

**THE IMPACT OF TRADE POLICY REFORMS ON HOUSEHOLDS: A
WELFARE ANALYSIS FOR KENYA**

By

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Declaration

I declare that this thesis titled “The Impact of Trade Policy Reforms on Households: A Welfare Analysis for Kenya”, is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.



M W OIRO OMOLO

19 November 2012

DATE

DEDICATION

This thesis is dedicated to my late parents: my father Gordon Oiro Obwa who encouraged me to proceed with my PhD and foresaw that I would succeed in balancing family and career, and my mother Jennifer Awino Oiro who believed in educating the girl child.

To my husband Arthur who has been encouraging and supportive throughout my career and to our daughters Joy, Grace and baby Angel who bring me back to the reality of balancing family and career.

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ABSTRACT

Trade liberalization in Kenya started in the early 1980s with the structural adjustment programmes, and continued under the multilateral framework of the WTO. During the same period, the incidence of poverty and level of inequality also worsened. The government's focus on trade negotiations has been to ensure that there is policy space for the daily running of the economy even though welfare impacts are also important. Non-state actors have argued that trade liberalization has negatively affected the poor; particularly the farmers, since they cannot compete with the developed countries whose farmers enjoy significant government support through subsidies, making their products much cheaper in the world market. Government officials, on the other hand, contend that trade liberalization is good as it brings in competition and transfer of technology which is good for an economy. It is important to examine how trade liberalization has affected household's welfare in Kenya, given that this kind of analysis has not been conducted in Kenya.

This study is unique because it does not assume the existence of a trade liberalization–poverty relationship, unlike most studies. It uses a multi-method approach to first test the hypothesis that there is no statistically significant relationship between trade liberalization and poverty, it further tests for multiplier effects of trade liberalization on poverty determinants. Trade Liberalization and poverty is found to have a stochastic relationship, furthermore investments and capital stock were found to significantly affect poverty determinants in the stochastic model. Due to unavailability of household welfare measure data in time series, a CGE model was used to establish the dynamics of trade liberalization on poverty at a point in time using the 2003 Social Accounting Matrix Data for Kenya. Overall, trade liberalization accompanied by FDI had the greatest impact on household welfare.

Trade liberalization had a positive impact on household welfare since household incomes and consumption increased. Micro simulations results, based on changes in consumption, also showed that poverty incidence reduced for all households, even though the urban households experienced higher decreases. The study found that there was little difference in protecting sensitive products and not protecting them; secondly, trade liberalization accompanied by foreign direct investment had greater impact on improving the household welfare. Consumption and incomes increased, resulting in overall poverty reduction. The welfare of urban households was much higher than rural households in terms of income and consumption increases. However, income inequality was much higher in urban than rural areas.

Key Words: Trade Liberalization, Granger Causality, Household Welfare, Computable General Equilibrium Models, Micro Simulations.

JEL Classification Codes: F13, D61, C63, C68

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1 INTRODUCTION

This thesis examines the impact of trade policy reforms on household welfare in Kenya because trade policies have formed an integral part of Kenya's successive development plans. These reforms have been undertaken since independence, with very little or no comprehensive assessments to establish household welfare effects. The main reasons for lack of analytical work in this area are: First, trade policy reforms are undertaken at a macro level while the welfare effects manifest at the household level; consequently, no attempts have been made to establish this macro-micro linkage. Secondly, there have been opposing intellectual arguments regarding the benefits of trade policy reforms; for example, a leading intellectual thought that has reigned from the 19th to the 21st century is that, trade policy reforms that led to trade liberalization have benefits for both developing and least developed countries, and that continuous trade liberalization results in development. This argument has been supported by international organizations such as the World Bank (WB) and the World Trade Organization (WTO), while some developing and least developed countries and civil society organizations argue for protection of their small and vulnerable economies. In Kenya, proponents or opponents of trade liberalization have focused on anecdotal evidence to support their arguments without much interest in empirical evidence. This has been largely due to the resources and time required to obtain such evidence. Lastly, while one will find literature on trade liberalization or poverty analysis in Kenya, there is no evidence that links these two issues, more so using a systematic and coherent analytical framework, as will be done in this study.

The benefits of trade liberalization that would result in development, traditionally, consisted of improvements in economic conditions in terms of growth rates in gross national products (GNP). In fact in the 1960s and 1970s, the United Nations considered countries that attained at least 6 per cent growth rates per annum as achieving development Todaro (1992). However, a cursory look at

development indicators for developing countries in sub-Saharan Africa shows that, while there was increase in per capita incomes, there was increasing poverty and unemployment in the poorest segments of the population. According to Todaro (*ibid*), development needs to be redefined to include changes in a social system and move from a life considered unsatisfactory, towards a life that is considered spiritually and materially better. This implies a multidimensional process involving changes in structures, attitudes, and institutions that lead to accelerated economic growth, reduction in inequality and eradication of absolute poverty that ensure self-esteem, life sustenance and freedom. Other leading development economists like Thirwall and Lopez (2008) have defined development from both economic and social perspectives. According to them, development entails life sustenance where individuals are able to economically satisfy their needs and self-esteem in conducting economic relations, and freedom, in choosing one's destiny. Sen (1979) equally recognizes that development is composite in nature and entails more than outputs and incomes, but other indicators such as political and social liberties. Ray (1998) goes further to provide a sequence for development, so that access to material well-being is a pre-requisite for obtaining other kinds of advancements which are a composite of development.

The opponents or sceptics of trade liberalization have argued that, liberalization should not just lead to increases in income and consumption, it should also include improvements in other facets of life, such as the ability to carry out one's daily obligations with dignity and social inclusion in issues of national interest. This has led to prolonged debates on whether trade liberalization outcomes should focus on income and consumption based outcomes only or should include other life improvements. This introductory chapter, therefore, defines the concept of trade liberalization and provides the motivation for the study, the research problem, study objectives, significance of the study, and a justification of why this study should be undertaken. Lastly, an outline of how the rest of the thesis is structured as well as the definition of key terms to be used will also be given.

1.1 THE CONCEPT OF TRADE LIBERALIZATION AND TRADE REFORMS

The absence of obstacles to the free movement of goods and services between and within nations, normally referred to as free trade, has been the subject of debates since the 17th century. One of the leading economic thinkers of this era, Adam Smith (2009), who was a strong proponent of free trade, argued that a government's policy towards export trade was to be similar to that of domestic trade. He advocated for a '*Laissez faire*' policy, where there was minimal government regulation of business and economic affairs so as to ensure a free enterprise system. This policy, he believed, could lead to higher level of well-being in all countries, since there was an 'invisible hand' that would ensure maximum benefits for all. Free trade is achieved through trade liberalization. Trade liberalization is the removal of any restrictions or barriers to trade, making a country more open to the international markets and to competition. Trade liberalization can be undertaken gradually or in certain cases, sectors can be completely opened up to free trade. Free trade has been given various definitions depending on the component of trade instruments used in trade liberalization. Greenaway and Sapsford (1980) perceive trade liberalization as synonymous with import liberalization, namely, the reduction of import barriers with or without any changes in export incentives. Krueger (1974) defines trade liberalization as the substitution of more costly instruments of protection with less costly ones; it is a shift from quantitative restrictions to the use of price instruments. Jenkins *et al.* (1997) view it as an assortment of measures which move the economy closer to neutrality and greater liberty. Dornbusch (1992) describes it as a time when opportunities open up, because access to cheap inputs creates export opportunities, which carry rents and profits that can be invested in capital goods which in turn, yield further productivity gains. The definitions, so far given, bring out the indistinctness of trade liberalization given that there are different components such as import liberalization, changes in relative prices, quantitative restrictions and tariffs. Collier *et al.* (1997) attempt to address this challenge by providing a more encompassing

definition so that, in practice, 'liberalization' could refer to import liberalization and/or a move towards neutrality in the structure of relative prices and/or the substitution of less distorting forms of intervention. Reforms, such as those sponsored by the World Bank, i.e., structural adjustment programs, incorporate ingredients of all three. The definition by Collier *et al.* (1997) will be the working definition that will be used in this thesis, because it provides a multifaceted definition of trade liberalization. With such a scope of definition, it will be possible to analyse all forms of trade liberalization without the risk of leaving out any important components that could have adverse effects on the economy and welfare in general.

It is equally important to highlight the concept of trade reforms since there is a lot of confusion on the concept of trade liberalization and trade reforms. Trade reform is any change in the trade regime that impacts on exports, imports, incomes and/or government revenue. Trade reform has been conventionally defined as measures that move a trade regime towards a more neutral incentive framework for foreign trade, or to a more liberal trade regime, or even towards both. According to Michaely *et al.* (1991), trade reform is any change which leads a country's trade system towards neutrality in the sense of bringing its economy closer to the situation which would prevail if there were no government interference. Institute of Development Studies (IDS, 2003) defines trade reforms from two complementary perspectives; namely, domestic market and exports. From the domestic market side, it involves the reduction of protection of domestic firms from foreign competition. This includes moving from quantitative to tariff-based import protection and cuts in import tariffs. On the export side, trade reforms include the removal or reduction of export taxation and export licensing. Trade reforms also cover export promoting arrangements such as Export Processing Zones (EPZs), import duty exemptions and drawbacks on imported inputs.

In any economy, the players can be broadly categorized into three; namely, consumers, producers and institutions (i.e., households, enterprises and government). There will always be

winners and losers within these three categories when trade liberalization takes place, since different players with different interests will be affected in different ways. Balassa (1980) and Bienen (1990), in their studies, found that while most economists are almost unanimously in favour of trade liberalization, government players who form public institutions tend to be cautious, and in some cases are not in favour of trade liberalization. Economists, for example, have advocated for trade liberalization for different reasons. First, given that economics is concerned with the allocation of scarce resources in the most efficient way possible, trade liberalization has the tendency to promote efficiency in production, as a country will exploit the advantages it has over division of labour and specialization of goods and services. This will result in the production of maximum aggregate output by allocating resources in the most efficient way possible. Secondly, trade liberalization encourages competition and quality production. Competitive pressures tend to reduce monopolies by setting lower prices, while maintaining quality production, resulting in well-functioning markets and higher efficiency. However, while this happens, losers arising from competition tend to oppose trade liberalization. Lastly, gains from competition, when efficiently invested, will result in new goods while new technologies could also be transferred to domestic firms (however, transfer of technology strongly depends on a country's intellectual property regime and human capital in the sector of focus). Consumers will also stand to gain as they will be shielded from unfair monopolistic behaviour, notwithstanding the fact that consumer surplus will also increase.

Policy makers and legislators are keen on examining and maintaining the interactions of the public and private sector and the rest of the world (ROW), in a mutually beneficial manner. Trade liberalization usually comes with institutional reforms that alter the behaviour of the public and private sector and the rest of the world. They consider trade liberalization as institutional reforms that entail the importation of institutions from abroad in order to harmonize a country's economic and social institutions with that of the trading partner. For example, WTO membership requires

adoption of institutional norms such as non-discrimination of trade, transparent notification of offers, WTO consistent patent and copyright laws, property rights, regulatory, macroeconomic stabilization, institutions for social insurance and conflict management. With a new set of rules, the pattern of behaviour is altered and at the same time the manner in which policy choices are made and implemented will also change. Therefore, for a policy maker or legislator, trade liberalization also alters policy parameters and behavioural relationships (Rodrik, 2000).

The political class, who also include the ruling elite, will view trade liberalization with very different lenses. To consolidate mass support, which is a pre-requisite to win elections, it is very important that the political group have control of key trade and production sectors for greater authority over society, as the Golden rule states "*The gold owner sets the rules?*". Trade liberalization is, therefore, not likely to provide a recipe for a successful political career as it implies less control of production and trade, less authority over society as more democratic space will result in unpredictable support during general elections. The political classes have been the key proponents of the import substitution industrialization (ISI) strategy. Under an ISI strategy, a country provides subsidies for the manufacture of export goods, which have the potential to develop a comparative advantage over time. Industries in this case are oriented towards the domestic market and trade restrictions such as tariff and quotas are used to encourage the replacement of imported manufactured products by domestic products. Given that the political class often are the owners of these industries, the ISI strategy has been used to protect the political interests of the ruling elites (Bienen, 1990).

1.2 SIGNIFICANCE OF THE STUDY

Trade liberalization is being negotiated in the Doha Development Agenda (DDA) under the auspices of the WTO. It is based on the agreements reached by countries at the WTO that member countries will liberalize their economies. Trade liberalization is intended to achieve development, with a central focus on poverty reduction. There has been an increased intellectual argument in favour of trade liberalization as a route to achieving development, following evidence generated from studies such as Dollar and Kraay (2001a), Fofack *et al.* (2001), IDS (2003) and KIPPRA (2005). Powerful economies such as the United States of America (USA) and the European Community (EC), who also form the donor community, have pushed for trade liberalization by putting pressure on developed, developing and the least developed countries (LDCs) to open up their markets for global trade if they want to achieve development and receive financial support. However, there is limited empirical evidence that directly links trade liberalization to development and poverty reduction. In cases where attempts have been made to investigate such linkages, i.e., the work of Dollar and Kraay (2001a) and Sachs and Warner (1995), they have been heavily criticized on methodological issues by, inter alia, Harrison and Hanson (1999) and Levine and Renelt (1992).

The current international economic relations that are geared towards globalization of the production and financial systems, and liberalization of economic activities, are primarily concerned with the removal of tariff and non-tariff barriers to trade, as a major step towards globalization. However, neither the proponents nor the opponents of trade liberalization have been able to determine, a priori, the likely effects that trade liberalization will have on the economy as a whole. In Kenya, state and non-state actors have argued that poverty has been increasing since trade liberalization commenced, while other economies that have closed trade regimes have had the incidence of poverty declining. These arguments have, however, not been backed by any empirical evidence. The World Bank (2002) argues that positive effects of trade liberalization on poverty

depend on the implementation of complementary measures that accompany the liberalization episode. Furthermore, gains tend to be experienced in the long run despite increasing poverty incidence in the short run.

It is clear, from the arguments above, that the true effects of trade liberalization on poverty (which is a measure of welfare) is an unknown territory with limited evidence that supports any thesis put forward. This study is significant as it sets out to first of all review the theoretical framework for trade liberalization and its linkages to poverty. Furthermore, with the growing policy interest in trade and developing country poverty, this study will offer a comprehensive analysis of the evidence available on trade liberalization and welfare, and further simulate the likely effects of trade liberalization as is currently being negotiated at the WTO. Based on a large scale literature review (including research reports, published journal articles and other academic sources), there is little evidence of research on the effects of trade liberalization on household welfare in Kenya. This study will therefore be important in informing the policy makers, and the government negotiators based in Geneva, the likely effects of trade liberalization on welfare in Kenya. More importantly, this thesis equally provides an opportunity to academics and policy analysts in Kenya to undertake analyses of the impact of trade liberalization on household welfare using a multi-method approach, consisting of time series analysis, general equilibrium models and micro simulations. This form of analysis has remained limited, i.e., while KIPPRA (2005) undertook similar analyses, there is limited information on the methodology used, even though the study acknowledges that it is a CGE model; moreover, there is a strong assumption that there is a statistical relationship between trade liberalization and poverty. Secondly, the nature of the relationship between trade liberalization and poverty at the household level is not clear; therefore, this study attempts to narrow this knowledge gap by examining trade liberalization impacts on welfare at the household level, by focusing on trade liberalization under the WTO agreements.

1.3 STATEMENT OF THE RESEARCH PROBLEM

At the time of independence in 1963, the Government of Kenya identified illiteracy, disease, ignorance, and poverty as the main problems to be addressed in the post-independence era.¹ In virtually all the development plans, Sessional papers and other government economic policy documents issued in the post-independence period, poverty alleviation had featured prominently as an area of concern. The *Sessional Paper No. 1* of 1980 theme was “poverty alleviation”. This was reinforced by the 1982 Sessional paper which included structural adjustments as a strategy of the government to improve the economic capacity of the nation in order to improve welfare, following the economic distortion that took place in the 1970s and 1980s. Initial trade liberalization episodes commenced with the structural adjustment programmes addressed in the *Sessional Paper No. 4*, on Economic Prospects and Policies under the support of the two Breton Woods institutions, i.e., the International Monetary Fund (IMF) and the World Bank. Further to the trade liberalization episodes initiated by the Breton Woods institutions, Kenya joined the multilateral trading system under the WTO framework in 1995. Kenya’s commitment to the WTO principles, and regional trade agreements (RTA) such as The East African Community Agreement (EAC), the Common Market for Eastern and Southern Africa (COMESA) and the Economic Partnership Agreement (EPA), form an integral part of its economic policies. All these agreements are more concerned with the rules to be followed in order for trade liberalization to take place. Under the multilateral trading system, it seems that trade liberalization is considered a panacea that will move poor countries into a development path that will improve welfare through poverty reduction. However, Thirwall (2003) argues that, while there are gains from trade liberalization, the practice of liberalizing trade neither guarantees that there will be equal distribution of gains from trade among participating countries, nor a permanent increase in the rate of growth of output and living standards.

¹ This issue was addressed in the *Sessional Paper No. 1* of 1965 – “African socialism and its application to planning in Kenya”

Consequently, while trade liberalization, on the one hand, started in the early 1980s with the structural adjustment programmes, and continued under the reciprocal liberalization within the WTO framework, welfare, measured by the incidence of poverty in Kenya, has not improved and the level of inequality has also worsened (GOK, 2000). The situation is aggravated by the fact that the government has focused on trade liberalization negotiations with the objective of ensuring that there is policy space left for the daily running of the economy. What has followed is that little attention has been given to the effects of trade liberalization on welfare, giving rise to contradictory schools of thought by different national stakeholders. Non-state actors, who largely include the civil society organizations, have argued that trade liberalization has not improved welfare. Farmers, who in most cases constitute the poor, have been negatively affected, given that they cannot compete with the developed countries whose farmers (small and large) enjoy a lot of government support through subsidies, making their products much cheaper in the world market. Government officials, on the other hand, contend that trade liberalization is good as it brings in competition and transfer of technology which is good for an economy. Economists, however, argue that trade liberalization has both long- and short-run effects; the short-run effects are likely to be negative while the long-run effects are likely to be positive when adjustments have taken place.

With this background, the main challenge arising is that the effects of trade liberalization have not been empirically established, and here especially at the household level, to inform both state and non-state actors' policy actions and debates, respectively. This situation is complicated by the fact that trade liberalization is a macroeconomic issue that deals with the removal of tariffs and any accompanying macroeconomic policies, while household welfare measures, using poverty incidence, is a microeconomic issue. This study will address this problem by, first, empirically establishing the nature of the relationship between trade liberalization and poverty and multiplier effects of trade liberalization on poverty determinant, and then proceed to examine the impact of

trade liberalization on household welfare in Kenya at a point in time using a multi-method approach. This approach combines time series data from 1970 to 2010 to test for transmission path from trade liberalization to household incomes (as indicator of household welfare), followed by a computable general equilibrium and micro simulation model, which will be used to run simulation scenarios, that will establish both the nature and extent of the poverty impacts of trade liberalization during a specific year for which a Kenyan Social Accounting Matrix is available for modelling purposes.

1.4 RESEARCH OBJECTIVES

Following the research problem set out in section 1.3 above, the overall objective of this thesis is to examine the impact of trade liberalization on household welfare in Kenya. More specifically, the study sets out to:

1. Establish theoretical macro-micro linkages between trade liberalization and household welfare using poverty incidence as a measure of welfare.
2. Establish the existence of a trade liberalization–household welfare transmission path and the dynamics of the transmission using a multi-method approach, which includes times series analyses, a computable general equilibrium (CGE) and micro simulation model.
3. Establish the nature of the trade liberalization-household welfare relationship for the purposes of policy recommendations.

1.5 RESEARCH JUSTIFICATION

The subject of trade liberalization and household welfare has generated a lot of debate at national, regional and international levels. Trade liberalization remains a macroeconomic issue while

poverty is microeconomic in nature, as it affects individuals at the household level. There is little understanding of trade liberalization-poverty relationships in Kenya since little work has been done to draw out the linkages between these two issues in Kenya. In cases where attempts have been made to link trade liberalization or economic reforms to poverty in Kenya, such as Bannister and Thugge (2001), Khasiani and Ndungú (1996), the studies consisted solely of literature reviews. Existing studies like Mwabu *et al.* (2000), Foroutan (1993), Reinikka (1994), Greer and Thorbecke (1986a; b), Nyangito (2000), and GOK (various) have either focused on trade liberalization or poverty but not on the linkages between these two variables. There are no studies that link the two issues and where available, the methodology used is not explicitly explained or evidence is anecdotal in nature. There is an urgent need to examine the linkage of trade liberalization and poverty, and the likely effects of the former on the latter, if trade is to be used as a tool for development.

Secondly, most studies have adopted the theoretical framework developed by McCulloch *et al.* (2000), where the authors have developed and explained the macro–micro framework that links trade liberalization to household welfare. This methodology has been adopted by several authors such as Löfgren *et al.* (2001), Ianchovichina *et al.* (2001), KIPPRA (2005), Balat and Porto (2006) and Filho and Horridge (2006). These studies have assumed, *ex ante*, that a trade liberalization–household welfare relationship exists. However, none of the authors who have adopted this framework for analysis have established the nature of the said relationship. This study, therefore, is unique because it first establishes the nature of the trade liberalization–household welfare relationship, based on the framework by McCulloch *et al.* (2000), and proceeds to further establish the impact of trade liberalization on household welfare in Kenya.

1.6 RESEARCH HYPOTHESIS

Based on the background and statement of the research problem stated above, the null and research (alternative) hypotheses to be tested in this study are as follows:

H_0 There is no statistically significant relationship between trade liberalization and poverty in Kenya.

H_1 There is a statistically significant relationship between trade liberalization and poverty in Kenya.

The multi-method approach, as indicated above, will be used to determine whether the null hypothesis as stated above can be accepted or rejected. In this approach, a time series analysis using regressions, unit root test and Granger causality test will be used to establish if there is a statistically significant relationship between trade liberalization and poverty. A computable general equilibrium model will be used at a specific period (2003) to examine the impact of trade liberalization at the household level, and lastly, micro-simulation will be carried out to establish whether households have moved in/out of poverty. A detailed description of the multi-method approach used in this study is provided in chapter four.

1.7 ORGANIZATION OF THESIS

Chapter one has introduced the concept of trade reforms and liberalization and has linked the two issues in order to provide a working definition of trade liberalization. It has further introduced the challenges of establishing the poverty impacts of trade liberalization in Kenya, given that poverty eradication has been a key subject of development plans in Kenya while trade liberalization has been used as development instruments in the same plans. This chapter provides

the context in which the subsequent chapters will be developed, since it has laid out the research problem to be investigated, as well as the null and research hypotheses guiding this investigation.

Chapter two seeks to answer the first objective of the thesis; namely, to establish the theoretical linkage between trade liberalization and poverty and proceeds further to provide empirical evidence for the existence (or otherwise) of such a relationship. This chapter will first provide a review of the neoclassical trade theory which has dominated world trade since the 19th century. The theories that underpin the concept of poverty will be reviewed and then the trade-poverty linkage will be established. This section is very important as it provides the framework for carrying out simulations on the impact of trade liberalization on household welfare. This chapter further provides empirical evidence and a broad-spectrum of literature on the political economy of trade reforms, factors that led to trade reforms and experiences in the implementation of these reforms. Key in this chapter is the examination of the elements of trade reforms and types of trade liberalization that arise as a result of such reforms. Empirical evidence of the impact of trade liberalization on household welfare will be categorized into three levels, namely, micro-, macro- and micro-macro level linkages. This categorization requires the use of different methodologies in addressing questions on the impact of trade liberalization and welfare. Given the array of methodologies that have been used, it will be possible to review and establish the challenges that are likely to be encountered particularly in using the CGE methodology. Published literature dating back to the 1950s, to the most recent accessible literature, will be discussed. The literature search will include sources from the internet, journals, reports and periodicals, World Bank and UNCTAD documents and libraries in general.

The third chapter will review trade liberalization and poverty in Kenya. The objective of this chapter is to give an account of trade liberalization and to further establish if liberalization actually took place using the methodology by Collier *et al.* (1997). It further proceeds to provide a historical

account of poverty in Kenya during periods of trade liberalization. This review will assist in understanding how trade liberalization and poverty evolved concurrently, although direct linkages have not been established. This chapter will borrow heavily from the works of Ongile (1998), Ryan and O'Brien (2001), Swamy (1994) and Mosley (1991) on the historical accounts of structural adjustment programmes and other related trade liberalization reforms. It is in this chapter that the different types of trade liberalization episodes and the reforms undertaken in an effort to achieve free trade will be reviewed. The Doha negotiations and the likely scenarios of the Doha negotiations will be examined since these will be the policy simulations that will be undertaken in chapter 5.

Chapter four forms the gist of the study. All that has been reviewed in chapter two and three will be important in building up the methodology for investigating the research hypothesis using a multi-method approach consisting of time series (1970-2010), a CGE model to investigate the effects of transmission at a specific point in time (2003 Kenya Social Accounting Matrix) and micro-simulations that link the CGE to household data. The IFPRI model by Löfgren *et al.* (2002) will be used to simulate the impact of the trade liberalization scenarios identified. Finally, chapter five will give the multi-approach results, followed by discussions based on the results. Chapter six will provide some concluding remarks and policy recommendations.

1.8 STUDY LIMITATIONS

Trade and poverty encompasses all aspects of trade that affect poverty as outlined by United Nations Conference on Trade and Development (UNCTAD, 2004). These includes a) the effects of primary commodity dependence; b)the balance-of-payments; c)constraint on poverty reduction; d)the relationship between export and import; e) instability and vulnerability; f) the relationship between upgrading the composition of exports towards higher-quality and higher-skill products and

the social exclusion of poorer producers from livelihoods; g) bargaining power in global production chains and the distribution of gains from trade; h) how the development of non-traditional exports affects gender relations; i) the effects of trends in, and variability of, the terms of trade on poverty; j) the relationships between trade and employment; and k) the relationships between trade and inequality, among others. This provides a wide spectrum of analysis. This study narrowly focuses on the subset: trade liberalization and poverty, which is concerned with the question of the necessary complementary policies that will ensure trade liberalization results in poverty reduction; this makes trade liberalization a given. This limitation has been dictated by current debate at the WTO where trade liberalization is a central focus in country development policies. The challenge of data availability equally limits the extent to which trade and poverty relationship can be analysed. The richness of data and frequency of availability dictates the level of detail of analysis that can be done. The multi-method approach that will be adopted requires three different sets of data: Time series, social accounting matrix and household survey data. Kenya does not currently have household incomes in time series; therefore, proxies must be used instead. Secondly, the social accounting matrix (SAM) is constructed periodically making it impossible to compare changes in welfare annually using a social accounting matrix. Lastly, the household survey is collected every 5-6 years hence an assumption of no significant structural change in household consumption and income patterns is made when doing this analysis.

1.9 CONCLUSION

This introductory chapter has shown that trade liberalization has been the subject of various development strategies in Kenya, while poverty alleviation has been a key subject of all national development strategies and plans since independence. The two issues found a confluence point in

the *Sessional Paper No. 4* of 1980 on 'Economic Prospects and Policies' and also under the WTO agreements where Kenya has been a signatory since 1995. Under the current WTO negotiations, trade liberalization is expected to result in development and poverty alleviation. While both trade liberalization and poverty have been subjects of various policy debates and action plans in Kenya, the link between these two issues have not been empirically tested to establish how they affect welfare at the household level measure by poverty incidence. This implies that trade liberalization strategies in Kenya that have been geared towards poverty alleviation have not been backed by empirical evidence.

This study intends to bridge that gap so that any trade liberalization related policy actions that are geared towards poverty reduction is backed by empirical evidence. The first step towards achieving this is to review and establish the theoretical framework for trade liberalization and poverty and further establish the linkage between the two. McCulloch *et al.* (2000), in their work, have theoretically provided potential pathways through which trade liberalization affect poverty at the household level. Several authors such as Annabi *et al.* (2008), Bautista and Thomas (1997), Cogneau and Robbilliard (2000) and Deaton and Tarrozi (2000) have gone ahead to use their framework for trade liberalization and poverty analysis by assuming that the potential pathways identified do exist without empirically establishing the nature of their existence. This study is unique as it is the first to attempt to empirically establish the nature of trade liberalization and poverty pathway in Kenya using McCulloch *et al.* (2000) framework. Chapter two reviews the theoretical foundations of trade liberalization and poverty and establishes empirical evidence that exists. From this approach, it will be possible to also draw an appropriate methodological framework to use for the analysis.

2 TRADE LIBERALIZATION AND POVERTY: THEORETICAL FRAMEWORK AND EMPIRICAL EVIDENCE

A person with no knowledge of history must remain content to dwell in obscurity

Goethe

German Writer

2.1 INTRODUCTION

This chapter seeks to achieve the first objective of the study, which is to provide the theoretical linkage between trade liberalization and poverty. The theoretical foundations will be backed by empirical evidence from literature. This chapter first introduces the theoretical foundations of trade liberalization based on the dominant neoclassical theory of trade that has reigned in the 20th and 21st centuries and further reviews factors that generally led to trade liberalization. Secondly, the concept of poverty and the theories from different schools of thought will be examined, followed by an examination of postulated trade-poverty linkages. Once an overview of the theories of both trade liberalization and poverty has been provided, literature will be reviewed to establish the trade liberalization-poverty linkage. As a build up to the theoretical foundations of trade liberalization and poverty, the next section will provide empirical evidence on the impact of trade liberalization and poverty, based on the linkages that have been identified.

It is important to define some key concepts that pertain to trade liberalization that will be used in this study. A commonly used term in trade liberalization is trade policy. This is a rule or guideline that is used to influence the flow of goods and services, while a trade regime is the trading system that exists during a particular period in a country or region. Trade policies used within a trading regime form components of trade liberalization such as quantitative restrictions, which in most cases take the form of import quotas, are direct restrictions on the quantity of a good

imported. Import quotas are usually enforced through issuance of licenses to individuals or firms. Import quotas are known to raise the domestic price of the imported good. The government does not receive any revenue. Only the license-holders gain by buying imports and reselling them at a higher price, receiving profits called quota rents. A tariff is also a component of trade liberalization, and is a tax that is imposed on imported goods. It causes a net loss to the economy by distorting economic incentives for producers and consumers. Export subsidies are payments given to a firm that exports goods abroad. When an export subsidy is provided, traders will export goods up to where domestic prices exceed the foreign price by the amount of subsidy. If an exporting country in free trade implements a specific export subsidy on exports of a product, a subsidy on exports will encourage the flow of product X to the border. It will now cost less to move the product from the exporting country to an importing country. As a result, the supply of product X to the foreign market will rise causing a decrease in the price. If the exporting country is a large country, the price of all X sold in the foreign market will fall. The lower price will raise import demand for product X. The higher supply of X to the foreign market will reduce supply in the domestic market and induce an increase in the domestic price. The higher price will raise export supply.

Export taxes are imposed on primary commodity exports. Their main intention is to promote local processing industries. The effect of export taxes is that it results in a lower price of a commodity for the farmer, as compared to the prices prevailing in the world market. Elimination of these taxes tends to raise the income of farmers and reduce the profitability of the established processing facilities. Export processing zones (EPZs) are designed to further integrate a country into the global supply chain and attract export-oriented investments into such zones, thus achieving its economic objectives of job creation, diversification and expansion of exports, increase in productive investments, technology transfer and creation of backward linkages between the zones and the domestic economy. The enterprises operating in this zone enjoy a variety of benefits, including,

inter alia, duty exemptions on raw materials and machinery, uncontrolled movement of foreign exchange and income tax exemptions. EPZs are intended to increase export production, especially in cases where economy-wide trade reforms have been impeded by infrastructure or the regulatory requirements cannot be met on a national basis. They combine private property rights and investment regulations such as no restrictions to foreign exchange, tariff free imports for export production, low levels of taxations or tax holidays and streamlined administrative procedures.

Other instruments include anti-dumping policies, which is a trade policy instrument that allows duties to be imposed on imports that are sold at prices below the exporters' home market price. It is meant to stop price discrimination across markets. Safeguard measures is the imposition of a temporary duty against all imports of the product concerned, and should be invoked when the domestic industry is seriously injured by import competition and is a threat to the national interest such as food security, public health, etc. Other complimentary policies include, inter alia, Exchange Rate Management and Macroeconomic Stabilization policies. The exchange rate is an important instrument for both stabilization and adjustment policies. It is imperative that when using the exchange rate for policy purposes, one should determine whether it is playing a stabilization or adjustment role. Adjustment policies affect resource allocation as it can improve efficiency using the existing resources to achieve economic growth. Stabilization polices are used to ensure a stable economic environment such as low inflation and interest rates.

