in the relative price of exports is estimated to raise average manufacturing export volumes by 2.5% in the long run. In their study of the effects of exchange rate uncertainty, Ricardo and Vittorio (1989) revealed that the theory alone may not determine the sign of the relationship between real exchange rate and exports. Ricardo and Vittorio were trying to prove the theory that reducing exchange rate uncertainty may decrease the real devaluation required to improve the current account balance through export expansion while avoiding a recession. Results obtained indicate that export volumes highly respond to exchange rate fluctuation.

2.5 Inflation and volume of fish exports.

Laure (2009) while analyzing the changing global markets for fish discovered that increases in domestic inflation lead to higher prices of fish exports hence a decrease in fish exports as foreign consumers substitute in favor of lower-priced alternative fish products produced within their own country or imported from elsewhere. He added that as the prices of domestically produced fish products increase while the prices import fish products remain constant and shoppers turn their fancy toward imports, which have fallen in price relative to inflating domestically produced fish

products. The net result for a country with a rise in inflation is decreased fish exports and increased consumption of fish imports. The result is a fall in Net fish exports which results into current account deficits which eventually leads to depreciation in the home currency and deterioration of balance of payments for the economy. On the contrary, John Sender (2009) while carrying out an impact assessment on the global economic crisis on Uganda in the year 2009, discovered that Uganda is a net exporter of food and continues to export increasing amounts of food to neighboring countries despite the strong increases in domestic food prices. He noted that with the strong depreciation of the Ugandan shilling against both the US$ and the currencies of neighboring countries, there were increased incentives to export more food from Uganda to the region. He attributed the acceleration in inflation in Uganda to the large exchange rate depreciation.

The OECD (1981), economic survey report on Iceland' fish exports revealed that inflation significantly influence the level of fish exports. It noted that both improvements and deteriorations in the terms of trade as well as fluctuations in the level of export production tend to accelerate the rate of inflation. A Reserve Bank of India (RBI) report (2011) observed that high inflation of 8.62 % was pushing the cost of merchandise production which was affecting the competitiveness of Indian exports. The report noted that higher inflation differential between India and major trading partners was a source of pressure on the competitiveness of Indian exports. It added that containing inflation was important for improving the external balance position.

Thorvaldur (1998), observed that inflation is inversely correlated with real exchange rates as long as nominal exchange rates do not adjust instantaneously to prices, even if high inflation may

impede exports. By regressing the ratio of exports to GDP on its main hypothesized determinants across countries, and then also by regressing the average rate of growth of real per capita GDP from 1985 to 1994 on the determinants of export performance indicated that high inflation and a heavy emphasis on the exploitation of natural resources have tended to be associated with low exports and slow growth.

Thorvaldur (1998), also revealed that overvaluation of national currencies is not the sole possible source of the hypothesized links between inflation, exports, and growth. He found out that high inflation may also distort production by driving a wedge between the returns to real and financial capital. He further noted that, high inflation may be a symptom of economic mismanagement; imperfect institutions and other factors that together help undermine export performance and economic growth. He also postulated that the exporters of primary commodities have more inflation than the exporters of manufactured commodities, even if the pattern is statistically insignificant. He found out that on average, the high-inflation countries export a third less than the low-inflation countries. There is, however, no significant difference between the export propensity of the medium-inflation countries and the high-inflation countries.

2.6 Summary of literature review

Relationship between Terms of Trade and fish exports

According to Musinguzi and Obwona (2000) found out that terms of trade had a marginal but statistically significant impact on export growth. Jayant Parimal (2006) also associated deteriorating terms of trade with contraction of export earnings. In Uganda, Kasekende and Atingi-Ego (1999) found out that 1% rise in terms of trade results in a 1.82% rise in Uganda's exports.

Svedberg (1990) argued that favorable terms of trade are associated with increased export growth rates and unfavorable terms with low export growth rates. OECD (2005) suggested fish exports instead of coffee as Uganda's largest export as Uganda's largest export because fish is less susceptible to terms of trade shocks, since fish may be less vulnerable to price fluctuations.

Kean et al (2010) reported that Uganda is close to a commodity currency, which means that exchange rate movements tend to correspond closely to the price developments of its major export, coffee.

GDP per capita and fish exports

Ahmad, J. et al (1996) found out that exports and GDP move together. He discovered that countries which do well in their export performance also do well in their GDP performance and vice versa. Melissa et al (2010) agrees with Ahmad that Uganda' PPP-adjusted GDP per capita has a positive relationship with export performance. Also Sharma (2001) discovered that the effect of GDP growth on exports is highly significant with positive sign. However, Niringiye (2009), disagrees with Sharma arguing that in Uganda whereas, the overall agriculture and its subsector's share in GDP falls as GDP per capita rises the fishing sector's share in GDP does not exhibit a significant relationship with per capita income. Nyombi and Bolwig (2004) found out that increase in population and per capita income substantially increase total demand for fish in Uganda. They further noted that the income elasticity of demand for fish is high compared to other food items.

Real Exchange rate and Level of Fish Exports

Gylfason (1998) proved that the real exchange rate which reflects the underlying relative movements of prices at home and abroad, had a significant effect on the export performance of

the lowest performers. Sharma (2001) in his study on export growth in India noted that a country's exports grow faster when its currency depreciates than when it appreciates, while Kasekende and Atingi-Ego (1990) discovered no significant relationship between real exchange rate and export volumes but indexes of competition do. Mwega (1993) in Kenya found out that the level of the real exchange rate does not explain the performance in non-traditional exports, which was consistent with the results in a much wider study by Elbadawi (1997). However both authors point out that undervaluation has positively influenced non-traditional exports

Inflation rate and fish exports

John Sender (2009) discovered that Increases in domestic inflation lead to higher prices for exported goods and a decrease in exports as foreign consumers substitute in favor of lower-priced alternatives produced within their own country or imported from elsewhere. John Sender (2009) also discovered that Uganda is a net exporter of food and continues to export increasing amounts of food to neighboring countries despite the strong increases in domestic food prices. He attributed the acceleration in inflation in Uganda to the large exchange rate depreciation. In Iceland the OECD (1981), revealed that inflation significantly influence the level of fish exports. It noted that both improvements and deteriorations in the terms of trade as well as fluctuations in the level of export production tend to accelerate the rate of inflation. Thorvaldur (1998) observed that inflation is inversely correlated with real exchange rates as long as nominal exchange rates do not adjust instantaneously to prices, even if high inflation may impede exports. He also revealed that exporters of primary commodities have more inflation than the exporters of manufactured commodities, even if the pattern is statistically insignificant.

CHAPTER THREE

METHODOLOLY

3.0 Introduction

This chapter presents the methodology of the study. That is the general approaches and procedures in which the research was conducted. It shows how data was collected, the research design, data types and sources, data capturing and analysis tools and procedures, model specification, estimation procedures and diagnostic tests.

3.1 Research design

This research was purely quantitative in nature, it focused on time series data collected on the variables; Terms of Trade, GDP per capita, Real Exchange Rate and Inflation Rate for the period between the years 1997 to 2012.

