ANALYSIS OF IMPORT DEMAND ELASTICITIES FOR KENYA: 1970 to 2013

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DECLARATION

This project is my original work and has not been presented for award of a degree in any other University.

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DEDICATION

This research work is dedicated to Thomas Kamau my father, Eunice Nyawira my mother, John Peter Muriuki my uncle and my lovely husband Fredrick Kinyua for their inspiration.
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Much appreciation goes to the Maker for answering my prayers and granting me countless blessings.
ABSTRACT

There was continued increase in imports volume and shrinking of exports. Due to government preoccupation with mobilizing external financial assistance, debt increased tremendously. The problem of growing population in Kenya, heavy importing and borrowing has led to current account deficit. Information on import demand elasticities was key to informing the tax policies that were to guide the taxation of imports and deciding optimal imports. The specific objective of the study were to estimate price elasticity of demand for imports, income elasticity of demand for imports and foreign exchange reserve elasticity of demand for imports. The study analyzed the import demand elasticities using time series data from 1970 to 2013. Secondary data was used in the study. Data was collected from Central Bank of Kenya and Kenya National Bureau of Statistics documents. A multiplicative import demand function was estimated from which import elasticities were determined. The results show that income, relative price and foreign exchange reserve affect imports value. Long run elasticities were estimated and the coefficients of the variables were statistically significant expect for relative price. All the long run elasticities were found to be inelastic. Value of imports, relative price, income and foreign exchange reserve were cointegrated in long run. The Kenya Revenue Authority can increase revenue collection from import duties. This was because import income elasticity for Kenya in long run was inelastic implying that imports responds to income is less than proportional. Export promotion policies should be encouraged as they increase foreign exchange reserves. This is because the results show that import demand respond to foreign exchange reserve. Borrowing efforts should be discouraged given that foreign exchange reserves elasticity was inelastic. This would improve balance of payments due to reduction in debts. Government can utilize imports of the previous period to forecast levels of tax revenue and also determine import behavior. This was because the lagged value of imports highly influences the demand of imports in Kenya.

Key words: Import demand elasticities, GDP
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ABBREVIATIONS AND ACRONYMS

ADF  Augmented Dickey Fuller
ARDL Autoregressive Distributed Lag
BOP  Balance of Payment
CBK  Central Bank of Kenya
CPI  Consumer Price Index
ECM  Error Correction Model
FDI  Foreign Direct Investment
GDP  Gross Domestic Product
GNP  Gross National Product
IMF  International Monetary Fund
KNBS Kenya National Bureau of Statistics
OECD Organization for Economic Cooperation and Development
OLS  Ordinary Least Square
SNA  System of National Accounts
SSA  Sub-Saharan Africa
VAR  Vector Autoregression
VECM Vector Error Correction Model

WTO  World Organization of Trade
OPERATIONAL DEFINITION OF TERMS

Import: Annual flow of goods and services from other countries in the world to Kenya

Import income elasticity: percentage change in the quantity demanded of imports due to a percentage change in income (proxied by real GDP)

Import price elasticity: percentage change in the quantity demanded of imports due to a percentage change in price of imports (proxied by relative price)

Foreign exchange reserve elasticity: percentage change in the quantity demanded of imports due to a percentage change in foreign exchange reserve

Gross Domestic Product: The total market value of all final goods and services produced in a country in a given year.

Exchange rate: Units of local currency per US dollar, adjusted for differential rates of inflation
CHAPTER ONE

INTRODUCTION

1.1 Background

Since 1980 Kenya has been faced with fluctuations in Gross Domestic Product growth rate, balance of payment deficit and inflation rate. There was a 9.3 percent rise in fiscal deficit in 1981 (Republic of Kenya, 1984). The current account deficit also reached 11 percent of GDP in 1981. The inflation rate measured by CPI increased to an average of 18 percent in 1983 (Republic of Kenya, 1984).

In 1990, International Monetary Fund (IMF) pushed the government to adopt an excessively demand management policy (Mwase, 1990). At the same period the economy fell into severe recession. In 2000, the IMF and World Bank offered loans to the country to prevent a severe economic crisis with GDP growth falling to 0.2 percent (Republic of Kenya, 1990). Before, liberalization regime, the World Bank and IMF were routinely forcing developing countries to devalue their domestic currencies as one of the measures of economic recovery (Mwase, 1990). These measures were undertaken without assessing whether or not conditions for successful devaluation existed in these countries.

In 1971, Kenya for example, made a decision to follow the U.S Dollar devaluation by letting the Kenya shilling to depreciate by 8 percent vis a vis Special Drawing Rights (Gulhati, 1986). However, inspite of these devaluations Kenya’s balance of payment position did not improve and imports continued with upward movement.
Balance of payments deteriorated and in 1994 it stood at ksh 5300 million. This was contributed by weakening of capital account due to decline in official capital inflows and increase in capital outflows (Republic of Kenya, 1995). The overall balance deteriorated further in 1999 to a surplus of ksh 4240 million due to decline in performance of capital and financial account (Republic of Kenya, 2000). It further deteriorated in 2013 to a surplus of ksh 73922 million. The continuous growth of imports volume has led to widening gap of balance of payments (Africa Development Bank, 2012).
Imports and GDP increased as depicted by the figure that follows.

Figure 1.2: Kenya’s value of Imports and GDP

The figure shows that there was a positive relationship between the value of imports and GDP. Imports contribute to the GDP as expenditure. This means that as expenditure on imports of goods and services increases, the GDP increases. In year 2013 both GDP and imports recorded the highest value of ksh 3,797,987 million and ksh 1,413,316 million respectively (Republic of Kenya, 2014). Due to increase in volume of imports, some local industry has closed and this has led to massive unemployment of youths. Liberalization of the Kenyan Economy in 1993 meant great competition from imported clothing (Republic of Kenya, 1995). There was increased importation of textiles especially second hand, “mitumba”. Nyang’or (1994) pointed out that these clothes were preferred to locally manufactured ones because of their high quality and low prices. Low sales and
financial difficulties experienced by the local producers led to closure of textile firms such as KICOMI, Allied Industries Limited and Heritage Woolen Mills.

Robert (2005) explained that a current account deficit implies an excess of imports over exports of goods, services, investment income and unilateral transfers. This leads to an increase in net foreign claims upon the importing nation. The importing nation becomes a net demander of funds from abroad, the demand being met through borrowing from other nations or liquidating foreign assets. The result is a worsening of the importing nation's net foreign investment position. The current account balance thus represents the bottom line on a nation's income statement. If it is positive, the nation is spending less than its total income and accumulating asset claims on the rest of the world. If it is negative, domestic expenditure exceeds income and the nation borrows from the rest of the world.