2.2 THEORETICAL FRAMEWORK: TRADE LIBERALIZATION AND POVERTY

2.2.1 The Neoclassical Theory of International Trade

The neoclassical school of economic thought was predominant between the 19th century to the early 21st century, especially in the United States. It relates supply and demand to an individual's rationality and his/her ability to maximize utility or profits. The prefix 'neo' means that it differs

from 'classical' economic thought of the previous century. The foundations of the neoclassical model of international trade were laid by Eli Hecksher and his pupil Bertil Ohlin, a Swedish economist giving rise to their popularly being referred to as the Heckscher-Ohlin (H-O) model. The H-O model is a general equilibrium model where income earned by the factors of production is used to purchase the two goods. The industry revenues are used to pay factor services, therefore the prices of output and factors equalize the supply and demand in all markets simultaneously. The goal of this model is to predict the patterns of trade for a country based on the characteristics of that country, in relation to factor endowment and factor intensity.

In this model, there are two countries, two goods being produced in a barter economy with two factors of production, i.e., capital and labour. Several assumptions are made in this model, namely, (1) that both labour and capital are taken to be homogeneous and are perfectly mobile across industries within the country but not across the countries, (2) that the amount of labour and capital used in the two sectors is limited to the country's endowment, (3) that factor owners are the same consumers of goods who maximize a utility function, and (4) that there are constant returns to scale, implying that an increase in both factors of production increases output by the same factor. There are four main theorems in the H-O model, namely, the Heckscher-Ohlin theorem, the Stolper-Samuelson Theorem, the Rybczynski theorem and the factor-price equalization theorem.

The H-O theorem states that each country will export the goods that use its abundant factor intensively. The output supply function will depend on factor abundance and prices of factors. Leamer (1995) provides basic insights to the H-O theorem in that traded commodities are bundles of factors, i.e., land, labour and capital. Feenstra (2003) further provides both graphical and algebraic inputs, while Chacholiades (2009) goes further and provides detailed graphical and algebraic derivation of the H-O theorem using both physical and price factors; definition of factor abundance is adopted.

The Factor Price Equalization (FPE) theory was put forward by Bertil Ohlin. This theory states that if the relative price of commodities reduces, then the relative factor price would also decrease. Chipman (2008) provided a detailed exposition of the FPE theory. He explained that there is a one-to-one correspondence between commodity and factor prices. Free trade therefore eliminates price differentials, thereby effecting an equalization of factor prices in wages and interest rates, so that when the prices of the output goods are equalized between countries as free trade occurs, then the prices of the factors (capital and labour) will also be equalized between countries. Hong (1970) provides detailed mathematical inputs and derivation of the theoretical framework for the factor price equalization theorem.

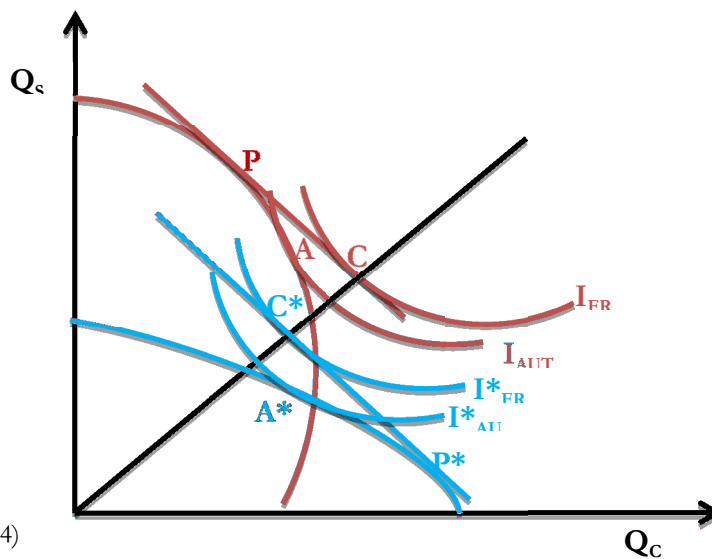
The Stolper-Samuelson proposition was derived by Wolfgang Stolper and Paul Samuelson. This proposition provides the impact of a change in the price of the final good to the rewards of the factors of production and the factor intensity of the production process. It states that, *“With two final goods and two factors of production, an increase in the price of final good increases the reward to the factors of production used intensively in the production of that good, and reduces the reward to other factors provided that both goods are produced.”* The Stolper–Samuelson theorem is important for analysing the effects of price changes on goods. These changes could be caused by tariffs, prices of factors of production etc. Neary (2004) intuitively explains the setting under which the Stolper-Samuelson theorem works and also that this theorem can be applied for a range of empirical issues including the effects of increased globalization on income distribution in developed countries.

The Rybczynski theorem, on the other hand, provides the link between production level of final goods and the available factors of production. It demonstrates how changes in endowments affect the output of goods when full employment is maintained. It states that: *“With two final goods, two factors of production and constant prices of the final goods, an increase in the supply of the factors of production results in an increase of the output of the final good that uses this factor of production relatively intensively, and a*

reduction in the output of the other final good, provided both goods are produced in equilibrium". The Rybczynski proposition deals with the question of allocation of available resources, i.e., capital and labour over two final goods. Ozawa (1970) diagrammatically provides proof of the impact of an increase in one factor on output. He found that an increase in one factor leads to greater expansion of the maximum possible output of the commodity that employs that factor more intensively relative to the other commodity.

Suranovic (2004) and Marrewijk (2002) both expound on welfare effects of free trade under the H-O model. With free trade, the aggregate welfare of a country will be raised relative to the welfare under autarky.

Figure 2.1: Welfare Effects of Free Trade



Source: Suranovic (2004)

Take country A and B, as shown in Figure 2.1. Under autarky, country A will produce and consume at point A where the indifference curve I_{AUT} is tangent to the production possibility frontier (ppf). With free trade, country A will produce at P and consume at C, there will be a higher indifference curve showing higher utility level given by I_{FR} . Country B, on the other hand, will produce and consume at A^* , where the ppf is tangent to the indifference curve. With free trade, production will be at P^* while consumption will move to a higher indifference curve I^*_{FR} . In this way, both countries

will have gained from free trade as they will be receiving more utility as they have moved to a higher indifference curve. It can be concluded that free trade raises the level of national welfare relative to autarky.

The aggregate welfare gains can further be decomposed into both production and consumption efficiency gains due to free trade. I_C is the welfare that would be gained under free trade if there is no change in domestic production, the difference between I_C and I_{AUT} represents the aggregate efficiency gain in consumption, while the shift in production from A to P is represented by aggregate efficiency in production which is the difference between I_C and I_{FR} . From a neoclassical perspective, Figure 2.1 demonstrates that free trade improves welfare, based on the assumption that there is factor mobility, so that workers can move freely and costless between and across industries, and that all workers have the same productivity level. Welfare, in this case, is measured in terms of consumption gains so that there is overall increase in consumption. Clearly, from this Figure 2.1, trade liberalization can result in increases in output based on the theoretical explanation given above. However, the short-run effects might not be positive since factors move freely within sectors, but not across sectors. This implies that there will be welfare winners in sectors with increase in output and losers in sectors where output contracts; with such an occurrence, income gap between sectors or countries can widen after trade liberalization. Thirwall and Lopez (2008) points out that, while trade liberalization has gains, there are no guarantees that income gaps will be reduced with trade liberalization.

The four theorems under the H-O model have brought out key variables that are affected when trade liberalization occurs. Prices of commodities and commodity outputs tend to change when trade liberalization takes place, however, the magnitude of change will depend on factor abundance and prices. Factor prices, i.e., wages and interest rates, are also affected by trade liberalization so that when prices of commodities decrease/increase, then the corresponding

wages/interest rate associated with labour/capital also decrease/increase. The increases associated with prices or wages, in turn, affect the consumption level of a nation so that when there is increased consumption, then there is improvement in welfare. These variables, namely, prices, wages and consumption levels are important variables that are affected by trade liberalization. It will be important to establish how they also affect poverty.

2.2.1.1 The Trade Liberalization Debate and Factors Leading to it

Section 2.2.1 has explained the key theories of trade liberalization; however, before linking the variables that are affected when trade liberalization takes place, it is important to review literature on the political economy of trade liberalization. The proponents of free trade, the neoclassical economists, put a very strong argument in favour of trade liberalization since they believe that everyone would benefit from free trade because, with competition, prices would go down. Furthermore, there is a tendency of trade liberalization to be accompanied by technology transfer which results in higher productivity. However, there have been strong opposition to free trade with several arguments opposing trade liberalization. Import substitution industrialization (ISI) has been a strong argument against trade liberalization. ISI is a trade, as well as an economic policy, based on the principle that a country can reduce foreign dependency by producing its manufactured products locally. This policy is implemented by providing subsidies to local industries that produce manufactured good for exports in the hope that, with time, they will be able to develop a comparative advantage and will be able to compete in foreign markets with other bigger industrial players. The ISI strategy is mainly used to protect infant industries, i.e., an industry which has latent comparative advantage of growth but whose operating cost is very high in the early stages of growth. If these industries are exposed to the competition of old established foreign suppliers, they would be

stifled in infancy. Consequently, they legitimately need protection for their survival and growth. In Kenya, the clothing, leather, dairy, and sugar industries are heavily protected for their survival and growth. Furthermore, products from these sectors are classified as sensitive products that need protection.

Danju (1997) and Bienen (1990) both support the ISI argument for developing countries, given that most of these countries emerged from the colonial era underdeveloped with dualistic economic structures, comprising of a comparatively large underdeveloped agricultural sector and small modern industrial sector. In their view, the only way to gain political independence and nationalism was for the new government to provide tax incentives and subsidies to enable private manufacturing expansion and public enterprise promotion. ISI was seen as a means of securing a monopoly in the local market by the rising 'bourgeoisie'. While the rationale for ISI is valid, Krueger and Tuncer (1982) caution that the ISI policy should be implemented as long as the input per unit of output is falling rapidly in the protected industries; however, protection cannot be justified for prolonged periods (i.e., ten years) if there is no evidence of cost reductions and productivity gains. They give the example of Turkey, which provided protection to a variety of new industries. These protected industries did, however, not show any systematic tendency for higher growth of output per unit of input as compared to the less protected firms and industries. Balassa (1980) argues that, ISI should be implemented at the point when there is a strong demand for industrial products generated by the primary sector. At this point, the surplus generated as primary output exceeds subsistence needs and is associated with export expansion. This stage of industrial development may be accelerated if natural protection is complemented by tariff or quota protection.

A second argument for ISI is the terms of trade argument as explained by Krugman and Obstfeld (2003) and Suranovic (2004). For a large country that is able to affect the price of foreign exports, a tariff will lower the price of imports and will thus generate a terms of trade benefits. If the

terms of trade benefits outweigh the cost of tariffs associated with the distortions of consumer and producer incentives, then there is a terms of trade argument for a tariff. While the ISI argument is a strong case for protectionism, it is known that government intervention in economic activities tends to bring about rents which can take various forms. These rent-seeking behaviours give rise to activities that are legal, while in other cases rent-seeking takes other forms such as bribery, corruption, smuggling and black markets. There are several costs associated with government restrictions; these include a) tedious paperwork, b) time and resources spent by entrepreneurs in obtaining their licenses, c) the cost of the administrative apparatus necessary to issue licenses. According to Krueger (1974), protectionism can trigger rent-seeking activities which tend to be non-productive; the losses associated with rent-seeking, such as spending by lobbyists, in most cases are transferred to the consumer. The welfare cost of quantitative restrictions, therefore, equals the tariff equivalents amounts and the value of the rents.

Several factors have given rise to trade liberalization; firstly, economic crises caused by external shocks or pressures which usually called for adjustments to bring back equilibrium to an economy. Some of these adjustments include fiscal or monetary reforms that move the economy to a new equilibrium. Most trade policy reforms in Africa were initiated in the 1980s and continued in the 1990s due to price shocks in the world market of important commodities, i.e., the increase in oil prices in 1973. The oil-shock had different impacts on economies. Kenya, for example, heavily relies on imported petroleum products; therefore, increases in oil prices resulted in increases in consumer and government spending, thus worsening the balance of payment deficit.

Secondly, activities of institutions such as the World Bank, the IMF equally led to further trade reforms. The World Bank, under its structural adjustment lending, included trade reforms conditionalities, while the IMF, which aims at assisting countries with deficits to undertake smooth financial adjustments using IMF resources, provided the stand-by loans under its lending

programmes. The conditionalities attached to these loans included trade reforms such as the removal of quantitative restrictions and their transformation to tariffs and import liberalization (Mosley, 1991). The ‘Washington Consensus’, which was considered to be a set of good policies and institutions to be considered by developing countries in achieving economic development, equally played a role in trade liberalization. The Washington Consensus list originally contained ten reforms with trade liberalization being the sixth reform item (Williamson, 2008). The Washington Consensus was subjected to varied interpretations by the Breton Woods institutions and applied to its clientele, most of them being developing and least developed countries.

Thirdly, macroeconomic shocks equally changed the political economic equilibrium since the political economy framework is set in the supply and demand for protection. The demand side constitutes individual preferences and lobby groups who demand for protection, while the supply side constitutes trade policy makers and institutional structures of government (Rajapatirana, 2000; Bienen, 1990). Macroeconomic shocks upset the balance of power among different groups, as the cost of protection accrue to a large proportion of the population, while the benefits of protection are enjoyed by a much smaller group, who in most cases are able to organize and lobby against the removal of a subsidy. In Kenya, for example, the birth of multi-party politics made the majority exercise its choice and ideologies that favour market oriented economies, given the collapse of command economies, and therefore trade reforms such as export promotion were initiated.

Finally, the negotiations preceding the signing of the Uruguay Round Agreement had an impact on domestic trade policies as countries committed to reduce trade barriers and also binding their tariffs. In as much as the domestic crisis caused the initial trade reforms, the Uruguay Round provided a mechanism for further reducing trade barriers and the formation of the World Trade Organization to ensure that countries honour their commitments. Rajapatirana (2000) further outlines why developing countries started actively participating in the trade negotiations: firstly,

intellectual arguments for trade liberalization leading to development were strong and therefore taking part in the negotiations helped developing countries influence the negotiation agenda. Secondly, the special and differential treatment in which countries did not have to reciprocate market access to developing countries was not beneficial. Enhanced market access (EMA), through the General System of Preferences (GSP) as explained by Oyejide (2002), was one major component of Special and Differential Treatment (S&DT) that was expected to produce results. However, the GSP is not a multilateral agreement, and preference granting countries have exercised rights to exclude or graduate specific countries from GSP benefits. Such factors led most countries to participate/be members of the WTO as decisions reached are a single undertaking and not unilateral as in the case of the GSP system.

2.2.2 Theoretical Foundations of Poverty

It is important, for the purposes of this study, to first define the concept of welfare and how it relates to poverty. Welfare is the provision of a minimum level of well-being deemed to constitute a reasonable set standard of living in a society. When one lacks this well-being he/she is deemed to be poor. In this study, household welfare will be examined using poverty incidence at the household level, so that households can be classified as poor or non-poor as a way of describing their level of welfare. Poverty can be defined as a state where a person lacks certain material possessions that makes him/her not be able to meet a certain level of standard of living and also to participate in society with dignity. There have been several definitions of poverty, and to an extent, there is lack of agreement on the definition of poverty. Authors such as Sen (1979) and Foster *et al.* (1984) have opted not to deal with definitional issues but focus on measurement. Coudouel *et al.* (2002) define poverty as ability of household to possess enough resources or abilities to meet their current needs. Based on the Participatory Poverty Assessment (PPA) by the World Bank (2002) on the definition

of poverty, they found that many factors converge to make poverty a multidimensional phenomenon, namely, poverty was defined as lack of what is necessary for material well-being such as food, housing, land and other assets. It also entailed psychological deprivations such as lack of voice, power and independence which subjects them to exploitation. The absence of physical infrastructure such as roads, transport, water and health facilities emerged as critical issues that define one's poverty status and lastly lack of physical, human, social and environmental asset increased poor people's vulnerability and exposure to risks World Bank (2002).

The numerous definitions of poverty, given its multidimensional nature, require proper conceptualization in order to facilitate measurement. Sen (1979) conceptualizes poverty in terms of 'capabilities and functionings', with capability in this case representing the ability to convert entitlements (set of commodities) such as food, information or even healthcare into functionings that have value. Functionings represent things that people can be able to do or be done for in their lives. Such functionings include being well nourished, literate or avoiding disease so that one is able to participate in the daily life within a community set up (*ibid*). Entitlement failure can occur when people are, in principle, capable of accessing commodities such as education; however, education might not be available within the set of commodities of entitlement. Capability failure can occur when people with entitlements cannot translate their entitlements into capability; such is the case where a blind person with income cannot read. Lastly, functioning failure may occur when entitlement such as information is available but people cannot translate the information into functioning because they cannot read. Sen (*ibid*) define poverty as a lack of a combination of entitlement and capability failure so that useful functionings cannot be achieved. Sen's conceptualization of poverty forms the capability school of thought.

The World Bank (2002) attempts to provide a much broader characterization on poverty than the capability school of thought. The World Bank defines poverty in terms of lack of

opportunity, insecurity and vulnerability and lack of voice in society. Lack of opportunity includes traditional concepts of income, consumption, lack of assets which can be categorised into: human assets such as skills and good health, lack of natural assets which include land and livestock, lack of physical assets such as access to infrastructure, housing or lack of access to credit or social assets such as networks of contracts that can be used in times of need. Poor people might not be able to translate the assets they have to meet their basic needs because of insecurities and vulnerability to risks such as natural catastrophes, disease, crime and violence. Poor households also experience being voiceless or disempowerment due to discrimination on grounds of gender, ethnicity or even race. The World Bank, in its conceptualization of poverty, developed an approach of aggregating measures of different dimension of poverty and well-being using a welfare function. This approach uses the economic concept of utility where a consumption level determines utility for an individual or household, this is also known as the 'income approach to poverty' (Dauphin and Asselin, 2001).

The Basic Needs School (BNS) of thought builds on the basic needs definition which refers to those fundamental requirements necessary for survival. BNS, as explained by Dauphin and Asselin (*ibid*), therefore, hinges on humanitarianism. It does not create a new theory; it is more concerned with identification of a set of concrete basic achievements corresponding to the satisfaction of some basic needs, which include food, water, sanitation, shelter, clothing, basic education, health services, and public transportation. The BNS arose in the 1970s in reaction to Welfarist antipoverty policies that focused on increasing productivity, employment, etc., as ways of increasing incomes that would result in poverty alleviation. Though not a new idea, it was advocated for by the International Labour Organization (ILO) in 1976 that, development planning should include, as an explicit goal, the satisfaction to an absolute level of 'the basic needs of the people', minimum requirements for private consumption (food, shelter, clothing), minimal access to community-provided services (water, sanitation, transport, health, education), and, implicitly,

participation by people in decision making as it affects them. The BNS argued that little attention was given to the consumption side and furthermore, the Welfarists assumed that market forces would spread the benefits of growth widely and government actions and social services would spread benefits downwards. While Welfarists locate equity in the space of resources, BNS situates it in the space of achievements. These achievements are in six areas; nutrition, primary education, health, sanitation, water supply, housing and related infrastructure (*ibid*). Poverty, according to BNS, is the non-achievement of a set of identified basic needs.

For obtaining a working definition of poverty for this thesis, we need to identify complementarities of the three schools of thought that would then provide an all-encompassing definition that would then assist in identifying indicators for examining characteristics of the poor. Access to basic needs such as food, clothing, education, proper shelter and sanitation, access to proper health care, etc., will affect the capacities such as being able to be adequately nourished, clothed, sheltered, being able to appear in public without shame. This results in proper functioning such as being adequately nourished/sheltered or taking part in the life of the community, etc. Ultimately, when one is able to achieve an adequate level of functioning, a certain level of utility is achieved. Poverty is the absence of these basic needs that will result in unacceptable capacities for achieving such functioning which, consequently, result in low utility levels implying the absence of well-being or poor welfare. The different schools of thought focus on different aspects of poverty which, therefore, brings out the multidimensional aspect of poverty. Economic well-being or satisfaction of basic needs and capacities of individuals are not directly observable. It becomes appropriate to develop a set of indicators that are measurable and close to a particular dimension of poverty.

2.2.2.1 Poverty Characteristics and Indicators

To examine variables that characterize the poor, it is important to divide them into financial and non-financial indicators. Musgrove and Ferber (1979), while examining the characteristics of the poor in Bogotá, Medellín and Lima, note that the characteristics must be (1) easy to establish or measure, (2) accurate in identifying the poor and the non-poor and (3) relevant to the design or evaluation of public policies. The series of characteristics to be identified should be associated with poverty, *ex ante*, and the characteristics should be easy to obtain through a household budget survey. For financial characterization of the poor, consumption income per person is the best indicator to examine because consumption income is reported more accurately by households and is less prone to transitory variations, which are more common with income (*ibid*). The level of consumption is determined by income sources such as wages and salaries, income from independent employment, receipts from capital, public and private transfers, transitory receipts and unclassified income. Labour income is made up of both wages and salaries and income from independent sources. Musgrove and Ferber (1979) further find that, labour income forms the greatest proportion of total income because it is the most concentrated source of income for the households examined. Labour income is hardly less than half of the total income for the groups examined. Furthermore, most groups' shares exceeded 70 per cent. They find that if a household has a low labour income, it has a high probability of being classified as poor.

The non-financial variables that characterize the poor can be based on the dwelling in which people live in. Following the work by Musgrove and Ferber (1979), some dwelling characteristics were also found to be important in characterizing the poor; occupation of a house without owning or renting increased the chances of being poor by 20 per cent. Furthermore, 70 per cent of poor households were found to share facilities like toilets and kitchens in all cities that were studied. Most of the dwellings were made of scrap metals, fibre boards and lacked piped water or electricity.

Education level, which is an individual characteristic, is a very important characteristic for classifying the poor; education level is also closely associated with occupation (Musgrove and Ferber, 1979). Oiro (2002), while examining poverty and employment in Kenya, found that education was very significant in determining whether one was above or below the poverty line. As the level of education rose, the chances of being poor decreased. Attaining a certificate of primary education and higher level of education was significant in determining the probability of not being poor. The occupation of an individual was also an important characteristic that determined whether one was poor or not; for example, in the same study, being a skilled private or public sector employee increased the probability of being above the poverty line. Musgrove and Ferber (1979) equally found linkages between consumption per head and average incomes of household working members.

According to the Poverty Reduction Strategy Paper (PRSP) for Kenya (2000-2003), the poor tend to be clustered into certain social categories such as (1) the landless, (2) people with disabilities, (3) female-headed households, (4) households headed by people without formal education, (5) pastoralists in drought-prone districts, (6) unskilled and semi-skilled casual labourers, (7) AIDS orphans, (8) street children beggars, (9) unpaid family workers, (10) large households (11) single mothers and fathers, (12) subsistence farmers, (13) urban slum dwellers, and (14) unemployed youth. In conclusion, there are several indicators that can be used to characterize the poor as shown in Table 2.1; however, certain indicators like clothing are subject to taste, fashion and preferences and cannot be used to determine, a priori, who is poor. Consumption income will remain the most commonly used indicator to characterize the poor. It will, therefore, be used in this study to classify households as poor or non-poor. Other characteristics such as dwelling places will be used to reinforce findings based on consumption income.

Dauphin and Asselin (2001) have classified poverty indicators by four characteristics, namely, area, level, frequency, and age-sex group. Area implies domain or social aspect of an

individual where poverty can be revealed. These include nutrition/food security, health/sanitation, income, birth control, assets, education/information, housing, land/agriculture, civil security, personal dignity, public expenditure/good, credit, social inclusion, vulnerability to crisis, housework, economic infrastructure, labour, rights/liberties, self-perception, clothing, etc. Level means the lowest unit of observation that can reveal an aspect of poverty from which statistical inference can be made. This may be at regional, country, community, household or individual level. Frequency focuses on the period or interval within which measurement is made. This could be short-term, less than one year, medium-term (3-5 years) or long-term that is normally more than five years. Lastly, certain indicators could be age or sex specific and, therefore, if they are to be articulated, age groups such as 0-12 months, 1-6 years, 6-15, 16-45, 45-60 and even the old 60+ must be considered.

Following the above classification, the commonalities of classification of poverty indicators is by level, frequency and age-sex groups. Fundamental differences will occur when classifying indicators by areas or domain as the three schools of thought hold different tenets with respect to poverty. Table 2.1 provides a summary of the classifications by domain following the different schools of thought.

Table 2.1: Poverty Indicators

	Welfarists	Basic Needs	Capability School
Area	<ul style="list-style-type: none"> • Employment Income • Expenditure 	<ul style="list-style-type: none"> • Nutrition/food security • Clothing • Education • Sanitation • Housing 	<ul style="list-style-type: none"> • Self-perception • Personal dignity • Rights/liberty • Civil security
Level	<ul style="list-style-type: none"> • Individual • Household • Community • Region • Country 		
Frequency	<ul style="list-style-type: none"> • Short –term • Medium Term • Long Term 		

	Welfarists	Basic Needs	Capability School
Age–Sex group		<ul style="list-style-type: none"> • New Born (0-12 months) • Preschool (1-6) • School age (6-15) • Adult (15-45) • Adult (45-60) • Old age (60+) 	

Source: Dauphin and Asselin (2001).

The domain provides the point of departure for the three approaches; however, these approaches are related in that the basic needs such as being adequately nourished and having proper shelter affect functionings such as appearing in public without shame or taking part fully in community life which in turn provide utility. It therefore follows that, while the different schools of thought have postulated different approaches to the concept of poverty, its multidimensional nature will entail using a cocktail of indicators favoured by different schools in analysing poverty.

2.2.3 Linking Trade Liberalization and Poverty

Section 2.2.1 has provided the theoretical foundation for trade liberalization and found that trade liberalization affects commodity prices, wages and consumption. All these variables are indicators of poverty as discussed in section 2.2.2. These two sections provide an introduction for linking trade liberalization, which is a macroeconomic issue, and poverty, which remains a microeconomic problem that manifests itself at individual or household level. McCulloch *et al.* (2000) acknowledge that it is not easy to identify trade liberalization as the main shock causing poverty; for example, poverty reduction was attributed to trade liberalization that had taken place in East Asia, however, this association was not sufficient to show that it was trade liberalization per se that caused the improvements in poverty indices. In contrast, mixed evidence that trade liberalization accompanied increasing poverty in Latin America and in Asia in the 1980s is not

sufficient to prove the opposite. Therefore, the only way to examine the trade liberalization-poverty impact is to examine the fragments of empirical evidence that exist on the potential pathways; this implies that, the contexts under which the analysis was taken must be clearly understood. Authors such as Thirwall and Lopez (2008) and McCulloch *et al.* (2000) have found that, implications of trade liberalization on poverty are case-specific and will depend on factors such as the characteristics of the poor, the components of trade liberalization used, and the structure of the economy.

This section introduces the wider concept of trade and poverty and then narrows the focus to trade liberalization and poverty. From the onset, the relationship between trade and development is an important policy issue, as it is concerned with how international trade can be used to effectively support development through national and international trade policies. Extensive literature on poverty has focused on national causes of poverty such as household characteristics (education level of members, access to credit, land, employment and location). The problem of poverty was first placed in the global context by World Bank in 1990 according to UNCTAD (2004). However, most analyses continued to focus on poverty at the national level. The proliferation of studies on poverty and trade became focal when international and national policies begun to, first, focus on poverty reduction and, secondly, the social outcomes of globalization became the focus of debate in political arena in the north and south economies.

Trade can either affect poverty through direct links such as cost of living, employment and wages, and government revenue for public good consumption or indirect links such as development and utilization of productive capacities, which include capital accumulation in the form of human, physical, social and organizational capital, structural change and technological progress. These productive capacities, which are linked to different aspects of trade, are also sources of economic growth as shown on Table 2.2 (UNCTAD, 2004).

Table 2.2 : Mechanisms Through which International Trade Affects Economic Growth

Source of Growth	Associated Aspects of Trade
1. Static and dynamic efficiency gains arising from specialization depending on the current comparative advantage	<ul style="list-style-type: none">• Openness• Exposure to international trade competition
2. Exploitation of a vent of surplus	<ul style="list-style-type: none">• Export growth, especially natural resource-based and tourism
3. Increased capacity utilization	<ul style="list-style-type: none">• Increased import capacity
4. Increased investment	<ul style="list-style-type: none">• Economies of scale through selling to domestic and external markets• Reduced costs of capital goods through imports• Reduced cost of wage goods through imports
5. Increased technology acquisition and learning	<ul style="list-style-type: none">• Buyer-seller links• Machinery and equipment imports embodying foreign technology• Exports that have great potential for learning through technology transfer
6. Structural change	<ul style="list-style-type: none">• Composition of exports and imports• Product and market diversification
7. Releasing the balance of payment constraint on economic growth	<ul style="list-style-type: none">• Export growth• Import substitution• Reduced income elasticity of imports• Increased elasticity of export growth with respect to growth of world income• Reduction of non-essential income

Source: UNCTAD (2004).

These mechanisms through which aspects of trade economic growth, as explained by UNCTAD (*ibid*), are exploratory and theoretical in nature, as the empirical links between trade liberalization and economic growth have remained subject of much debate as will be seen in the empirical evidence review provided in the next chapter. Openness and exposure to international competition can result in specialization in areas of comparative and competitive advantage which can result in economic growth, especially when there are structural changes related to the composition of exports and imports and product and market diversification. Secondly, increased imports due to open trade with strong buyer-seller links tend to be accompanied by transfer of technology which is a driver of economic growth. Increases in productive capacities and efficiency will also encourage capital investment given that the ability of expansion will be at constant returns to scale. Such investments,

which are foreign in nature, tend to be accompanied by technology transfers which further enhance productive capacities. Increased exports and reduction in income elasticity of imports tend to reduce the balance of payment challenges which, in turn, increase economic growth.

The increase in the development and utilization of productive capacities results in the utilization of previously idle resources, and in the case of export growth in natural resources or tourism based resources. There is an opportunity for 'vent of surplus', especially where the main source of capital is land like most sub-Saharan Africa countries. All these factors tend to affect employment which has a direct link to poverty and well-being. Employment will improve general well-being as there will be improvements in consumptions and incomes, food security and human development through investment in health, education, housing, water and sanitation; moreover, the efficient use of productive capacities also means sustained poverty reduction.

2.2.3.1 Trade Liberalization and Poverty: Theoretical Linkages

The debate on trade liberalization and poverty linkages has been the focus of both national and international debate. Several studies have examined the issue of trade liberalization and poverty, for example, Winters (2002), Bannister and Thugge (2001), Srinivasan and Bhagwati (1999), and Berg and Krueger (2003). However, UNCTAD (2004), while acknowledging the importance of these studies, point out that these studies have focused on trade liberalization and poverty, which narrows down the subject of trade and poverty. Secondly, this approach is likely to exaggerate the role of trade policy in trade development and the role of trade liberalization within trade policy. Thirdly, trade liberalization tends to be prioritized over poverty reduction, in that, trade liberalization is taken as a given, hence efforts are geared towards making poverty reduction objectives compatible with it.