3.2 Data type and sources

Secondary annual time series data between 1997 and 2012 was used to estimate the model. Data about Terms of Trade, GDP per capita, Real Exchange Rate and Domestic inflation rate and their influence Uganda's fish export was obtained from mainly Uganda Bureau of Statistics (UBOS), Uganda Export Promotions Board (UEPB), Ministry Of Finance Planning and Economic Development (MFPED), Bank of Uganda report publications, Department of Fisheries Resources (DFR) and the Food and Agriculture Organization (FAO).

3.3 Data analysis

Data was captured in Excel soft ware and then later exported to E-Views version 3.0 and STATA version 11 soft wares for analysis. To achieve the objectives of the study, different methods of

data analysis were employed which included; measure of central tendency, descriptive analysis to establish the distributive properties of normality, stationarity and order of integration of variables. The study also adopted t-test statistic to test the significance of the partial coefficients in explaining the dependent variable, F-test statistic to test for the overall specification or fit for the model and R and R^2 to measure the goodness of fit of the model.

3.3.1 Univariate analysis

Under this approach various methods were adopted to analyze Terms of Trade, GDP per capita, Real Exchange Rate and Inflation rate. Among the methods that were employed, included the graphical analysis, Normality test and stationarity;

3.3.1.1 Graphical analysis

As it was noted by Morley et al (1991), that before one pursues any formal tests for stationarity of the series; graphical analysis of a single case time series data is always advisable to plot each time series single case data under study to give an initial clue about the likely nature of the time series. Morley et al (1991) stated that if the series on the plot are showing an upward trend or perhaps a downward trend, then it suggests that the series are perhaps not stationary. Therefore all the variables under investigation were subjected to a plot in order to study their nature of trending.

3.3.1.2 Normality test

The linear regression models assume that the variable μ_i has a normal distribution about the mean. They assume that values of μ, for each variable have bell shaped symmetrical distribution their zero mean and variance of one: $\mu \sim N(0,1)$. The Jarque-Bera (JB) normality test for the error term, (a white noise test) was run under the $H_{0:}$ that the residuals are normally distributed

for all the periods. The JB test of normality is an asymptotic, large –sample test. It is also based on the OLS residuals. This test first computes the skewness (s) and kurtosis (k) measures of the OLS residuals and uses the following test stastistic:

$$JB = n\left[\frac{s^2}{6} + \frac{(K-3)^2}{24}\right]$$

Where n = sample size, S = skewness coefficient, and K = kurtosis coefficient. For a normally distributed variable, S=0 and k=3. Therefore, the JB test of normality is a test of the joint hypothesis that S and K are 0 and 3 respectively. In that case the value of the JB statistic is expected to be 0 implying that the data series are normally distributed.

3.3.1.3 Testing for unit root

Unit root is a test for stationarity of data series. It has been proven both from empirical and theoretical studies that most of the macroeconomic variables are non-stationary because they have a stochastic trend. Therefore to remove such a trend, Augmented Dickey Fuller (ADF) test was applied which takes into account the time characteristics of data. ADF (1979) introduced the first statistical test that could help to determine whether the economic variable is stationary 1 (0) or not. The test was applied by running ordinary Least squares (OLS) regression to variables as in equation 2.5a (zero drift) or 2.5b (non-zero drift) and comparing the obtained values with Fuller distribution (Fuller, 1970). It is based on the hypothesis that the trend parameter is equal to zero: $H_0\ \rho = 0$. This test is conducted by "augmenting" the preceding two equations by adding the lagged values of the dependent variable $Y_{t-1.}$ The ADF here consists of estimating the following regressions:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t \quad \text{.....(2.5a)}$$

$$\Delta Y_t = \beta_{1+} \beta_2 + \delta Y_{t-1+} \alpha_t + \sum_{k-1}^{m} \nabla Y_{t-1} + \varepsilon_t \quad \text{.....(2,5b)}$$

Where ε_t is a pure white noise error term and where $\nabla Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $Y_{t-2} = (Y_{t-2} - Y_{t-3})$ etc. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated. H_0 was rejected if the absolute value of ADF test statistic exceeded the critical values at 1%, 5% and 10% levels of significance.

3.3.2 Bivariate analysis

Under this approach, paired correlation matrix was run to establish the general association between any two variables for all selected variables under investigation. It was based on the hypothesis that, there is no association between any two variables.

3.3.2.1 Testing for multi-collinearity

Multi-collinearity is a condition of perfect or exact, linear relationship among some or all explanatory variables of regression model. Or a case where regressors are interrelated but not so perfectly. One of the assumption of the classical linear regression model (CLRM) requires that there is no multi-collinearity among the regressors included in the model. If multi-collinearity is perfect the regression coefficients of the regressors are indeterminate and their standard errors are infinite. If multi-collinearity is less than perfect, the regression coefficients although indeterminate poses large standard errors (in relation to the coefficient themselves), which means the coefficients cannot be estimated with great precision or accuracy. If there is no multi-collinearity, it implies that the regressors are independent of one another and therefore each can predict the performance of the dependent variable independently.

Running a paired correlation between each two explanatory variables helped to determine their correlation and was done under the null hypothesis that, there is no relationship between any two explanatory variables in question against the alternative hypothesis that, the variables in question are significantly related. Harvey, (1998) proposed ±0.8 as a limiting value and he explained that any correlation coefficient between any two independent variables below this implies no problem but any correlation coefficient above this implies a big problem and therefore one should be concerned about multi-collinearity.

3.3.3 Multivariate analysis

This study adopted a multiple linear regression model used by Marco Fugazza (2004) in the analysis of export performance and its determinants, in the United Nations Conference on Trade and Development (UNCTAD) New York and Geneva. In his study, he focused on GDP, population, foreign market access and internal cost of production and supply, as the major determinants of exports growth. In little contrast, this study focused specifically on fish exports and hence incorporated some explanatory variables that were not considered by Marco Fugazza, such as, Terms of Trade, GDP per capita, Real Exchange Rate and Domestic Inflation rate.

3.3.3.1 Model Specification and estimation

3.3.3.1.1 Model specification

The standard model specification that summarizes fish exports and its determinant is as follows;

Fish Exports (X) =f(TOT, PPP, RER, DIR, and U)

Where TOT = Terms of Trade

PPP = GDP Per capita

RER = Real Exchange Rate

DIR = Domestic inflation Rate

U = other variables that are not included in the study.

3.3.3.1.2 Model estimation

The long run model was developed basing on the standard model specification that summarizes fish exports and its determinants and is as follows;

$X = \beta 0 + \beta_1 TOT + \beta_2 PPP + \beta_3 RER + \beta_4 DIR + \in_t$

Where β_0 is a constant, $\in_t$ is the error term, and $\beta_1 \ \beta_2, \ \beta_3 \ and \ \beta_4$ are partial coefficients

3.4 Diagnostic test

3.4.1 Testing for individual regression coefficients

The t-test statistic was adopted in this regard. It focused on the hypothesis that the estimated coefficients are statistically not different from zero, that is;

$H_0 : \beta_i = 0$, $i = 0,1,2,3$ and 4

Rejection criterion was at 5% level of significance. The coefficient was considered statistically different from zero, if its correspondent t-value, that is, t-value $\geq |2|$ with a corresponding p-value of less than 0.05, then the null hypothesis was rejected and concluded that the coefficient is statistically significant.