According to Osoro (2012), increase in the value of imports in most developing economies is largely due to the increase in prices of Petroleum; oil lubricants, fertilizers, and food grains.

The goals of Vision 2030 is to improve manufacturing by reducing imports in key local industries, growing market share in regional market and attracting atleast 10 large strategic investors in key agro-processing industries. Kenya is also aiming at strategically increasing the level of value addition in niche exports by additional processing of local agricultural products (Republic of Kenya, 2007). The main goal of Vision 2030 is to promote exports and reduce imports by promoting agro-processing. Despite the expected strong growth in exports of goods and non-factor
services, the external current account deficit widened gradually to 6.7 per cent of GDP in 2009, reflecting the strong increase in imports associated with increased foreign direct investment and higher disbursement of long term capital for investment spending. However, net capital inflows were expected to be more than offset the deficit in the current account thereby facilitating an overall balance of payments surplus. This was in turn to help the government further build up adequate foreign reserves to the equivalent of 4.7 months of import cover by 2012 which was a way to cushion the economy from external vulnerabilities including high oil prices and drought effects. This was an equivalent of 6 months import cover using the previous years import bill (Republic of Kenya, 2008).

The year 1997 was a turning point in Kenya’s trade balance when it recorded a deficit of US$ 885.9 million, thereafter there was a huge increase in trade deficit due to slow growth of export and fast growth in imports (Osoro, 2012). Kenya has reported a worrisome, deficit over decades, which means that large amounts of the Kenyan shilling leave the country. These outflows have driven the value of the Kenyan currency down, making it more costly to purchase imports. Policy reforms have had an impact on the balance of payment which affects the performance of the economy. Resumption of economic growth led to increase in imports than exports, contributed to further deterioration of Kenya’s trade deficit in 1995 and 1999. In 2000 it became worse as explained by the figure that follows.
The current account worsened. Earnings from merchandise exports declined while import bill increased in 2013. The trade deficit expanded as a result of marked increase in value of imports and a decrease in value of exports (Republic of Kenya, 2014).

With the new government in 2003 the economy started recovering and surplus in current account was recorded. From 2004 Kenya has run a current account deficit since then and in 2011 it recorded a deficit of KShs. 359,463 million (Osoro, 2012). This was contributed by higher oil prices which led to inflation increase. Exports stagnated and earnings from the exports were not enough to cover oil importation.

Imports are dominated by industrial supplies with a share of 36 percent of total imports in Kenya (Manitra, 2011). Machinery and capital formed 15 percent of
total imports while food and beverages constituted an average of 8 percent. Kenya is also having heavy imports of crude oil. Manufactured goods account for most of the imports from European Union, the United States and Japan. Tariffs have been the main trade policy instrument, however since Kenya became a member of World Trade Organization overall protection has been reduced (Manitra, 2011).

Exchange rate policy plays a key role in determining a country’s international competitiveness. If the real exchange rate depreciates, a country’s exports become more attractive to the rest of the world, while imports become relatively more expensive, thus favoring domestic production.

Foreign aid represents an important source of finance for many countries in sub-Saharan Africa (SSA), where it supplements low savings, narrow export earnings and thin tax bases. Most of African countries have been receiving foreign aid from the United States responds to African humanitarian crises. Organizations such as World Bank and IMF have been lending funds. Kenyan government has been seeking foreign assistance too.

With regard to international trade, foreign currency is often a necessary requirement to finance imports of goods and services. In this sense, foreign reserves play the role of an international liquidity constraint and any increase in reserves should thus have a positive impact on import demand (Arize and Osang, 2007).

Due to inability of export earnings to fully finance imports, the government has on many occasions turned to foreign financing. However, the availability of foreign
finance declined in 1980s due to sharp increases in interest rates (Mullei and Scaperlanda, 1986 and Khan and Montles, 1987). The external debt service payments have cut into export earnings thereby, exerting greater pressure on Kenya’s ability to import essential goods.

Information on elasticities is important in coming up with trade policies that are friendly. For developing countries in particular, estimates of secular elasticities are of practical importance for examining the effects of import price, income, foreign exchange reserve and foreign asset on demand for imports as well as for analyzing the welfare implications of the cross-sectional structure of trade. For instance, Grossman and Helpman (1994), in the endogenous trade policy context, predict that the industries with high import demand elasticities are given less protection since the deadweight loss from trade diversion in those industries is higher. This sort of welfare analysis depends on the information about these elasticities.

1.2 The Statement of the Problem

Imports help in increasing the utility of the consumer through raising the level and variety of goods and services consumed. Import demand elasticities are important for examining the effects of relative price, income and foreign exchange reserve on the value of imports. For foreign trade policy implementation, it is important to determine import and export demand elasticities. Elasticities are also essential in making policy decisions on optimal trade volume and making decisions on import policy.
In Kenya, appetite for imported goods is rising and market for exports is shrinking. There has been a bulky import of machinery and equipment for investment and consumable goods. In the local markets, the imported goods are cheaper compared to the locally processed goods (Manitra, 2011). Kenya’s growing population places demand on imported goods and services. Therefore, population growth, infrastructural improvement and manufacturing activities lead to increased volume of imports. The government has to make prudent decisions about the volume of imports as envisaged in Kenya’s Vision 2030 (Republic of Kenya, 2007). This can only be done if there is availability of information on import demand elasticities.

Unavailability of import demand elasticities information is dangerous to the economy and especially to policy makers. It means optimal import demand decisions cannot to be determined. Foreign exchange reserves also determine imports demands (Mwega, 1993).

The purpose of the study was to estimate an import demand function from which import demand elasticities are to be derived.

1.3 Research Questions

i. What is the price elasticity of demand for imports?

ii. What is the income elasticity of demand for imports?

iii. What is the foreign exchange reserve elasticity of demand for imports?
1.4 Objectives of the Study

The general objective of the study was to estimate and analyze import demand elasticities for Kenya.

The specific objectives were to estimate:

i. Price elasticity of demand for imports

ii. Income elasticity of demand for imports

iii. Foreign exchange reserve elasticity of demand for imports.

1.5 Significance of Study

To achieve efficient policy formulation, it is necessary for the policy makers such as government and Central Bank to have knowledge of not only the signs, but also the magnitude and stability of the response of the relevant variables that are required for policy decision making. The derived estimates are to be used not only as an analytical tool in decision making, but also as an instrument for economic forecasting of demand for imports.