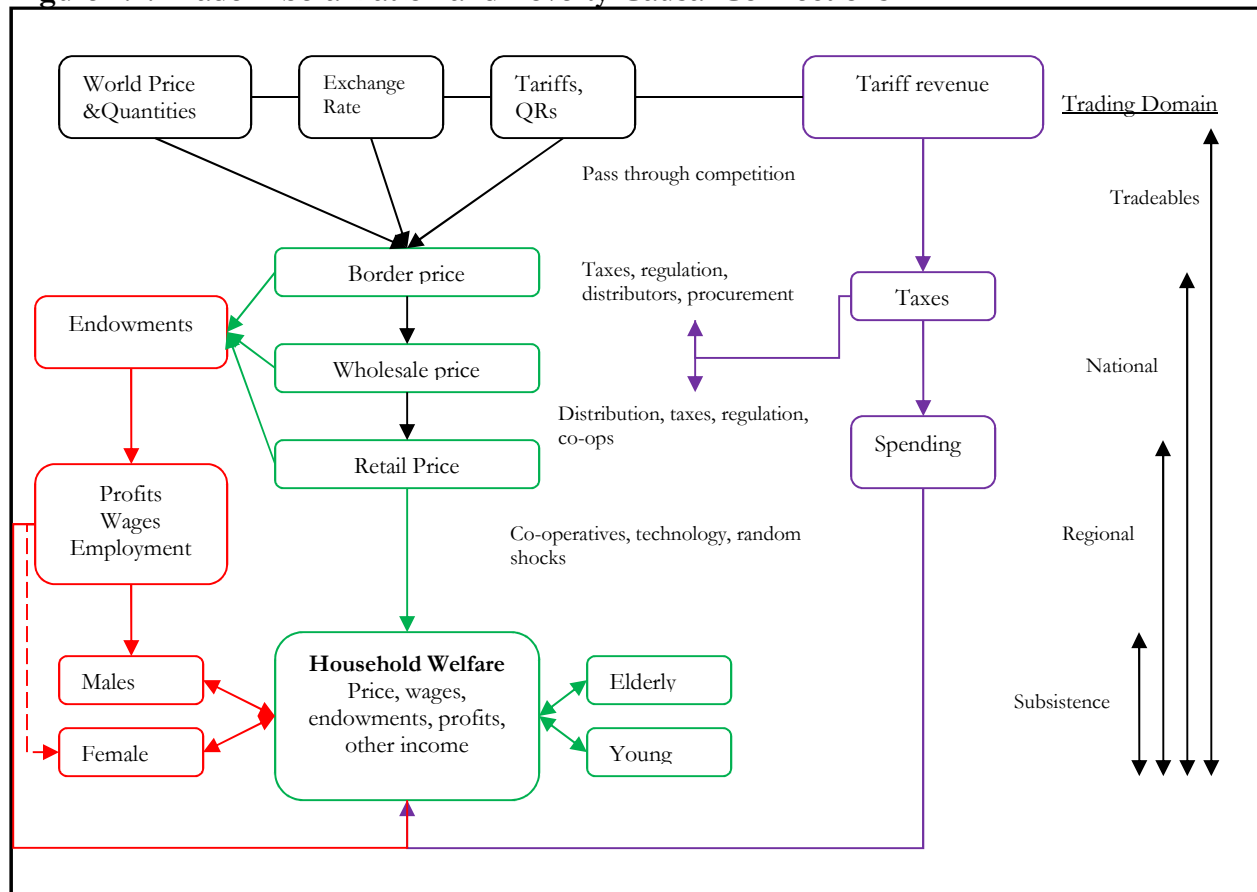
Lastly, it focuses on the short-term efficiency and welfare improvements when resources are allocated while ignoring the long-term dynamic effects of indirect changes in patterns of trade.

Based on the criticism by UNCTAD (2004), it would be important to acknowledge that it is not easy to distinguish the effects of trade liberalization from other reforms and from the effects of macroeconomic stabilization, internal price liberalization, changes in foreign exchange rates or the system, liberalization of capital account, etc. However, Berg and Krueger (2003) argue, firstly, that trade is a very important component of reform; secondly, that trade openness has positive spillovers on other aspects of reforms so that there is a strong correlation with other pro-reform policies, making openness fundamental part of a reform package, and, finally, there is little evidence that other reforms must precede an effective trade reform. Furthermore, it is also worth noting that most developing and least developed countries are not able to affect the world prices given that they are small economies and do not have sufficient clout to influence the outcomes of the ongoing trade liberalization negotiations at the WTO. In this regard, trade liberalization is taken as a given by most developing and least developed countries, and as a result, most countries undertake trade liberalization and examine complimentary policies that work towards poverty reduction.

In this study, the effects of trade liberalization on poverty will be analysed while taking account of the development approach proposed by UNCTAD. In doing so, we will be able to draw questions that need to be answered or issues that need to be incorporated in developing a trade liberalization and poverty analysis for Kenya. In narrowly focusing on trade liberalization and poverty using the development approach in the next sub-sections, the first step will be to draw the linkage between trade liberalization and poverty while encompassing issues of international trade, productive capacities, and poverty. The analytical question is how trade liberalization affects poverty. This approach will provide insights into how the economy works and this will provide theoretical linkages between trade and poverty. Secondly, from this approach we will be able to seek empirical

evidence on the connections already identified, and lastly, this evidence can be used to draw an overall picture based on the linkages already identified for policy purposes. McCulloch *et al.* (2000), provide a framework for analysing the trade liberalization-poverty connection, as shown in Figure 2.2. The connections of trade liberalization to poverty can largely be divided into price transmissions through the distributive, through enterprises and government spending.

Figure 2.2: Trade Liberalization and Poverty-Causal Connections



Source: McCulloch *et al.* (2000).

The transmission of a price shock based on changes in world prices and transmitted to the households through the distributor channel, i.e., through the border, wholesale and retail price before being transmitted to households. A combination of world price, exchange rates and tariff rates constitute the post-border price. The goods will face domestic taxes, regulations and

procurement requirements that may increase transaction costs resulting in the wholesale price. Distribution of the goods to local areas or points faces more taxation, regulations and distribution networks that would add more costs to a commodity resulting in a higher retail price. From the retail centre, the goods are transmitted to the household. The ability of households to translate price signals into welfare depends on the household's ability to switch consumption, household characteristics such as labour skills, endowments, technology and productivity. Export goods emanating from household production will take the reverse path through the marketing channels; total production will constitute national supply of export goods sold abroad at prevailing world market prices.

Trade liberalization can also be linked to poverty through its effects on enterprises, i.e., units producing and selling output and employing labour from outside its own households. In the enterprise sector, there is demand for home enterprise output which is affected by incomes, exports, imports and domestic prices. Secondly, firms provide output which serves the domestic and export market. Such output is affected by both domestic and export prices, the costs faced when firms hire labour and capital and factor input-output coefficients which are also affected by technology. Lastly, the demand for factors is matched by supply in the factor markets. This happens through factor price movements which affect wages and employment - these two variables directly affect poverty. Factor movements could assume that employment is fixed and wages are flexible so that price transmissions from trade liberalization will affect price of inputs and technology used, as is the case of the Stolper-Samuelson theory. Alternatively, wages can be fixed and employment varies so that any amount of labour can be obtained with the prevailing wages

Lastly, trade liberalization reduces tariffs which affect government revenues especially when tariff peaks, exemptions and quotas are removed. In situations where governments want to maintain a balanced budget or as low deficits as possible, overall expenditures are usually reduced and the

most common worry is that social and core poverty alleviating programmes such as health care and education are always affected. In order to maintain the revenue levels, new compensating taxes can be introduced on goods that are predominantly consumed by the poor.

2.3 TRADE LIBERALIZATION AND POVERTY: EMPIRICAL EVIDENCE

2.3.1 Economic Growth

Economic growth is the increase in the goods and services produced in an economy. It is conventionally measured as the percentage increase in the gross domestic product in real terms. From international trade theory, it is expected that trade liberalization will lead to an increase in economic growth. Research on the impact of trade liberalization on economic growth has been the subject of various studies which have found varied relationships between trade liberalization and economic growth. Dollar and Kraay (2001a) examined the relationship between openness and growth using cross country regression analyses, where they categorized countries into globalizers and non-globalizers based on trade volume and tariff changes. They found that the average incomes of the poorest fifth of society rose proportionately with GDP per capita for the 80 countries they analysed over a forty-year period. Frankel and Romer (1999) attempted to establish trade economic growth linkages by examining whether openness caused growth or whether countries that grew faster tended to be those that opened up. They examined the effect of the geographic component of trade and found that a rise of one percentage point in the ratio of trade to GDP increased income per person by at least one-half per cent. Trade appeared to raise income by stimulating the accumulation of physical and human capital and by increasing output for given levels of capital.

Greenaway *et al.* (1998) used a dynamic model of growth to analyse the impact of liberalization on growth using a dataset of 73 countries. They found that liberalization impacted

favourably on GDP growth per capita in the relatively near-term. Edwards (1998) equally used comparative data for 93 countries to examine the robustness of the relationship between openness and total factor productivity growth. He found that using the openness indicator, more open economies experienced faster productivity growth. Vamvakidis (1999) compared the growth performance of countries that liberalized multilaterally as compared to countries that liberalized through regional trade agreements, he found that countries that liberalized broadly grew faster both in the long and short run as compared to those that liberalized through regional trade agreements. Sachs and Warner (1995) constructed a composite index that used tariff quotas, quota coverage, black market premiums, social organization and existences of export market boards to measure openness. They then examined the impact of post-war trade liberalization on economic performance in the developing countries. They found that open trade leads to higher growth rates in poorer countries than in richer countries.

While there is empirical evidence supporting the positive impact of trade liberalization on growth, there are several authors who found no link between trade liberalization and economic growth; Harrison and Hanson (1999), in an attempt to understand the effects of trade reform, examined evidence on trade reform and long-run growth. In their analysis, they showed that the measure of openness as presented by Sachs and Warner (1995) did not capture trade policy per se, since the measure is a composite index of trade, exchange rate, and other policies, all of which could have very different effects on growth, and as a result they found that the Sachs and Warner measure failed to establish a robust link between more open trade policies and long-run growth. Levine and Renelt (1992) further examined the sensitivity of an empirical linkage between growth rates and different economic policies and found that, for a large variety of trade policy measures, there was no robust correlation with growth when the equations included investment share. Even after distinguishing partial equilibrium models of growth that seemed robust from those that were fragile,

most of the econometric specifications in which macroeconomic policy indicators had a strong correlation with growth were still fragile. They recommended that it would be better to examine the interactions of macroeconomic policy regimes instead of the influence of a particular policy, given that national policies appeared to be complex. Tybout (1992) similarly found no stable predictable correlations between productivity and crude indexes of trade regimes using World Bank data on Chile, Colombia and Morocco's manufacturing sectors.

Razzaque *et al.* (2003) analysed the relationship between trade liberalization and economic growth in Bangladesh by making use of trade dependency ratios, namely, the ratio of imports of consumer goods to GDP and implicit nominal tariff rate openness measures. While they found increasing returns to scale in the production of aggregate output, the trade liberalization indicators were found not to be significant for economic growth and did not have any influence of total factor productivity. However, the trends associated with post-trade liberalization period were higher (4.8%) as compared to pre-liberalization (3.6%). Raihan (2008) equally examined the relationship between trade liberalization and growth in Bangladesh in the context of the manufacturing sector, and found no statistically significant relationship between trade liberalization and growth.

The main challenge arising from the studies that examine the relationship between openness and growth is that several indicators of openness have been used. These indicators, as listed by McCulloch *et al.* (2000), are constructed and their statistical relationships with growth are established. Most of these indicators have been criticized by Rodriguez and Rodrik (1999), Tybout (1992), and Levine and Renelt (1992) as being statistically weak or fragile since they are not robust. It is evident that the impact of trade liberalization on growth has not been clearly established; McCulloch *et al.* (2000) highlighted some of the factors that hinder the establishment of an unambiguous link between trade liberalization and growth, these include the difficulties of measuring the degree of openness of a country when there are mixed instruments such as tariffs, quotas or quantitative

restrictions. In addition, good trade policies require complementary macroeconomic policies for positive outcomes, and, as argued by the World Bank (2002), the success of trade liberalization that has a positive impact on growth would also depend on complementary macroeconomic management.

2.3.2 The Price Transmission Pathway

2.3.2.1 Prices

Price changes induced by trade liberalization can take place through the distributor sector or through the domain of trade. Changes through the distributor channel commence at the border, the post-border price of an import good is determined by the import price of the good, the tariff faced at the border and the exchange rate. After the border, the good faces domestic taxes and other associated costs such as transportation. The price at this level is referred to as the wholesale price. From the distributor centre, the good is sent to other distribution points, where there are more taxes and regulation. Other labour managed enterprises are also involved at this stage with the resulting price being the retail price. From the retail level, goods are distributed to the households or to individuals. The household level is where the effect of liberalization on prices is translated into welfare.

The Factor Price Equalization theory of the H-O model states that, with free trade, prices of output are expected to equalize, the equalization of output prices will in turn lead to an equalization of factor prices. With international trade, it is therefore expected that there will be price changes (increases or decreases). Several studies have been undertaken on the household impacts of price changes. Balat and Porto (2006) simulated the effects of price increase in the cotton sector in Zambia due to trade liberalization on the vulnerable small holder farmers. They found that the cotton production shares of those at the bottom of the income distribution, who were mostly poor

farmers, would increase. With regard to international market access, they found that a 12.7 per cent increase in world prices would benefit cotton producers across the entire income distribution, this gain would be approximately 1 per cent of household income. These gains would only accrue to households involved in cotton production and not those in subsistence farming. They however found that the magnitude of the benefits was very small and the only way to gain full benefits was the use of complementary policies.

Ianchovichina *et al.* (2001) found different results when they simulated the price changes on income distribution and poverty in Mexico. They concluded that trade liberalization benefited people in the poorest deciles more than those in the richer ones. They further established that, tariff reform would have positive effects on welfare for all expenditure deciles when they simulated the effects of Mexico's potential unilateral tariff liberalization. Similarly, Filho and Horridge (1996) simulated the potential effects of import prices and export demands based on the Doha negotiations on poverty-income distribution in Brazil. They found that the gini-coefficient was likely to fall by 0.21 per cent; this change was quite minimal because the Brazilian economy is not open to external trade since it has a very large domestic market. There were higher positive changes in household incomes of the lowest income households. In terms of poverty intensity, the FGT index of income shortfall decreased for most of the household income classes, particularly the lowest 30 per cent, implying an improvement in income distribution. On the contrary, this improvement was not sufficient to drive large numbers of persons out of poverty.

Ravallion (1989) examined the effects of increase in staple food prices under induced wage responses for rural poor Bangladesh. He found that in a partial equilibrium analysis, the rural poor lose, from an increase in the relative price of staple food. Using a steady-state equilibrium, the rural population rural rich are likely to gain from such a price increase, but in the long run the welfare of a typical poor household is more likely to be neutral to changes in the price. The long-run effects will

vary across households; the poorest household would gain more from price increases as compared to the less poor households. In his estimation, there should be a 3-4-year time lapse for changes in prices not to affect a poor household negatively.

Minot and Daniels (2002) examined the effects of cotton price changes in rural Benin, and found that, in the short run, that is when cotton farmers do not adjust their production patterns to price changes, a 40 per cent decrease in cotton price will raise the incidence of poverty for cotton farmers from 37 per cent to 59 per cent, while the average incidence of poverty for all farmers will rise by 8 percentage points. This in absolute terms translates to 334,000 people falling below the poverty line due to 40 per cent price decrease in cotton. However, in the long run, when farmers relocate their resources to other crops, the decrease in cotton prices will lead to a 20-21 percentage point increase in poverty incidence for cotton growers and a 6-7 percentage point increase for overall rural poverty.

Ravallion and Van de Walle (1991) simulated hypothetical effects of the liberalization of Indonesia's external rice trade by increasing (decreasing) rice prices by 10 per cent under different reform scenarios. They found that in a reform scenario where the government used its tax/subsidy implements to make compensatory transfers between rice producers and the non-poor, such that the rice incomes of poor producers are unaffected by the price change, a 10 per cent increase (decrease) in price would increase (decrease) aggregate poverty. They further found that the effect on poverty of a 10 per cent increase (decrease) in prices, leaving producer incomes unchanged, depends crucially on how the necessary compensation to producers is financed; aggregate poverty will increase (decrease) if it is financed by the non-poor while the direction of the effect is reversed for all poverty measures if it is financed equally by all consumers, whether poor or not.

2.3.2.2 Income and Income inequality

Dollar and Kraay (2001a) first categorized countries as either globalizers or non-globalizers based on changes in trade volumes and tariff since 1980. They then determined the statistical relationship between trade volume and the gini-coefficient. They compared income growth rates for average households versus the poorest quintile and found no general trend in inequality among countries classified as globalizers, who tended to have higher rates of growth than non-globalizers. This led them to the conclusion that globalization tended to be associated with a decline in absolute poverty. They further examined the existence of systematic relationship between changes in trade volumes and changes in the income share of the poorest and found no relationship. Additionally, no statistical relationship between changes in trade volumes and changes in income inequality could be established.

Cockburn (2001) found that trade liberalization in Nepal encouraged a reallocation of resources from agricultural sector, particularly heavily protected inward oriented paddy and other food crop sectors, to the services and non-manufacturing industrial sector. This, in turn, led to a fall in the remuneration of land and unskilled labour relative to the skilled labour wages and non-agricultural capital. These changes tended to favour urban over rural households. Income inequality may be affected by trade liberalization as illustrated by Cockburn (2001), where before liberalization, the gini index for the Nepalese urban area was 47.52 and this went up to 47.74 after liberalization. The Terai hills and mountain areas had a change of -0.04 and 0.08, respectively, for the gini index after liberalization

Minot and Daniels (2002) examined the impact of changes in cotton prices on rural poverty in Benin; they found that reducing the farm gate prices of cotton by 40 per cent would reduce the income of cotton growers from 99,437 FCFA per person to 78,370 FCFA per person, which equalled a 21 per cent reduction in income. This price reduction would, in turn, lower average

income (including non-cotton) growers by 7 per cent, from 105,203 FCFA per person to 97,944 FCFA per person. The price changes had different impacts on the income categories in the short run, the greatest reductions were in the high income households. About 30 per cent of households in the third income quintile and 8 per cent in the fourth quintile dropped below the poverty line. In the long run, only 1-4 per cent of the third quintile group rose out of poverty. It should be noted that in their case, the long-run results were sensitive to the supply elasticity used. In Philippines, Bautista and Thomas (1997) ascertained that import rationing had adverse effects on household's incomes with the losses increasing from 6.3 per cent to 9.7 per cent from the base-year incomes. The only beneficiaries were the metro manila households, who are urban dwellers. However, the imposition of a 4 per cent import surtax incomes of all household groups declined with the heaviest burden on the metro manila households.

Examining the overall impact of trade liberalization on households in Nepal, Cockburn (2001) concluded that trade liberalization favoured urban households as opposed to Terai (fertile plains) and Hill/mountain households. Poverty fell in urban areas and appeared to increase in rural areas, particularly among the moderately poor as opposed to the very poorest. The absolute impact of trade liberalization, whether it is positive (in the urban areas) or negative (in the rural areas), generally increased with the level of income. In fact, there appeared to be a very strong, mostly positive, impact on the very richest individual. This explains the finding of increased income inequality in the urban and hill/mountain regions. Fofack *et al.* (2001) further note that, in Burkina Faso, the high income inequality is likely to have negatively affected household welfare through the reduction in the poverty response to growth. Poverty growth elasticity decreased from -3.2 per cent to -1.9 per cent. The negative sign is consistent with the view that rising incomes should translate to declining poverty.

Minot and Goletti (2000) offered an extensive examination of how rice market liberalization in Vietnam affected income and poverty. They were able to ascertain that export liberalization raised rice prices within the country, particularly in the country's rice exporting areas. The higher prices had a positive effect on rural incomes, and are generally favourable with regard to the number of people in poverty. Since rice production is quite labour intensive in Vietnam, a rise in rice price would increase demand for agricultural labour, and consequently the agricultural wage rate. Higher prices would then lead to a greater decrease in poverty, particularly in households that derive a share of their income from agricultural labour

Löfgren (1999) examined how reduced agricultural and industrial protection would affect Moroccan household in the short run. He established that trade liberalization in agriculture would result in gains for the country as a whole, while the rural will lose out. Reduced agricultural protection would generate significant aggregate welfare gains, at the same time a significant part of the disadvantaged rural population would lose strongly. The impact of industrial tariff cuts was quite small and less unfavourable for rural households over a slightly longer time frame where labour migration between agriculture, the rest of the rural economy and urban areas was feasible.

Harris (2001) compared the 1993 system of agricultural supports to the less distorting 1996 system in Mexico and found that in the absence of exogenous shocks, the newer system (less distorting system) was better for the economy. All macroeconomic indicators increased, even the agricultural sector experienced increase in output. Because of the strong linkages between rural production and urban production, the urban sector also benefited from the policy. When the economy was subjected to a negative shock, such as exchange rate devaluation, the inefficiencies of the 1993 system were negated by directing resources from the protected crops towards the export crops. Although the macro economy was generally better off with the 1993 system following the

shock, urban households were made worse off. Given their size in the overall population, reverting to the protectionist 1993 system would be politically and socially infeasible.

Bautista and Thomas (1997) examined the income effects due to trade policy adjustments (quantitative restrictions and import surtax) that had been put in place to deal with an unsustainable current account balance in Philippines. At the macro level, GDP expectably decreased under a regime of quantitative import restrictions and, less markedly, with the imposition of general import surtax. The adjustment, through the reduction of tariffs to a low and uniform rate, led to a larger GDP. This favourable result, however, was counterbalanced by a substantial loss in government income. Moving to general import surtax represented an improvement in the non-Metro Manila households as they would lose less. They found that reducing tariffs to a uniform 5 per cent (as targeted officially by 2003) not only improved the average income of each household group, but also raised the incomes of small-farm and "other rural" households relative to those of the more affluent Metro Manila, "other urban", and large-farm households. The anti-agriculture bias of restrictive trade policy is part of the explanation for the favourable income and equity effects of import liberalization. They conclude that, in Philippine rural households, especially the lower-income ones, had been heavily penalized by the imposition of import rationing and general import surtax in response to past current account deficits that were unsustainable.

Löfgren *et al.* (2001) explored the effects of external shocks and domestic policy changes aimed at poverty alleviation in Malawi. The external shocks reflect episodes to which Malawi's economy had been exposed to changes in the international prices of tobacco and petroleum products and fluctuations in the real exchange rate. They simulated two types of poverty-alleviating domestic policy shifts: a public works program and a land reform program. The public works program functioned as an absorber of negative shocks elsewhere in the economy. The land reform program introduced a structural change in the distribution of factor incomes in favour of the poor.

The results for the simulated external shocks confirmed that Malawi's economy was highly sensitive to external shocks of the magnitudes that the country had experienced in recent years. The consequences were particularly negative for the non-agricultural population.

2.3.3 The Enterprise Sector Pathway

The labour market is an important channel of transmission of trade policy reforms. From the Stolper-Samuelson Theory, it is expected that trade liberalization will result in the increase in the factor of production that is abundantly used in the production of that good. Manda (2004) examined the impact of globalization on employment and earnings in Kenya's manufacturing sector. He found that between 1994 and 2000, there was a decline in the proportion of the manufacturing workforce, with primary education accompanied with an increase in the workforce with secondary and higher level of education. In his analysis he concluded that, with more trade, there was a tendency to shift towards more skilled labour. This finding is contradicting the H-O theory, where more trade should make a country shift towards more abundant resource (unskilled labour). The report further shows that from the 64 enterprises surveyed by the Federation of Kenyan Employers (FKE) in 1995, total employment had fallen from approximately 43,000 to 41,000 between 1992 and 1994. The returns to university education in this sector were on the rise while that of primary and secondary education was declining over time. On a similar note, Cockburn (2001) equally found that that removal of tariffs in Nepal with an imposition of a 1.1 per cent tax would result in a fall in output prices in the agricultural sector leading to a decline in remuneration of unskilled labour, since unskilled labour was primarily remunerated by agricultural sector except in urban regions.

In contrast, Akinboade (1996), while simulating the likely effects of an increase in world market prices for agricultural goods in Kenya, found that more resources would be allocated to the production of agricultural commodities, resulting in all the categories of labour (estate agricultural

unskilled, rural unskilled, rural self-employed, urban unskilled, and urban skilled) experiencing an increase in employment. Similarly, Minot and Daniels (2002), while examining the effects of global cotton prices on poverty in rural Benin, found that a drop in global cotton prices by 40 per cent associated with US cotton subsidies, increased rural poverty by 8 percentage points in the short run and 6-7 percentage points in the long run. In terms of consumption spending, they estimated the marginal propensity to consume to be 3.3, implying that a one dollar reduction in spending by cotton growers, who were mostly based in the rural areas would result in a 3.3 dollar contraction in overall spending; they did not find evidence of a strong adverse effect of reduced cotton production on demand for hired agricultural labour.

Reventa (1994) analyzed the effect of trade liberalization on employment and wages in the Mexican manufacturing sector from 1985 to 1987. Trade reforms resulted in a decrease in industry production and labour demand, real wages on the average declined by 3-4 per cent while for adversely affected industries; the decline was as much as 10-14 per cent. Given that the Mexican manufacturing sector has minimum wages by labour unions, the rents by workers, captured in the form of minimum wage, also reduced during this period. Reventa (1992) had earlier investigated the effects of increased import competition on US manufacturing employment and wages, using data for a panel of manufacturing industries over the period 1977-1987. The main empirical finding was that changes in import prices had large and significant effects on both employment and wages. The estimated import price elasticities ranged from 0.24 to 0.39 for employment, and from 0.06 to 0.09 for wages. Reventa (*ibid*) found that the wages and employment effects in a particular industry were quite small; however, during the period under study, the dollar equally appreciated during the period 1980-1985, and the effect was a reduction in wages by 2 per cent and employment by 4.5-7.5 per cent, on the average. This finding brings out the importance of complementary policies in trade liberalization.

Milner and Wright (1998) examined the short- and long-run labour market responses to trade liberalisation using panel data for Mauritius. In the exportable sectors, there was a downward pressure on employment and wages in the short run, while in the long run, both wages and employment increased in response to trade liberalization. Employment and wages, however, expanded in the importable sector following liberalization, and have been accompanied by general expansion of the economy and of labour supply. They caution that in making conclusions, allowance needs to be given to country-specific circumstances when modelling particular trade liberalization.

Behrman *et al.* (2003) estimated the impact of changes in liberalization policies on wage differentials by schooling level (between less-schooled and more-schooled workers) using new high quality data set for 18 Latin American countries for the period 1977-1998. The market-oriented policy changes were derived from the 'Washington Consensus' which consisted of a) trade and financial sector liberalization, b) privatization, c) opening of capital markets, d) reduction of high income tax rates in favour of broad-based taxes on consumption, and e) deregulation of labour markets. They found that that, on average, liberalizing policy changes had a strong positive effect on wage differentials, but that the overall effect tended to become smaller over time. However, the different policies of the Washington Consensus had varied effects: labour market reform also appeared to raise wage differentials, though this result was less solid because the period covered was more limited and the estimated effects faded away relatively fast, while privatization reduced wage differentials, but not enough to offset the increases in wage differential due to other reforms. Trade openness had no overall effect on wage differentials.

Akmal *et al.* (2007) examined the long- and short-run effects of trade liberalization on poverty in Pakistan using measures of trade liberalization such as trade and financial openness and public interventions. In their study, they found that trade liberalization had cumulative effects on

poverty reduction in the long-run than in the short-run. Poverty tended to reduce with low taxation and high foreign direct investment.

2.3.4 The ‘Taxation and Spending’ Pathway

There are several studies that have examined the impact of trade liberalization on public finances. Most studies, such as those by Suliman (2005), Moore and Zanardi (2010), ECLAC (1999), Khatry and Rao (2002) and Baunsgaard and Keen (2005) have focused on the revenue implications of trade liberalization. Suliman (2005) was interested in establishing how the tax system in Sudan responded to trade liberalization in 1992. He examined tax buoyancy in the periods 1970-1991 and 1990-2002 and found that there was a general decline in tax buoyancy by 12 per cent after trade liberalization. Interestingly, import tax showed a positive increase in buoyancy despite the fact that its total share in revenue decreased from 47.3 per cent to 28 per cent after liberalization. Similarly, Moore and Zanardi (2010) were keen on establishing whether trade liberalization had the tendency of reducing tax revenues, which would in turn lower public spending in critical areas such as education, health and infrastructure. They examined 51 developing countries in Africa and Asia, and found that, while trade taxes on the average constituted approximately 22 per cent of total revenues, central government expenditure patterns could not be explained by variations in trade tax revenues. Even though trade liberalization tended to lower import and export tariff revenue, most developing countries had not changed the composition of their expenditure allocation.

ECLAC (1999) assessed the impact of trade liberalization on public finances in Jamaica due to fluctuations of commodity prices and incomes from services; ECLAC (*ibid*) established that during the trade liberalization period, i.e., 1991 to 1998, the economy was not negatively affected since the reduction in tariff revenue was offset by increases in imports resulting in more duty being collected. Moreover, the commodity price fluctuations arising from agricultural exports neither

affected nor changed the composition of GDP. Khattry and Rao (2002), while assessing the revenue implications of trade liberalization, classified 80 countries into low, lower-middle, upper-middle and high incomes groups in order to establish how the four country groupings tax to GDP ratio responded to trade liberalization. They established that the decline in income taxes in low income countries was due to structural characteristics that prevented them from transitioning from trade to income taxes. Secondly, changing market incentives gave rise to tax evasion and unemployment which caused income tax decline. In contrast, high income countries were able to transition from trade to income taxes.

Baunsgaard and Keen (2005), like Khattry and Rao (2002) equally surveyed 117 countries with data spanning 32 years in order to establish if countries have recovered from domestic taxes the revenues lost from past episodes of trade liberalization. They divided countries into three categories: low, middle and high income countries; overall, they found that openness was significantly and positively correlated with domestic tax revenue. High income countries were able to recover from domestic taxes what was lost in trade liberalization because, for these countries, trade policy decisions were not driven by revenue motives. Middle income countries were able to substantially replace revenue by 35-50 cents in the short run and \$1-\$1 in the long run. For low income countries, recovery of taxes largely depended on the tax instruments used rather than episodes of revenue decline.

2.4 METHODOLOGICAL REVIEW FROM EMPIRICAL EVIDENCE

There are several methodologies that can be used in estimating the poverty impacts of trade liberalization. Hertel and Reimer (2002) reviewed the methodologies that have been used so far and categorized them into four: cross country regressions, partial equilibrium/cost of living analysis,

computable general equilibrium (CGE) models, and macro-micro simulations. IMF (2008) has also provided a multi-layered approach to analysing the macro-poverty linkages, which combines methodologies already identified by Hertel and Reimer (2002). From the empirical evidence presented in the previous section, there are several cross-country regressions that have been used by various authors: Dollar and Kraay (2001b), Greenaway *et al.* (1998), Vamvakidis (1999), and Sachs and Warner (1995). These authors have examined anecdotal evidence on the impact of trade liberalization and poverty, by focusing on one of the potential pathways identified by McCulloch *et al.* (2000), while others such as Razzaque *et al.* (2003) and Raihan (2008) have used single country time series data. The main challenges associated with using time series analysis is that, first, getting the appropriate measure of openness has been a challenge since results are sensitive to openness measure used. Secondly, household data is provided periodically in most countries; therefore, establishing household time series data is almost impossible, hence most time series analysis tends to make generalizations on households. The main advantage of such an analysis is that one is able to use the traditional statistical tools of analysis to test hypotheses and results.

The partial equilibrium/cost of living models focus on one sector in estimating the impacts of trade liberalization on poverty. From the empirical evidence of literature so far found, authors such as Balat and Porto (2006), Ianchovichina *et al.* (2001), Filho and Horridge (1996), Ravallion (1989), Minot and Daniels (2002), and Ravallion and Van De Walle (1991) have all used partial equilibrium/cost of living models in establishing the impact of trade liberalization on poverty by focusing on different sectors of the economy. These studies are the most common as acknowledged by Hertel and Reimer (2002), since they require the use of survey data which, in most cases, tends to be available for a number of countries. The main drawback of this methodology is that it tends to focus on one pathway as already identified by McCulloch *et al.* (2000) while leaving out the other pathways. In most cases, there are usually spill-overs associated with one sector or several sectors.

The computable general equilibrium (CGE), which follows the social accounting matrix structure, is a model of simultaneous equations that provide a complete picture of how markets and agents interact in an economy producing a circular flow of income. Some of the studies that have used CGE analysis in the review section are: Bautista and Thomas (1997), Löfgren (1999), Cogneau and Robbilliard (2000), Löfgren *et al.* (2001), and Cockburn (2001). CGE models are quickly gaining popularity as a technique for assessing, *ex ante*, impacts of trade liberalization on poverty. This methodology, as noted by Kirkpatrick and Scricciu (2006), attempt to bridge the gap between micro-macro analysis by providing a ‘meso’ analysis. These models have the advantage of theoretical and data consistency; secondly, there is no challenge of identification since they are structural in nature and can be used to address a broad range of policy issues. The main disadvantage of CGE models is that they cannot be used to forecast and they cannot be subjected to standard tools of statistical analysis to test for hypothesis and results.

Micro simulation models integrate CGE and micro simulations, making it easy to establish within group variations in details, something that the CGE has not adequately addressed. Ianchovichina *et al.* (2001) used this model to examine the impact of trade reforms in Mexico on household welfare, the price changes generated from the GTAP model were used in household survey data to compute the changes in income and welfare. The multi-method approach by the IMF (2008) incorporates the three methodologies into one framework as shown in Figure 2.3. This is a relatively new approach which has been currently used by Jordaan (2012) to establish the impact of interest rates changes on households in South Africa. A shock of 100 basis-point increase in the repo rate is introduced into the macroeconomic model. The output from the impulse response shock from the macroeconomic model is used as an input shock for the economic impact model based on the 2009 social accounting matrix (SAM). The simulation results from the model are then used to establish the impact on household expenditures. This approach is more comprehensive as it

uses different methods to address different aspect of the same question, making it possible to obtain full answers and a robust understanding of the trade liberalization-poverty relations. This form of meta-analysis enables triangulation of results since results from one model can be used to validate the other model, and lastly, a larger scope of study can be undertaken, resulting in new discoveries for further research.