3.4.2 Testing for joint significance of regression coefficients

In this case the F-test statistic was applied with the help of ANOVA, to test the hypothesis that,

$H_0 : \beta_2 = \beta_3 = \ldots = \beta_k = 0$, (i.e, all slope coefficients are simultaneously equal to zero), the F-test statistic function is expressed as;

$$F = \frac{ESS/(k-1)}{RSS/(n-k)}$$

Where,

F = F-test statistic

ESS = Error Sum of Squares

RSS = Residual sum of squares

K = Number of variables

n = Number of observations

Rejection criterion: If the p-value of F obtained is sufficiently low that is, less than 0.05, at 5% level significance then, the null hypothesis was rejected and concluded that all the regression coefficients are simultaneously not equal to zero.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This chapter presents the empirical findings, interpretation and discussion of the results. It first presents the descriptive properties of the data series incorporated in the study, then the trend or growth analysis of the variables, followed by; distributive tests, results from the model to measure long term relationships and diagnostic tests.

4.2 Univariate analysis

4.2.1 Descriptive properties of the fundamental variables

Under this section, the descriptive properties for each variable were established using different techniques of analysis and these included; measure of central tendency and dispersion of variables, graphical analysis to establish the nature of trending for each variable, normality test to establish how each variable data series are distributed about the mean and unit root test to test for stationarity of each data series.

4.2.1.1 Measure of central tendency and dispersion of the variables

From the results in table 4.1 below, it was found out that, in the period from 1997 to 2012, on average each year, Uganda has been reaping 86,320,710 US dollars from fish export, Terms of Trade was 108.005 percent, GDP per capita was 355.125 US dollars, exchange rate was 1,813.805 Ugandan shillings against 1 US dollar and domestic inflation rate was found as 7.694 percent. The maximum earnings received from fish exports for the period between 1997 and 2012 was 143,618,000 US dollars while the minimum value received from fish exports in the same period was 28,800,000 US dollars. The maximum Terms of trade experienced by fish

exports from Uganda in the period of 16 years was discovered as 156 percent attained in 1997 while the minimum Terms of Trade for the same period was 92.91 percent attained in 2001. The highest GDP per capita ever attained in Uganda from 1997 to 2012 was 589 US dollars whereas the lowest GDP per capita ever hit in the same period was discovered as 234 US dollars achieved in 2012 and 1997 respectively. The highest and the lowest exchange rates of Ugandan shillings against 1 US dollar were found to be 2,522.8 UG Shs and 1083.01 UG Shs, obtained in 2012 and 1997 respectively. The minimum and maximum rates of inflation attained in Uganda in the period from 1997 and 2012 were 0.0 percent and 18.7 percent which were hit in 1998 and 2011 respectively. The high standard deviation (36,736,060 US dollars) of the value from fish exports implies that, there has been a high dispersion in the annual revenue earned by Uganda from fish exports every year.

Table 4.1: Measure of central tendency and dispersion

Observations = 16

Variable	Mean	Std. Dev.	Min	Max
Value of fish export ($ '000)	86320.71	36736.06	28800	143618
Terms of Trade	108.005	17.87444	92.91	156
GDP per capita	355.125	116.7692	234	589
Exchange rate	1813.805	382.5065	1083.01	2522.8
Domestic inflation	7.69375	5.012846	0.0	18.7

The high and varying standard deviations between each explanatory variable indicate that the influence of each independent (determinant) variable on the performance of Uganda's fish export is not the same and constant throughout the period studied thus contributing to variations in the revenue earned by Uganda from fish exports every year. This is as a result of unstable terms of trade, exchange rate, domestic inflation rate and unsteady growth in GDP per capita.

4.2.1.2 Graphical analysis

This analysis was carried out for the purpose of visual inspection of the data series and to establish the nature of trending and growth of each single variable data series incorporated in this study. From the plots of each single variable data series as presented in appendix (i), it was found out that, all the variables (Value of fish exports, Terms of Trade, GDP per capita, Real Exchange Rate and domestic inflation rate), exhibit random walk characteristics in their trending and growth, thus indicating that the means and the variances of the data series are not constant (0,1) respectively and perhaps the variables' data series are not stationary. As noted by Morley et al (1991), if the variable has shown an upward and down ward trend and growth over time, it paves way for carrying out more formal tests for stationarity of the data series such as normality and unit root tests, as in the preceding sections.

4.2.1.3 Normality test

This test was performed to establish how each variable data series are distributed about the mean. It is carried out in order to avoid spurious results when running the model, owing to the fact that some non-stationary data series were regressed on one another. Jacque-Bera (JB) test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. It is based on the assumption that, for a normally distributed variable, S = 0 and K = 3. Therefore, the JB test of normality is a test of the joint hypothesis that S and K are 0 and 3, respectively. In that case the value of the JB statistic is expected to be 0. From the results in table 4.2 below, most of the variables namely X (JB = 0.809, p = 0.667), PPP (JB = 1.772, p = 0.412), RER (JB = 0.037, p = 0.982) and DIR (JB = 0.566, p = 0.753) follow a normal distribution because as their p-values were tending to one their corresponding JB statistic values were tending to zero whereas only the variable of TOT (JB = 7.790, p = 0.020) do not follow a normal

distribution because it's JB test statistic value is far greater than zero with its p-value less than 0.05.

Table 4.2 Normality test

Observations = 16

Variable	Value of fish exports	Terms of Trade	GDP per capita	Real Exchange Rate	Domestic Inflation
Skewness	-0.245	1.535	0.644	0.116	0.457
Kurtosis	2.013	4.503	2.000	2.972	2.875
Jarque-Bera	0.809	7.790	1.772	0.037	0.566
Probability	0.667	0.020	0.412	0.982	0.753

The normality test using Jarque-Bera test is based on; H_0: that the variable data series are normally distributed against the H_a: that the data series are not normally distributed. H_0 was rejected if the Jarque-Bera test value is far greater than zero with its corresponding P-value < 0.05. As noted by Spanos (1986), normally distributed data series help to arrive at accurate estimate of the parameter coefficients established in any model. From the results in Table 4.2 above, the variables of fish exports, GDP per capita, real exchange rate and domestic inflation rate are normally distributed.

4.2.1.4 Unit root test

Having plotted all the data series on the graphs, and established that all the variables incorporated in this study exhibited random walk characteristics over time, this gave a clue that, the data series may be non stationary and according to Mahadeva and Paul (2004), macroeconomic variables that increase or decrease over time are typical examples of non stationarity data series and that most of the macroeconomic variables are affected by a stochastic factor (time characteristics), therefore applying ADF test helps to remove this stochastic trend.