The estimation results are to be used to assist the Kenya Revenue Authority and the Treasury in forecasting the level of tax revenue from import sources, as knowledge of the behaviour of imports will inform the behaviour of import tax revenue. The study also provided a basis for the formulation of international trade policy coordination in Kenya for both bilateral and multilateral trade relations, as well as useful input for macroeconomic modelling of the Kenyan economy. The study was also to add to literature and used for policy formulation.
1.6 Scope and limitation of the Study

The study focused on estimating and analyzing import demand elasticities for Kenya. The study covered a period of forty four years from 1970 to 2013.

Data on foreign exchange reserve and foreign asset were not readily available for periods before 1970 hence the period of the study was 1970 to 2013.

1.7 The organization of the study

The study is organized into five chapters. Chapter one contains introduction, statement of the problem, research questions, objectives of the study, significance of the study, scope and limitation of the study. Chapter two presents literature review both theoretical and empirical and overview of the literature review. Chapter three focuses on methodology which includes the research design, theoretical framework, model specification, definition and measurement of variables, data type and sources and data analysis. Chapter four contains data analysis and interpretation of the results. Chapter five focuses on summary, conclusion and policy implications of the study.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter contains theoretical literature which links the study with the existing theories. It has empirical literature review which portrays linkage between literature review and objectives of the study and research questions. It indicates related work done by other researchers and the knowledge gap. Finally there is overview of the literature in which the knowledge gap is identified.

2.2 Theoretical literature

The international trade literature suggests three major theories of the import demand: The Mercantilism, the new trade theory (also known as the imperfect competition theory of trade) (Hong, 1999) and the Neoclassical Trade Theory

2.2.1 Mercantilism

The view of mercantilism was to maximise net exports and it was the best route to national prosperity. In Mercantilism the idea that the only true measure of a country’s wealth and success was the amount of gold that it had. If one country had more gold than another, it was necessarily better off. This idea had important consequences for economic policy. The best way of ensuring a country’s prosperity was to make few imports and many exports, thereby generating a net inflow of foreign exchange and maximising the country’s gold stocks (Robert, 2005).
It was the dominant economic doctrine for more than three centuries (16th - 18th), mostly associated with the colonization era. It was often dubbed economic nationalism where the efforts to boost exports were backed by a powerful state protecting domestic monopolies (such as the British East India Company). It was a way nation-states were competing with each other. The nation which had more gold had more wealth and it could raise a stronger army, and thus be more powerful. The role of colonies was crucial in this power struggle, as they were the source of precious metals and raw materials, and on the other hand the recipients of exported goods (Robert, 2005).

Mercantilism was characterized by a triangular trade system, where European countries were exporting manufacturing goods and textiles to Africa and America, America was sending raw materials to Europe, while Africa was sending slaves to America. After all, during the period of mercantilist dominance, the living standards of the population were still miserable, not much better than during the hunter-gatherer times (Robert, 2005).

A big part of the mercantilist doctrine was protectionism. More precisely protectionism of business interests against any forms of competition. Governments applied many forms of different protectionist policies, from guild rules and taxes, tariffs and quotas, prohibitions of imports to big state-run monopolies. It provided capital to exporting industries and even prohibited exports of tools (technology) and skilled labour that would allow foreigners to produce the same goods the home country is producing (Robert, 2005).
2.2.2 The Neoclassical Trade Theory

In the neoclassical trade theory of comparative advantage, as characterized by the Heckscher-Ohlin framework extended from the classic Ricardian theory, the focus is on how international trade, its volume and direction, is affected by world prices and domestic prices, which in turn are explained by the differences in factor endowments between countries. The effects of changes in income on trade is not the concern; the level of employment is assumed to be fixed and output is assumed to be always on a given production frontier (Ethier, 1983).

While the neoclassic import demand function which estimate both prices and income elasticities is based on the assumed neoclassical microeconomic consumer behavior and general equilibrium framework, as distinguished from the neoclassical comparative advantage analysis, relative prices are assumed to be rigid and employment is variable (Dixit and Norman, 1980). Further, international capital movements are not assumed away and they are passively adjusted as required by the trade balance. So, this theory focuses on the relationship between income and import demand at the aggregate level and in the short term. The relationship can be defined by a few ratios, such as the average propensity to import, the marginal propensity to import which describes responsiveness of import volumes and the income elasticity of imports. Competition theory of trade, the latest school in trade theory, and the intra-industry trade, which is not explained well by the theory of comparative advantage. The analytical framework of this theory depends on specific assumptions about the market structure that give rise to increasing returns. Details can be found in (Dixit and Norman, 1980),
(Helpman, 1981), (Grossman, 1992) and (Krugman, 1987). By applying the general equilibrium framework to the global economy, the analytical form of the neoclassical import demand function is defined as follows (Dixit and Norman, 1980).

\[ M(P) = D(P, E(P,u)) - S(P) \]  \hspace{1cm} 2.1

Where \( M \) is the real demand for imports, \( P \) is the relative price of imports both import price index and consumer price index. \( D \) is the total demand for importable goods, derived from the optimal consumer assumption, \( E \) is expenditure at the given relative price \( P \) and the given utility level \( u \), \( S \) is the domestic supply of importable goods. The elasticity form is as follows:

\[ e = c - s - m \]  \hspace{1cm} 2.2

Where \( e \) is the elasticity of import demand, \( c \) is the demand substitution elasticity, \( s \) is the supply substitution elasticity and \( m \) is the marginal propensity to import.

By the same token, one can also define the import price elasticity of the foreign country as \( e^* \). The summation of the absolute value of both \( e \) and \( e^* \) plays an important role in international trade policy analyses. For example, \(|e| + |e^*| > 1\), which is the Marshall-Lerner condition, defines a condition for the stability of international trade equilibrium (Dixit and Norman, 1980).

### 2.2.3 The New Trade Theory

The new trade theory explains the effects of economies of scales, product differentiation, and monopolistic competition on international trade. There are three approaches that are usually used in defining the imperfect competitive
market effects on international trade: Marshallian, Chamberlinian, and Cournot approaches. The Marshallian approach assumes constant returns at the firms level but increasing returns at the industry level, the Chamberlinian approach on the other hand assumes that an industry consists of many monopolistic firms and new firms are able to enter the market and differentiate their products from existing firms so that any monopoly profit at the industry level can be eliminated (Dixit and Norman, 1980). The Cournot approach assumes a market with only a few imperfectly competitive firms where each takes each other's outputs as given. With any one of these three market structures, an opening of international trade will lead to a larger market size, decreasing costs and more output and trade the volume of imports will increase (Dixit and Norman, 1980). Hence the new trade theory suggests a new link between trade and income as the role of income in determining imports goes beyond that defined in the neoclassic import demand functions, where income only affects purchasing power.