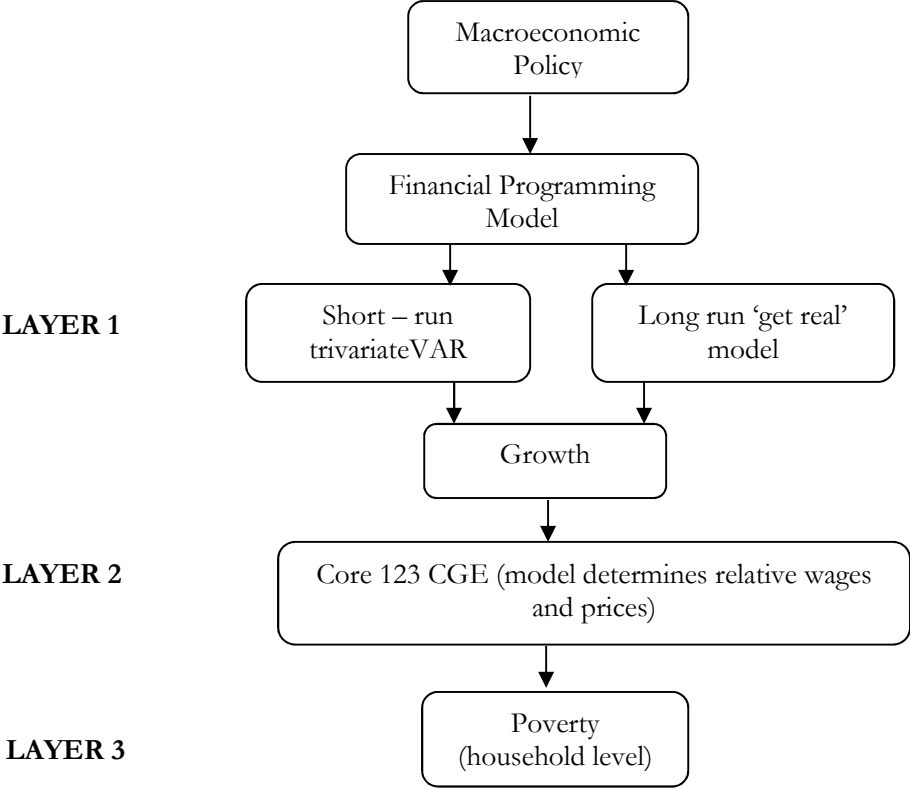
2.4.1 The Multi-Method Approach for Trade Liberalization and Poverty Impact Analysis

Section 2.2.3 has drawn the trade liberalization and poverty linkages based on the framework provided by McCulloch *et al.* (2000). This approach has attempted to establish the macro-micro linkage using potential pathways, which requires multi-method approach to answer the trade liberalization question. The IMF (2008) has provided a systematic multi-method framework for analyzing micro-poverty linkages using the 123PRSP model. This quantitative model was developed by the World Bank to analyze the impact of macroeconomic policies on poverty. It combines different modeling approaches, which are independently used to evaluate different issues. These models are layered so that the results of one model feed into the next model, as shown in Figure 2.3.

Macroeconomic policies are evaluated using a financial programming model as well as long- and short-run growth models. These models can examine the effects of macroeconomic policies on growth under the assumption of fixed relative prices, wages and composition of output. In the second level, a simplified 123 is used. This is a one-country model with two sectors (exports and imports) and three commodities (export, domestic and import goods). The CGE model takes into account the growth impacts generated from the macro models so that it can in turn generate prices, wages, and sectoral output under the assumption of full employment. This model is quite aggregated since in reality, most economies have many commodities within a sector. In the third (micro) layer,

the new sets of prices generated are fed into the household data in order to compute welfare using either consumption or income indicators.

Figure 2.3: 123PRSP Macro-Poverty Links



Source: IMF (2008).

The theoretical framework by McCulloch *et al.* (2000) can be realigned within this framework in order to establish the trade liberalization-poverty linkage. At the macro level, it will be possible to determine whether there is a deterministic relationship between trade openness and variables such as price, household consumption and incomes, employment, GDP, and export and import commodities following pathways already identified. These variables identified affect the direct determinants of poverty, it is important that they are found to be significant at the macro level. With these variables being significant, a detailed analysis of the impact of trade liberalization on households can be carried out using a CGE model. The changes in incomes and consumptions of

households from the CGE are then fed into a micro model which will determine whether a household's welfare has changed by either moving into or out of poverty.

The advantage of such a layered approach is that results from one model are easily fed into the linked model from the macro level up to the micro level. On the other hand, there is a strong assumption of one-way causality moving from the macroeconomic policies to poverty with no feedback mechanism from the micro level to macro balance (IMF 2008).

2.5 DISCUSSION AND CONCLUDING REMARKS

The main objective of this chapter was to provide the trade liberalization-poverty linkage by examining existing theoretical literature and empirical evidence on trade and poverty. The neoclassical trade was theory laid down by Eli Hecksher and Bertil Ohlin, hence the Hecksher-Ohlin model. Improvements of the model were undertaken by Vanek and Samuelson, provided the background on trade liberalization factors of production in terms of quantities and prices of factors. These changes were then linked to welfare using production possibility frontiers and indifference curves. The concept of poverty has been expounded using different approaches, namely, the Welfarist, capability and basic needs approaches. The characteristics of the poor and poverty indicators were established based in these approaches of conceptualizing poverty. The most common approach, i.e., the Welfarist approach has been used by the World Bank because of the ability to measure welfare using employment incomes and consumption expenditures. The level of analysis can be done at the household, community, regional or country level.

The Trade liberalization-poverty theoretical linkage has been provided by McCulloch *et al.* (2000), who have shown that, trade liberalization through price transmissions, the enterprises and through government spending, affect the welfare of the household so that poverty incidence can increase or decrease. Poverty impacts on households depend on the characteristics of the

households; first, farm households that make decision on production, consumption and hours of work will be affected differently by non-farm households where members work for a salary; secondly, asset (whether physical, natural and human) ownership by a household will impact its ability to adjust to shocks related to trade liberalization. IMF (2008) has further provided a multi-layered methodological approach that can be used to link trade liberalization to poverty by using three different models that feed into the next layer, moving from the macro level to the micro level.

The impact of trade liberalization on households will also depend on the institutions involved in the three pathways identified, so that if price changes take place in a sector with more casual labourers, then more poor households will be affected. If, on the other hand, price shocks affect the export sector with big buyers and sellers, then the impact on the poor might be minimal. The impact of a shock therefore depends on a sector's institutional structure and the operating framework within which the shock takes place. Such structures will be established in examining the impact of trade liberalization on household welfare in chapter 5. This section reviewed various evidence available based on the theoretical framework for analysing trade liberalization and poverty by McCulloch *et al.* (2000). The relationship between trade liberalization and economic growth has remained inconclusive given that studies like Dollar and Kraay (2001a), Greenaway *et al.* (1998), Vamvakidis (1999), Sachs and Warner (1995) find positive relationship between trade liberalization and economic growth, In contrast, other authors (Rodriguez and Rodrik, 1999; Tybout, 1992; Levine and Renelt, 1992) have found no positive relationship between economic growth and trade liberalization. The measure of openness used could be a contributing factor to the varying results obtained, given that Harrison and Hanson (1999) found that most measures of openness were statistically weak, therefore not robust. Secondly, the macroeconomic conditions and institutional framework also contribute to the varying results.

From the empirical evidence reviewed, trade liberalization has commonly been measured using trade to GDP ratio. Trade liberalization has further been found to affect the direct determinants of poverty such as incomes, consumptions, wages and employment. Four main methodologies have been used to establish the trade liberalization-poverty impacts namely, cross country regressions which are time series in nature, partial equilibrium/cost of living models, which have been the most common, computable general equilibrium models, macro-micro synthesis models. The IMF (2008) has also provided a new methodology which combines the four methodologies, so that the results from a macroeconomic model are fed into the CGE model. The price, income and wage changes from the CGE model are then shocked into the household survey data to establish the welfare changes.

Based on both the empirical and methodological literature review, this thesis will use the multi-layered approach in establishing the trade liberalization-poverty impacts. The time series data will examine the relationship between trade liberalization and macro variables such as national income, employment, and household consumption in order to establish whether there is a relationship. However, given the data challenges of not being able to obtain time series data on poverty or household incomes, the intention here is to establish whether a relationship exists for Kenya based on the pathways identified by McCulloch *et al.* (2000). With the establishment of a relationship, at the macro-level, a CGE model will be used to further unpack the trade liberalization and poverty relationship in a more detailed manner in order to establish the effects of the transmission.

The price and income changes from the CGE model will then be fed into the household survey data in order to establish whether there are changes in welfare measured by poverty incidence. This hybrid approach provides a more comprehensive framework for bridging the macro-micro gap since it combines historical data with economic theory to produce econometric

outcomes which are tested using statistical principles. This approach provides a time-varying component of analysis together with a detailed snapshot of the economy on the effects of transmission mechanisms. This unique approach has not been applied to Kenyan data before; hence this thesis will pioneer this multi-layered approach in Kenya.

3 TRADE LIBERALIZATION AND POVERTY IN KENYA

The main objectives of this chapter are a) to provide a chronological overview of how trade liberalization took place in Kenya from the time of independence to present; b) an understanding of the environment under which trade liberalization took place; and c) to further establish whether trade liberalization actually took place. Economic performance and evolution of economic and well-being, using poverty incidence during and after the liberalization episodes, will be reviewed. Trade liberalization in Kenya, as will be seen, has taken several forms depending on the economic objectives. Initial trade liberalization episodes initiated by the government in Kenya were autonomous and non-discriminatory in nature, so that all goods that came into the country irrespective of origin faced the same tariffs or restrictions. These reforms were mainly under the Structural Adjustment Programmes (SAPs).

With a more open market, the Kenyan Government also undertook reciprocal trade liberalization under the WTO multilateral trade framework, which is also non-discriminatory in nature. The country is also involved in preferential forms of trade liberalization where the agreements are reciprocal but discriminatory, such as the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the African Caribbean Pacific and European Union (ACP-EU) Agreements. Martin and Ng (2004) have further established that, 65 per cent of the trade liberalization that has taken place is autonomous, while multilateral and regional trade agreements have only accounted for 25 and 10 per cent of liberalization, respectively. Since all other agreements must be WTO compatible, the focus has mainly been on trade liberalization at the multilateral level.

3.1 INTRODUCTION

The Republic of Kenya covers an area of 582,646 sq. km. It is situated in East Africa and is bordered by Somalia on the east, the Indian Ocean on the southeast, Tanzania on the south, Lake Victoria on the southwest, Uganda on the west, Sudan on the northwest, and Ethiopia on the north. Nairobi is the capital and largest city. The country, which lies astride the equator, is made up of several geographical regions. The first is a narrow, coastal strip that is low lying except for the Taita Hills in the south. The second, an inland region of bush-covered plains, constitutes most of the country's land area. In the northwest, straddling Lake Turkana and the Kulal Mountains are high-lying scrublands. In the west is the Great Rift Valley, an irregular depression that cuts through Western Kenya from north to south in two branches. In the southwest are the fertile grasslands and forests of the Kenya highlands, this is also the location of the country's highest mountain, Mt. Kenya (5,199 m). In addition to the capital city, other important cities include Mombasa (the chief port), Nakuru, Kisumu, Thika, Machakos, and Eldoret.

Kenya has 46 ethnic groups who can be broadly categorized as Bantus, Nilotes and Cushites. The predominant ethnic groups of the Bantus are Kikuyus, Luhyas, Kambas, and Gusiis. The Nilotic group mainly consists of the Luos and Kalejins; while Cushites, who are a minority, are found in the coastal region and the North Eastern province of Kenya. About 97 per cent of the people of Kenya are of African descent while other communities include Europeans, Americans, Indians and Arabs. The official language of communication is English, while Kiswahili is the national language; therefore all official documents are written in both English and Kiswahili. There are several indigenous languages spoken by the people of Kenya. The Kenyan population is estimated at 38.6 million with the rural population accounting for 68 per cent of the total Kenyan population. Based on the 2009 population census, it can be deduced that Kenya's population is

young, as 43 per cent of the population are in the age range of 0-14; 21 per cent are in the 15-24 range while only 3.4 per cent are above 65 years.

According to various economic surveys of Kenya on economic indicators, real GDP per capita is currently estimated at USD 416 and income per capita at USD 400. The country's human development index (HDI) was ranked 154 out of the 177 countries in 2003. Currently, 28.3 per cent of the population lives on up to USD 1 a day, however, if the monetary threshold is raised to USD 2 a day, then the population percentage below the said threshold rises to 58.2 per cent. Furthermore, the poorest 20 per cent of the population receives only 6 per cent of the national income, while the upper 20 per cent receives 49.1 per cent of the national income. Based on this information, it can be deduced that both income inequality and poverty rates are very high in Kenya. The three main sectors of the Kenyan economy are: services, which account for 60 per cent of GDP; agriculture including forestry and fishing, which accounts for approximately 27 per cent; while manufacturing accounts for 11 per cent of GDP. Foreign trade (i.e., exports and imports) has averaged 45 per cent of GDP; however, increasing international petroleum prices has tended to be the main source of trade instability. Kenya is a primary commodity-producing country with agriculture being the main foreign exchange earner. The sector is of paramount importance as 80 per cent of the population depends on agriculture for their livelihood. The bulk of production is based on small-scale, family-farms, producing both food and cash crops. The industrial sector employs 7 per cent of the labour force while the service sector employs 12 per cent.

3.2 FACTORS THAT LED TO TRADE LIBERALIZATION IN KENYA

Political and economic developments in Kenya in the 1970s and 1980s played an important role in what led to trade reforms that resulted in trade liberalization. As will be seen in the subsequent

subsections, the political and economic factors, while taking place in parallel manner, reached a convergence where trade reforms that led to trade liberalization had to take place.

3.2.1 Political Developments

Kenya gained political independence from the Great Britain in 1963. After independence, the country was ruled by President Jomo Kenyatta, who was the leader of the independence movement under the political party the Kenya African National Union (KANU). The Kenyatta government attempted to gain national sovereignty by Africanizing the civil service and other public sector appointments. This regime carried over the policies of the colonial government both in the political and economic arenas Odinga (1968). The economy continued with protectionist economic policies which were aimed at encouraging local industry development. The President's ethnic group, the Kikuyus, had been the main beneficiaries of education and employment in the formal sector during the colonial period; therefore, they were the logical candidates for appointments to the public sector jobs. They were also favoured by the new government in the allocation of agricultural land and credit.² The political decision making process during the first years of independence was concentrated in the central government and in particular office of the president.³ Furthermore, the political space during this regime was uncontested. This was maintained by making sure civil society only participated in social and economic activities which the government was not able to undertake.

The first national election in 1963 decided the basic political question of whether Kenya should have a strong central government or a decentralized state (referred to locally as *majimbo*). KANU preferred a strong central authority and won. After the elections, a series of laws and constitutional amendments in the 1960s increased the powers of the president in relation to the

² Barkan, 1994.

³Ryan and O'Brien (2001).

cabinet, parliament, judiciary, civil service, local government and civil society organizations such as labour unions cooperatives and women groups.⁴ Such a concentration of authority meant that the adoption and implementation of any major economic policy initiative would always require presidential assent. Thus, any analysis of the process of policy formulation and implementation in Kenya must understand the central role of the president and the circle of key advisors and associates who controlled access to him. Policy issues that would affect the whole country were subjected to consultations by a few people in the inner circle of the Kenyatta regime. Several groups attempted to organize political parties that were opposing the ruling regime; however, their attempts either failed or were suppressed, and by 1969, Kenya became a *de facto* one-party state.

President Kenyatta died in 1978 and the then Vice President Daniel Arap Moi, who came from a smaller ethnic group of the Kalenjin, took over the presidency. There began a gradual shift in the balance of power within the ruling party that is reflected in the framework of Kenyan national politics to the present day. While President Kenyatta centralized decision making authority in the Office of the President, his successor Daniel Arap Moi, who took office in 1978, maintained and even increased the concentration of power in the executive branch of government. One event that increased the concentration of power was the unsuccessful coup attempt against the Moi government in 1982. The coup severely disrupted political and economic affairs for some time, but did not weaken the president's grip on the leash of authority. A constitutional amendment was adopted in 1982 making Kenya a *de jure* one-party state. In 1988, the Constitution was further amended to give the president power to remove members of the Public Service Commission, the Judicial Service Commission and the judiciary, although these provisions were later amended. President Moi also used his authority to reduce the predominance of Kikuyu civil servants, especially in the higher ranks of the public service. His argument, according to Ryan and O'Brien (2001) was

⁴Ng'ethe and Owino (1996).

that the Kikuyu domination of institutions was undermining social cohesion and that their replacement, even with less qualified candidates, was necessary to ensure stability in the country. However, this policy had the unfortunate effect of further undermining efficiency in the public sector and, to a degree, replacing one group of rent-seekers with another, many of whom lacked the expertise to run the organizations they inherited.

National elections under the one-party regime were held in 1979, 1983 and 1988, but with greater party control over the selection of candidates than in the Kenyatta regime. The policy decision-making process still remained closed to a few technocrats surrounding the president. Civil society, on the other hand, agitated for a new constitution that would ensure citizen consultation in the policy decision-making process and equitable distribution of resources. These events led to a unanimous decision by the donor community in November 1991 to suspend balance of payments support for Kenya. President Moi acceded to internal and external pressure for political liberation in late 1991, which brought about a new multi-party era. During this era of multi-party politics, the political parties evolved almost entirely on tribal lines. The multi-party politics saw the opening up of political space and increased citizen participation in the national policy making process. Donor pressure also saw the Moi government yield to policy reforms that resulted in trade liberalization and opening up of institutions to public scrutiny. While various parties published manifestos setting out their political, social and economic goals (and generally the opposition parties had been openly in favour of economic liberalization through structural adjustment, criticizing the government for weak implementation of SAP programs), these policy documents received little notice during the campaigns and has had little or no influence on voter behaviour.

In 2002, Mr. Mwai Kibaki succeeded President Moi and took office in January 2003, after winning by a landslide victory. He won on the promise of giving Kenyans a new constitution within a hundred days of taking office and fighting corruption. Kenyans felt that the concentration of

power within the presidency was a major cause of the economic and political crisis in the country. The key issue among others in the new constitution was the devolution of the presidential powers. Kenyans preferred a devolved system of government where resources were distributed evenly and not based on 'political tokenism' where resources were allocated based on voting patterns. Secondly, the people preferred that they be included in the decision making process. The Kibaki government made good headway in ensuring that the policy making process in Kenya became as inclusive as possible. Stakeholders now had platforms where they could air their views and push their agenda to influence policy. However, little was done in the devolution of power as Kenyans rejected the new constitution at a referendum in November 2005, since the proposed new constitution did not address issues of devolution of power as Kenyans had expected, and lastly, corruption remained rampant within the public service.

Comparing the two political regimes, namely, that of Kenyatta and Moi, there are similarities and differences. The similarities are, firstly, that both regimes concentrated power and decision making around the presidency, with President Moi making it even more concentrated after the 1982 coup attempt. Secondly, both regimes did not have a consultative policy making process, as decision making still remained in the hands of a few people. Finally, both of these regimes were characterized by single party rule. In contrast, the Moi regime succumbed to donor pressure and opened up to multiparty politics in 1991. The multiparty era saw the gradual opening up of democratic space, followed by more donor pressure to liberalize the economy through SAPs. Furthermore, issues of governance were questioned and the policy reform processes started to be more consultative. The Kibaki regime opened up the political and democratic space and reoriented the Kenyan economy to work towards achieving more openness and integration into the world market.

3.2.2 Economic Developments 1963-1980

The Kenyan economy generally performed well over the 1964-1980 periods with GDP growth rates averaging 5.8 per cent per year during the period 1965-1973 and 5 per cent in 1974-1980 period. The agricultural sector grew at nearly 5 per cent, with growth based primarily on small-holder farmers who benefited from the conversion of former colonial states to African ownership⁵ (Ryan, 2002). The manufacturing sector expanded at 10 per cent per year, fuelled by the growth in domestic rural incomes and expansion of exports to Tanzania and Uganda under the customs union created by the East African Community (EAC). The domestic saving rate averaged 16 per cent in the 1970s. The efficiency of investment was relatively high with an incremental capital output ratio (ICOR) of 3 in the 1960s and a 4 in the 1970s. The tax/GDP ratio was rising steadily from 12 per cent in the mid-1960s to 20 per cent in 1979-1980. The fiscal deficit was contained in most years at 3-6 per cent of GDP. The overall Balance of Payment (BOP) deficit was also managed at 3-4 per cent of GDP.⁶

There were some disruptions that caused economic growth to slow down in the mid 1970s to an average of 3.4 per cent per year during the period 1973-1976. One of the principal causes was the negative impact of the increase in oil prices in 1973. This had a major effect on the economy given the country's heavy reliance on imported petroleum products. In the late 1970s the boom-and-bust cycle in coffee and tea prices in 1976-1979 sparked a steep increase in both consumer and government spending.⁷ The government then proved unable to reduce spending sufficiently when coffee and tea export revenue fell sharply after 1977. The economy was also set back by the August 1977 breakup of the East African Community (EAC), which ended with the favoured access for Kenyan exporters to the Ugandan and Tanzanian markets, raising infrastructure costs. The Kenyan

⁵ Between 1962 and 1976, almost two million hectares were purchased from former white settlers and transferred to African owners.

⁶ Op. cit 486.

⁷ The fiscal deficit rose to 9.5 percent of GDP in 1975.

government had to absorb much of the workforce of the overstuffed EAC railways, ports and post and telecommunication agencies. There was a second oil shock in 1979 which further exacerbated the economic situation.

As a direct result of this rapid succession of economic shocks, the balance of payments current account deficit rose from 3 per cent of GDP on average during the period 1975-1977 to 10-11 per cent during the period 1978-1982. By the beginning of the 1980s, the Kenyan economy had suffered, within a short span of only 3-4 years, a series of economic shocks that were quite severe and much greater than other problems experienced in the post-independence era. By end of the 1970s, it had become clear to many Kenyan technocrats that significant changes in the direction of economic policy would be required to address the myriads of problems that had arisen, in as much as the country had adopted inward looking trading policies in the two regimes for political expediency (Ryan and O'Brien, 2001; Mosley, 1991).

3.3 TRADE LIBERALIZATION IN KENYA

3.3.1 Import Substitution Industrialization (ISI)

The concept of Import Substitution Industrialization (ISI) can be defined as strategies that emphasize providing subsidies in the manufacture of an export good which has the potential to develop comparative advantage over time. Industries in this case are oriented towards the domestic market, and trade restrictions such as tariffs and quotas are used to encourage the replacement of imported manufactured goods by domestic products. During the ISI era, the Kenyan Government was keen on protecting the small industries, which they inherited from the colonial government. However, the economic shock caused by the oil crisis and the break-up of the East African Community necessitated the government to approach the World Bank and IMF in order to restore

macroeconomic stability and to revive economic growth through increased resource mobilization and more efficient utilization of resources. Kenya approached the IMF for a loan in 1979 due to the balance of payment problems and a rapid growth in its debt obligations that had been worsened by the oil crisis. The Kenyan economy was also considered sound and the World Bank and IMF were reconciled to the established market interventions of the government that included a fixed exchange rate and interest rates, price controls, and a sizeable and growing state-owned enterprise sector. Table 3.1 provides a summary of the loan types and the conditionalities attached to them.

Table 3.1: Reforms of the SAPs under ISI Era

Type of loan	Reforms
1975 World Bank Program Loan US\$ 30 million	<ul style="list-style-type: none"> • Limited conditionalities
1975-76 IMF USD\$ 128 million	<ul style="list-style-type: none"> • Through the Special Oil Facility, Compensatory Financing Facility and Extended Fund facility • Limited conditionalities
August 1979 IMF standby SDR of 122.5 million	<ul style="list-style-type: none"> • Ceilings on domestic assets of the central bank and on the government borrowing from the banking system • Reaching an understanding on the exchange rate policy and elimination of the import deposit scheme by end of 1979

Source: Ongile (1998); Mosley (1991).

The IMF and World Bank lending programmes had very low conditionalities as shown on Table 3.1; this can be attributed to the fact that the Kenyan economy had been performing well. During this period, there were no major trade reforms; however, macroeconomic policies related to exchange rate tend to affect import and export prices which in turn affect trade volumes thereby altering the trade pattern and structure. The focus at this time was on macroeconomic stability and economic growth and it is for these reasons that the loans also had limited conditionalities.

3.3.2 The Structural Adjustment Programmes (SAPs)

SAPs are a comprehensive set of policy reforms initiated by the World Bank and the IMF. The SAPs were implemented in three phases, phase I was from 1980-1984, Phase II 1985-1991 and phase III 1992-1995. The basic objective of SAPs, as initially conceived, was to restore developing countries to macroeconomic stability following disruptions of the 1970s (primarily the two oil shocks), and to revive economic growth through increased resource mobilization and more efficient utilization of resources. SAPs also called for elimination of barriers to foreign trade and foreign investment; however, with time they included institutional reforms and social aspects of adjustments. These entailed budget rationalization on the allocation of resources to the health and education sectors. Swamy (1994) further notes that, the SAPs had a medium-term focus, and were not intended to deal directly with more fundamental development priorities such as poverty alleviation, reducing unemployment and human capital development.

The first phase of the SAPs under Structural Adjustment Loan I (SAL I), as shown on Table 3.3, had major trade reform components, which included replacement of quantitative restrictions with tariffs and further commencement of tariff reductions. There was delay in the implementation of the reforms and the World Bank was not particularly happy with progress of government in implementing the reforms and, as a result, there was a delay of the release of the US\$50 million second tranche of the 1982 operation by nine months. The funds were later released in early 1984, even though the conditions set for the cereal market liberalization were not fully implemented. The SAL II reforms were more focused than SAL I. In SAL II, agricultural reforms were considered significant (Mosley, 1991; Swamy, 1994), the bank required that all firm prices should be based on export and import parities and should provide adequate incentives to producers; The Bank further asked the government to privatize the marketing of maize (Mosley, 1991: 284). Subsequent to SAL II, the country continued to experience balance of payments problems and decided to approach the

IMF for a loan. Despite Kenya's continuing balance of payment deficit, there was a hiatus in further adjustment loan commitments and disbursements until 1986, although the decline in this form of assistance was offset, to some extent, by a large volume of food aid in response to a devastating drought in 1984 (Ryan and O'Brien, 2001).

Table 3.2: Reforms under the Structural Adjustment Programme Phase I

Type of Loan	Reforms
March 1980 World Bank IDA Structural Adjustment Loan/Credit (SAL I) of US\$ 55m	<ul style="list-style-type: none"> • A time schedule for replacing quantitative restrictions with tariffs to be finalized by April 1980 • Begin replacing quantitative restrictions by June 1980; begin reducing tariffs by 1981; complete the rationalization process by December 1983 • Improve the existing system of export compensation payment and examine proposal for export insurance scheme • Set up programme for monitoring and controlling external borrowing during the 1980-1981 period • Prepare a forward budget for the years 1980/81 and 1982/83
October 1980 IMF standby of SDR 241.5 million	<ul style="list-style-type: none"> • Ceilings on central banks net domestic assets and net public sector borrowing • Undertaking to reach an agreement on exchange rate policy and on import liberalization
January 1982 IMF loan , SDR 151.1 million	<ul style="list-style-type: none"> • Ceilings on budget deficit and on net credit to the government • A commitment to a programme of progressive import liberalization in the medium term • Only SDR 90 million was drawn
June 1982 World Bank Structural Adjustment Loan/ Credit (SAL II) of USD 130.9 million,	<ul style="list-style-type: none"> • Shift 20 per cent of items presently subjected to quotas to free import status each year from 1982 to 1986 • Prepare action programme for export promotion by June 1983 • Undertake review of maize marketing and implement its recommendations • Monitor annual prices review to confirm the prices are based on export parities • Prepare programme for subdivision of cooperative and group-owned firms • Pass on increases in energy costs to consumers • Establish national population council and set up specific targets for family planning , average family size and population • Establish positive real interest rates • Improve machinery for recovering external debt
March 1983 IMF standby of SDR 175.9 million	<ul style="list-style-type: none"> • Devaluation • Fiscal adjustment and reduction in government borrowing from banking system

Source: Mosley (1991).

The implementation of reforms was characterized by stop-go pattern, the donors in turn became unsatisfied by the manner and pace in which the reforms were being implemented, and as a result, there was strained government-donor relationship.

Economic reforms in Kenya gained renewed momentum in 1986 following the government's adoption of parliamentary *Sessional Paper No.1* (SP No. 1) "Economic Management for Renewed Growth" (GOK, 1986). Policy dialogue with the World Bank and IMF had resumed during 1985, while this comprehensive policy document was in preparation. As implementation of the policy reform proposals set out in SP No.1 got underway, the IMF and World Bank responded. The IMF initiated a programme of lending under Structural Adjustment Facility (SAF), later converted to Enhanced Structural Adjustment Facility (ESAF), and the World Bank undertook a new programme of IDA Sectoral Adjustment Credits (SECAL) (Ryan and O'Brien, 2001). Due to the Bank's experience with poor implementation of reforms in Kenya during the SAL phase, the Bank decided to switch to sectoral lending (SECAL). Table 3.3 provides a summary of the SAP conditionalities in phase II.

Table 3.3: Reforms under the Structural Adjustment Programme Phase II

Loan type	Reforms
June 1986 World Bank Agricultural Sector Credit - US\$ 60 million	<ul style="list-style-type: none"> • Increased fertilizer availability; expand number of distributors; • Announce fertilizer prices each year • Adopt a new fertilizer pricing based on world prices; • Increase fees for livestock services • Restructure the National Cereal Produce Board (NCPB), South Nyanza Sugar Company (SONY) and National Irrigation Board (NIB) and implement the budget rationalization plan in the ministry of agriculture • Begin implementation of plan to rehabilitate agricultural finance corporation (AFC)
February 1988 IMF standby of US\$ 8 million Structural Adjustment Facility- US\$90 million	<ul style="list-style-type: none"> • Reduce overseas borrowing • Reduce budget deficit • Maintain positive real interest rates.
May 1988 World Bank Industrial sector adjustment credit- US\$ 110 million	<ul style="list-style-type: none"> • Implement unrestricted licensing for all items in current schedule IB and IIB • Reduce the number of tariff rates from 25 to 12 • Devise a simple import duty compensation scheme with wider

Loan type	Reforms
	<p>coverage and greater level of reimbursement to exporters than existing one; improving incentives for manufacturing on bond; implement EPZ</p> <ul style="list-style-type: none"> • Remove price controls on 10 products and gradually decontrol prices of all remaining items not falling under new monopolies bill • Restructure development finance institutions; industrial development bank and Kenya Industrial Estates
<p>Feb-April 1989 World Bank and IMF Enhanced structural adjustment facility</p>	<ul style="list-style-type: none"> • Reduce budget deficit, including introduction of user charges and removal of price controls. • Review and adjust exchange rate to expand and diversify export base • Restrict public sector deficit by introducing user charges in education and elsewhere in the public sector • Import liberalization: licenses for imports in schedules I and II (formerly IIA) and IIIA (formerly IB) to be issued without restrictions. • Export incentives as per World Bank Industrial Sector adjustment credit • Various measures to reduce budget deficit, including introduction of user charges • Removal of price controls
<p>July 1989 World Bank financial sector adjustment credit,</p>	<ul style="list-style-type: none"> • Positive real interest rates; increase in CBK's regulatory powers; establishment of a capital markets development authority • Reduction in public sector fiscal deficit to 4 per cent in 1992/93

Source: Mosley (1991); Ryan and O'Brian (2001)

The World Bank approved six SECALs (two based on agricultural sectoral policy reforms, one supporting industrial sector reforms, and one financial sector policy support operation). The World Bank's Industrial Sector Loan and the IMF/World Bank Enhanced Structural Adjustment Facility carried most of the trade reforms that would lead to trade liberalization. But in 1991, there was a breakdown in the adjustment lending programme, following a sharp conflict between donors and the Kenyan Government, this was followed by a consultative group meeting where donors postponed aid pledges to Kenya. The reason for this postponement was cited as lack of implementation of economic policies, corruption and governance issues. Appendix Table 1 provides a summary of the World Bank and IMF loans and how they were disbursed.