The results in table 4.3 indicate that, macroeconomic variables of Terms of Trade and Domestic Inflation rate became stationary in levels, that is, they are integrated of order zero at all levels of significance for Terms of Trade and at 5 percent and 10 percent levels of significance for Domestic Inflation rate while the rest of the variables namely: value of fish export, GDP per capita and Real Exchange Rate failed to become stationary in levels implying that their ADF test statistics were greater than the critical values at all the significant levels (1%, 5% and 10%). However the results in table 4.4 reveal that, all the macroeconomic variables became stationary at first difference that is (their ADF test statistics were less than the critical values at different levels of significance).

Table 4.3 Unit root test in levels

Variable	ADF-test statistic	Order of Integration	Lag length	Probability
Value of export	-1.832	I(0)	0	0.3520
Terms of Trade	-5.320* ** ***	I(0)	2	0.0061
GDP per capita	-1.517	I(0)	0	0.7763
Real Exchange Rate	-2.763	I(0)	3	0.2347
Domestic Inflation Rate	-4.564** ***	I(0)	0	0.0138

Table 4.4 Unit root test at first difference

Variable	ADF-test statistic	Order of Integration	Lag length	Probability
Value of export	-5.121* ** ***	I(1)	0	0.0061
Terms of Trade	-2.361** ***	I(1)	0	0.0224
GDP per capita	-3.811** ***	I(1)	0	0.0484
Real Exchange Rate	-2.372** ***	I(1)	0	0.0219
Domestic Inflation Rate	-7.188* ** ***	I(1)	0	0.0000

Note: This test was based on the hypothesis $H_{0:}$ The variable data series are non-stationary against H_a: that the variable data series are stationary. H_0 was rejected if the absolute value of ADF test statistic exceeded the critical values at 1%, 5% and 10% levels of significance. The asterisks (*) in the tables represent significance at 1 percent (*), 5 percent (**) and 10 percent (***).

4.3 Bivariate analysis

Under this approach, paired correlation matrix was run to establish the general association between any two variables for all selected variables under investigation. The results are presented in table 4.5.

4.3.1 Multi-collinearity test

This test was carried out by running a pair wise correlation to discover whether there is any relationship between any two or more independent variables. According to Harvey (2002), if multi-collinearity exists between any two independent variables, it becomes difficult to distinguish the effect of one independent variable from another in predicting the dependent variable and that multi-collinearity can be detected by experiencing high correlation coefficients between independent variables, high R^2 and adjusted R^2 and insignificant t-scores. Harvey proposed ±0.8 as a limiting value and he explained that any correlation coefficient between any two independent variables below this implies no problem but any correlation coefficient above this implies a big problem and therefore one should be concerned about multi-collinearity. From the results in table 4.5 below, it was clearly found out that, there is no multi-collinearity between any two or more explanatory variables (all their coefficients are less than ±0.8), a proposed limiting value for detecting multi-collinearity.

Table 4.5 Paired correlation matrix for multi-collinearity test

Variable	Value of fish export	Terms of Trade	GDP per capita	Real Exchange Rate	Domestic Inflation Rate
Value of fish export	1.0000				
Terms of Trade	-0.6153				
	0.0112*	1.0000			
GDP per capita	0.3787	0.0472			
	0.1480*	0.8623*	1.0000		
Real Exchange Rate	0.4884	-0.5049	0.6978		
	0.0549*	0.0461*	0.0027*	1.0000	
Domestic Inflation Rate	0.1885	-0.0410	0.7774	0.6808	
	0.4916*	0.8800*	0.0004*	0.0037*	1.0000

Values with asterisk (*) indicate corresponding probability values

4.4 Multivariate analysis

Under this analysis, a multiple linear regression model was used to ascertain the extent of the impact of Terms of Trade, GDP per capita, Real Exchange Rate and Domestic Inflation Rate on the value of fish exports in Uganda.

4.4.1 Model estimation and discussion of the empirical results

Having established the distributive properties of each single case variable data series in the previous tests, the next step was to run the model and establish the long run relationship between the dependent variable (Value of export) and the explanatory variables (Terms of Trade, GDP per capita, Real Exchange Rate and Domestic Inflation Rate). The results of the model were obtained by the method of Ordinary Least Squares (OLS) and the results are presented in table 4.6 below.

Table 4.6 Model results

Dependent variable: Value of fish exports (X)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	260671.2	98467.96	2.647269	0.0227
Terms of Trade (TOT)	-1787.177	572.7474	-3.120357	0.0097
GDP per capita (PPP)	293.6194	113.4955	2.587058	0.0253
Real Exchange Rate (RER)	-37.57414	38.91741	-0.965484	0.3550
Domestic Inflation Rate (DIR)	-2267.543	2247.736	-1.008812	0.3347
R-squared	0.640045	F-statistic		4.889845
Adjusted R-squared	0.509152	Probability (F-statistic)		0.016388

The model was estimated at 5% level of significance

Fitting the results in the model

$X = 260671.2 - 1787.2TOT + 293.62PPP - 37.57RER - 2267.54DIR + \mu$

4.4.2 Interpretation and discussion of empirical results in the model

4.4.2.1 Terms of Trade and fish export

The result of the model above shows that, there is a negative correlation between fish export earnings and terms of trade, thus implying that any increase in terms of trade ratio by 1 percent, led to a decline in fish export earnings by 1,787,200 US dollars. The t-value (-3.120357) implies that the coefficient is statistically significant in explaining the performance of fish exports in Uganda. The probability (0.0097) shows that terms of trade are statistically significant in explaining the variation in the earnings from fish exports. This result conforms to the findings of Musinguzi and Obwona (2000), who found out that terms of trade have a negative significant effect on export earnings. Therefore, the null hypothesis that, TOT has no significant impact on fish export is rejected in favor of the alternative hypothesis that terms of trade has a significant impact on fish export.

4.4.2.2 Gross Domestic Product per capita and fish exports

The estimation result indicates a positive and a significant relationship between GDP per capita and fish exports basing on the probability value of 0.025. A unit increase in GDP per capita increased fish export earnings by 293,620 US dollars. The t-value (2.587058) implies that the coefficient is statistically significant in explaining the performance of fish exports in Uganda. This result however disagrees with the findings of Sharma (2001) who found out that, as GDP per capita rises the fishing sector share in GDP does not exhibit a significant relationship with per capita income, but agrees with findings of Nyombi and Bolwig (2004) who discovered that increase in population and per capita income substantially increases total demand for fish in Uganda as well as the findings of Delgado et al (2003) which reveal that across countries, per capita fish consumption is significantly correlated with average per capita national income. In this case the null hypothesis that GDP per capita has no significant impact on fish exports is rejected in favor of the alternative hypothesis.

4.4.2.3 Real exchange rate and fish exports

The result in the model reveals a negative and insignificant relationship between Real Exchange Rate and fish exports. A unit increase in Real Exchange Rate (Ugandan shillings) against 1 US dollar led to a reduction in fish export earnings by 37,570 US dollars. The t-value (t-value = -0.965) implies that the coefficient is statistically insignificant in explaining the performance of fish exports in Uganda. The result however, somewhat agrees and disagree with the findings of Kihangire (2005) whose empirical evidence suggested a negative and significant correlation between Uganda's fish exports and exchange rate volatility respectively. Thus the H_0: that Real exchange rate has no significant effect on fish exports is

accepted against the alternative hypothesis. Hence change in Real exchange rate does not necessarily influence fish exports greatly.