2.3 Empirical Literature
Moazzami and Wong (1988) estimated aggregate import demand function for China. The study used partial adjustment model with 17 annual observations from 1970 to 1986. Relative price and disaggregated GDP which included: exports, real investment, real private and public consumption and real disposable income. Autoregressive Distributed Lag Model was used to derive long run and short run coefficients. The study results showed that the relative price had negative effects and macroeconomic variables had positive effects to trade volume. Domestic macroeconomic variables such as GDP, disposable income, aggregate investment
and aggregate exports appear to be important determinants of the relevant types of import demand in the long run and short run. The long-run elasticities are found to be elastic. The current study will utilize aggregated real GDP rather than disaggregated GDP. One key conclusion is that high dependency on investment to promote economic growth may lead to consequent deterioration on balance of trade. This is what is happening in Kenya (Republic of Kenya, 2013).

Mwega (1993) estimated demand elasticities for aggregate imports and component in Kenya over 1964-91. An error correction model was utilized to estimate elasticities. Mwega (1993) showed that short-run relative price and real aggregate import demand elasticities were weakly significant. Mwega (1993) used an error correction model and CHOW test to estimate the elasticities for aggregate import and its components, and testing for stability of import demand during trade liberalization in Kenya for the period 1964-1991. Conversely, aggregate imports were strongly responsive to lagged foreign assets and foreign receipts. The CHOW test revealed the stability of the function.

Dutta and Ahmed (1997) studied Bangladesh import performance and used quarterly data for the period 1974-1994. They applied cointegration and error correcting modeling approaches and found unique equilibrium relationship exists among the real quantity of imports, real import prices, real GDP, foreign aid and real foreign exchange reserves. The study utilized additional variables which were major determinants of imports in developing countries which were foreign exchange reserve and foreign aid disbursed. Estimated price elasticities had the correct negative sign and they were statistically significant. For the income
elasticities, the significant positive sign was estimated and they were also significant. The study will be relevant to current study as foreign aid and foreign exchange reserve were present in Bangladesh study.

Sinha (1997) estimated an aggregate import demand function for Thailand using annual data for the period, 1953-90. The study had used the traditional variables relative price and real GDP. The study had utilized the current time series analysis, cointegration approach, Johansen Jeselius. The study showed that aggregate import demand for Thailand was price inelastic, cross price inelastic (with respect to domestic price) and income inelastic in the short-run. In the long-run, aggregate import demand was still price inelastic and cross price inelastic. However, aggregate import demand was highly income elastic in the long run. The study was relevant as the country experiences current account deficit and had high importation of capital goods and oils same as Kenya.

Egwaikhide (1999) estimated import demand using an error correction specification for an import demand model for Nigeria and indicated that foreign exchange earnings, relative prices and real income all significantly determined the behavior of total imports in the reference period. The study aim was to determine the effects of various trade reforms particularly the liberalization policy since the mid-1980s on the import demand behavior of Nigeria. Findings also show that short-run import decisions are determined by the dynamics of foreign exchange, which are tied to the long-run effect through the feedback mechanism. The results of the disaggregated imports reveal the importance of foreign exchange. The literature is relevant to the current study as Nigeria is also a developing country
and had similar Structural Adjustment Programme which was inspired by IMF and World Bank such as in Kenya.

Kotan and Saygili (1999) estimated an import demand function for Turkey. The main aim of the study was to assess Turkish import developments of domestic income, exchange rate and foreign exchange movements. This study incorporated two different model specifications to estimate an import demand function for Turkey. The estimation performance of the two models was compared and contrasted for the period 1987Q1-1999Q1 by using quarterly data. The significance of variables that affect import demand were individually and jointly tested. Also, the short run elasticities of the two models are compared. The first model estimated imports using Engle Granger found that in the long run, income level, nominal depreciation rate, inflation rate and international reserves significantly affect imports. The second approach modelled import demand using the Bernanke-Sims structural VAR method. The findings indicated that anticipated changes in the real depreciation rate and unanticipated changes in the income growth and real depreciation rate. The Turkey study assisted in comparing the results of Engle Granger approach, Bernanke-Sims structural VAR method and Johansen approach. Engle Granger approach this approach has its own shortcoming compared Johansen Jeselius. In the study for Turkey Inflation rate was determined in the model. In the current study relative price which is a ratio of import price index and consumer price index is used.
Previous studies done low import price elasticities were portrayed using ordinary least square method or fixed effect method. Industries producing homogeneous products price elasticities were higher than in those producing differentiated ones. In long run average price elasticities were higher than one and close to zero in short run. A study in Malaysia estimated the long-term relationship between import demand, and its determinants, namely income and relative prices, a robust estimation method known as the Unrestricted Error Correction Model Bounds Test Analysis was used (Cheong and Nair, 2002). The results showed that import volume, income and relative prices were cointegrated. The estimated long run elasticities of import demand with respect to income and relative prices were 1.5 and -1.3 respectively. This implied that monetary, fiscal and exchange rate policies could be used as instruments to maintain favorable trade balance.

Musyoka (2010) estimated compensated and uncompensated elasticities. The study used import demand function for cereals. Three estimators were utilized in estimation of elasticities which were Ordinary Least Square, Instrument Variable and Seemingly Unrelated Regression Equations. The conclusion was that uncompensated elasticities were bigger in magnitude than the compensated elasticities. The study recommended removal of the tariff rate and alternative ways of improving domestic wheat production rather than import restrictions. This study was conducted in Kenya and it relates to current study as it estimated elasticities of cereal imports.

Harvey and Sedegah (2011) studied import demand in Ghana, its structure, behavior and stability using time series data from 1967 to 2004. Variables such as
imports volume, Openness Trade Index, and foreign assets have been used in the study. Cointegration and error correction models had been used to estimate the model. Aggregated and disaggregated imports demand functions are estimated. The results of the study indicated that domestic income, foreign exchange reserves and trade liberalization played a significant role both in the long run and short run imports demand levels in Ghana. There was also parameter stability in import demand function in the period under the study. The aim of the trade policies authority was to reduce imports to correct balance of payment deficits in the long run. The current study uses similar variables used by Harvey and Sedegah, 2011.

2.4 Over view of the literature review.

The three theories that is the neoclassic trade theory, the Mercantilism, and the new trade theory assume that in a market economy, import demand can be fully modeled by income and relative prices. All other factors can be theoretically sub-modeled within these two factors (Tang, 2003).

In most studies the traditional variables are used that is real GDP and relative prices except for Turkey study. Other variables such as Foreign Aid, Foreign exchange reserves, international reserves, nominal depreciation rate have been included in the various studies under review. Imports volume has been widely used as the dependent variable.