Table 3.4: Implementation Phase III of the SAPs

Loan Type	Reforms
April 1993 - December 1993 IMF monitored programme	<ul style="list-style-type: none"> • Open market operations, raising cash ratios for banks • Reducing access to the rediscount windows • Reducing the commercial bank overdrafts with the central bank • Revoking previously granted exemptions in the financial sector • Devaluation of the shilling
December 1993 IMF extended structural adjustment facility- US\$ 850 million	<ul style="list-style-type: none"> • Target fiscal deficit of 6.1 per cent GDP (excluding grants) in 1993/94 • Liberalizing the maize market • Deregulation of petroleum sector • Eliminating all the price controls • Reducing import tariffs and eliminating export taxes • Divestiture of 25 non-strategic parastatals, including specific entities in 1994 • Reducing the civil service workforce

Source: Mosley (1991)

In April 1992, the government agreed on a framework to re-establish the macroeconomic framework, including a fiscal deficit target of 3.5 per cent for fiscal year 1992, and 2 per cent for fiscal year 1993. Growth in money supply was to be restricted to about 9 per cent in 1992. Also included in the programme was introduction of foreign exchange retention scheme to improve export and limits on non-concessional foreign borrowing. After a period of what the World Bank termed as “period of stop-and-go” policies, the government implemented the reforms as shown in Table 3.5.

The political economy can be seen to play a very important role in the implementation of policies and making reference to Bienen (1990), who noted that implementation of trade policy reforms largely depended on the interests of the ruling elite. This ruling elite interest can be seen to have been at play by looking at the system of maize production in Kenya. Maize production had been subjected to commissions of inquiry in the years 1946, 1952, 1955, 1958, 1963, 1966, and 1972, each of which had recommended some diminution of the scale of state involvement in the interest of lowering the price to the consumer, encouraging specialization of maize growing and rendering the black market redundant. Unfortunately each of these enquiries had been unsuccessful. Mosley

(1991: 284) notes that the large maize farmers, starting from the president downwards, made profits out of controls for so long as controls existed. This is one reason why reforms in the maize sub-sector was not successful. This is also evident when analysing the changes in the import schedules: In 1984, 24 per cent of total imports were in import schedule IA (Quota free) while schedule IIB (imports competing with domestic industry severely restricted) stood at 14 per cent. By 1986, 48 per cent were in schedule IA while 7 per cent were in schedule IIB; this implies that there were still several commodities under protection.

In the implementation of reforms on fertilizers, Mosley (1991) notes that, its availability rose by 40 per cent in the first year and thereafter flattened out. The increase can, largely, be attributed to decontrol of prices at all levels since 1990. Swamy (1994), in his discussion, notes that the price change increased the number of fertilizer retailers at interior locations, thus increasing the availability, particularly at retail level, where margins had been low in the past. In 1991, fertilizer imports were transferred from schedule II to schedule I and became unrestricted. Swamy (*ibid*) further notes that fertilizer use declined between 1989 and 1991. This could be attributed to allocations in a process that was neither transparent nor coordinated with private demand for fertilizers.

A review of the implementation of the SAPs shows that the objectives of the SAPs were very clear, moreover the schedule of reforms to be undertaken were also very clearly set out in each loan agreement. A key element that was not well considered in the whole SAP implementation process was the political economy of trade liberalization. This is evidenced by several policy reversals and lack of commitment in implementation of policies in certain sectors; for example, it was not possible to implement reforms in the maize sector because of both political and business interests of the ruling elite at this time. The manner in which policies were implemented, especially in the maize sub-sector, brings out the issue of political economy of trade liberalization. The ruling

elite in Kenya, who also constituted large maize plantation owners were not willing to open up that sector to free competition, this is evident by the number of commissions of inquiries that did not yield any fruits.

3.3.3 Multilateral Trade Liberalization

The WTO is considered the largest trading bloc with the goal of facilitating a free global trading system by ensuring that trade impediments are tariff-based and transparent through gradual removal of these tariffs. Multilateral negotiations began after the World War II, when it was imagined that the negotiations would take place under an umbrella body “International Trade Organization” (ITO) parallel to the Breton Woods Institutions. However, due to political difficulties, the ITO was never established. A group of 23⁸ countries began trade negotiations under a provisional set of rules known as the General Agreement on Trade and Tariffs (GATT). The GATT was an agreement where participating parties were contracting parties. Countries, in this case the contracting parties, operated on a set of rules in order to reduce tariffs as per the GATT agreement.

In 1995, the World Trade Organization (WTO) was created; the fundamental difference between GATT and the WTO is that while GATT was an agreement, the WTO is an international organization which is concerned with members following the trade rules set out. The GATT rules remained in force and the basic logic of the system still stands. The WTO is a forum for international cooperation on trade-related policies and the creation of regulations under which trade is carried out by member governments. These rules of engagement emerge from the exchange of trade policy commitments in periodic negotiations Hoekman (2002). The WTO operates on five

⁸The countries include Australia, Belgium, Brazil, Burma, Canada, Ceylon, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon, Luxembourg, the Netherlands, New Zealand, Norway, Pakistan, Southern Rhodesia, Syria, South Africa, United Kingdom, and United States. Subsequently the United States, China, Lebanon and Syria withdrew.

basic principles: non-discrimination, reciprocity, enforceable commitments, transparency and safety valves. Initial trade liberalization commitments were undertaken during the Uruguay Round of trade negotiations, which were completed in 1991, after which the Doha Round of negotiations followed.

The WTO's commitment to ensuring that multilateral trade results in development for developing countries are spelt out in the Doha Development Agenda (DDA):

“International trade can play a major role in the promotion of economic development and the alleviation of poverty. We recognize the need for all our peoples to benefit from the increased opportunities and welfare gains that the multilateral trading system generates. The majority of WTO Members are developing countries. We seek to place their needs and interests at the heart of the Work Programme adopted in this Declaration. Recalling the Preamble to the Marrakech Agreement, we shall continue to make positive efforts designed to ensure that developing countries, and especially the least-developed among them, secure a share in the growth of world trade commensurate with the needs of their economic development. In this context, enhanced market access, balanced rules, and well-targeted, sustainably financed technical assistance and capacity-building programmes have important roles to play.

We recognize the particular vulnerability of the least-developed countries and the special structural difficulties they face in the global economy. We are committed to addressing the marginalization of least-developed countries in international trade and to improving their effective participation in the multilateral trading system. We recall the commitments made by Ministers at our meetings in Marrakech, Singapore and Geneva, and by the international community at the Third UN Conference on Least-Developed Countries in Brussels, to help least-developed countries secure beneficial and meaningful integration into the multilateral trading system and the global economy. We are determined that the WTO will play its part in building effectively on these commitments under the Work Programme we are establishing” (WTO, 2001).

Since the Doha declaration in 2001, members had committed to implementing the commitments made; however, members would not agree on how to proceed during the ministerial conference in Cancun in September 2003, leading to the collapse of the talks. Developing countries made it clear that progress in the negotiations would only be achieved if developed countries committed to lowering their barriers to trade and removing agricultural subsidies. A decision was then reached in July 2004 on how to implement the Doha agenda, the decision is popularly known as “*July framework*”. The July framework also stressed development and in particular agricultural reforms which was seen as the key to achieving development. It provided the framework for negotiating tariff reduction and ultimate removal of these tariffs (popular known as modalities) in agriculture and non-agriculture market negotiations. The July framework also provided a framework for negotiations on trade in services and trade facilitation.

3.3.4 Agricultural Market Access

Several issues have been discussed under agricultural market access; these include the tariff reduction formula, agricultural domestic support and export subsidies. The Doha work programme proposed the use of a tiered formula to achieve higher tariffs cuts (bigger magnitudes of tariff reductions); however, the tiered formula will not be discussed in this paper as Kenya is exempt from using the tiered formula. Table 3.5 provides the simple applied average tariffs for different products for Kenya under the EAC customs union, the EAC tariffs were harmonized with those of the WTO.

Table 3.5: Summary Analysis of the East African Customs Union MFN Tariff, 2006

Analysis	No. of lines ^a	Applied 2006 rates				
		No. of lines used	Simple avg. tariff (%)	Range tariff (%)	Std-dev (%)	CV
Total	5,429	5,428	12.9	0-100	11.9	0.9
By WTO definition^b						
Agriculture	729	729	19.7	0-100	13.9	0.7
Live animals and products thereof	97	97	23.2	0-25	6.5	0.3
Dairy products	24	24	42.5	25-60	17.9	0.4
Coffee and tea, cocoa, sugar, etc.	134	134	24.6	0-100	17.2	0.7
Cut flowers and plants	37	37	5.4	0-25	6.8	1.3
Fruit and vegetables	155	155	24.8	10-25	1.7	0.1
Grains	21	21	28.3	0-75	27.4	1.0
Oil seeds, fats, oils and their products	77	77	12.6	0-25	8.7	0.7
Beverages and spirits	41	41	24.6	10-25	2.3	0.1
Tobacco	10	10	28.0	25-35	4.8	0.2
Other agricultural products	133	133	6.9	0-25	8.8	1.3
Non-agriculture (excl. petroleum)	4,673	4,672	11.9	0-55	11.2	0.9
Fish and fishery products	117	117	24.1	0-25	4.2	0.2
Mineral products, precious stones and precious metals	336	336	13.9	0-55	10.8	0.8
Metals	615	615	9.6	0-40	9.1	0.9
Chemicals and photographic supplies	904	904	4.5	0-25	8.6	1.9
Leather, rubber, footwear and travel goods	167	167	12.7	0-25	9.2	0.7
Wood, pulp, paper and furniture	269	269	16.5	0-25	10.7	0.6
Textiles and clothing	872	871	21.4	0-50	8.6	0.4
Transport equipment	156	156	7.3	0-25	9.7	1.3
Non-electric machinery	533	533	3.5	0-25	6.7	1.9
Electric machinery	259	259	11.2	0-35	10.1	0.9
Non-agricultural articles n.e.s.	445	445	15.3	0-35	10.9	0.7
By ISIC sector^c						
Agriculture, hunting, forestry, and fishing	308	308	17.3	0-75	12.3	0.7
Mining	105	105	5.8	0-25	8.2	1.4
Manufacturing	5,015	5,014	12.8	0-100	11.9	0.9

Analysis	No. of lines ^a	Applied 2006 rates				
		No. of lines used	Simple avg. tariff (%)	Range tariff (%)	Std-dev (%)	CV
By stage of processing						
Raw materials	652	652	13.5	0-75	13.0	1.0
Semi-processed products	1,793	1,792	10.1	0-100	12.0	1.2
Fully-processed products	2,984	2,984	14.4	0-60	11.4	0.8

a Total number of lines are listed. Tariff rates are based on a lower frequency (number of lines) since lines with no *ad valorem* equivalents are excluded.

b Twenty seven tariff lines are excluded from both WTO agriculture and non-agriculture definitions (essentially petroleum products).

c International Standard Industrial Classification (Rev.2). Electricity, gas, and water are excluded (one tariff line).

Note: CV = coefficient of variation.

Source: WTO (2006).

An important aspect of market access is the binding overhang which is the difference between bound tariff rates and applied tariff rates. Anderson and Martin (2006) observe that, in developing countries, the binding overhang tends to be high for developing countries since the Uruguay Round.

Domestic support is the provision given by governments to encourage local production and it could take several forms such as transfer, price support, or even development programmes. The key objective of WTO's agreement on agriculture has been to reduce domestic support while at the same time leaving great scope for governments to design domestic agricultural policies in the face of, and in response to, the wide variety of the specific circumstances in individual countries and individual agricultural sectors. Domestic support is generally considered to distort trade, however, under article 6 of the Agreement on Agriculture (AoA), they have been classified into two: support with no, or minimal, distortive effect on trade often referred to as "Green Box" measure and trade-distorting support often referred to as "Amber Box" measures. For example, government-provided agricultural research or training is considered to be in the green box while government buying-in at a guaranteed price ("market price support") falls into the amber box. The amber box is subject to limits known as "diminimis support" which is 10 per cent of agricultural production and 5 per cent for developed countries. There is the blue box which is the "amber box with conditions" — conditions designed to reduce distortion. Any support that would normally be in the amber box is

placed in the blue box if the support also requires farmers to limit production. Reduction in domestic support is expressed in terms of total aggregate measures of support (AMS); this includes specific and non-specific products into one single figure. Kenya uses the de minimis support and the special and differential treatment clause; she is therefore not subject to AMS.

Export and competition improvement measures at the WTO include export subsidies, export credit, guarantees and insurance, food aid, exporting state trading enterprises and export restrictions and taxes. Only 25 WTO members can subsidize exports, but only for products on which they have commitments to reduce the subsidies. Those without commitments cannot subsidize agricultural exports at all (WTO, 2000). Kenya has not made commitments to subsidize exports and is not affected by this agreement. Anderson and Martin (2006) however note that the overall impact of elimination of export subsidies is very small relative to the impact of abolishing barriers to market access.

3.3.5 Non-Agricultural Market Access

The Non-agricultural Market Access (NAMA) negotiations⁹ are aimed at reducing or, as appropriate, eliminating tariffs and non-tariff barriers among WTO members while giving due considerations to the concerns of developing country members (WTO, 2001). Paragraph 16 of the Ministerial Declaration at Doha in 2001 sets the benchmarks for guiding negotiations in efforts to address the market access constraints under NAMA. To date, there has been a broad agreement among WTO members, reflected in Hong Kong Ministerial Declaration 2005, where countries are expected to reduce the protection level in NAMA products using a Swiss type formula, which is currently under negotiations, developing countries are negotiating for less than full reciprocity,

⁹These are the product that the negotiations on Non-agricultural Market Access (NAMA) will cover. They include products other than those listed in Annex 1 of Agreement on Agriculture (AoA). Note that the coverage of these products is also an element in the negotiations. Proposal on the coverage is contained in JOB(06)/126 of WTO.

which is a situation where developing countries will not have to liberalize their NAMA products at the same level as developed countries. The second category involves (paragraph 6) PARA6¹⁰ group of countries (Kenya is among the para6 countries) which are exempted from formula application but are expected to increase their binding coverage.

Paragraph 8 of the December 2008 Chairman's text on NAMA modalities, which provides the latest modalities on implementing the Doha declaration is as follows:

Flexibilities for developing Members with low binding coverage¹¹

- 8.(a) *As an exception, developing Members with a binding coverage of non-agricultural tariff lines of less than 35 per cent will be exempt from making tariff reductions through the formula. Instead, developing Members with a binding coverage of non-agricultural tariff lines:*
- i. below 15 per cent shall bind 75 per cent of non-agricultural tariff lines;*
 - ii. at or above 15 per cent shall bind 80 per cent of non-agricultural tariff lines; and*
 - iii. each Member shall bind at an average level that does not exceed 30 per cent.*
- (b) *These tariff lines shall be bound on 1 January of the year following the entry into force of the DDA results at initial bound rates.*
- (c) *The initial bound rates shall be established as follows: for bound tariff lines the existing bindings shall be used, and for unbound tariff lines the Member, subject to this modality, will determine the level of the initial binding of those tariff lines.*
- (d) *The overall binding target average shall be made effective at the end of the implementation period as follows: the tariff reductions shall be implemented in 11 equal rate reductions. The first reduction shall be implemented on 1 January of the second year following the entry into force of the DDA results and each successive reduction shall be made effective on 1 January of each of the following years.*
- (e) *All duties shall be bound on an ad valorem basis. Existing bindings on a non-ad valorem basis shall be converted to ad valorem equivalents on the basis of the methodology outlined in document TN/MA/20.*

The simple applied tariff rates for non-agricultural products are shown on Table 4.5. Kenya falls under category 8(a)*i* as its binding coverage is 1.6 per cent, with an average bound tariff of 54.8 per cent. Adopting this proposal which has been substantially agreed on will alter the applied tariffs.

¹⁰ PARA6 countries refer to the following group of developing countries not required to reduce tariff using the formula approach: Cameroon, Congo, Cote D'Ivoire, Cuba, Ghana, Kenya, Macao China, Mauritius, Nigeria, Sri Lanka, Suriname, and Zimbabwe.

¹¹Developing Members concerned are: Cameroon, Congo, Côte d'Ivoire, Cuba; Ghana, Kenya, Macao China, Mauritius, Nigeria, Sri Lanka, Suriname, and Zimbabwe.

3.3.6 The Doha Trade Liberalization Scenarios

There are several trade liberalization scenarios for agricultural and non-agricultural market access for Kenya. While Kenya will neither be subjected to tariff reduction using neither the tiered formula in agricultural negotiations nor the Swiss formula in the NAMA negotiations, she will be subjected to second rounds of negotiation of ultimate tariff removals even though her tariff bindings are very low. Furthermore, the sensitive/special products, i.e., products guided by indicators of food and livelihood security of rural development for a nation and ‘sensitive products’ which are considered strategic for political reasons, are exempted from tariff reduction. The agricultural modalities text requires only 12 per cent of the tariff lines to be declared sensitive while for special products, there should be 5.3-8 per cent coverage for the products. Consequently, there will be tariff elimination for both agricultural and non-agricultural products.

Anderson and Martin (2006) have simulated the average applied tariff rates that would be reached by 2015 if developing countries undertake less than reciprocal trade liberalization while least developed countries do not undertake any form of liberalization: agricultural and food tariffs would average 19.6 per cent while for, aggregate merchandise trade, the average tariff would be 15.9 per cent. The second scenario in which there is full reciprocity, in which similar tariff cuts are made by both developed countries on one side and developing and least-developed countries on the other, agricultural and food tariff rates are likely to be reduced to 16.1 per cent while aggregate merchandise trade tariffs will be 15 per cent. Ultimately, tariffs are expected to be eliminated in order for free trade to be achieved. It is the impact of full tariff elimination that will be simulated to examine how they impact on household welfare.

The current DDA negotiations are moving at a slow pace as member countries are concerned about the impact of trade liberalization on the welfare of their economies, given that full tariff elimination is eminent with the completion of the Doha Round of negotiations or even after the

Doha Round. Developing countries, Kenya included, are advocating to excluding special/sensitive products from liberalization. They are increasingly demanding for donor aid to facilitate adjustment costs to cushion losers from trade liberalization adverse effects. There have also been strong calls for foreign direct investment to accompany donor aid.

Unlike the unilateral and non-discriminatory trade liberalization under the SAPs, multilateral and non-discriminatory trade liberalization under the WTO has displayed a different ball game. While in the former, the Kenyan Government was compelled to undertake trade liberalization in order to achieve certain macroeconomic outcomes set out for them, multilateral liberalization was largely initiated by the government itself when it made a decision to accede to the WTO. All reforms related to tariffs are scheduled and agreed upon depending on a country's level of development. Furthermore, the WTO has mechanisms for addressing imbalances through trade remedies especially where trade liberalization negatively affects the economy. Such mechanisms were not available under the SAPs. The WTO also has a trade policy review body that reviews progress made in the implementation of agreements. A monitoring and evaluation structure is important as it provides a forum where all parties meet to discuss the challenges and progress made and a way forward. In contrast, the SAPs were directives from a stronger party to a weaker party without any opportunity for redress and hence the stop-and-go policies.

3.4 EVIDENCE OF TRADE LIBERALIZATION

3.4.1 Quantitative Measures

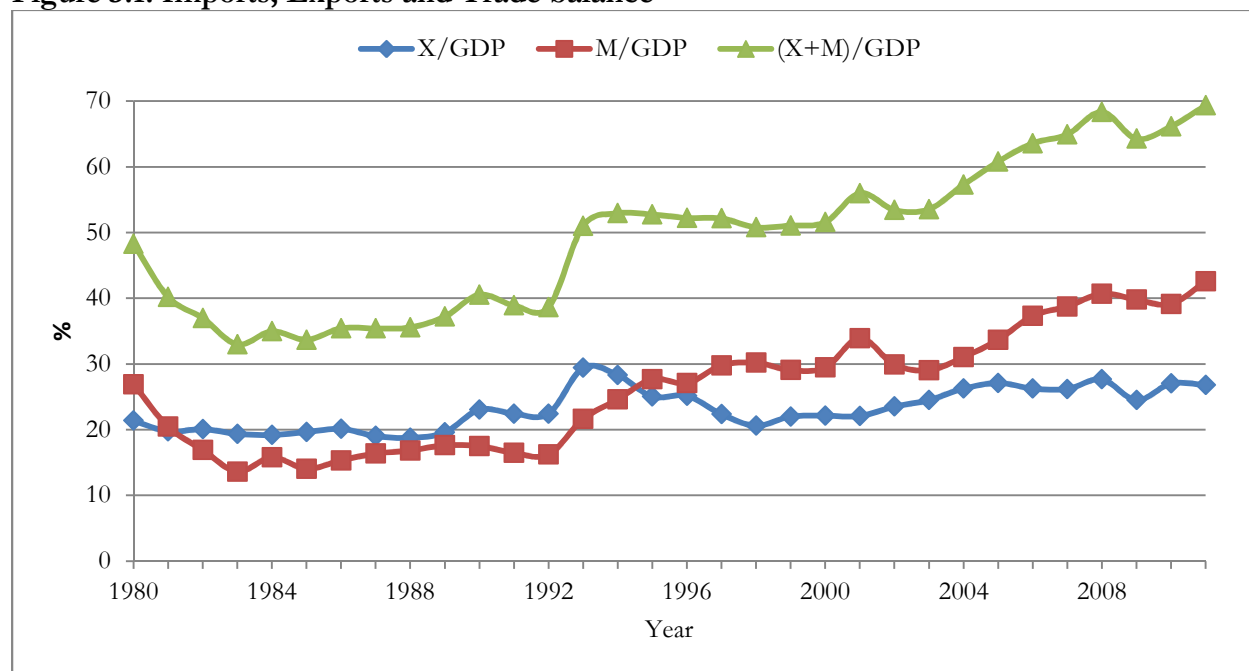
The Implicit Tariff Index, developed by Reinikka (1994), is an index used to identify trade liberalization episodes. It is the ratio of the domestic price of a given group of importable goods relative to the world price. It captures changes in the nominal rate of protection (NRP), which is the combined effect of nominal tariffs and tariff equivalents of quantitative or non-tariff restrictions.

Using this index, Reinikka (*ibid*) identified four liberalization episodes in Kenya between the 1970s and 1980s when: (i) there was endogenous import liberalization in response to the coffee boom, (ii) there was import liberalization in the 1980s despite the deteriorating terms of trade, (iii) there was licensing introduced in 1982, and (iv) the replacement of import controls by export promotion measures in 1988-1992. Mwega (1999) further used implicit index to examine the consistency of the policy account of trade liberalization. In his case, trade liberalization episodes took place in 1973, 1975, 1977-1981, 1983, 1985, 1988-1990, 1993. From the policy account under the SAPs, the 1973-1981 trade liberalization can be attributed to the coffee boom and the deteriorating terms of trade due to the price changes in oil and the break-up of the East African Community. Mwega (1999) and Reinikka (1994) caution that the base implicit tariff index seemed to have exaggerated the extent of trade liberalization in 1977-1981. The main drawbacks of this index is that it does not give the dispersion around the mean and also empirical derivation is not easy as indirect variables have to be used to obtain it.

The examination of exports (X/GDP), import (M/GDP) and trade (X+M)/GDP ratio is also an important measure of trade liberalization. From Figure 3.1, imports reduced between 1980 and 1983. There was slight improvement in 1984; however, from 1985 to 1992, imports as a percentage of GDP averaged 17 per cent. From 1993, there was a sharp increase in imports which can be explained by the fact that imports controls were relaxed during this period as per the policy account. Export performance was a generally poor as can be seen from Figure 3.1; however, from 1992 to 1993, exports increased from 17 per cent of GDP to 22 per cent of GDP. This can be attributed to the export promotion measures initiated by the government Mwega (1999). Kenya was less open in the 1980s; this is reflected by Kenya's poor export performance which resulted in increased import compression. Furthermore, since Kenya joined the WTO in 1995, exports have not

increased much as is expected. This can be attributed to the commodities under export as well as Kenya's high dependence on imports for production of both imports and exports goods.

Figure 3.1: Imports, Exports and Trade balance



Source: World Development Indicators Database.

Mwega (1999) proceeded to develop an import compression index, which is given by the percentage difference between actual imports and predicted imports from an import-demand function. Kenya was using import restrictions to close the gap between demand for imports and supply of foreign exchange; therefore, when there was foreign exchange shortage, imports depended on the amount of foreign exchange available. From his results, the gap between actual and predicted imports declined from 2.3 per cent in 1974-1983 to -4.2 per cent in 1984-1993. The error correction equation showed less compression for the two periods: with the gap declining from 1.2 per cent in 1974-1983 to -0.3 per cent in 1984-1993. Using the above quantitative measures, following the findings of Reinikka (1994) and Mwega (1999), it can be concluded that trade liberalization actually took place.

3.4.2 Credibility of Trade Reforms

Oyejide *et al.* (1997) explain that, in order to have conclusive inference on episodes of trade liberalization, it is important to examine changes in quantities in order to reinforce any policy account of trade liberalization, since certain policies tend to move in different directions. Liberalization is not only limited to trade but also takes place in the domestic financial system, the exchange rate regime and international movement of goods and capital. Issues regarding appropriate sequencing of reforms, the optimal pace at which liberalization policies should proceed, and the conduct of short run macroeconomic policy in an economy undergoing extensive structural adjustment are raised, and how trade liberalization can be considered credible under such circumstances. Collier *et al.* (1997) further give three conditions necessary for trade liberalization to be considered credible: macroeconomic compatibility; absence of systematic forecastability; and time consistency.

Macroeconomic compatibility is more applicable to Africa as it focuses on the balance of payment component. Exogenous trade policies, which are not accompanied by complementary policies, tend to worsen the balance of payments. Systematic forecastability is where the government is seen as using endogenous trade policy rule to achieve a certain target under an economic situation. The trade policy being used by government is known to the economic agents, who are able to predict the governments next steps, given this knowledge, they can either allocate resources for investments or refrain from it until they are certain the trade policy will not be reversed or it will remain predictable, the economic agents can accumulate foreign exchange or even stock imported inputs. Time inconsistency is where the economic agents are not certain of the true intentions of the government, they suspect that the government might deviate from the policy it has taken and this might result in a policy reversal. Trade liberalization might be time inconsistent due to the incentives for liberalization rather than government intention. Collier *et al.* (*Ibid*), note that time

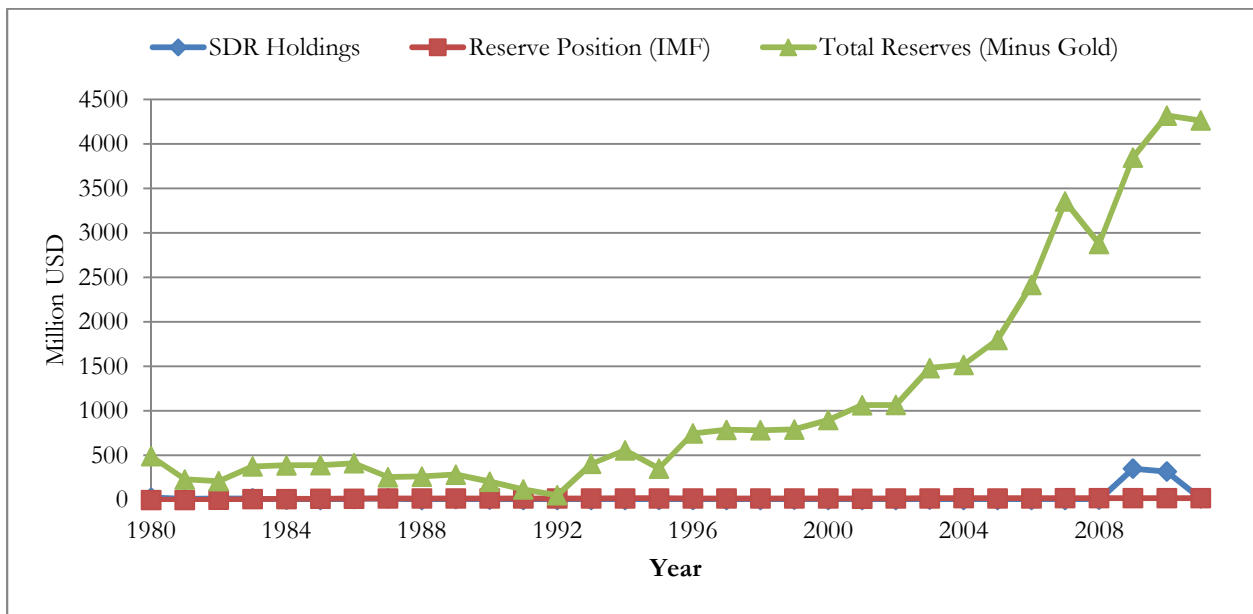
inconsistency in trade liberalization might be caused by aid and donor funding where trade reforms that result in liberalization might be implemented but at the end of the donor support period, the government might revert to its initial state.

Reinikka (1994) picked out the import liberalization episodes in the early 1980s, when the external terms of trade were on the decline following the coffee boom and the eventual replacement of import controls with the export compensation schemes. The reaction of economic agents was key in determining the credibility of trade liberalization. One has to determine the private sector's perception of the reform; whether it is incompatible with macroeconomic policy or time inconsistent. During the coffee boom, there was excess foreign exchange licenses which ranged between K£ 100 million and K£ 200 million. The private sector agents perceived the import liberalization associated with the coffee boom as transient. They were, therefore, hedging against future returns of quantitative restrictions. During this same period, no tariff reforms were undertaken. By 1978, imports were about K£ 100 million in excess of foreign exchange allocation. During the exogenous liberalization in 1980, there was a 35 per cent increase in consumer durables (Collier *et al.*, 1997). Consumer durables are a form of savings. The excess bonded and durable imports during this time was estimated at K£ 245 million. This figure was estimated to be two and a half times the capital formation in manufacturing in 1980. The introduction of systematic licensing in 1982 saw the annual deviations between foreign exchange allocation and actual imports reduce, and given that, the exchange rate and tariffs started varying. Excess licensing became a very risky way of hedging by the private sector and it became evident that there was a negative stock of licenses and a reduction in bonded warehouse imports. The export promotion scheme that took place from 1988 to 1992 also came with the complete decontrol of import and removal of quantitative restrictions. The commercial sector stock piled licenses while bonded stock of consumer

goods were reduced. However, it is not clear whether the increase in stock by the commercial sector was due to speculation or import liberalization.

Substantial analysis of the credibility of the liberalization episodes for the period 1990-1994 has been undertaken by Mwega (1999), who examined the trade liberalization episodes between 1990 and 1994. The official reserves account records the current stock of reserve assets (and often simply referred to as foreign exchange reserves) available to, and controlled by, the country's authorities for financing of international payment imbalances, foreign exchange intervention and other uses.

Figure 3.2: Foreign Exchange Reserves, 1980-Present



Source: IFS Database

Changes in the official reserves account for the differences between the capital account and current account, and effectively represent foreign exchange interventions; the magnitude of these changes will depend on monetary policy. Net decreases of official reserves indicate that a country is buying its domestic assets, usually currency or bonds, to support its value relative to whatever asset, usually a foreign currency that they are selling in exchange. In assessing the credibility of the trade reforms,

Mwega (1999) notes that the policies that supported the trade reforms were exogenous given that they were agreed upon by the government and donors, and secondly, they were macro incompatible as suggested by the increases in the foreign exchange bearer certificates. Following Collier *et al.* (1997):

“.....the most obvious diagnostics of incompatibility are the changes in the levels of reserves.....If trade liberalization is not coordinated with other policy changes then reserves will start to fall immediately”

The foreign reserves fell for the periods 1990 to 1992 and then started increasing as shown in Figure 3.2. The decrease can be associated with the suspension of donor aid. The foreign exchange bearer certificates provided an alternative way of obtaining foreign exchange, even though their premiums were higher than the official exchange rate. From 1996 onwards, total reserves have been on the increase

The Balance of payment is also another important diagnostic for credibility of trade liberalization. The current account main aggregates cover transactions of goods, services, investment income and current transfers. From Table 3.6, the current account was at its low in the 1981-1990 periods and from 1995 to 1999. The deficits can be attributed to higher import bills. The capital account showed remarkable increases from 1992 to 1999. This trend was broken in 2000-2002, but later picked up.