4.4.2.4 Domestic inflation rate and fish exports

The findings in the model show a negative and insignificant correlation between domestic inflation and fish export earnings by Uganda. Implying that, a unit percentage increase in domestic inflation rate led to a reduction in fish export earnings by 2,267,540 US dollars. The t-value (t-value = 1.0089) implies that the coefficient is statistically not significant in explaining the performance of fish exports in Uganda. This result is in consistence with the findings of Laure (2009), while analyzing the changing global markets for fish, discovered that, increase in domestic inflation leads to higher prices of fish exports hence a decrease in fish export earnings as foreign consumers substitute imported fish in favor of lower-priced alternative fish products produced within their own country or imported from elsewhere. Therefore the null hypothesis that, domestic inflation has no significant effect on fish export is accepted against the alternative hypothesis.

4.4.3 Interpretations of diagnostic tests

4.4.3.1 The model parameter coefficients analysis

The value of adjusted R^2 (0.5092) reveals that, about 50.92 percent in the variation of fish export earnings by Uganda is explained by changes in Terms of Trade, GDP per capita, Real Exchange Rate and Domestic Inflation Rate, thus implying that about 49.1 percent in the variation of fish export earnings by Uganda is explained by other variables not included in the model and R^2 (0.64) implies that the fitted regression equation explains about 64 percent of the variation in export earnings by Uganda.

4.4.3.2 Test for joint significance of the regression parameter coefficients

This test was carried out to establish a joint stability of the parameter coefficients for the entire model system. It was performed by use of Wald test under the null hypothesis that the parameter coefficients of the independent variables are all equal and are equal to zero at 5 percent level of significance. The probability value of F-statistic (0.0164) which is substantially less than 0.05 indicates that the parameter coefficients in the model are jointly significant and therefore not equal to zero. Thus, the null hypothesis is rejected in favor of the alternative hypothesis.

Table 4.7 Wald test, for joint significance of the regression parameter coefficients

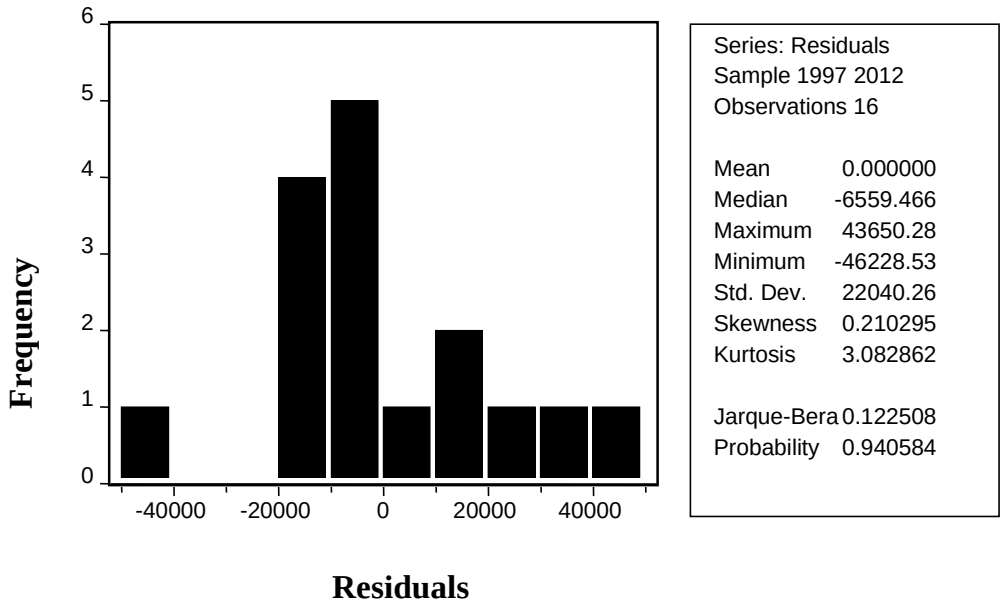
Equation: C(1) = C(2) = C(3) = C(4) = 0

F-statistic	4.889845	Probability	0.016388

4.4.3.3 Normality test of the residuals

This test was based on the Jarque-Bera test statistic. The test aimed at establishing whether the residuals are stable under the null hypothesis that the residuals are normally distributed against the alternative hypothesis that the residuals are not normally distributed, which is an essential condition for the robustness and reliability of the model. The result of Jarque-Bera (0.122508) with the probability value of 0.940584 in Figure 4.1, indicate that the residuals are normally distributed.

Figure 4.1 Normality test of the residuals



CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSIONS, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, discussion, conclusions, policy recommendations and suggested areas for further study. The study was set to carry out the analysis on the determinants of fish exports of Uganda for the period between year 1997 to year 2012.

5.2 Summary of the findings

In this study, it was revealed that, on average Uganda receives about 86,320,710 US dollars from fish export each year and the minimum value ever received from fish exports by Uganda between year 1997 to year 2012 was 28,800,000 US dollars which was attained in year 1997 while the maximum value generated from fish exports by Uganda in the same period was discovered to be 1,724,300,000 US dollars, which was hit in year 2005. The standard deviation of 36,736,060 US dollars implies that there is a very high dispersion between average revenues generated from fish export in Uganda each year.

The empirical results from the model reveal that, Terms of Trade and GDP per capita have a great positive influence in explaining the variation in fish export earnings by Uganda, while Real Exchange Rate and Domestic Inflation Rate were proved to have a marginal influence in determining the variation in fish export earnings by Uganda. The results of the model further showed that about 50.92 percent (adjusted $R^2 = 0.509152$) in the variation of fish export earnings by Uganda is explained by Terms of Trade, GDP per capita, Real Exchange Rate and Domestic Inflation Rate and the probability of F-statistic (0.016399) which is substantially less than 0.05,

level of significance implies that, the model was well specified and therefore the results of this model can be reliable.

The results from a correlation matrix indicate a moderate association between Real Exchange Rate and fish exports, a slight relationship between GDP per capita and fish exports, a moderate relationship between Domestic Inflation Rate and fish exports and a negative correlation between Terms of Trade and fish exports.

5.3 Discussion of findings

5.3.1 Terms of Trade and fish exports

The result in the model indicated a negative and significant relationship between fish export earnings and Terms of Trade, thus implying that an increase in Terms of Trade ratio negatively impacts on the performance of Uganda's exports. This result, agrees with the findings of Musinguzi and Obwona (2000), who found out that Terms of Trade had a negative marginal but statistically significant effect on export earnings and the findings also conform with the findings by Svedberg (1990), which revealed that in the 1990's, unfavorable terms of trade in Sub Saharan Africa negatively impacted on exports. However the results are not consistent with the findings by Kasekende and Atingi-Ego (1999) who found that a rise in terms of trade resulted into a proportionate rise in Uganda's exports. Jayant Parimal (2006) also associated deteriorating terms of trade with contraction of export earnings. He cited an example of Burundi which is dependent on coffee and tea to an extent of 87%. When its coffee and tea prices fell by 37% and 20% respectively, its annual exports fell from $154 million to $90 million. In Uganda Kasekende and Atingi-Ego (1999) using an export model on world market prices for exports proxied by terms of trade found out that 1% rise in terms of trade results in a 1.82% rise in Uganda's

exports. Basically their model suggests that the short run exports are being driven by changes in terms of trade. Therefore, the null hypothesis that, TOT has no significant impact on fish export is rejected in favor of the alternative hypothesis.