In various study time analysis have used. Cointegration approaches such as Engle Granger, Johansen approach have been used to test cointegration among the variables. An error correction has been used to determine short run dynamics.
Many studies have been conducted by the researchers and the results show that in short run price elasticity is inelastic in long run price elasticities are elastic. Various studies have shown that Real GDP has positive effect to imports volume and relative price has negative effects to trade volume. In developing countries under review foreign exchange is a major determinant of imports. Also foreign aid variable is a major determinant of trade volumes. Parameters in most studies are stable in period under the studies.

In the current studies various elasticities of imports were determined which include income, price and foreign exchange reserve. Most studies have determined only income and price elasticities
CHAPTER THREE

METHODOLOGY

3.1 Introduction
The chapter contains research design, theoretical framework, definitions and measurement of variables, estimating model, data types, source and data analysis.

3.2 Research design
The research design which was adopted in the study was descriptive. The study specifically adopted a non-experimental time series research design. Time series data was collected for the period 1970-2013. The data was subjected to time series properties tests. Correlation analysis was also done to determine the relationship between independent variables. Cointegration analysis was done as it allowed non-stationary data to be used so that spurious results are avoided. Ordinary Least Squares estimation was done to determine the import demand elasticities.

3.3 Theoretical Framework
Neoclassical theory of comparative advantage characterized by the Heckscher-Ohlin theory was adopted. It explains how international trade is affected by volume of imports and relative prices due to difference in factor endowment between the countries. Neoclassical import demand function was adopted to estimate elasticities of import demand. It was based on neoclassical microeconomic consumer behavior. Microeconomic consumer behavior was used to identify the relevant variables of the import demand, function as derived from the utility maximization model (Varian, 2009).
Assuming maximization of utility of two goods $X_1$ and $X_2$. Importer will to maximize the following general utility function.

$$\text{Max } u = (X_1 X_2) \text{ ..................................3.1}$$

Subject to

$$P_1 X_1 + P_2 X_2 = Y \text{ ..................................3.2}$$

$U =$ utility

$X_1 =$ imports

$X_2 =$ other goods

$P_1 =$ price

$P_2 =$ price for other goods

From equation 3.1 and 3.2 lagrangian composite equation is;

$$L = X_1 X_2 - \lambda (P_1 X_1 + P_2 X_2 - Y) \text{ ..................3.3}$$

From equation 3.3 the first order condition for utility maximization is as follows:

$$\frac{\partial L}{\partial X_1} = X_2 - \lambda P_1 = 0 \text{ ..................................3.4}$$

$$\frac{\partial L}{\partial X_2} = X_1 - \lambda P_2 = 0 \text{ ..................................3.5}$$

$$\frac{\partial L}{\partial \lambda} = P_1 X_1 + P_2 X_2 - Y = 0 \text{ ....................3.6}$$

From the first order conditions, import demand function is derived

$$X_1 = \frac{Y}{2P_1} \text{ ..................................................3.7}$$
However, import does not only depend on price and income but also on other factors. The other factors include: foreign exchange reserve (Dutta and Ahmed, 1997). The following equation was therefore estimated:

\[ X_t = f(Y_t, P_t, FER_t) \]  \[ \text{3.8} \]

\[ \begin{align*}
P &= \text{Price} \\
Y &= \text{Income} \\
FER &= \text{Foreign Exchange Reserve}
\end{align*} \]

**3.4 Model Specification.**

To derive elasticities, it was appropriate to estimate a log-linear demand function of the following specification:

\[ M_t = (e)^{\beta_0(Y_t)^{\beta_1}((RP)_t)^{\beta_2}(FER_t)^{\beta_3}\varepsilon} \]  \[ \text{3.9} \]

\[ 
\begin{align*}
(M)_t &= \text{value of import for year } t \\
(Y)_t &= \text{real GDP for year } t \\
(RP)_t &= \text{relative import prices for year } t \\
(FER)_t &= \text{current foreign exchange reserves in year } t
\end{align*} \]

To linearize by taking the logarithm of the variables yield the following equation:

\[ \ln M_t = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln RP_t + \beta_3 \log FER_t + \varepsilon_t \]  \[ \text{3.10} \]
3.5 Definition and measurement of variables

Table 3.1 Definition and measurement of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Imports (M)</td>
<td>Annual value of goods and services flow from other countries in the world to Kenya.</td>
<td>Value of imports measured in Ksh.</td>
</tr>
<tr>
<td>Real Gross Domestic Product (Y)</td>
<td>This is a measure of economic output adjusted for price changes (is a proxy for income)</td>
<td>Nominal GDP deflated by GDP deflator.</td>
</tr>
<tr>
<td>Relative prices (RP)</td>
<td>Ratio of import price index and consumer price index</td>
<td>Real relative price.</td>
</tr>
<tr>
<td>Foreign exchange reserve (FER)</td>
<td>Foreign-exchange reserves are assets held by central banks and monetary authorities</td>
<td>Foreign exchange reserve will be measured in Ksh.</td>
</tr>
</tbody>
</table>

3.6 Data Type and Sources

Secondary data was collected for forty four years from 1970-2013. The data collected from the period was annual. The GDP for Kenya was collected from CBK annual reports while value of imports, foreign asset, foreign exchange reserve, import price index and consumer price index was collected from KNBS Economic Survey annual publications.

3.7 Stationarity

Time series data usually exhibit a non-stationary process and if OLS method is applied directly the results would be spurious. Because of this a test for stationarity was done. Unit root test on both dependent and independent variables in the model was conducted to evaluate their time series characteristics. The test was to ascertain number of times a variable has to be differenced to arrive at stationarity.
The basic logic here was to avoid the problem of spurious regression. For this purpose Augmented Dickey-Fuller (Dickey and Fuller, 1981) was employed to determine stationarity.

\[ \Delta y_t = \alpha y_{t-1} + \sum_{i=1}^{l} \beta \Delta y_{t-i} + \theta + \gamma_t + \epsilon_t \quad \text{for levels 3.11} \]

\[ \Delta \Delta y_t = \alpha y_{t-1} + \sum_{i=1}^{l} \beta \Delta \Delta y_{t-i} + \theta + \gamma_t + \epsilon_t \quad \text{for first difference 3.12} \]

Where: \( y \) is the variable whose stationarity is being examined, \( M \) is the number of lags and \( t \) represents time. If the null hypothesis is rejected then it means that the time series data is stationary.