Table 3.6: Balance of Payment Performance in Kenya, 1980-2011

Million USD	81-90	1991	1992	1993	1994	1995	1996	1997
Current Account	-380.58	-213.32	-180.15	-261.87	-448.92	-1578.24	-961.19	-1790.67
Capital Account	4.81	3.23	83.09	65.08	72.14	124.30	216.78	195.72
Financial Account	269.90	96.58	-270.11	354.29	207.60	-266.29	540.20	54.25
Errors & Omissions	48.38	69.63	110.31	-131.72	129.22	1706.02	815.58	1573.48
Overall Balance	-57.49	-43.88	-256.86	25.78	-39.96	-14.21	611.37	32.78
Reserves	57.49	43.88	256.86	-25.78	39.96	14.21	-611.37	-32.78
Million USD	1998	1999	2000	2001	2002	2003	2004	2005
Current Account	-2632.73	-2365.22	-199.39	-320.28	-117.67	132.42	-131.77	-259.93
Capital Account	129.33	172.65	49.56	51.47	81.18	163.05	145.19	103.33

Financial Account	639.91	690.66	269.76	148.11	-173.91	406.31	40.25	511.28
Errors & Omissions	2159.86	2145.04	-127.13	130.66	194.02	-276.54	-66.78	-237.72
Overall Balance	296.37	643.13	-7.21	9.96	-16.38	425.24	-13.12	116.97
Reserves	-296.37	-643.14	7.21	-9.96	16.38	-425.24	13.12	-116.98

Million USD	2006	2007	2008	2009	2010	2011
Current Account	-478.82	-1101.78	-1982.60	-1688.51	-2368.67	-3333.20
Capital Account	168.40	156.84	94.48	260.85	240.18	234.89
Financial Account	673.63	2070.93	1095.42	2465.84	2128.21	1869.36
Errors & Omissions	218.09	-314.68	297.41	79.78	141.88	17.26
Overall Balance	581.30	811.31	-495.29	1117.97	141.60	-1211.69
Reserves	-581.30	-811.30	495.29	-1117.97	-141.60	1211.69

Source: IFS Database.

Mwega (1999) further attributes three factors to the improvement of the capital accounts: first, there was reduced capital flight due to trade liberalization measures such as the phasing out of the foreign exchange bearer certificates and the unification of the two-tier exchange rate system. Second, there was an increased short-term capital inflow; the reason behind this phenomenon was that Kenya had just come from the first multiparty general elections, and a lot of money had been printed for campaign. The Kenya shilling had therefore depreciated against the dollar and there was a lot of capital being repatriated to take advantage of the weak shilling. The central bank was also trying to mop up excess liquidity through the issuance of treasury bills, which had high return rates; at the same time, the bank deposit rate was also yielding high returns. Lastly, the resumption of suspended program loans disbursements also positively affected the capital account.

Trade liberalization, as noted by Collier *et al.* (1997), will affect import composition of merchandise trade. Products that previously had import restrictions would now flow in with minimal barriers. The quantum indices show how merchandise imports were affected by the various liberalization attempts. Food and live animals recorded the high increases in 1994 (560), 1997 (608), 2000 (585) and 2001 (670). Machinery and transport equipment index declined during the 1991-1993 periods, with the sharpest growths in 2001 (298) and 2005 (267). Manufactured goods declined in

1991-1993 and continued increasing; as from 2001, the index more than doubled. The import quantum indices for the goods by broad economic categories have more than doubled for the last 15 years; it will be conclusive to say that trade liberalization actually took place as shown on Table 3.7.

Table 3.7: Import Quantum Indices

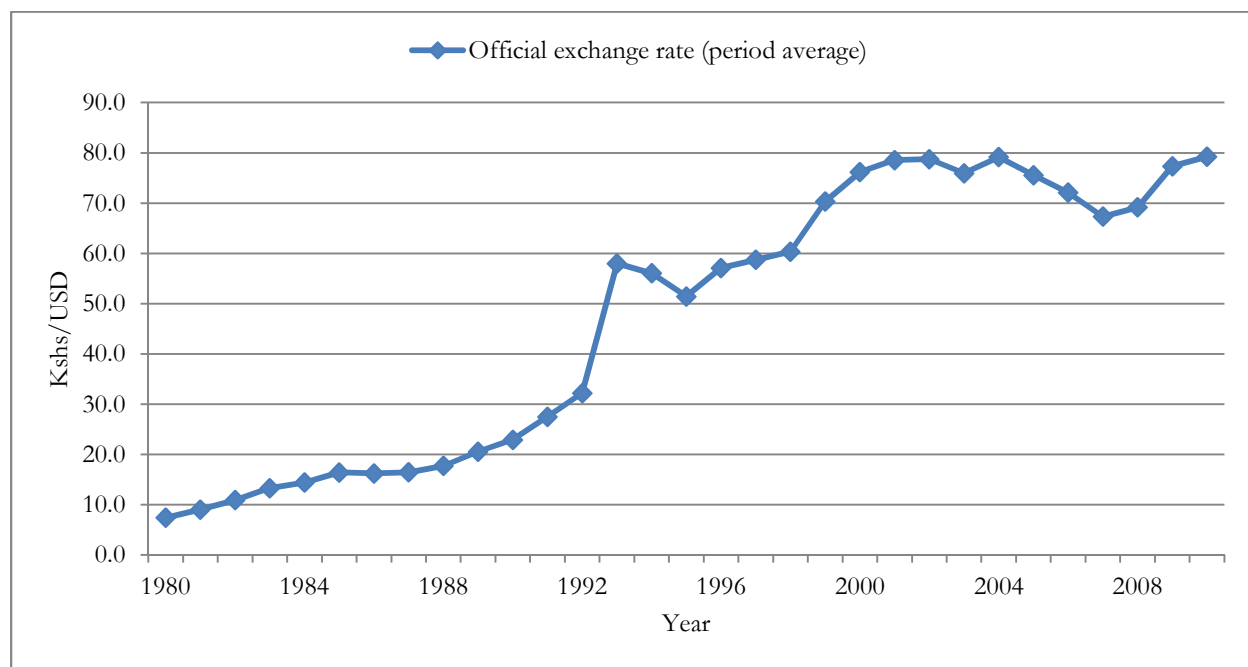
1982=100	1990	1991	1992	1993	1994	1995	1996	1997
Food and live animals	217	148	211	135	560	157	348	608
Beverages and tobacco	62	85	85	121	118	186	112	179
Crude materials, inedible	158	176	194	179	117	232	224	180
Mineral fuel	104	94	91	123	110	113	115	129
Animal and vegetable oils	150	154	176	138	176	194	219	194
Chemicals	97	113	115	131	124	231	230	187
Manufactured goods	108	112	99	114	114	193	219	192
Machinery & transport equipment	135	95	92	84	111	179	142	150
Miscellaneous manufactured articles	98	114	112	118	153	166	200	202
	1998	1999	2000	2001	2002	2003	2004	2005
Food and live animals	493	358	585	670	343	515	476	489
Beverages and tobacco	191	205	254	384	327	314	874	882
Crude materials, inedible	274	430	433	539	369	316	452	451
Mineral fuel	190	115	159	151	124	150	167	139
Animal and vegetable oils	197	254	256	344	349	320	158	285
Chemicals	191	168	259	180	192	184	295	313
Manufactured goods	182	215	207	157	464	667	390	417
Machinery & transport equipment	125	130	144	298	107	136	187	267
Miscellaneous manufactured articles	222	247	237	203	331	530	629	404
	2006	2007	2008	2009	2010*			
Food and live animals	501	987	1,067	1,253	937			
Beverages and tobacco	868	933	1,308	749	1,168			
Crude materials, inedible	493	657	662	651	653			
Mineral fuel	124	118	189	171	182			
Animal and vegetable oils	409	399	479	357	487			
Chemicals	289	290	300	307	423			
Manufactured goods	345	379	418	409	539			
Machinery & transport equipment	238	284	307	343	402			
Miscellaneous manufactured articles	551	597	504	462	562			

Source: Adopted from Mwega (1999); Economic Survey, 1998, 1999, 2002, 2004, 2006, 2011, *provisional.

In the case of Kenya, one of the ways used to offset import liberalization was by raising the exchange rate (exchange rate depreciation), from 1992 onwards when the greatest depreciation took

place in response to import liberalization and in order to correct the balance of payments; this is evident in Figure 3.3. From 1995 to present, the depreciation of the Kenya shilling has been gradual with the periods 1993-1995 and 2004-2007 recording appreciation of the shilling against the US Dollar.

Figure 3.3: Official Exchange Rate, 1980-2010



Source: WDI Database.

3.5 OUTCOMES

Evaluating trade policy reforms is challenging and demanding for several reasons: first, not all intended liberalizations are implemented, and in some cases, there ends up being policy reversals. Secondly, it is not easy to disentangle trade policy reforms from other changes since certain reforms come as a package; for example, tariffs can be reduced while privatization is promoted and governance reforms taking place. Furthermore, trade reforms tend to be implemented in the most difficult circumstances, making it difficult to determine the path the economy would have taken in

the absence of reforms. Lastly, the period within which to decide that reforms are in place and therefore evaluation can be undertaken is not clear. Trade liberalization is undertaken with the assumption that they will, ultimately, improve exports and economic growth since for most countries, exports represent an important share of output and hence trends in foreign sales are critical in fostering overall growth (Mwega, 1999)

Oyejide *et al.* (1997) point out that the consequences of liberalization are assessed against the expectations that, first, liberalization provides expanded market opportunities through exploitation of comparative advantage, which increases capacity utilizations, and exploitation of economies of scale. Second, liberalization stimulates export performance for non-traditional exports by reducing anti-export bias. Third, studies that have linked trade regimes to export growth have also linked export growth to income and employment growth as an indirect causation, even though this linkage has come under strong criticism of weak empirical evidence. Lastly, increased competition from abroad and enhanced access to better technology has induced technological innovation and higher quality products.

3.5.1 Economic Performance

3.5.2 Output Growth and Compositions

Empirical evidence of whether trade liberalization leads to economic growth has remained inconclusive, and in cases where trade liberalization has been found to either increase or reduce economic growth, there has been criticism from a number of angles. Table 3.8 gives the output growth and composition of Kenya's major sectors. GDP growth rate average was highest in 1985-1989 and in 2005; the other periods recorded low economic growth rates. While it would be tempting to say that trade liberalization has not resulted in high economic growth, the period under examination also saw the implementation of other domestic economic reforms which could have

also impacted on economic growth. The high economic growth in 2005 can be attributed to the change in the political regime, from KANU to the NARC government. The new government, under its development document “Economic Recovery Strategy for Employment and Wealth Creation 2003-2007”, implemented several development strategies for reviving the economy.

Table 3.8: Average Growth Rates by Major Sectors, 1980-2010

	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010
GDP growth (annual %age)	2.79	5.66	1.56	2.92	2.59	4.68	5.55
Agriculture (%age of GDP)	33.33	31.45	30.25	31.28	29.98	26.40	25.18
Services (%age of GDP)	46.80	49.59	51.51	51.44	52.55	54.59	55.00
Manufacturing (%age of GDP)	12.21	11.74	11.05	11.96	11.17	11.74	11.40
Manufacturing (annual %age growth)	3.98	5.58	2.79	0.62	2.30	4.40	4.41
Agriculture (annual %age growth)	2.55	4.36	-0.15	4.32	2.21	1.40	6.26
Services (annual %age growth)	4.43	5.60	3.33	3.30	2.42	5.30	5.83

Source: Authors calculations from WDI Database

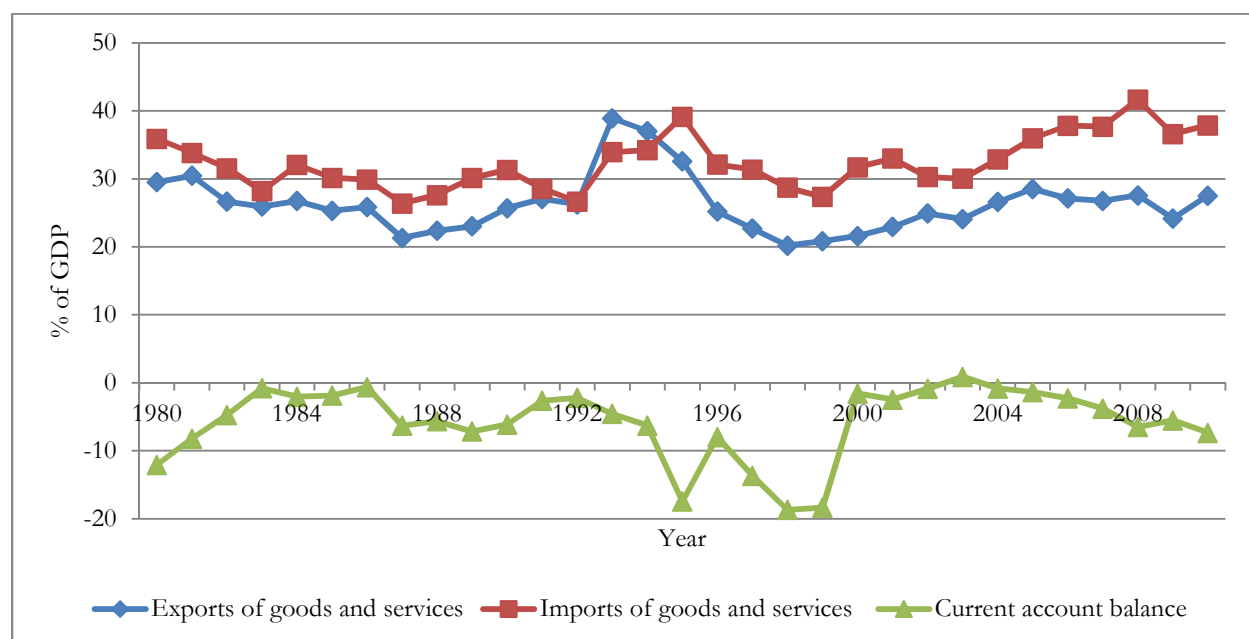
With trade liberalization, manufacturing as a proportion of GDP, has remained stagnant over the 1980-2005 period. The increased contribution of services to GDP can be attributed to the significant role travel and tourism plays in services.

3.5.3 Trade Performance

One of the expected outcomes of trade liberalization is the diversification of exports as new markets and new products become exportable (Mwega, 1999), since trade liberalization is expected to remove various forms of trade restrictions that will result in an increase in export growth. Export growth must outpace import growth in order to avoid balance of payment difficulties. In Figure 3.4, the high import share in GDP implies that liberalization has taken place by the removal of import barriers; import share in GDP was lower than export shares in 1993 and 1994. The high import share in GDP had also resulted in a negative current account balance as a proportion of GDP. An

imbalance between export and import growth has led to greater international indebtedness. Christian Aid (2005) has estimated that the effect of import growth exceeding export growth due to trade liberalization has cost sub-Saharan Africa countries \$272 billion loss in output over the last 20 years, this amount they estimate is able to wipe out debts if aid was not conditional on trade liberalization.

Figure 3.4: Share of Total Exports and Imports



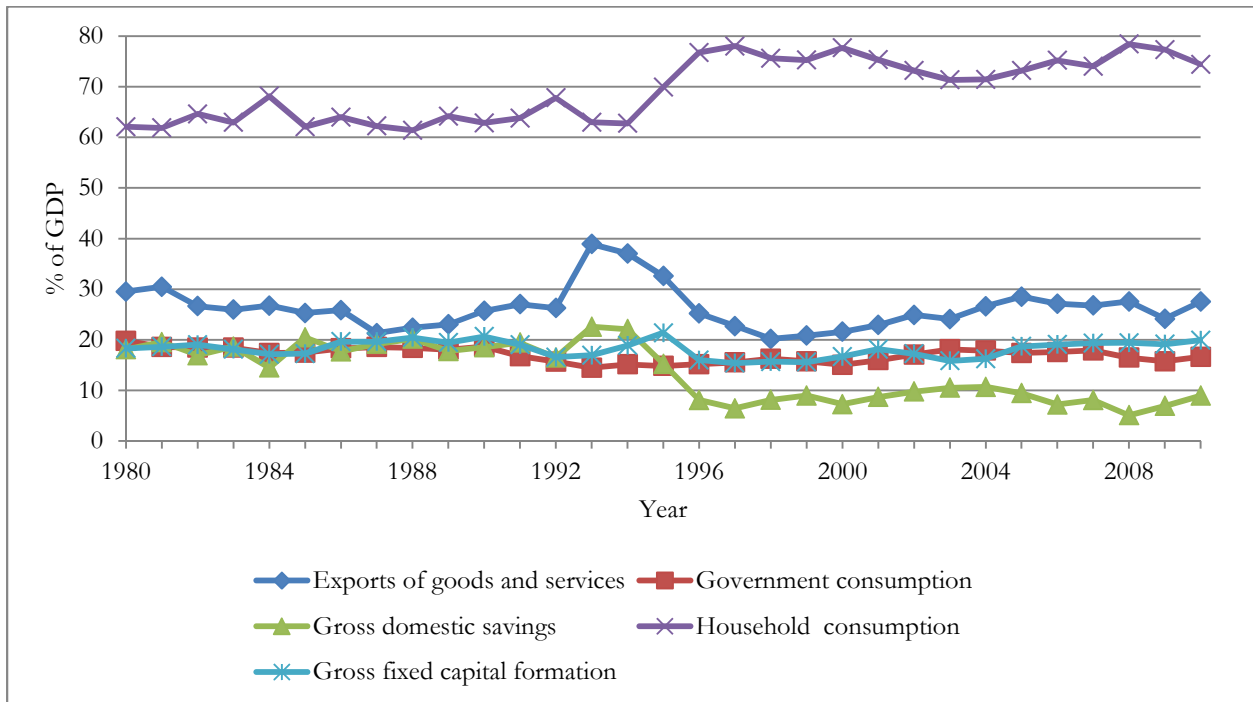
Source: WDI Database.

Thirwall and Lopez (2008) conclude that, there is no convincing evidence that the balance of payment and growth trade-off has improved because of trade liberalization.

3.5.4 Final Demand

It is expected that trade liberalization will alter the final demand composition. The final demand composition in Kenya has not changed substantially during most of the reform period. The household final consumption expenditure has grown especially after 1996. Exports spiked in 1993 period, this coincided with the resumption of donor lending under the SAPs. During this time, there were several export promotion initiatives that were initiated by the government (Figure 3.5).

Figure 3.5: Final Demand



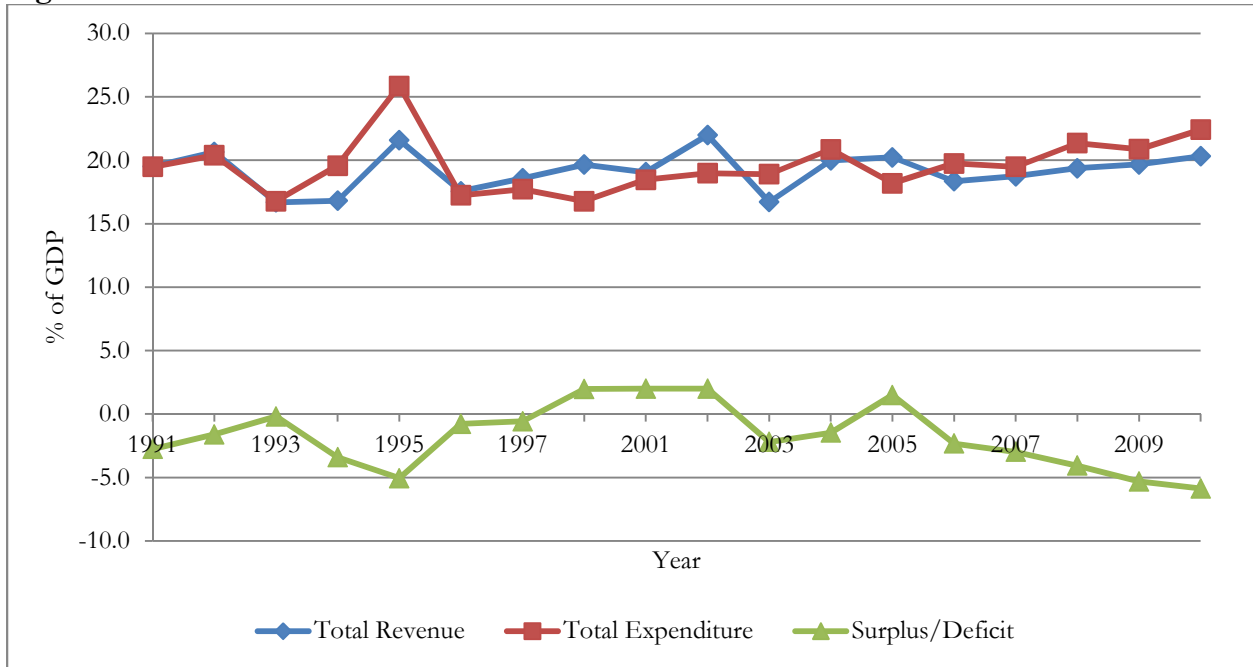
Source: WDI Database.

3.5.5 Fiscal Profile

The evolution of government finances over the reform period is shown in Figure 3.6, based on data available. The government’s fiscal position improved during the reform period, particularly 1991-1993. During this time, revenue and expenditure matched; although after this period, total expenditure remained higher than total revenue. Most developing countries, particularly in Africa, rely heavily on trade tax revenue. Baunsgaard and Keen (2005) note that SSA trade taxes account for 25 per cent of government revenue; while for developing countries in Asia, it accounts for 15 per cent. Trade liberalization has been associated with declining trade tax revenue as a proportion of GDP for the last 20 years, with the greatest decline being registered in SSA and Asia which had low

collected tariff rate (IMF, 2005). The reform period has seen greater decline in revenue, even though the government has tried to reduce expenditure.

Figure 3.6: Fiscal Indicators



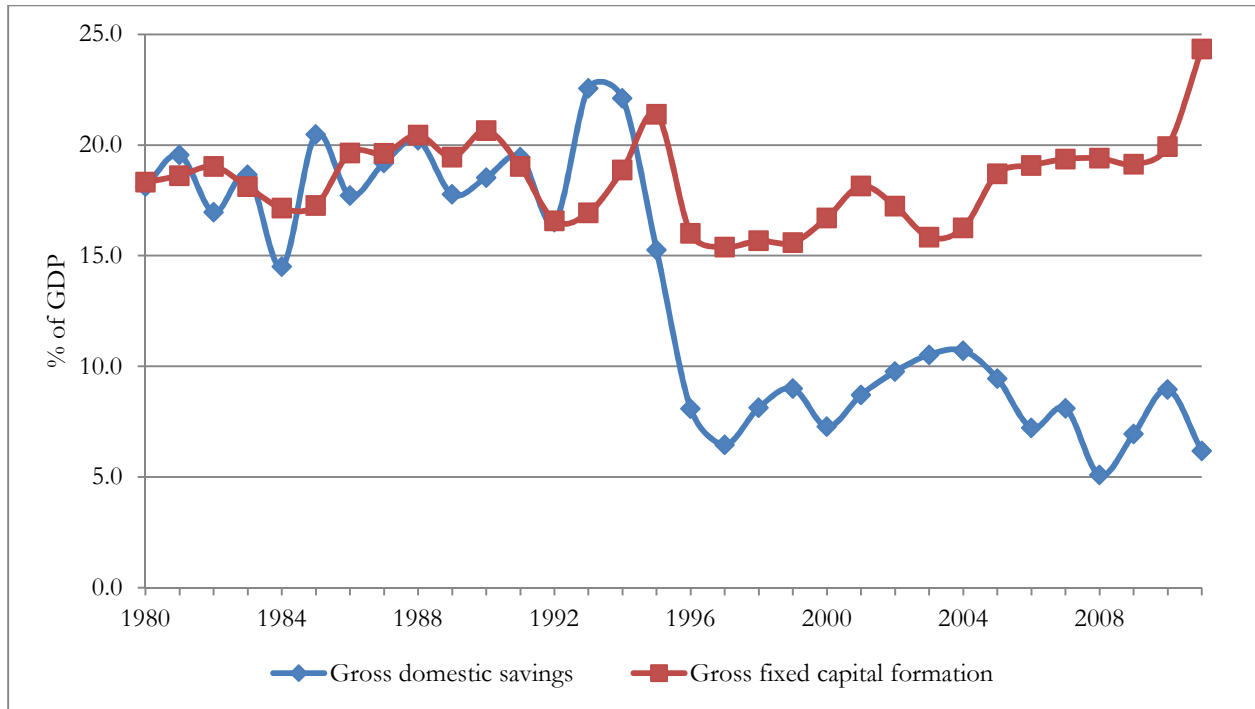
Source: WDI Database.

3.5.6 Savings and Investments

It is expected that trade liberalization will affect capital formation through profitability of investment, certainty of policies and availability of foreign exchange (Tutu and Oduro, 1999).

While it is not easy to determine the net effect of liberalization, a priori, relative prices is an important determinant of investments. An increase in interest rate will increase the cost of capital, thereby discouraging investments; the reverse is also true. The investment trends in Kenya remained mixed, with highest investment experienced in 1995. The savings trend has been much lower, with the sharpest decline being recorded from 1994 to 1997, as shown in Figure 3.7.

Figure 3.7: Savings and Investment Trends

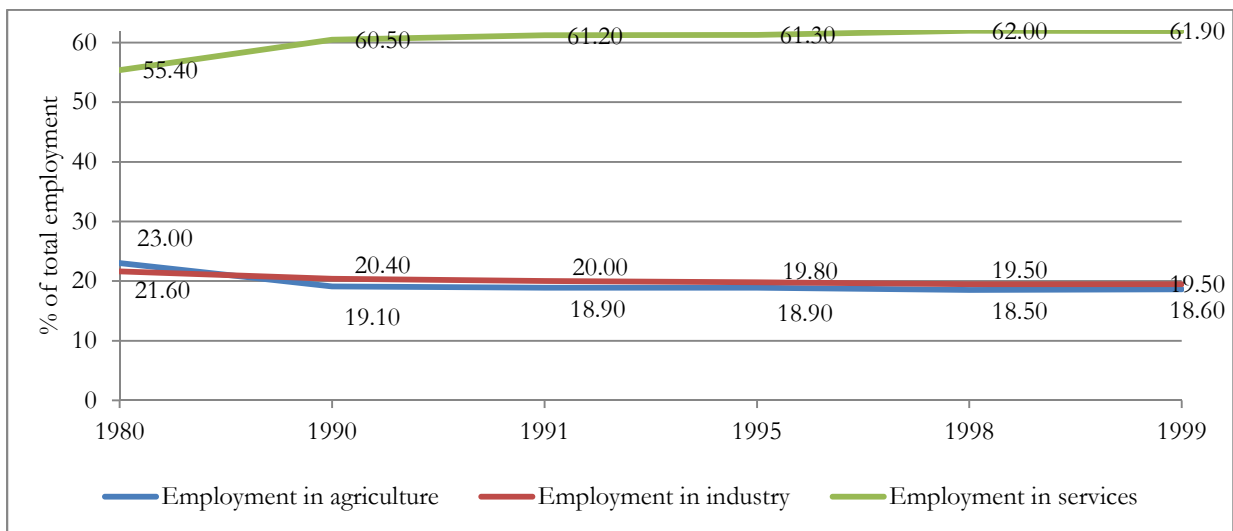


Source: WDI Database.

3.5.7 Employment

The Stolper-Samuelson theory states that trade liberalization is expected to result in opportunities that create more employment.

Figure 3.8: Employment by Major Sectors



Source: WDI (2004).

Figure 3.8 shows that the service sector has continued to employ the majority, while the agricultural and industry sectors have continued to lag behind. Employment has remained stagnant over the trade liberalization period. While these observations are made, it will be acknowledged that employment data has not been readily available, making inference from employment trends quite inconclusive. However, the data available is good enough to provide direction on the issues under study.

3.5.8 Poverty

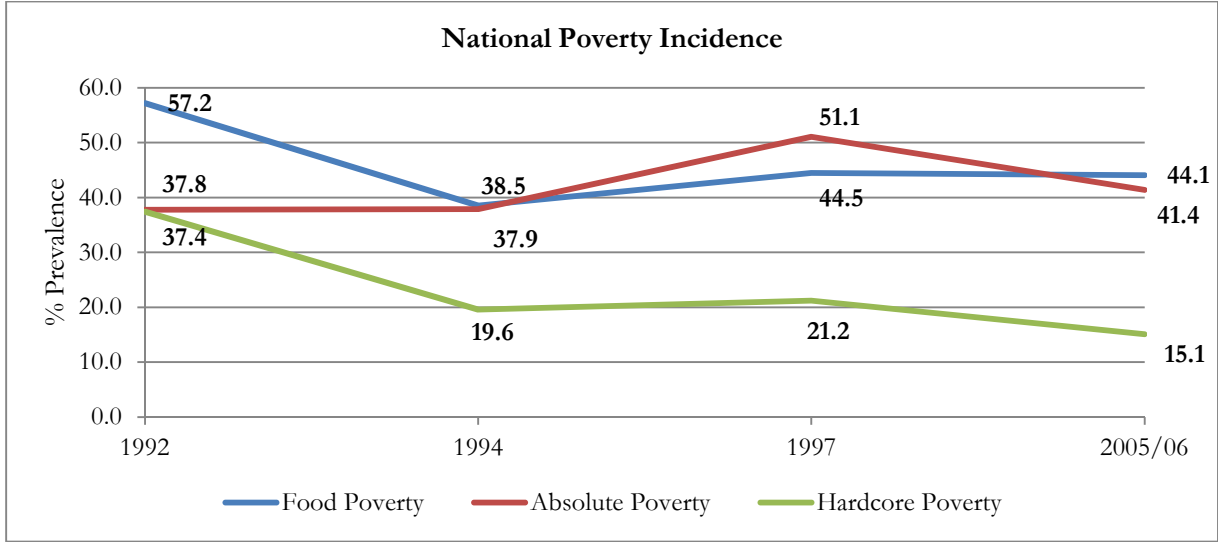
Several data sources have been used to examine the incidence of poverty in Kenya. The Integrated Rural Survey (IRS) series contained information on income and consumption in rural Kenya, sources of income for different social, economic and demographic groups, housing and social amenities, employment and occupation. The IRS I, II and III used smallholder farmers to determine the poverty incidence in 1974/75, 1977 and 1981/82, respectively. This survey only produced rural poverty. The government of Kenya further conducted a series of the Welfare Monitoring Survey, popularly referred to as WMS between 1992 and 1997. WMS was intended to gauge the present and future net socioeconomic consequences of the structural adjustment in Kenya (Mukui, 1994). It set to establish indicators on living standards of different regions and socioeconomic groups in order to monitor changes in vulnerable segments of the population, among other objectives.

Three rounds were conducted: WMS I in 1992, WMS II in 1994, and WMS III in 1997. The WMS gathered information on health, education, social amenities, crop production, child nutrition, income, food, and non-food expenditure. It covered over 10,000 households and over 50,000 individuals in all districts of Kenya in both rural and urban areas. Lastly in 2005/06, the Kenya Integrated Household Budget Survey (KIHBS) was designed and undertaken to provide numerous

indicators needed to measure living standards and poverty in Kenya. It contained data on socioeconomic indicators such as education, health, energy, housing, and water and sanitation. Other information collected included: food consumption and expenditures; non-food consumption; ownership of durable goods; agricultural holdings, activities and outputs; livestock; household economic enterprises; transfers; other income; credit; and recent shocks to household welfare. In this survey 13,430 households where information on 66,725 individuals was obtained (MoPND, 2008).

The data described above provides the opportunity to compare poverty over time. In 1992, when Kenya was in the heart of reforms, food, absolute and hard core poverty were 57.2, 37.8 and 37.4 per cent, respectively. The average national poverty level decreased in 1994 and went up again in 1997, as shown in Figure 3.9.

Figure 3.9: National poverty prevalence in Kenya 1992-2005/06



Source: GOK (various).

There were several factors that could explain the increase in poverty incidence during the 1992 period. Firstly, there were a series of structural adjustment reforms that were initiated by the

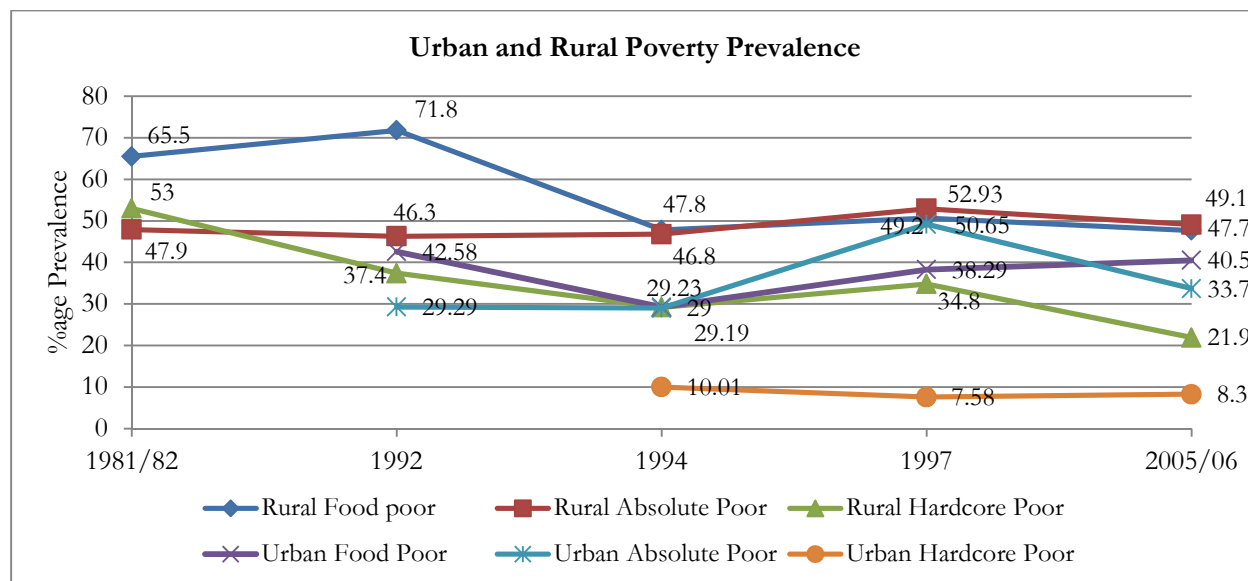
government following the conditionalities by the World Bank and the IMF. These reforms resulted in losers and winners as incomes and expenditures were affected. Secondly, some of the SAP components included trade reforms that affected the direct determinants of poverty such as income, wages, prices and government expenditure. Lastly, during this time, Kenya was in a political transition where the political landscape had changed from single party political leadership to multiparty politics. All these factors had a bearing on welfare and therefore impacted on poverty.