5.3.2 Gross Domestic Product per capita and fish exports

Evidence from the result of the model indicate a positive and significant relationship between GDP per capita and fish exports, implying that an increase in GDP per capita increases fish export earnings in Uganda. This result agrees with findings of Nyombi and Bolwig (2004) who discovered that increase in population and per capita income substantially increases total demand for fish in Uganda as well as the findings of Delgado et al (2003) which reveal that across countries, per capita fish consumption is significantly correlated with average per capita national income. Sharma (2001) discovered that Gross Domestic Product (GDP) has a positive impact on exports and that the effect of GDP growth on exports is highly significant with positive sign. However, the results by Niringiye (2009), disagrees with Sharma arguing that in Uganda whereas, the overall agriculture and its subsectors such as food crops, livestock and forestry's share in GDP falls as GDP per capita rises the fishing sector share in GDP does not exhibit a significant relationship with per capita income. Delgado et al (2003) discovered that across countries, per capita fish consumption is significantly correlated with average per capita national income. They quoted Consumer theory which suggests that as individuals become wealthier, they tend to substitute higher-priced calories for lower-priced ones, once basic food needs are met. They added that the demand for fish products at the household level, as well as at the national level, are quite responsive to changes in income, furthermore, Arsson (2007) while studying the relationship between growth in the fishing industry and total GDP of the Icelandic economy revealed a rather stable relationship. On the other hand, the findings disagree with the

findings of Sharma (2001) who found out that, as GDP per capita rises the fishing sector share in GDP does not exhibit a significant relationship with per capita income

5.3.3 Real exchange rate and fish exports

The result in the model reveals a negative and insignificant relationship between Real Exchange Rate and fish exports. Thus, indicating that, an increase in real exchange rate (Ugandan shillings) against 1 US dollar leads to a reduction in fish export earnings of Uganda. This result, somewhat agrees and disagrees with the findings of Kihangire (2005) whose empirical evidence suggested a negative and significant correlation between Uganda's fish exports and exchange rate volatility respectively. The result also agrees with Goldstein and Khan (1978) whose study on the demand and supply of fish exports discovered that fish export volumes are negatively and significantly correlated with real exchange rate as well as Nimrod (2008), also agrees with the result by postulating that the demand for a country's fish exports increases when its export prices fall in relation to the world prices while Bagumire (2009) discovered both positive and negative effects of fluctuating foreign exchange rates on the fishing company revenues. Furthermore, Atingi-Ego (1999) found no significant relationship between real exchange rate and export Volumes. Helleiner (2002) discovered that a competitive real exchange rate is associated with non-traditional exports success, while conducting a time series study on Non Traditional Exports (NTEs) he found a statistically significant relationship between real devaluation and export growth of nontraditional exports. Elbadawi (1997) found out that while the levels of the Real Effective Exchange Rate (REER) do not significantly explain export performance, indices of competitiveness do. He argues that so long as countries avoid over-valuation, then a "correctly" valued RER or one that is under-valued could encourage export performance. In Kenya, Mwega (1993) finds that the level of the real exchange rate does not explain the performance in non-

traditional exports, which is consistent with the results in a much wider study by Elbadawi (1997), however both authors point out that undervaluation has positively influenced non-traditional exports. Ricardo and Vittorio (1989) revealed that the theory alone may not determine the sign of the relationship between real exchange rate and exports. In Uganda Kasekende and Atingi-Ego (1999) using an export model on Real exchange rates and world market prices for exports found out that a 1% devaluation of real exchange rate leads to a 0.17% rise in Uganda's exports however their result is not in line with the findings of this study.

5.3.4 Domestic inflation rate and fish exports

The findings in the model showed a negative correlation between domestic inflation and fish export earnings by Uganda. Implying that, an increase in domestic inflation rate leads to a reduction in fish export earnings by Uganda. This result is in consistence with the findings of Laure (2009), while analyzing the changing global markets for fish, discovered that, increase in domestic inflation rate leads to higher prices of fish exports hence a decrease in fish export earnings as foreign consumers substitute imported fish in favor of lower-priced alternative fish products produced within their own country or imported from elsewhere, also the findings are in line with Thorvaldur (1998), who observed that inflation is inversely correlated with real export earnings as long as nominal exchange rates do not adjust instantaneously to prices of exports and John Sender (2009) also discovered that increases in domestic inflation lead to higher prices for exported goods and a decrease in exports as foreign consumers substitute in favor of lower-priced alternatives produced within their own country or imported from elsewhere and finally the result by OECD (1981), in their economic survey report on Iceland' fish exports revealed that inflation both significantly and inversely influences the level of fish exports and this result conforms to the findings of the study.

5.4 Conclusions of the study

This research sought to empirically explore the correlation between fish export earnings and Terms of trade, GDP per capita, Real Exchange Rate and Domestic inflation rate using the annual time series data for the period 1997 to 2012. The findings from the study evidently indicate that Terms of trade and GDP per capita have a greater negative and positive impact respectively on the performance of Uganda's fish exports. It can therefore be concluded that if Terms of Trade are kept at minimum and GDP per capita persistently improved it leads to increase in Uganda's fish exports. This conclusion is in concurrence with the conclusions made by Musinguzi et al (2000) and Delgado et al (2003) who found Terms of trade and GDP per capita respectively, to have a significant impact in determining fish export earnings. Therefore maintaining favorable Terms of trade and high GDP per capita is essential for the growth of fish export earnings.

Evidence further proved that Real Exchange Rate and Domestic Inflation Rate acts in the opposite direction with regard to growth in fish export earnings that is, an increase in real exchange rate and domestic inflation rate have got negative impact on the growth in fish export earnings by Uganda. Kihangire (2005) and Laure (2009), observed the same result in their studies about the relationship between fish export, real exchange rate and domestic inflation rate respectively.

5.5 Policy Recommendations

Basing on the findings of this study, there is need for a sustained commitment by the government to the designing and implementation of sound macroeconomic and structural adjustment policies in line with outward looking strategy that foster fish production and exports. The emphasis of the policy should focus on the following areas:

The government should aim to strengthen favorable terms of trade by reducing on trade restrictions like fish export duties, and should also negotiate with the trading partners to weaken on their trade restrictions imposed on Uganda's fish exports like quotas and trade embargos, so as to allow Ugandan fish exports to compete freely in the international markets. Much as the terms of trade used in this analysis indicated a significant effect on fish export earnings in Uganda, these are overall reflection of the terms of trade but not the real terms of trade like quotas and trade embargos involved in international trade.