### 3.8 Correlation analysis

Correlation was done to determine the relationship between the regressors that was, price, income and foreign exchange reserve. This was to help establish if there was a problem of multicollinearity or not. If the independent variables are strongly correlated one of them was removed to avoid biased estimated parameters.

### 3.9 Cointegration

Cointegration analysis allows non stationary data to be used so that spurious results are avoided. It establishes whether there is a long-run causal relationship between the dependent variable and the independent variables. The cointegration analysis was carried out within the Johansen (1992) framework using the maximum eigenvalue test and trace test. The Johansen approach is preferred.
because it offers the means to determine whether there is more than one cointegrating vector.

The Vector Autoregression (VAR) based cointegration test methodology by Johansen is described under a VAR of order p:

$$y_t = Ay_{t-1} + \ldots + A_p y_{t-p} + BZ_t + \mu_t$$  \hspace{1cm} (3.13)

Where $Y_t$ is a vector of non-stationary I(1) variables $Z_t$ is a vector of deterministic variables and $\mu_t$ is a vector of other variables not in the model. This test is robust to any departure from normality since it gives room for normalization with respect to any variable in the model that becomes the depended variable. If the Maximum Eigen value test and trace test confirm presence of cointegrating equation then there exists a long run relationship between the variables.

### 3.10 Data Analysis

The objectives of the study were attained by estimating a log linear import demand function as explained in section 3.10. Specification of a log linear form was preferable when estimating import demand function as the use of this form allowed the interpretation of the coefficients as elasticities. $\beta_1$ coefficient of $\ln Y_t$ was to measure income elasticity of demand for imports. $\beta_2$ coefficient of $\ln RP_t$ was to measure price elasticity of demand for imports. $\beta_3$ coefficient of $\ln FER_t$ were to measure foreign assets and foreign exchange reserve elasticities of demand for imports respectively.
CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter deals with the presentation and interpretation of empirical findings of the study. It focuses on descriptive statistics of each variable both dependent and independent variables. It also contains stationarity test results, correlation analysis results and cointegration results. The chapter also focuses on diagnostic test which include serial correlation, heteroscedasticity and functional form test. Normality test is also discussed in this chapter. Finally the chapter analyzes regression results and every elasticities is analyzed.

4.2 Descriptive statistic and normality test

The study has employed descriptive statistics and Jarque-Bera test to test for the normality in the variables. The results are as follows:

Table 4.1 Descriptive statistic and normality test

<table>
<thead>
<tr>
<th></th>
<th>Log of Value of imports</th>
<th>Log of real Gross Domestic Product</th>
<th>Log of Relative price</th>
<th>Log of Foreign asset</th>
<th>Foreign exchange reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>10.932</td>
<td>8.974</td>
<td>2.946</td>
<td>8.780</td>
<td>8.799</td>
</tr>
<tr>
<td>Minimum</td>
<td>8.058</td>
<td>7.852</td>
<td>2.104</td>
<td>6.820</td>
<td>7.006</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.817</td>
<td>0.471</td>
<td>0.802</td>
<td>1.924</td>
<td>1.923</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.014</td>
<td>-0.198</td>
<td>0.861</td>
<td>0.413</td>
<td>0.283</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.810</td>
<td>2.344</td>
<td>2.351</td>
<td>1.692</td>
<td>1.714</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>2.597</td>
<td>1.078</td>
<td>6.213</td>
<td>4.388</td>
<td>3.616</td>
</tr>
<tr>
<td>Probability</td>
<td>0.273</td>
<td>0.583</td>
<td>0.045</td>
<td>0.111</td>
<td>0.164</td>
</tr>
<tr>
<td>Observation</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
</tbody>
</table>

Source: Own calculations
Where log means Natural Logarithm

Table 4.2 above reveals that the Jarque-Bera statistic after logarithmic transformation of the variables is not significantly different from zero, thereby implying that all the variables are normally distributed at 5% significance level except log of relative price as the p value is 0.045 which was less than 0.05. The other descriptive statistics for the variables are summarized in table where the standard deviation for Log of Foreign asset is 1.923 suggesting that it was the most volatile variable among the data set over the entire duration under observation

4.3 Stationarity analysis results

To perform a stationarity test on the individual time series, evaluation on each of the variables for the presence of a unit root using the Augmented Dickey-Fuller (Dickey and Fuller, 1981) test. The test is based on the regression for both level and first difference. The following table shows results for unit root tests.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Calculated value</th>
<th>5% Critical value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>with intercept</td>
<td>with trend and intercept</td>
<td>none</td>
</tr>
<tr>
<td>Log M</td>
<td>-0.228</td>
<td>-2.789</td>
<td>5.081</td>
</tr>
<tr>
<td>Log Y</td>
<td>-0.943</td>
<td>-2.058</td>
<td>3.206</td>
</tr>
<tr>
<td>Log RP</td>
<td>-1.919</td>
<td>-2.111</td>
<td>-1.945</td>
</tr>
<tr>
<td>Dlog RP</td>
<td>-5.564</td>
<td>-5.548</td>
<td>-4.953</td>
</tr>
<tr>
<td>Log FER</td>
<td>0.007</td>
<td>-2.812</td>
<td>2.675</td>
</tr>
<tr>
<td>Dlog FER</td>
<td>-6.672</td>
<td>-6.703</td>
<td>-5.101</td>
</tr>
<tr>
<td>LAGM</td>
<td>0.023</td>
<td>-2.645</td>
<td>5.233</td>
</tr>
</tbody>
</table>

Source: Own calculations

Where:
Log M- Natural Logarithm of value of imports
D Log M- Differenced Natural Logarithm of value of imports
Log Y- Natural Logarithm of real Gross Domestic Product
D Log Y- Differenced Natural Logarithm of real Gross Domestic Product
Log RP- Natural Logarithm of Relative Price
D Log RP- Differenced Natural Logarithm of Relative Price
Log FER- Natural Logarithm of Foreign Exchange Reserve
D FER- Differenced Natural Logarithm of Foreign Exchange Reserve
LAGM- Lagged value of imports
D LAGM- Differenced Lagged value of imports

The ADF test was employed both with intercept, with intercept and trend and without intercept and trend. The decision criterion involved comparing the computed tau values with the MacKinnon (1999) critical values for the rejection of a hypothesis with a unit root. For tests at levels in table 4.2 the computed tau statistics are greater than the MacKinnon critical tau values, and thus null hypothesis was not rejected the null hypothesis that the time series data variables are non-stationary at levels. On the other hand, the computed tau statistics are less than the MacKinnon(1999) critical tau values at first difference and this means at first difference all variables are stationary.