The period under which KIHBS 2005/06 was carried out also coincides with the time when Kenya was an active participant in international free trade initiatives such as the World Trade organization (WTO) and regional trade agreements. It has been argued that such initiatives have tended to increase productive capacities for better competition, and this could have a bearing on the general welfare of the nation. Secondly, government initiatives such as free primary education (FPE) and the constituency development funds (CDF) could have also influenced the general improvement of welfare. However, while these are all speculative, a general equilibrium analysis will provide the true effect of trade liberalization on welfare at household level. While overall poverty incidence has reduced, poverty levels still remain high, as shown in Figure 3.10. Issues of inequality and employment need to be further examined given the regional differences in poverty incidence.

Majority of the poor are agricultural based workers, i.e., those working on their own or other people's holdings were worse off than professionals or managerial class were. The poorest household head did not have any formal education and large household sizes had a strong positive correlation with the prevalence, depth and severity of poverty for all the different levels of poverty. The average share of food in total expenditure was 75.2 per cent for the hard-core poor and 63.2 per cent for all rural households. The food-poor spent most of their food budget on maize (30.1 per cent), milk products (11.5 per cent), beans (9.6 per cent), and meats (8.8 per cent), while the non-poor spent 21.5, 13.5, 9.0, and 10.8 per cent of their food budget on maize, milk products, beans

and meats, respectively. The hard-core poor spent 30.9 per cent of the food budget on maize, 10.8 per cent on milk products, 9.8 per cent on beans and 8.3 per cent on vegetables Mukui (1994).

Figure 3.10: Regional Poverty prevalence



Source: GOK (various).

3.5.9 Income Inequality

It is possible to have a situation where poverty rates fall while income inequality rises. This is given by the fact that the share of income going to the top income recipients may be more than that going to other income recipients.

Table 3.9: Income Inequality in Kenya

	1992	1994	1997	2005
GINI index	57.46	42.07	42.51	47.68
Income share held by lowest 20%	3.39	5.61	5.97	4.84
Income share held by second 20%	6.72	10.12	9.86	8.68
Income share held by third 20%	10.73	14.75	14.27	13.2
Income share held by fourth 20%	17.32	21.43	20.82	20.08
Income share held by highest 20%	61.84	48.09	49.08	53.2

Source: WDI Database.

Table 3.9 gives the income inequality incidence for Kenya. There is limited data available on income inequality in Kenya and poverty since household survey data is collected every five years even though this has not been regular, as can be seen. Therefore, from available data, the gini index was quite high in 1992, at 57.46. The index reduced to 42.5 in 1997 and increased to 47.68 in 2005. While the gini index went down in 1997, inequality has remained high since the richest 20 per cent hold approximately 53 per cent of the income as compared to the poorest 20 per cent who only hold 5 per cent as at 2005. Even with more opening up of the economy due to trade liberalization, income inequality has not reduced as postulated in the Hecksher-Ohlin theory where wages are expected to equalize, which ultimately results in income inequality reduction.

3.6 DISCUSSION AND CONCLUDING REMARKS

This chapter set out to review the evolution and evidence of trade liberalization in Kenya, establish whether trade liberalization actually took place, and the outcomes of trade liberalization with respect to economic performance and welfare outcomes, measured by poverty incidence. Kenya undertook both unilaterally (under the SAP programmes) and multilaterally (under the WTO). There are marked differences under the two forms of trade liberalization. First, SAPs were more of directives as compared to the WTO framework where there are initial negotiations that take place before agreements are reached. Secondly, under the WTO, there are remedies for correcting imbalances that adversely affect the socioeconomic welfare of a country, and mechanisms for monitoring progress and challenges of implementation. Such frameworks did not exist under the SAP trade liberalization framework. Lastly, while the implementation of the trade reforms emanating from both forms of liberalization were done under the same political economy framework, the WTO reforms cannot be easily reversed because a lot of consultations at the multilateral and

national level must be undertaken. In contrast, a presidential decree was all that was required to reverse policies under the SAPs.

Even though trade liberalization were undertaken within different frameworks with the same objectives, there is sufficient evidence that trade liberalization actually took place. Reinikka (1994) and Mwega (1999) show that trade liberalization took place during the following periods 1976-1977, 1980-1981, 1983, 1985, 1988-1989 and 1993; these were the SAP periods after, which Kenya joined the WTO and further committed to liberalize its economy. It is interesting to note that while trade liberalization took place under different economic and political environment, the common denominator was that trade liberalization was actually taking place. Economic performance during the episodes show mixed trends in performance while poverty and employment remained low. Certain years registered high growth rates, 1985-1989 growth averaged 5.66 per cent; other years the GDP growth rate ranged between 2.1-2.8 per cent. Moreover, the incidence of poverty, i.e., food, absolute and hard-core poverty did not improve much with higher inequality: the richest 10 per cent of the population hold approximately 34 per cent of the income while the poorest 10 per cent hold less than 3 per cent of total income. Employments in the broad economic sectors, i.e., agriculture, industry and services have remained stagnant over the period of trade liberalization.

The socio-economic outcomes can be attributed to trade liberalization and other accompanying domestic policies that were also implemented at that time. It is important to establish what components of trade reforms that lead to trade liberalization impacted on poverty, given empirical evidence, provided in chapter two, shows different results for different countries. In Kenya, the incidence of poverty, i.e., food, absolute and hard-core poverty did not improve much even though trade liberalization took place.

In conclusion, it is evident that trade liberalization took place in Kenya based on trade liberalization episodes initiated unilaterally under the SAPs and multilaterally under the WTO

framework. There have been varying outcomes on economic growth, employment and poverty. While potential pathways and accompanying empirical evidence have been established on the impact of trade liberalization on poverty (IMF, 2008), it would be important to establish the true effects of trade liberalization on poverty by using a multi-layered approach discussed in chapter 2. The essence here is that, given the trade liberalization account provided in this chapter and the overall outcomes relating to poverty, it would be fundamental to establish an empirical pathway through which trade liberalization affects poverty in Kenya in order to establish the true effects of trade liberalization on poverty. This will be addressed in the next chapter.

4 METHODOLOGY: THE MULTI-METHOD APPROACH

4.1 INTRODUCTION

This chapter seeks to provide the methodology for examining the impact of trade liberalization on poverty using a multi-method approach. The first approach is to empirically establish the existence of trade liberalization-poverty transmission pathways, using regression and cointegration analyses of time series data for the period 1970 to 2010. This involves undertaking regressions, unit root and cointegration tests in order to establish whether a statistically significant relationship exists between trade liberalization and poverty. Once the nature of the trade liberalization-poverty relationship is established, the next step involves uncovering the complex dynamics of the relationship using the single-year social accounting matrix for Kenya for 2003 and calibration of the SAM in a CGE model. The changes in consumption from the CGE model will then be fed into a micro simulation model where we shall be able to establish whether the changes in consumption moves a household above or below the poverty line.

4.2 DATA

4.2.1 Time Series Data 1970-2010

Time series data for Kenya was collected from the period 1970-2010 for the following variables: agriculture, services and manufacture value added, exports, imports, households consumption, national incomes, GDP per capita, Gross Domestic Product, government final consumption, gross capital formation, gross domestic savings, national income, employment, consumer price index and exchange rate. This data was obtained from the World Development Indicators, which is taken to be a reliable source of data. The main challenge was for employment

data which had missing values from 2000-2010 when accessed in April 2012. However, using the same data source in November 2012, the missing years were available even though they seemed much lower than the previous year. Linear ordinary least square regressions were undertaken to establish the nature of the trade-poverty relationship using the variables aforementioned. Furthermore, Granger causality tests were carried to test for possible causal relationships between trade liberalization and factors that determine poverty, such as national income, employment and prices. The said time series analyses forms the backbone for testing the hypothesis driving this investigation. The results of such analyses will be augmented by using a Social Accounting Matrix (SAM) as described below.

4.2.2 The Kenya Social Accounting Matrix

A SAM is an economy-wide data framework that represents the real economy of a single country. The SAM provides a summary of the national accounts and traces out the flow of incomes from production activities, to factor payments, to incomes of institutions and back to demand of commodities. The row represents receipts while columns represent expenditures. The SAM structure, shown in Table 4.1, is in millions of Kenya shillings and it shows that activities pay for intermediate inputs (909,674), factors of production which consist of labour (430,332) and capital (546,242). Activities in turn receive payments from domestic sales (1,793,765) and home production (92,484), which is activity based. Commodity accounts pay for obtaining goods from activities (1,793,765), transaction costs (97,623), sales taxes (131,721) and imports and tariffs (416,892), and they receive from intermediate sales (909,674), transaction costs (97,623), final demand from private consumption, government, investments and investment stocks, which totals Kshs. 1,151,587, and exports (281,116). Both the activity and commodity accounts in the SAM are broadly categorized into agriculture, manufactures and services, which can further be disaggregated into 50 activities

/commodity by ISIC (International Standard Industrial Classification), as shown in Appendix Table 3. There is a one-to-one activity/commodity mapping. This form of classification enables comparison of activity/commodities over time and across regions or borders. The disaggregated model enables one to understand the differences in sectors and can also enable one to distinguish the impact of more vulnerable sectors.

The institutions, which comprise enterprises, receive incomes from capital (494,960), transfers from government (43,575) and the rest of the world (ROW) (4,938). They, in turn, receive from pay households (289,280) in the form of surplus, pay taxes (35,809) and pay government (7,264) in the form of operating surplus and they make savings (204,069). Households receive from labour (430,332), capital (47,007), enterprises (289,280), government transfers (11,829) and ROW (101,111). The households are disaggregated into urban and rural households and in deciles so that there are twenty households in total. This disaggregation is important for profiling households by deciles or location when establishing an impact. The government receives sales tax (131,721) from commodities, taxes from enterprises (35,809) and households (33,613), capital income (4,276) surplus from enterprise (4,276), and transfers from ROW (5,677). The government consumes commodities (199,034), and makes transfers to enterprises (43,575), households (11,829), ROW (176) and consumes its savings (36,255).

The capital account which consists of savings and stocks received from enterprises (204,069), households (-2,539), government (-36,225) and foreign savings (31,279); these receipts are used as domestic investments (213,997).

Table 4.1: The Macro SAM for Kenya 2003 (Million Kshs.)

	Activities -1-	Commodities -2-	Labour -3-	Capital -4-	Enterprises -5-	Households -6-	Taxes -7-	Government -8-	Investment -9-	Stocks -10-	Rest of world -11-	Total -12--
Activities -1-		1,793,765 Marketed Output				92,484 Home Production						1,886,249 Gross Output
Commodities -2-	909,674 Intermediate Inputs	97,623 Transaction Costs				756,000 Private consumption		199,034 Government consumption	179,109 Investment	17,444 Investment Stock	281,116 Exports	2,440,000 Demand
Labour -3-	430,332 Labour Value-added											430,332 Labour Income
Capital -4-	546,242 Capital Value-added											499,236 Capital Income
Enterprises -5-				494,960 Enterprise Income				43,575 Transfer to Enterprises			4,938 Transfers from ROW	543,473 Enterprise Income
Households -6-			430,332 Labour Income	47,007 Return on capital	289,280 Surplus to households			11,829 Transfer to households			101,111 Transfers from ROW	879,558 Household Income
Taxes -7-		131,721 Sales Taxes			35,809 Taxes remitted	33,613 Tax to Gov.						201,143 Total Tax Income
Government -8-				4,276 Factor Income	7,264 Surplus to Gov.		201,143				5,677 Transfers from ROW	218,359 Government Income
Savings -9-					204,069 Enterprise Savings	-2,539 Household Savings		-36,255 Government savings			31,279 Foreign Savings	196,554 Savings
Stocks =10-									17,444 Investment stock			17,444 Investment stock
Rest of world -11-		416,892 Imports			7,052 Surplus to ROW			176 Gov. transfer to ROW				424,120 Forex Outflow
Total -12-	1,886,249 Activity	2,440,000 Supply Expenditures	430,332 Labour Expenditure	499,236 Capital Expenditure	543,473 Enterprise Expenditure	879,558 Household Expenditure	201,143	218,359 Government Expenditure	196,554 Investment	17,444 Investment Stock	424,120 Forex Inflow	23,643,292

Source: Kiringai *et al* (2006)

4.2.3 The Kenya Integrated Household Budget Survey (KIHBS)

The KIHBS data was collected in 2005/06 by the Government of Kenya with the main objective of obtaining a wide spectrum of socioeconomic indicators required to measure, monitor and analyse the progress made in improving living standards in a single integrated household survey. Furthermore, KIHBS was designed to enable updating and strengthening of the national database, the consumer price index and the system of national accounts. KIHBS data contains information on demographics, housing, education, health, agriculture and livestock, enterprises, expenditure and consumption, household social amenities and community perspectives. KIHBS data was collected from 1,343 randomly selected clusters across all districts in Kenya and comprised 861 rural and 482 urban clusters. Ten households were further randomly selected with equal probability from each cluster resulting in a total of 13,430 households of which 8,610 were rural while 4,820 were urban (GOK, 2007). The 1,343 clusters are the primary sampling units from the NASSEP IV sampling frame, which is designed to give a nationally and sub-nationally representative household survey samples.

4.3 DESCRIPTIVE STATISTICS

The structure of the Kenyan economy is based on the SAM for 2003, from which different macro and micro indicators of the economy can be derived so as to understand its structure.

4.3.1 Macroeconomic Aggregates

The macroeconomic aggregates in this case examine the main components of the gross domestic product (GDP). Private consumption, which is dominated by households, forms the greatest portion of GDP and is approximately 75 per cent. Government and investment each

account for less than 20 per cent. Imports on the other hand are much larger than exports and account for approximately 27 per cent of GDP.

Table 4.2: Macroeconomic Aggregates

Component	Million Kshs.	%age of GDP
Private consumption	772,971.69	75.01
Investment	179,224.89	17.41
Government	202,913.22	19.71
Exports	281,386.77	27.33
Imports	406,881.74	39.52

Source: Kenya SAM, 2003

It follows that any shocks that negatively affect the households will ultimately have a major impact on GDP in general since households form the bulky part of private consumption.

4.3.2 Production

In production, as shown on Table 4.3, the services sector has dominated the economy with around 63 per cent of total production. Zepeda *et al.* (2009), in their analysis note that, tourism and hotels are the main activities that boost these sectors. Non-service production, which constitutes agriculture and mining, food processing and non-food industry, constitutes approximately 37 per cent of total production.

Table 4.3: Production by Broad Sector Categories

Sector	Million Kshs.	%
Agriculture and mining	259,428.78	14.55
Food processing	152,372.42	8.55
Non-food industries	240,697.82	13.50
Services	1,130,550.01	63.41

Source: Kenya SAM 2003.

In terms of output from the sectors, manufactured outputs rank highest. Other manufactures, which are items not included in the ISIC main categories, accounts for slightly over 10 per cent of the total production, as shown on Table 4.3. Food processing is also dominant in

manufacturing as can be seen. Meat and dairy processing account for approximately 8 per cent of total production, while beverage and tobacco account for approximately 6 per cent. The importance of Kenya's natural resources, as also noted by Zepeda *et al.* (2009), can be seen in Kenya's manufacturing activities, where there is a large concentration of manufacturing based on the natural resources.

Table 4.4: Top 10 Merchandise Production

Commodities	Million Kshs.	%
Other manufactures	68,502.68	10.50
Meat and dairy processing	51,278.82	7.86
Tea	46,045.14	7.06
Beverage and tobacco	40,033.53	6.14
Maize	34,673.82	5.31
Non-metallic products	33,861.51	5.19
Milling	33,094.34	5.07
Petroleum	31,103.05	4.77
Machinery	28,235.36	4.33
Beef	24,577.28	3.77

Source: Kenya SAM, 2003.

4.3.3 Commodities

The main export commodities in Kenya are shown in Table 4.5. Tea is the main export accounting for around 21 per cent of merchandise trade excluding petroleum; cut flowers (approx. 11 per cent) ranks second, followed by coffee, vegetables, pulses and oils. The main export destination of these agricultural commodities is Europe.

Table 4.5: Top 5 Exports of Agricultural Commodities

Commodities	Million Kshs.	%*
Tea	46,131.71	21.48
Cut Flowers	22,786.85	10.61
Coffee	9,468.03	4.41
Vegetables	7,752.11	3.61
Oils and Pulses	6,892.01	3.21

Source: Kenya SAM, 2003; * % of total merchandise exports excluding petroleum.

Kenya's manufactured exports consist of both processed foods and non-processed foods. The processed foods are mainly meat and beverage and tobacco, as shown on Table 4.6. Meat

accounts for around 8 per cent of exports as a percentage of total merchandise trade excluding petroleum products, while beverage and tobacco accounts for approximately 6 per cent of merchandise trade. While agricultural export commodities are destined mainly for the European Market, manufactured exports are mainly destined for Kenya's neighbours within the EAC and COMESA region.

Table 4.6: Top 5 Exports of Non- Agricultural Commodities

Commodities	Million Kshs.	%*
Meat	17,477.83	8.14
Chemicals	15,757.96	7.34
Machinery	15,657.10	7.29
Other manufactures	15,357.76	7.15
Beverage and tobacco	13,154.55	6.12

Source: Kenya SAM, 2003; * % of total merchandise imports excluding petroleum.

Table 4.7 shows the main agricultural imports into Kenya; wheat and rice which are some of Kenya's main staple foods, each accounting for approximately 4 per cent of total merchandise trade. Sugar has remained a major import for Kenya given that the country is not self-sufficient in sugar production to meet the demands of the people.

Table 4.7: Top 5 Imports of Agricultural Commodities

Commodities	Million Kshs.	%*
Wheat	10,687.19	4.25
Rice	10,080.06	4.01
Sugar	2,631.70	1.05
Maize	1,162.67	0.46
Other crops	962.35	0.38

Source: Kenya SAM, 2003; * % of total merchandise imports trade excluding petroleum.

Imports, on the other hand, consist of manufactured goods rather than processed foods as shown on Table 4.8. Machineries constitute approximately 30 per cent of total merchandise imports followed by chemicals (21.6 per cent).

Table 4.8: Top Imports of Non-agricultural Commodities

Commodities	Million Kshs.	%*
Machinery	75,604.60	30.04
Chemicals	54,350.78	21.60
Other manufactures	32,819.76	13.04
Other manufactured foods	25,615.21	10.18

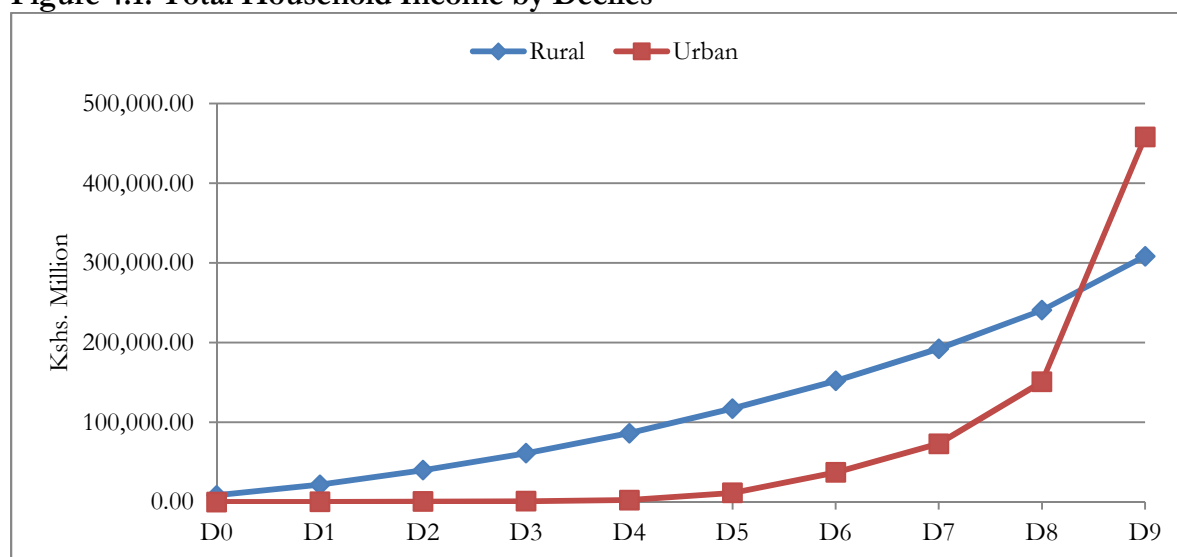
Commodities	Million Kshs.	%*
Printing and publication	9,922.04	3.94

Source: Kenya SAM, 2003; * % of total merchandise trade excluding petroleum.

4.3.4 Household Income

In the 2003 SAM, there is monetary income for twenty households who have been grouped by deciles.

Figure 4.1: Total Household Income by Deciles



Source: SAM, 2003.

Figure 4.1 shows the incomes of both rural and urban cohorts by deciles. Clearly, the total income of rural households is much higher for all deciles except for the richest decile, which holds the most incomes. Checking for income inequality within the regions, the total income for rural households has a gradual slope, implying less income disparity as compared to the urban slope which bends at decile eight and increases rapidly. Table 5.9 further shows the household incomes by deciles. The urban households have more incomes as compared to the rural households; however, as already shown in Figure 4.1, urban households have uneven distribution of income as compared to the rural counterparts. In the rural areas, the poorest decile holds approximately 2.7 per cent of income compared to the urban counterparts, which holds 0.0009 per cent of the income. The richest rural

decile, on the other hand, holds approximately 22 per cent of total rural income, the richest urban decile controls 67 per cent of the total urban income. The median deciles (aggregate D4 and D5) hold 18.16 and 2.30 per cent, respectively of total income for rural and urban, respectively. It is clear that there is uneven distribution of income especially for urban households as compared to the rural counterparts. While the thesis will examine welfare impact of trade liberalization on households, particular attention will be given to the two lowest and richest deciles.

Table 4.9: Household Income (Million Kshs.)

	Rural		Urban	
	Amount	(%)	Amount	(%)
Poorest Decile (D0)	8,390.67	2.72	4.19	9.14E-4
2nd Poorest Decile (D1)	13,277.01	4.30	139.64	0.03
D2	18,340.12	5.94	443.58	0.10
D3	21,133.00	6.85	322.30	0.07
D4	25,252.20	8.18	1,454.20	0.32
D5	30,803.29	9.98	9,046.68	1.98
D6	34,756.79	11.26	25,663.43	5.60
D7	40,350.46	13.08	36,075.16	7.88
2nd Richest Decile (D8)	48,407.82	15.69	77,572.08	16.94
Richest Decile (D9)	67,861.88	21.99	307,323.62	67.09
	308,573.23	100.00	458,044.88	100.00

Source: SAM, 2003.

4.3.5 Households Consumption

Consumption expenditures for households vary between urban and rural households, as shown on Table 4.10. In the rural households, the highest total consumption expenditure shares are found in transport (12.8 per cent), beef (8.8 per cent), maize (7.4 per cent), and milling (5 per cent). On further disaggregating the expenditure shares by household deciles, maize, milling and vegetables are consumed most by the poorest decile, i.e., Rural0. The consumption expenditure share of maize and vegetables decrease as we move to higher income deciles. The richest household, Rural9,

consumes more services than agriculture and manufactured goods' for example, Rural9 consume more health (7.9 per cent)m financial (3.9 per cent), and other services (10.1 per cent). While other services such as electricity and trade form smaller percentages, Rural9 consumes more. The median rural household, Rural4 and Rural5 consumption patterns are not far off from each other, at the same time, their consumption patterns remain in the middle, they are neither ranking in the top nor the bottom.

The urban households have a high total consumption expenditure shares in transport (17.7 per cent), restaurants (11.9 per cent), other services (9.5 per cent) and meat and dairy processing (7.5 per cent). In this group, the urban poorest, Urban0, 50.7 per cent of their consumption expenditure is spent on maize, while 23 per cent of their income goes to milling. The Urban richest, Urban9, like their rural counterparts, consume more services particularly restaurants (13 per cent) and other services (12.2 per cent). The urban median households Urban4 and Urban5 have varied consumption patterns; Urban4 consumption of maize is more than doubles that of Urban5, while for meat and dairy processing and restaurants, Urban5 consumes more than Urban4. These marked differences show the need to disaggregate households for analysis as much as possible, since there is a lot of information lost when households are aggregated.

There are clear disparities between urban and rural households, comparing access to financial services, while it is expected that the urban poor would consume more financial services as compared to the rural poor, Table 4.10 shows that the poorest rural household consumes more services such as financial and hotel than its urban counterpart. This can be attributed to the challenges of aggregation in the SAM accounts, where in certain cases peri-urban households are classified as rural households hence their consumption behaviour tends to bias the final SAM accounts. Furthermore, the SAM collects data at one point in time, and as this is what is used for

decision making, this becomes tricky when the particular year under study was affected by an economic shock that altered household behaviour temporarily.

Table 4.10: Percentage Consumption Expenditure Shares by Rural Households

	Rural0	Rural1	Rural2	Rural3	Rural4	Rural5	Rural6	Rural7	Rural8	Rural9	Total
Maize	20.5	11.7	10.1	11.5	10.3	8.5	8.4	6.5	5.6	2.8	7.4
Wheat	0.1	0.0	0.1	0.4	0.2	0.0	0.1	0.1	0.0	0.0	0.1
Rice	1.3	0.9	2.0	1.3	1.7	1.5	1.7	1.7	1.5	1.2	1.5
Roots and Tubers	1.5	1.6	2.0	1.8	1.6	1.5	3.0	2.0	2.0	1.6	1.9
Oils and Pulses	2.8	3.2	2.3	3.1	2.9	3.0	2.9	2.9	2.6	1.8	2.6
Fruits	1.3	0.6	0.8	1.0	0.8	0.8	0.7	1.0	0.8	0.6	0.8
Vegetables	4.6	3.4	2.7	2.9	2.8	2.6	2.6	2.4	2.1	1.5	2.4
Beef	7.2	6.4	9.6	9.1	8.7	9.5	11.2	10.9	8.6	6.9	8.8
Dairy	4.7	3.3	3.8	3.2	3.7	3.0	2.9	2.7	2.3	1.7	2.7
Poultry	1.7	1.6	1.1	0.7	1.8	0.5	0.9	1.2	1.3	1.3	1.2
Other Livestock	1.1	2.9	1.8	1.0	0.9	0.9	0.6	1.1	1.0	1.0	1.1
Goats	0.9	0.8	1.3	1.1	0.6	1.1	0.6	1.5	2.0	1.0	1.2
Fish	2.1	2.2	2.3	1.9	2.1	1.3	1.1	1.0	0.7	0.4	1.2
Forestry	1.2	2.7	1.3	2.7	4.4	2.6	2.8	4.3	3.3	2.1	2.9
Meat & Dairy Processing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milling	8.8	9.5	7.4	7.8	8.0	7.2	7.0	5.2	4.8	3.3	5.9
Bakery & Confectionery	7.5	6.0	6.2	5.3	5.7	4.9	4.6	4.2	3.7	2.7	4.4
Bev & Tobacco	4.4	3.1	3.7	3.3	3.1	3.6	4.5	4.2	3.9	4.8	4.0
Other Manufactures	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.3
Textiles	1.3	1.5	1.9	2.0	1.8	2.2	2.0	2.4	2.6	2.2	2.2
Footwear	0.6	1.2	1.2	0.7	1.1	1.6	1.8	1.5	1.9	2.5	1.7
Wood & Paper	0.1	0.3	0.2	0.2	0.5	0.3	0.4	0.4	0.6	0.6	0.4
Printing and Publishing	1.3	1.5	1.4	1.5	1.4	1.0	1.7	1.3	1.0	1.4	1.3
Petroleum	1.0	1.0	1.0	0.8	0.8	0.6	0.7	0.8	0.9	1.6	1.0
Chemicals	6.7	6.1	5.9	4.9	5.4	4.3	4.7	4.1	3.7	2.6	4.2
Machinery	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Manufactures	1.6	1.9	2.7	2.1	2.3	2.4	2.5	3.8	2.8	3.1	2.8
Water	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1

	Rural0	Rural1	Rural2	Rural3	Rural4	Rural5	Rural6	Rural7	Rural8	Rural9	Total
Electricity	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.5	0.2
Trade	0.2	0.2	0.3	0.4	0.2	0.5	0.8	0.6	0.6	3.2	1.1
Hotels	0.7	1.2	0.9	2.7	1.8	2.9	2.0	3.7	4.2	3.8	3.0
Transport	6.7	10.5	10.9	11.5	11.9	16.6	11.3	14.4	14.5	12.3	12.8
Communication	0.5	5.7	4.5	1.5	0.4	3.0	3.9	1.7	3.3	4.8	3.2
Financial Services	0.4	0.1	0.3	2.9	0.6	0.6	0.4	1.3	2.5	3.9	1.9
Restaurants	0.2	0.0	0.1	0.1	0.3	0.2	0.4	0.3	0.7	1.2	0.5
Other Services	2.2	2.8	4.4	4.5	3.5	4.6	5.7	4.4	7.7	10.1	6.2
Administration	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.1
Health	1.9	1.9	2.2	2.6	2.2	1.9	2.3	3.3	2.8	7.9	3.7
Education	2.3	3.5	2.9	2.7	5.7	4.4	2.9	2.4	3.1	3.1	3.3
	100	100	100	100	100	100	100	100	100	100	100.0

Source: Author's Calculation

Table 4.11: Percentage Consumption Expenditure Shares by Urban Households

	Urban0	Urban1	Urban2	Urban3	Urban4	Urban5	Urban6	Urban7	Urban8	Urban9	Total
Maize	50.7	1.3	2.1	3.2	6.5	2.7	2.2	1.3	3.1	0.0	0.9
Wheat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rice	2.8	5.7	4.2	0.8	1.9	1.1	1.5	1.5	1.2	0.6	0.9
Roots and Tubers	1.7	3.1	0.8	2.1	1.2	0.6	3.0	1.6	1.0	0.7	1.0
Oils and Pulses	4.1	1.2	2.3	4.7	1.3	1.6	2.7	2.7	1.5	1.0	1.4
Fruits	1.6	0.7	0.6	1.6	0.9	0.5	2.2	0.9	0.7	1.0	1.0
Vegetables	5.9	9.6	9.0	7.4	4.1	5.0	4.2	5.2	2.7	1.6	2.4
Beef	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dairy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poultry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fish	0.0	5.4	0.9	1.0	1.8	0.9	0.4	0.8	0.2	0.4	0.5
Forestry	0.0	0.1	0.2	0.8	3.6	0.3	0.1	0.0	0.6	0.0	0.1

	Urban0	Urban1	Urban2	Urban3	Urban4	Urban5	Urban6	Urban7	Urban8	Urban9	Total
Meat & Dairy Processing	7.4	16.9	10.5	12.4	9.6	10.8	7.4	8.4	9.4	6.7	7.5
Milling	23.0	9.9	11.6	7.0	7.7	4.2	7.0	8.0	2.8	2.0	3.1
Bakery & Confectionery	0.0	9.3	9.7	6.8	6.0	5.1	5.4	4.7	4.0	1.8	2.8
Bev & Tobacco	0.0	2.9	4.4	1.8	3.4	2.9	5.7	5.4	2.1	4.5	4.2
Other Manufactures	0.0	1.2	0.7	0.5	0.3	0.2	0.4	0.3	0.2	0.1	0.2
Textiles	0.0	0.1	0.2	0.7	0.9	0.6	3.9	0.9	3.1	2.2	2.3
Footwear	0.0	0.1	0.0	0.6	0.5	0.2	2.3	0.2	0.3	0.9	0.8
Wood & Paper	0.0	0.6	2.1	1.1	2.7	0.9	0.5	0.4	0.4	0.2	0.3
Printing and Publishing	0.0	0.4	0.4	0.7	2.5	0.5	0.4	0.6	0.9	1.3	1.1
Petroleum	0.5	2.9	2.7	1.3	1.3	2.4	2.2	1.1	1.6	1.6	1.6
chemicals	1.2	8.9	11.3	6.1	8.9	3.5	6.5	3.9	3.7	2.4	3.1
Machinery	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.4	0.4	0.3
Other Manufactures	1.1	1.2	2.6	6.4	1.6	0.8	1.9	4.7	1.7	2.6	2.5
Water	0.0	2.1	4.1	0.5	1.9	0.8	1.4	1.0	0.5	0.5	0.6
Electricity	0.0	0.9	0.0	0.3	0.1	0.0	0.7	0.1	0.5	2.1	1.5
Trade	0.0	0.0	0.0	0.1	0.2	0.0	0.1	1.7	0.2	1.6	1.3
Hotels	0.0	0.0	1.0	2.9	6.7	0.3	0.4	1.3	1.9	4.1	3.1
Transport	0.0	2.3	1.3	11.7	6.5	39.5	21.9	17.5	30.5	13.4	17.7
Communication	0.0	0.0	0.9	2.2	0.0	0.0	0.0	4.8	3.3	5.4	4.5
Financial Services	0.0	0.0	0.0	0.7	1.6	0.2	0.2	0.2	4.3	10.0	7.2
Restaurants	0.0	12.8	12.7	9.8	8.0	12.0	9.1	9.8	10.3	13.0	11.9
Other Services	0.0	0.3	1.9	2.6	2.2	1.5	4.0	6.4	4.4	12.2	9.5
Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Health	0.0	0.0	0.4	0.2	2.5	0.1	0.2	1.3	0.6	2.4	1.8
Education	0.0	0.1	1.3	2.0	3.6	0.7	2.0	3.2	2.1	3.0	2.8
	100	100	100	100	100	100	100	100	100	100	100.0

Source: Author's Calculation.