Evidence from the study clearly shows a positive significant relationship between GDP per capita and earnings from fish exports Therefore there is need for the government to sustainably fight poverty among its citizens by supporting them in income generating activities so as to boost GDP per capita in the country. This is because high GDP per capita leads to high domestic demand for fish which results in less export of fish, this in turn leads to high demand of fish from the international markets and consequently high prices of fish and earnings from fish exports.

The study findings indicate a negative insignificant relationship between Real Exchange Rate and fish export. Much as the impact is not significant, there is need for the government to ensure a stable exchange rate by striking a balance in the circulation of both local currency and foreign currency into the public. This will help to avoid loses encountered as a result of exchange rate volatility and will not encourage fish exports but it will also encourage foreign investors who will be able to invest in fish production in Uganda.

Since evidence has shown that domestic inflation rate reduces demand for fish exports, the government should device monetary policies to help control domestic inflation for instance, by

controlling the amount of money circulation into the public and also to boost fish production in the country, this will make the Ugandan fish exports cheaper in the international markets.

Finally, the government should device strong policies and laws for instance by imposing tough charges on wetland pollution. This will help to protect wetlands which act as breeding grounds for fish species which in turn, will boost fish production in the country. Much as this study focused on secondary factors affecting fish exports in Uganda, it is crucial to first tackle the primary factors affecting fish production, this will eventually strenthen the secondary factors analyzed.

5.6 Suggested areas for further research

1. There is need to carry out an in depth study on how the primary factors such as pollution of water, indiscriminate fishing and over fishing, affect fish production in Uganda.
2. The impact trade restrictions such as trade embargoes and quarters and taxes on trade such as export and import duties on fish exports.
3. The impact of trade liberalization on fish exports.

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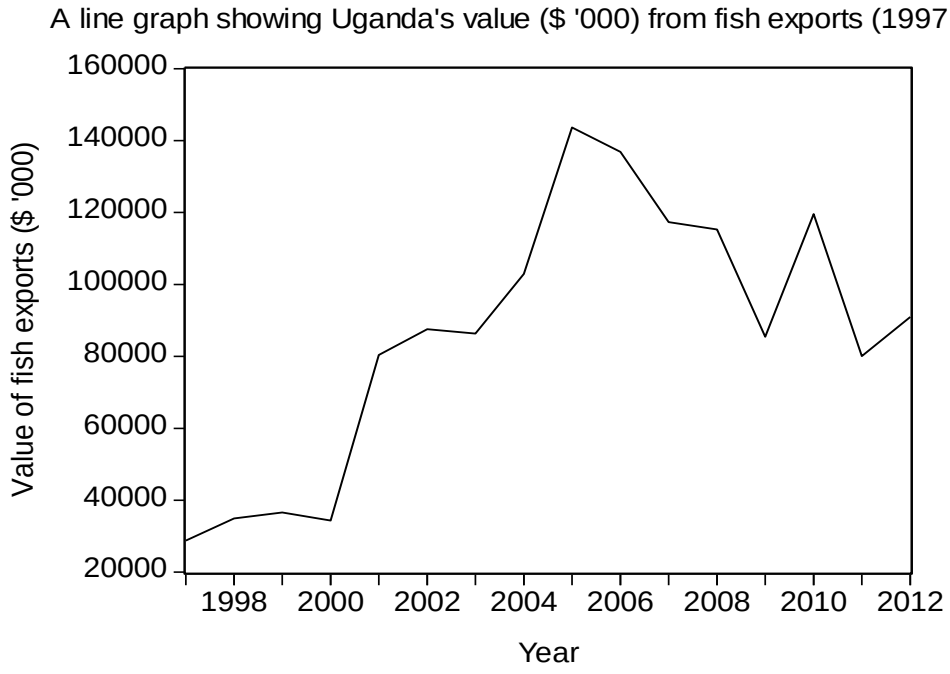
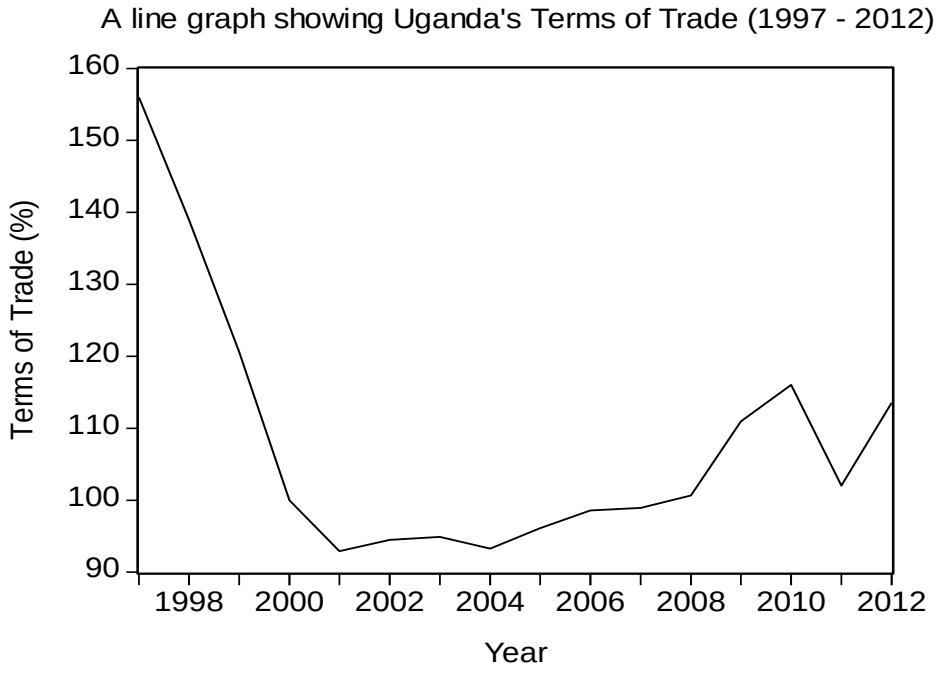
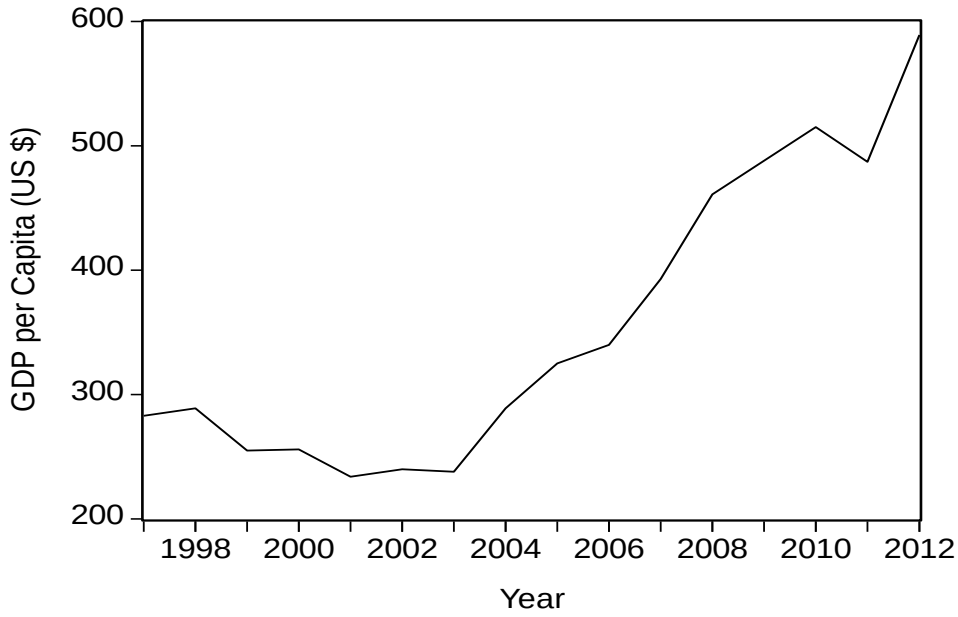
APPENDICES