This test further confirms that all the variables are non-stationary in levels at 5% significance level. The meaning of this is that, the time series data have a stochastic trend and do not revert to their respective means or long-run values after
a shock strikes and the distributions have no constant mean or variance. The non-stationary variables exhibit difference stationarity because they are integrated of order one \([I(1)]\) implying that they should be differenced once to attain stationarity. After the confirming that the order of integration is the same, test for Co-integration followed.

4.4 Correlation Analysis Results

Table 4.3 presents correlation coefficients for the variables

Table 4.3 Correlation Analysis Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Real Gross Domestic Product</th>
<th>Relative price</th>
<th>Foreign asset</th>
<th>Foreign exchange reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Gross Domestic Product</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative price</td>
<td>-0.232</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign asset</td>
<td>0.327</td>
<td>-0.449</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Foreign exchange reserve</td>
<td>0.316</td>
<td>-0.406</td>
<td>0.968</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Source: Own calculations

The correlation matrix was done to check for multicollinearity between the regressors: Real Gross Domestic Product, Relative price, Foreign asset and Foreign exchange reserve. From the correlation coefficients in Table 4.1 there is existence of multicollinearity in the equation between foreign exchange reserve
and Foreign asset. The procedure used to detect the presence and severity of multicollinearity by Koutsoyiannis (1977) was applied. The procedure involves regressing the dependent variable on each of the explanatory variables separately. The results obtained from regression are assessed on the basis of priori and statistical criteria. Regression which appeared to give the most plausible results was adopted. Foreign asset was dropped for the purpose of this study. Then there insertion of other additional variables and examine effects on individual coefficient, standard error and overall $R^2$. A new variable namely lagged imports value was introduced which improved overall $R^2$ and also Durbin Watson.

4.5 Cointegration Test Results

The time series variables exhibited a stochastic trend. So to investigate if there was any long-run relationship was necessary. This study then employed the Johansen cointegration test, which is to a greater extent more superior to the Engle and Granger two step procedure. The Vector Autoregression (VAR) based cointegration test methodology by Johansen is described under a VAR of order $p$. Basically the test also involved the Maximum Eigen test and the Trace statistics which are employed in the analysis. The results are presented in the table that follows.
Table 4.4 Johansen Cointegration Test Results

<table>
<thead>
<tr>
<th>Series: Log of Value of imports</th>
<th>Log of Real Gross Product</th>
<th>Log of Relative price</th>
<th>Log of Foreign exchange reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesized No. of C.E (s)</td>
<td>Eigenvalue</td>
<td>Trace Statistics</td>
<td>0.05 Critical value</td>
</tr>
<tr>
<td>None*</td>
<td>0.612</td>
<td>66.571</td>
<td>47.856</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.394</td>
<td>29.687</td>
<td>29.797</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.229</td>
<td>10.178</td>
<td>15.495</td>
</tr>
<tr>
<td>At most 3</td>
<td>0</td>
<td>0.021</td>
<td>3.841</td>
</tr>
</tbody>
</table>

Trace test indicates 1 cointegrating eqn(s) at 0.05 level
* denotes rejection of the hypothesis at 0.05 level
** Mackinnon-Haug-Michelis (1999) p-values

<table>
<thead>
<tr>
<th>Maximum Eigen Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesized No. of C.E (s)</td>
</tr>
<tr>
<td>None*</td>
</tr>
<tr>
<td>At most 1</td>
</tr>
<tr>
<td>At most 2</td>
</tr>
<tr>
<td>At most 3</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates 1 cointegrating eqn(s) at 0.05 level
* denotes rejection of the hypothesis at 0.05 level
** Mackinnon-Haug-Michelis (1999) p-values

Source: Own calculations

Both statistics Trace test and Maximum Eigen test has one cointegrating equation thereby implying that there exists a unique long-run relationship between the set of variables. The results showed that import demand for Kenya is cointegrated in the longrun. The lag length was 4.

4.6 Diagnostic and Stability Test Results

The diagnostic test include serial correlation, heteroskedasticity and functional form test. To stability CUSUM test was employed.
Table 4.5 Diagnostic Test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>F Statistic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial correlation</td>
<td>0.877</td>
<td>0.425</td>
</tr>
<tr>
<td>Heteroskedasticity</td>
<td>1.507</td>
<td>0.912</td>
</tr>
<tr>
<td>Functional form</td>
<td>0.975</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Source: Own calculations

In serial Correlation Test Breusch-Godfrey Serial Correlation LM Test was employed. Breusch- Godfrey is used for AR (1) and higher orders of serial correlation. The p-value of F-statistic was 0.425 which is greater than 0.05 so null hypothesis of no serial correlation cannot be rejected.

White Test with no cross terms was employed to test presence of heteroskedasticity. The condition occurs when the error terms do not have constant variance. The p value of F-statistic was 0.912 which was greater than 0.05. Null hypothesis cannot be rejected that shows there is no presence of heteroskedasticity. There was statistical evidence that the OLS problem of heteroskedasticity did not exist at 5 percent significance level.

Functional Form Test was done using Ramsey RESET test. The test employed was a test linear specification against a non-linear specification. The null hypothesis state that the correct specification is linear and the alternative hypothesis state that the correct specification is non-linear. The p value of F statistic was 0.975 which was greater than 0.05. The model was correctly specified.
The CUSUM test (Brown, Durbin, and Evans, 1975) is based on the cumulative sum of the recursive residuals and is used to test stability. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

Since the stability of the import demand function is vital for an effective trade policy, testing whether the estimated import demand equation has shifted over time is an important part of empirical studies. As showed by Figures 4.1 the CUSUM test of parameter stability indicates that the parameters are stable during the sample period. The findings are supported by Korean study on reexamination of aggregate import demand function (Chang, 2005).
4.7 Regression analysis

The results of regression analysis are presented in the table that follows.

**Table 4.6 Regression results**

Dependant variable Log of Value of imports

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.661</td>
<td>-1.213</td>
<td>0.233</td>
</tr>
<tr>
<td>Log of Real Gross Domestic Product</td>
<td>0.378*</td>
<td>2.116</td>
<td>0.041</td>
</tr>
<tr>
<td>Log of Relative price</td>
<td>-0.026</td>
<td>-0.410</td>
<td>0.684</td>
</tr>
<tr>
<td>Log of Foreign exchange reserve</td>
<td>0.159*</td>
<td>2.967</td>
<td>0.005</td>
</tr>
<tr>
<td>Lagged imports</td>
<td>0.726*</td>
<td>9.118</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Adjusted R-squared 0.995  
Schwarz criterion - 0.884  
Durbin-Watson stat 2.195  
F- statistic 1860.9 p-value 0

* implies that the coefficient is statistically significant at 5 percent

Source: Own calculations

The autonomous value of imports was -1.661. This was the value when all the explanatory variables had a value of zero. The autonomous coefficient of the value of imports was statistically insignificant with the probability value of 0.233. Lagged value of imports was also a major determinant of imports (it had the highest coefficient). Lagged value of imports coefficient was statistically significant as the p-value was zero. Its coefficient was inelastic because it was below one.
F-statistics showed that the variables included in the model were important determinants of value of imports. Adjusted R-squared is 0.995. This means that 99.5 percent of change in value of imports is explained by variations in all the explanatory variables included in the estimated model. The Durbin Watson is 2.195, which means there is no autocorrelation.

4.8 Price Elasticity of Demand for Imports

The coefficient of price on imports had the expected negative sign according to the traditional imports theory which was -0.0264. The coefficient of the variable was statistically insignificant as the probability was 0.684 that is greater than 0.05. The coefficient of price was inelastic. It means that 1 percent increase in price decreases the value of imports decreases by 0.026 per cent. For China's aggregate import demand, longrun price elasticities were found to be inelastic -0.52 (Moazzami and Wong, 1988), which was consistent with this study.

The non-significant or weakly significant relative price elasticities suggest that devaluation and stabilization policies pursued in the past did not effectively assist trade liberalization efforts, at least at the rate they were implemented. More generally, they suggest that policies that directly increase export earnings and access to external capital inflows are likely to have a larger impact on import volumes than those that concentrate exclusively on aggregate demand and exchange rate management.
Heien (1968) argued that for any country whose value of the price elasticity is between 0.5 and -1.0 is necessary to ensure success of exchange depreciation. Therefore, the estimated value of price elasticity 0.026 suggests that exchange rate policy is found to be unfavorable in improving Kenya's trade balance in the long run. Kenya has been pursuing a managed exchange rate regime with a view of boosting exports and improving the current account position of the balance of payments through maintaining competitiveness of its international market. Moreover, the estimated long run relative price elasticity was inelastic. This indicated that the value of imports demanded was insensitive to increases in domestic price level.

4.9 Income Price Elasticity of Demand for Imports

The coefficient of real GDP was 0.378. The coefficient was statistically significant considering the probability was 0.041. The coefficient of income was inelastic because when the real GDP increases by 1 percent the value of imports increases by 0.38 percent. The results indicate that import demand is inelastic with respect to real income and thus submits that a growth income may not lead to the expectation of trade deficits. The study for Indonesia supports this study (Dutta and Ahmed, 1997). The estimated long-run income elasticity was closer to unity (0.98) but inelastic still, and does suggest that Indonesia's import demand is significantly driven by economic growth. If imports are biased towards imports of consumption goods, ceteris paribus, the country may face problems in the balance of payments in the longer run. Thus, policy designs in influencing the pattern of
various final expenditures (real income) would seem most effective (Cheong, 2002).

4.10 Foreign Exchange Reserve Elasticity of Demand for Imports

The foreign exchange reserve elasticity of imports was 0.159. The coefficient was statistically significant as its p value stood at 0.005. It was found to be inelastic as one percent change in foreign exchange reserve caused 0.16 percentage increases in import value. An increase in foreign reserves may have a positive effect on the demand for imports since it relaxes the excess demand liquidity restriction. Policies which focus on increasing foreign exchange reserves should be pursued, as they are likely to influence import behavior.
CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

Chapter five of the study contains summary of the study, conclusion, policy implications and area for further research. Each part is discussed as follows.

5.2 Summary of the study

There is continued increase in imports volume and shrinking of exports. The government was mostly preoccupied with mobilizing external financial assistance and debt increased tremendously. The problem of growing population in Kenya, heavy importing and borrowing lead to current account deficit. Information on import demand elasticities is key to informing the tax policies that are to guide the taxation of imports and deciding optimal imports. The specific objectives of the study were to estimate income elasticity of demand for imports, price elasticity of demand for imports and foreign exchange reserve elasticity of demand for imports.

Secondary data was used in the study and the period was from 1970 to 2013. Data was collected from Central Bank of Kenya and Kenya National Bureau of Statistics publications. A multiplicative import demand function was estimated from which import elasticities were determined. The variables were found to be cointegrated in the long run.

The results show that income, relative price and foreign exchange reserve affect imports value. Long run elasticities were estimated and the coefficients of the income, foreign exchange reserve and lagged value of imports variables were
statistically significant except relative price. The lag of value of imports was the variable with the highest coefficient and this indicated it drives Kenya imports. It was found that foreign exchange reserves matter for import demand in the long run. In addition, the sign of the estimated coefficient of reserves was positive, as expected. The statistical impact of foreign exchange reserve was significant.

5.3 Conclusion

The study concluded that the estimated coefficients for income, foreign exchange reserve and lagged value of imports are statistically significant except for relative price. All the coefficients had the expected signs. The value of imports was positively related to income, foreign exchange reserves and lagged imports and was found to be negatively related to relative prices. All coefficients of the variables were inelastic. Relative price coefficient was insignificant hence it could not be used to make any policy implications. There is unique long-run equilibrium relationship for Kenyan import demand. That is, income, foreign exchange reserve, lagged value of imports and prices are the plausible factors that affect import demand function.

5.4 Policy Implications

The Kenya Revenue Authority can increase revenue collection from import duties. This was because import income elasticity for Kenya in long run was inelastic implying that imports responds to income is less than proportional.
Export promotion policies should be encouraged as they increase foreign exchange reserves. This is because the results show that import demand respond to foreign exchange reserve.

Exports are likely to increase foreign exchange reserves and can thereby provide greater access to international markets which is in line with Vision 2030. This policy is possible because foreign exchange reserve was positively related to import demand.

Borrowing efforts should be discouraged given that foreign exchange reserves elasticity was inelastic. This would improve balance of payments due to reduction in debts.

Government can utilize imports of the previous period to forecast levels of tax revenue and also determine import behavior. This was because the lagged value of imports highly influences the demand of imports in Kenya.

5.5 Area for further research

Future research on the issue should also accompany disaggregated analysis of the same. Another improvement in this regard would be to utilize the relative price data of tradables versus the non tradables (instead of the commonly used practice of using proxies). Further still, domestic absorption variable might be more suitable instead of the real GDP for it would present the income minus the external sector and would eliminate endogeniety that is inherent in the GDP and import variable. Further research could be geared towards panel estimation of elasticities.
of various countries for comparative analysis and also towards employing a combination of estimation methodologies.
REFERENCES


Central Bank of Kenya. Quarterly Economic Reviews (various issues)