Appendix (i): Plot of each single data series

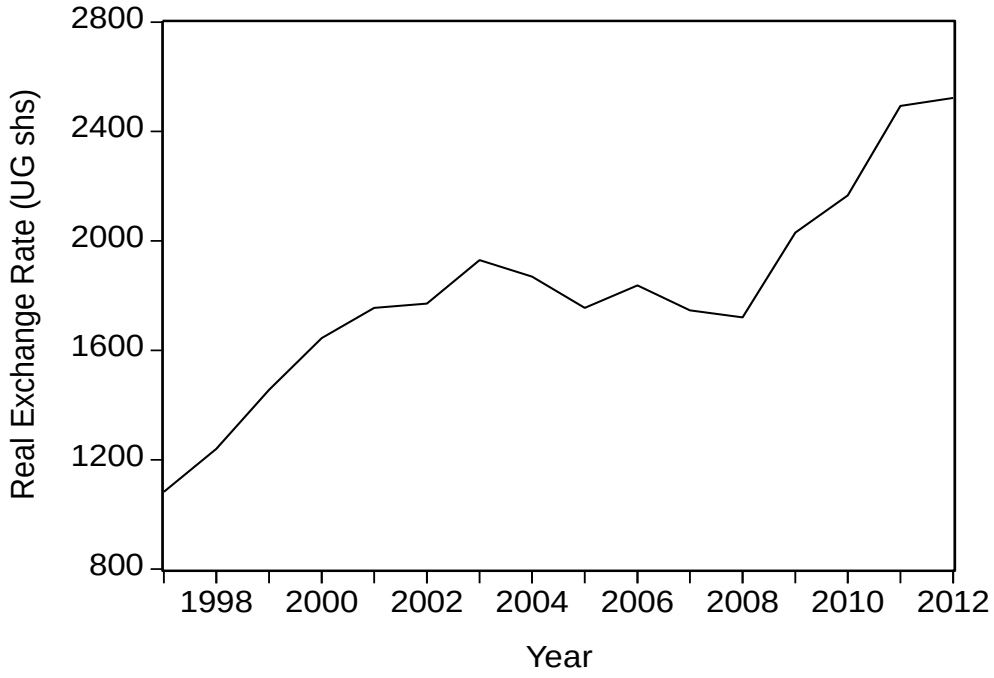


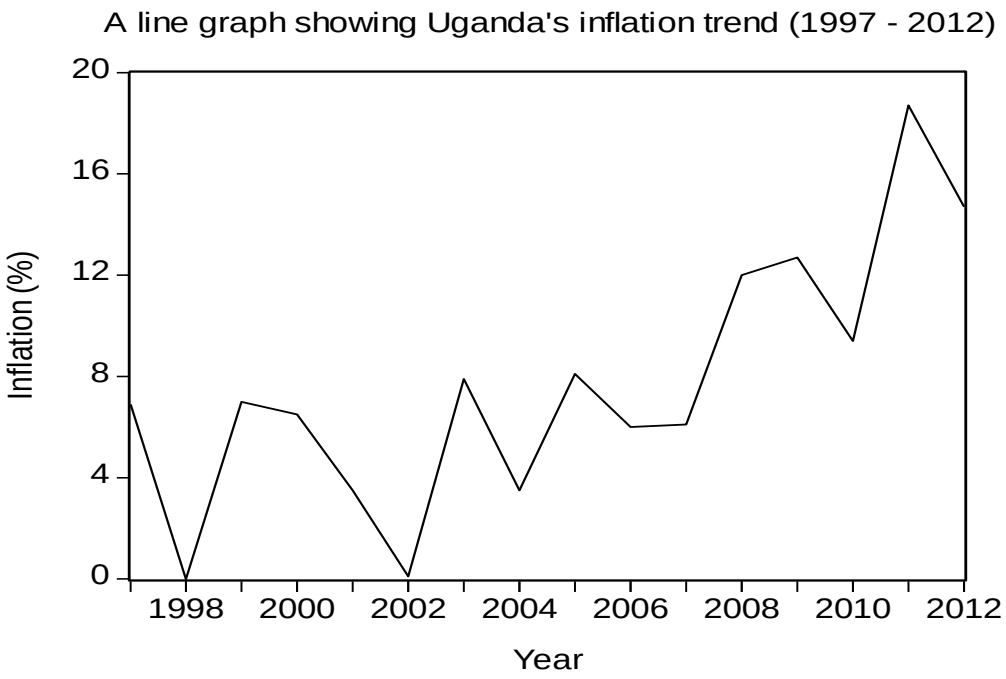


A line graph showing Uganda's GDP per Capita (1997 - 2012)



A line graph showing Uganda's Real Exchenge rate (1997 - 2012)




A line graph showing Uganda's inflation trend (1997 - 2012)
Inflation (%)
20
16
12
8
4
0
1998
2000
2002
2004
2006
2008
2010
2012
Year

Data set used in the analysis

Year	Export Volume (Metric tons)	Export Value ($ '000)	Terms of Trade	Domestic inflation	Exchange rate	GDP Per Capita
1997	9839	28800	156	6.9	1083.01	283
1998	13805	34921	139	0.0	1240.22	289
1999	13380	36608	120.62	7.0	1455.59	255
2000	15876	34363	100	6.5	1644.47	256
2001	28672	80398	92.91	3.5	1755.66	234
2002	25169	87574	94.49	0.1	1770.57	240
2003	25111	86343	94.91	7.9	1930.03	238
2004	30057	102917	93.27	3.5	1869.35	289
2005	39201	143618	96.13	8.1	1755.5	325
2006	32855	136851	98.58	6.0	1837.27	340
2007	28394	117364	98.93	6.1	1746.08	393
2008	23430	115306	100.66	12.0	1720.44	461
2009	17346.7	85436.3	110.96	12.7	2030.49	488
2010	23967	119600	116.04	9.4	2166	515
2011	18,472	80,050.01	102.03	18.7	2,493.40	487
2012	15,500	90,982	113.55	14.7	2,522.80	589

Sources: DFR, MoFPED, UBOS