4.4 TIME SERIES ANALYSIS

The objective of using time series data is to establish whether the trade liberalization transmission mechanism postulated by McCulloch *et al.* (2000) exists. The analysis will be able to tell us whether the relationship that exists is random (i.e., there is no transmission relationship), stochastic (transmission path exists but is subject to some random influence) or deterministic (transmission path exists with no random influence) in nature. It should be noted that time series analysis does not actually answer the question whether trade liberalization has improved welfare measured by poverty incidence. It does, however, show as whether there is a relationship with trade liberalization, which affects the direct determinants of poverty. A linear model will be used to establish the absolute changes in various variables using trade to GDP ratio as the dependent variable. The trade to GDP ratio (TRADERATIO) was taken as the measure of trade liberalization based on literature review. The linear model is given in Equation 4.1

$$TRADERATIO = \alpha + \sum_{i=1}^n \beta_i X_i + u \quad (4.1)$$

α is the constant, β is the slope of the coefficients X_i are the variables which have been specified based on economic theory on the determinants of poverty. This includes incomes, output, employment, consumption and prices. Given the challenge of obtaining these variables in time series for household, proxies will be used such as: national income, employment, GDP, exports, imports, government and household consumption, exchange rate and consumer price index. Equation 4.1 will further be modified to a log linear model in order to establish the multiplier effects of trade ratio on the determinants of poverty.

The next step will be to carry out unit root tests in order to establish the stationarity of the variables already identified. The Augmented Dickey–Fuller (ADF) test will be used to test for stationarity. The null hypothesis is $H_o : \delta = 0$ (unit root) while $H_i : \delta \neq 0$ and takes the following

functional form: $Y_t = Y_{t-1} + \varepsilon_t$ (random walk), $Y_t = \alpha + Y_{t-1} + \varepsilon_t$ (random walk with shift) or $Y_t = \alpha + \beta t + Y_{t-1} + \varepsilon_t$ (random walk with shift and trend). If the variables in the model are non-stationary, then if Y and X are both I(1) they will be cointegrated and have a long-run relationship if the residuals from the OLS regression is I(0). If such a relationship will be found to exist, then an error correction model (ECM) will be used. The ECM will capture both the short- and long-run behaviour.

4.5 THE COMPUTABLE GENERAL EQUILIBRIUM MODEL

After establishing whether transmission mechanisms exist in section 4.4, the CGE model will establish the detailed effects of the transmission at a point in time as a case study augmenting the obtained time series-based results. This will be achieved by using the detailed SAM (Appendix 3) and defining the mathematical relationships that exist in the SAM movements described in 5.2.2. The CGE model will establish how different scenarios affect the transmission mechanism. There are four blocks of equations: prices, production and trade, institutions and the systems constraints block. For calibration, reference is also made to the works of Sadoulet and De Janvry (1995), Bolnick (1989), Bandara (1991), Annabi *et al.* (2008), Mansur and Whalley (1984), and Dostie *et al.* (1996). CGE modelling has evolved over time and has become much easier to understand, and is used widely on examining the economy-wide impacts of shocks. Furthermore, the numerical calibration of CGE models are based on economic theory and operations research technique i.e., mathematical programming is used to solve the problem. Leon Walras (1874) was the father of economic equilibrium since he was the first one to highlight the interrelationships between markets, where forces of supply and demand meet under perfect competition. Arrow and Debreu (1954) and Debreu (1959) then proceeded to apply Walrasian equilibrium in real economies. Subsequently other authors have used these models for different economic issues; for example, Chenery and Uzawa

(1958) used the CGE model to analyse economic development while Harberger (1962) examined issues of taxation.

In the CGE model, there are parameters, variables and equations that are defined. The price block is of particular interest since this is where we shall set the import tariff rate to be equal to zero, in order to examine how other variables will adjust when tariffs are eliminated. Once the equations are written, the variable and parameters are defined as shown in the next section. The definitions here follow the work of Löfgren *et al.* (2001) and the sets and parameters for these equations are presented in Appendix tables 3 and 4, while the equations are presented in Appendix Table 5.

4.5.1 Production and Commodities

Production is based on the neoclassical aggregate production function which maps total inputs into outputs. Neoclassical growth models are also known as Solow-Swan growth models or exogenous growth models, which attempt to explain the long-term economic growth by looking at productivity, capital accumulation, population growth and technological progress. This is a Cobb-Douglas Production function written as:

$$Y = AK^{\alpha}L^{\beta} \tag{4.2}$$

Y is aggregate output; A is a measure of technology or multi-factor productivity. K and L are capital and labour, respectively. α and β are the function exponents which determine the degree of homogeneity. The production function exhibits constant return to scale if the sum of α and β is restricted to 1. In reality, production requires combining several intermediate outputs, capital and labour to produce output. Depending on the elasticity of substitution, production will take different functional forms. Production here takes a two-step nested process so that at the top level of the production structure, intermediate consumption is combined with value-added using CES (Constant

Elasticity of Substitution) technology to produce aggregate output. The CES production function takes the form:

$$Q = A[\delta K^{-\rho} + (1 - \delta)L^{-\rho}]^{1/\rho} \quad (4.3)$$

($A > 0$; $0 < \delta < 1$; $-1 < \rho \neq 0$) the variables K and L are capital and labour, respectively; δ is the distribution parameter like α and β in Equation 4.2.; ρ is the substitution parameter which determined the value of the (constant) elasticity of substitution. The CES is homogeneous of degree one, displays constant returns to scale and the slope is negatively sloped. In the model, this equation is calibrated as shown in Equation 11 (Appendix Table 5). At the bottom level, primary inputs, i.e., capital and labour are combined in order to produce value-added output using a CES function. This is calibrated in the model as Equation 15 (Appendix Table 5).

Leontief technology is used in order to produce aggregate output, which consists of value added and intermediate technology. This technology is appropriate given the zero substitutability between intermediate inputs and value-added. In the CGE model, the calibration is given by Equation 11 (Appendix Table 5). At the same level, intermediate inputs are combined in fixed proportion using Leontief technology in order to produce intermediate consumption as provided in equations 14 and 15 (Appendix Table 5). For each activity of the economy, the respective producer maximizes profits, given technology and prices of inputs. Profits are derived as the difference between total revenue earned, less the cost of factors and intermediate inputs.

On the demand side, there is a composite commodity which is made up of domestic sales and imports, these two commodities are imperfect substitutes, therefore the Armington function (Armington, 1969) is used to differentiate imports and domestically produced goods. The Armington assumption of imperfect substitution is given by

$$Q = A[\alpha M^{-\rho} + (1 - \alpha)D^{-\rho}]^{1/\rho} \quad (4.4)$$

Where D is demand for locally produced good; M is imported imperfect substitute; A is the scale parameter; α is the share parameter' and ρ is the function exponent. Aggregate output is allocated between domestic sales and exports so that suppliers maximize their sales revenue subject to imperfect substitution between exports and domestic sales based on the “Armington assumption” of imperfect transformability so that the production of exports and domestic sales is undertaken using constant elasticity of transformation (CET) between domestic supply and export as follows:

$$Q = A[\alpha E^\rho + (1 - \alpha)D^\rho]^{1/\rho} \quad (4.5)$$

Where E is exports, equations 5.4 and 5.5 are calibrated as shown on the Appendix Table 5 (21 and 24, respectively). The composite commodity is allocated between households, government, intermediate use and investments. The parameters for CET, CES and the Armington functions are exogenously determined.

4.5.2 Factors of Production

There are five primary inputs consisting of labour (skilled, semi-skilled and unskilled), capital and land. As part of profit maximization, activities use factors of production up to the equilibrium point where factor price equals the marginal revenue product of each factor.

$$W_F = P \left[\sum \delta_i QF_i^{-\rho} \right] \delta_F QF^{-\rho-1} \quad (4.6)$$

P is the price of factors, QF is the quantity demanded of each factor and W_F is the factor price in the model, producers adjust to factor prices in each sector. This model does not factor in the cost of switching resources from other sectors.

4.5.3 Institutions

Institutions in the CGE model consist of households, enterprises, government and the rest of the world (ROW). The households in this model are from the rural and urban areas, which are further divided into deciles, making them twenty households in total. Households receive incomes from factors of production and transfers from other institutions, the incomes are taxed and a proportion is saved. The disposable income is spent on home and marketed commodities which are purchased at producer and market prices, respectively. The household is assumed to maximize a ‘Stone-Geary’ utility (also known as linear expenditure system-LES) function, subject to a consumption expenditure constraint. This model does not assume unitary elasticity of substitution and minimal and discretionary components of consumption (Löfgren *et al.*, 2002).

$$C_i = C_{\min i} + \frac{\alpha_i}{p_i} \left[Y - \sum P_j C_{\min j} \right] \quad (4.7)$$

C_i is consumption for good i and $C_{\min i}$ is the minimum consumption for each commodity i . Y is income and $Y - \sum P_j C_{\min j}$ represents the supernumerary or residual income.

Enterprises receive factor incomes and transfers from other institutions. They in turn pay taxes to government and also save. The government receives incomes in the form of tax collected (ad valorem rate) and transfers received from other institutions. The government uses its income to consume commodities in real terms while it also makes transfers to other institutions. Government savings becomes the residual which is the difference between government income and expenditure. The last institution is the ROW which receives transfers from other domestic institutions, and from commodity trade with the rest of the world. The foreign savings are also reached by the difference between receipts and expenditures.

4.5.4 Model Closure and Simulation Scenarios

It is important that balance is achieved in the model or it is properly closed. Equilibrium must be achieved in the labour market, product market, foreign trade, government budget and in savings and investments. The first two closures can be called micro closure while the last three are macro closure. In the micro closure, the labour is considered to be perfectly mobile between sectors while capital is fixed so that total factor supply is fixed while demand is flexible; the equilibrating factor is the factor price. Equation 39 (Appendix Table 5) imposes this equality so that total labour demand equals labour supply.

$$\sum QF_{LABOUR} = \overline{QFS}_{LABOUR} \quad (4.8)$$

In the product market, the composite commodity supplied must equal total commodity demand.

$$QQ = \sum QINT + \sum QH + GC + QINV + qdst + QT . \quad (4.9)$$

$$\begin{bmatrix} Composite \\ Supply \end{bmatrix} = \begin{bmatrix} Intermediate \\ Use \end{bmatrix} + \begin{bmatrix} Household \\ Consumption \end{bmatrix} + \begin{bmatrix} Govt. \\ Cons. \end{bmatrix} + \begin{bmatrix} Fixed \\ Investment \end{bmatrix} + \begin{bmatrix} Stock \\ Change \end{bmatrix} + \begin{bmatrix} Trade \\ input \\ use \end{bmatrix}$$

The macro closure consists of the external balance, government balance and the savings investment balance. In the government closure, government revenue is the sum of government expenditure and government savings.

$$YG = EG + GSAV \quad (4.10)$$

In this case, government savings, consumptions and transfers are taken to be fixed, so that revenue is variable. Since government revenue is determined by the tax rate, the tax rate will adjust in order to achieve equilibrium.

Equilibrium in foreign trade requires that foreign spending, i.e., imports and transfer to the rest of the world must equal foreign earnings, i.e., exports, transfers from the rest of the world and foreign savings as shown in Equation 42.

$$\sum p_{wm} \times QM + \sum trnsfr = \sum p_{we} \times QE + \sum trnsfr + \overline{FSAV} \quad (4.11)$$

This is achieved by having a flexible exchange rate. For the savings investment balance (Equation 43), savings is made up of private, public and foreign savings, which equal total investment.

$$PSAV + GSAV + EXR \times \overline{FSAV} = \sum PQ \times QINV + \sum PQ \times qdst \quad (4.12)$$

$$\left[\begin{array}{c} Domestic \\ Savings \end{array} \right] + \left[\begin{array}{c} Exchange \\ rate \end{array} \right] \times \left[\begin{array}{c} Foreign \\ Savings \end{array} \right] = \left[\begin{array}{c} Fixed \\ Investments \end{array} \right] + \left[\begin{array}{c} Stock \\ change \end{array} \right]$$

Investment is taken as exogenous in order to align to the reality of governments or policy makers wanting to achieve a certain investment objective. Given that the price for investment is endogenously determined in the model while foreign and public savings are exogenous, savings will equal the fixed investment quantities when the base year of non-government institutions savings rate adjust to achieve equilibrium. This is therefore an investment driven closure.

The study under discussion is focused on examining the impact of trade policy reforms (in order to effect trade liberalization) on household welfare in Kenya. The main trade policy instrument currently used in the WTO negotiations is tariffs. We shall examine three simulation scenarios which have been carried out in order to determine the impact of trade policy reforms on household welfare:

1. **Scenario 1: Limited Trade Liberalization (Ltd. TL):** Total elimination of tariffs on all commodities excluding special/sensitive products. The parameter tm_c will be set to zero in

Equation 1 on Appendix Table 5, while considering commodities defined in the set SP(C) which is special products.

2. **Scenario 2: Full Trade Liberalization (Full TL):** Total elimination of tariffs on all commodities including special/sensitive products. The parameter tm_c will be set to zero in Equation 1 on Appendix Table 5 for all commodities.
3. **Scenario 3: Full Trade Liberalization plus FDI (Full TL plus FDI):** Total elimination of tariffs with a 10 per cent increase in foreign direct investment (FDI). The parameter tm_c will be set to zero in Equation 1 on Appendix Table 5 for all commodities, while increasing foreign savings through FSAV.

These scenarios have been selected because they form the basis of the current negotiations currently being undertaken by Kenya. First, the government argues that there are products that have to be protected as they are important for livelihood protection. This list of sensitive products includes maize, wheat, rice, cotton, sugar, tea, roots and tubers, fruits, vegetables, cut flowers, beef, dairy, poultry, other livestock, goats, fish and meat processing. For this reason the first scenario undertakes liberalization while excluding the sensitive/special products. Secondly, scenario 2 undertakes liberalization including sensitive/special products since the ultimate goal of the negotiations is the total elimination of barriers to trade on all products.

Lastly, for scenario 3, the civil society has also advocated for more foreign direct investment to accompany trade liberalization. It has successfully sold this position to the government, who in return is encouraging more investors in the country as Kenya continues to gradually liberalize. Currently, a target of 10 per cent increase in FDI was used following the Government's economic blue print Vision 2030. The applied base tariffs for the simulations are displayed on Table 4.12 for all commodities.

Table 4.12: Applied Tariff Rates for Imports

Commodity	Tariff	Commodity	Tariff
Maize	0.100	Other food manuf.	0.014
Sugar	0.040	Wood	0.168
Vegetables	0.086	Chemicals	0.019
Meat & Dairy Processing	0.105	Other Manuf.	0.081
Beverage & Tobacco	0.278	Rice	2.08E-4
Footwear	0.167	Oils	0.139
Petroleum	0.052	Mining	0.120
Non-Metallic Manuf.	0.095	Bakery & Confectionery	0.210
Wheat	0.192	Textiles	0.149
Tea	0.086	Print	0.021
Other Crops	0.034	Machinery	0.061
Milling	1.373		

Source: Kenya SAM, 2003.

4.6 MICRO SIMULATIONS

There are different approaches that can be used to measure poverty; following Sen (1979), either through identification of who is poor or through aggregation, where poverty characteristics of heterogeneous groups are combined into an aggregate measure. It is further important to distinguish poverty either in relative or absolute terms. Given that necessities vary from society to society, when measuring poverty, it is important to define poverty in relative terms based on the notion that poverty is a situation in which one cannot take part in the ordinary way of life of the community they are living in. Absolute deprivation of necessities is important in examining the core poor, in this case, a poverty line is fixed over time and space, the poverty line is used to distinguish the poor from the non-poor. Relative poverty in most cases supplements absolute poverty measurement.

4.6.1 The Direct Method vs. Income Method in Aggregating Poverty

Sen (1979) advocated for two methodologies in measuring poverty: The direct method and the income method. The direct method identifies people whose actual consumption basket leaves

some minimum needs unsatisfied. The income method first calculates a minimum income at which specified needs are satisfied (poverty line), secondly, individuals whose income fall below this amount are identified as poor. The direct method has the advantage that it deals with direct information regarding satisfaction of specified needs and no assumptions of behaviours are required, while the income method provides a numerical distance from the poverty line, income shortfall which the direct method does not provide. In contrast, given that the direct method does not consider behaviour patterns, a miser who does not consume much food will be considered poor even if the income at his disposal qualifies him as non-poor. The preconditions for identification under the income method are challenging in that if there is no consistency in the consumption behaviour pattern, then it will not be possible to obtain a specific income level where specified necessities are met. Second, if there are market differences in prices for different groups, income will tend to be group specific even with similar consumption behaviour.

A second important factor that must be considered when measuring poverty is that the family is the unit for measuring consumption and not the individual. This has implications for calculating the minimum income required to meet basic needs since the family income is usually divided by the family size in order to obtain individual income. This approach tends to overlook the economies of scale associated with certain items of consumption, and secondly, children's needs are different from those of adults. Sen (1979) posits that this problem can be dealt with by converting each family member into a certain number of "adult equivalents" by the use of some "equivalence scale". He however warns that there is still some element of arbitrariness in such conversions, but continues to explain the different bases for deriving the equivalence scale and weighting of families of different sizes is meant to ease comparison (Sen, 1979: 292).

In measuring poverty, the income shortfall (income gap), as defined by Sen (1979), is the difference between the poverty line and individual income y_i , therefore let

$y = (y_1, \dots, y_n)$ be the individual income

$Z > 0$ is the predetermined poverty line

$g_i = Z - y_i$ income shortfall in i^{th} household

In aggregating poverty, Foster *et al.* (1984) following the work of Sen (1979) developed common measure of overall poverty commonly known as the FGT index, which is used to quantify three well known elements of poverty, namely: level, depth and severity, which are also, respectively, known as incidence, inequality and intensity of poverty. The FGT index is defined as:

$$P_\alpha(y|z) = \frac{1}{n} \sum_{i=1}^q \left[\frac{g_i}{z} \right]^\alpha \tag{5.1}$$

$q = q(y; z)$ number of poor households with income no greater than z

$n = n(y)$ total number of households

α can take the value 0, 1 or 2.

When $\alpha = 0$, then $P_0 = \frac{q}{n}$ this is the headcount ratio and is the proportion of the population below the specified poverty line. α_0 measures the level or incidence of poverty. This measure does not take into account how far below the poverty line one falls; therefore ranking a population by intensity of poverty is not possible. When $\alpha = 1$, then

$$P_1 = \frac{1}{n} \sum_{i=1}^q \left[\frac{g_i}{z} \right] \tag{5.2}$$

Equation 5.2 gives the aggregate shortfall of income of all the poor from the specified poverty line, this measure gives the depth of poverty. This can be normalized by being expressed as the percentage shortfall of income of the poor from the poverty line and gives the “income-gap ratio”. However, the income-gap ratio, P_t , as noted by Sen (1979) is insensitive to transfers of income among the poor, as long as nobody crosses the poverty line by such transfers. This method

concentrates on the aggregate shortfall and does not examine distribution of poverty. When $\alpha= 2$, we have the poverty severity index as shown in Equation 5.3.

$$P_2 = \frac{1}{nz^2} \sum_{i=1}^q \left[\frac{g^2_i}{z} \right] \quad (5.3)$$

The poverty severity index is the population mean of the weighted sum of poverty gaps, with weights being defined as the squared proportionate poverty gaps. The larger the severity index the greater the poverty gap, which indicates that poverty is severest among the very poor. Although this index does not have a straightforward interpretation, it is very useful in comparing poverty severity over time, across regions and among social groups. It can also be used to rank poverty severity indices obtained using different poverty lines. For decomposability, i.e., to obtain the level of poverty for subgroups (Foster *et al.* 1984) we shall have

$$C_j = \left[\frac{\left(\frac{n_j}{N} \right) P_{\alpha_j} (Y^{(j)} : Z)}{P_{\alpha} (Y : Z)} \right]^{100} \quad (5.4)$$

Where,

C_j - Percentage contribution of subgroup j to total poverty.

P_{α_j} - Poverty measure for a given value of FGT parameter in subgroup or employment category j , where the values of the FGT parameter, α ranges from 0 to 2.

Z_j - Poverty line for subgroup j , which might be the same as the overall poverty line Z .

N - Total population.

$$\text{Where } P_{\alpha}(y | z) = \frac{1}{n} \sum_{i=1}^q \left[\frac{g_i}{z} \right]^{\alpha} \quad (5.5)$$

$$\text{And } P_{\alpha_j} = \frac{1}{n_j} \sum_{i=1}^{q_j} \left[\frac{g_i}{z_j} \right]^{\alpha} \quad (5.6)$$

The above expression can be used to isolate population groups that are over-represented in the overall poverty of persons in wage and non-wage employment. The resultant poverty profiles can be used to target poverty alleviation programs to population groups that are most affected by poverty.

Establishing the household welfare effects will provide new information on how trade policy reforms affect welfare at the household level. Welfare here will be measured using the Foster Greer and Thorbecke (FGT) discussed in 4.6.2, particularly equations 5.1, 5.2 and 5.3. Equation 5.1 is the headcount ratio, which shows how many people are below the poverty line. Equation 5.2 has a decreasing relation with income and provides the income shortfall, while Equation 5.3 gives the poverty severity index. Further to the FGT index, the distribution of income will be examined in order to establish the extent to which welfare within different household groups are affected by trade policy reforms. The FGT index will be established, by first, generating the changes in household consumption from the model simulations in section 4.5. The changes in household consumption by deciles will then be linked to the household consumption data available in the Kenya Integrated Household Budget Survey (KIHBS) 2005/06. This adjusted household survey consumption data will then be analysed using the Distributive Analysis Stata Package (DASP) using the poverty and inequality incidence modules. With this analysis, we shall be able to establish in details the impact of these trade reforms policy shocks on households.

4.7 DISCUSSION AND CONCLUDING REMARKS

Examination of the impact of trade liberalization on household welfare has necessitated the use of an integrated approach. This approach emanates from the fact that trade liberalization is a macro economic issue while the impacts manifest at the micro level. Therefore, different methodologies are required to address the various issues acting at each level. This has necessitated the use of a multi-method approach, which involves the use of different methodologies, which,

ultimately, must build on each other. In conclusion, the multi-method approach is more appropriate, given that it allows for the use of various methodologies within an integrated framework, so that results from one level feed into the next level. This approach, while proposed by the IMF (2008), has not been used in any study we could find. The subsequent section presents the results which will also show how the various methods complement each other.

5 RESULTS AND DISCUSSION

5.1 INTRODUCTION

This chapter presents the results from which can be determined whether the postulated null-hypothesis stating that there is no statistically significant relationship between trade liberalization and poverty in Kenya can be accepted or rejected. The objective of this chapter is to present the results of the investigation based on the multi-method approach explained in chapter four. The first results presented are from the time series analysis conducted to test the said null-hypothesis in order to establish whether the postulated trade liberalization-poverty relationship does exist. This was done by, first, determining whether the said data series are stationary. Thereafter, Regression, Cointegration, and Granger causality tests were conducted to establish if the potential pathways by McCulloch *et al.* (2000) exists using time series data from 1970 to 2000. The dynamics of trade liberalization at a point in time using 2003 social accounting matrix for Kenya are also presented in an endeavour to understand the nature of trade liberalization-poverty relationships. In this case the price transmission mechanism from tariff reduction to changes in overall price and volume changes in output are presented. The impact of these changes in price and volume on value added and factor movements and the resulting welfare effects are also presented. Finally, simulation results presenting the changes in poverty are also tabulated and discussed.

5.2 TIME SERIES ANALYSIS

5.2.1 Unit Root and Cointegration Tests

Unit root tests were carried out using the augmented Dickey-Fuller (ADF) test for several variables identified from empirical literature review to have an effect on poverty. These variables include national income as a proxy for household income, employment, government consumption, household consumption, prices, exchange rate and the gross domestic product. The following were the results of the unit root test: Trade ratio I(1), National Income I(1), Employment I(2), Exports I(1), Government Consumption I(2), Consumer Price Index I(2), Exchange Rate I(1), and GDP I(1). A cointegration test was carried out by regressing the residual of a linear model containing all the above variables. The error term was stationary, showing no existence of a unit root. Results of the tests are presented in Appendix 2.

5.2.2 Stochastic Relationship

The results presented in Table 5.1 shows several variables that affect trade liberalization. Export, exchange rate and GDP are significant at the one per cent level of significance while national income, employment and household consumption are significant at the five per cent level.

Table 5.1: OLS Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.035012	0.031212	-1.121754	0.2759
DNATIONALINCOME	9.14E-11	4.16E-11	2.199985	0.0404
EMPLOYMENT	6.01E-09	2.42E-09	2.486775	0.0224
DEXPORTS	5.38E-12	8.69E-13	6.189549	0.0000
DDGOVCONSUMPTION	-1.24E-12	1.20E-12	-1.036444	0.3130
DHHCONSUMPTION	8.98E-13	3.38E-13	2.660543	0.0154
DDCPI	0.001078	0.004653	0.231623	0.8193

DEXCHANGE	-0.010549	0.003129	-3.371496	0.0032
DGDP	-3.74E-12	8.23E-13	-4.543642	0.0002
R-squared	0.791432	Mean dependent var		-0.011725
Adjusted R-squared	0.703614	S.D. dependent var		0.063949
S.E. of regression	0.034814	Akaike info criterion		-3.622478
Sum squared resid	0.023029	Schwarz criterion		-3.194269
Log likelihood	59.71469	F-statistic		9.012186
Durbin-Watson stat	2.102764	Prob(F-statistic)		0.000046

Trade liberalization is affected by national income, which is significant at the five percent level. The model is of best fit since 79 per cent of variations are explained in the model. The model is not spurious since the Durbin Watson statistics is greater than the R-squared. The Durbin-Watson statistics also shows that there is no auto-correlation in the model. These results provide an overall picture of the relationship between trade liberalization and key variables that determine poverty in a country which are stochastic in nature, given the existence of the error term. From these results, the transmission path from trade liberalization to poverty exists at a macro level. It is now possible to draw a step-by-step path, based on theory, of how trade liberalization affects key variable that in turn affect poverty.

Having established the overall picture showing that a transmission path exists, we now move to establish a step-by-step transmission pathway. Table 5.2 has put national income as the dependent variable and it shows that it is determined by exports, GDP, trade ratio and exchange rate. All these variables are significant with an R-squared of 70 per cent and a D-W statistic of 1.88. There is no evidence of cointegration as shown on Table 5.3. The unit root test on the residuals of regression shows that a unit root does not exist, this means that there is no cointegration in this model.

Table 5.2: Regression Results for National Income

Dependent Variable: DNATIONALINCOME				
Method: Least Squares				
Date: 04/06/12 Time: 04:05				
Sample(adjusted): 1971 2009				
Included observations: 39 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-1.24E+08	75524851	-1.645950	0.1090
DGDP	0.017683	0.002093	8.450032	0.0000
DEXPORTS	-0.009366	0.002948	-3.177203	0.0032
DTRADERATIO	1.65E+09	7.86E+08	2.103531	0.0429
DEXCHANGE	16037118	9061352.	1.769837	0.0857
R-squared	0.704469	Mean dependent var.	3.53E+08	
Adjusted R-squared	0.669701	S.D. dependent var.	3.92E+08	
S.E. of regression	2.25E+08	Akaike info criterion	41.42172	
Sum squared resid.	1.72E+18	Schwarz criterion	41.63500	
Log likelihood	-802.7235	F-statistic	20.26179	
Durbin-Watson stat	1.880223	Prob. (F-statistic)	0.000000	

Table 5.3: Cointegration Test for National Income

ADF Test Statistic	-5.728051	1% Critical Value*	-2.6243
		5% Critical Value	-1.9498
		10% Critical Value	-1.6204

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID26)

Method: Least Squares

Date: 04/06/12 Time: 04:06

Sample(adjusted): 1972 2009

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID26(-1)	-0.950594	0.165954	-5.728051	0.0000
R-squared	0.469895	Mean dependent var.	-3994254.	
Adjusted R-squared	0.469895	S.D. dependent var.	2.96E+08	
S.E. of regression	2.15E+08	Akaike info criterion	41.24044	
Sum squared resid.	1.72E+18	Schwarz criterion	41.28353	
Log likelihood	-782.5683	Durbin-Watson stat	1.931755	

Household consumption, which is a proxy for household welfare is determined by GDP, domestic savings and national income as shown on Table 5.4. National income is significant at 10 per cent, while GDP and gross domestic savings are significant at one per cent. There is also no evidence of cointegration in this model, as shown by the unit root test results on Table 5.5. The model further explains around 87 per cent of the variations in the data. This step has drawn the pathway from national income to household consumption. Table 5.6 also shows that there is a causal connection

from household consumption to trade liberalization. The causal connection from household consumption to trade liberalization means that, due to trade liberalization, households have now changed their consumption patterns, so that they are now consuming more imported commodities, and have now put pressure on government to ensure that the markets are more open in order to consume a composite commodity made of both local production and imports.

Table 5.4: Regression Results on Determinants of Household Consumption

Dependent Variable: DHHCONSUMPTION					
Method: Least Squares					
Date: 04/06/12 Time: 04:25					
Sample(adjusted): 1971 2009					
Included observations: 39 after adjusting endpoints					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	-5.87E+09	3.20E+09	-1.832587	0.0754	
DGDP	0.875684	0.141239	6.200014	0.0000	
DNATIONALINCOME	13.64886	7.499067	1.820074	0.0773	
DGDS	-1.090496	0.109175	-9.988547	0.0000	
R-squared	0.867788	Mean dependent var.	2.31E+10		
Adjusted R-squared	0.856456	S.D. dependent var.	2.99E+10		
S.E. of regression	1.13E+10	Akaike info criterion	49.23403		
Sum squared resid.	4.48E+21	Schwarz criterion	49.40465		
Log likelihood	-956.0636	F-statistic	76.57565		
Durbin-Watson stat	2.600728	Prob.(F-statistic)	0.000000		

Table 5.5: Cointegration Test for the Error using Unit Root Test of the Error Term

ADF Test Statistic	-8.750795	1% Critical Value*	-2.6243
		5% Critical Value	-1.9498
		10% Critical Value	-1.6204

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(RESID28)
 Method: Least Squares
 Date: 04/06/12 Time: 04:26
 Sample(adjusted): 1972 2009
 Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID28(-1)	-1.345538	0.153762	-8.750795	0.0000
R-squared	0.673776	Mean dependent var.		-
				6.52E+08
Adjusted R-squared	0.673776	S.D. dependent var.		1.77E+10
S.E. of regression	1.01E+10	Akaike info criterion		48.94174
Sum squared resid.	3.80E+21	Schwarz criterion		48.98484
Log likelihood	-928.8931	Durbin-Watson stat		2.050748

Table 5.6: Granger Causality Trade Liberalization and Household Consumption

Pairwise Granger Causality Tests			
Date: 04/06/12 Time: 06:05			
Sample: 1970 2010			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Probability
DHHCONSUMPTION does not Granger Cause DTRADERATIO	39	4.51331	0.04057
DTRADERATIO does not Granger Cause DHHCONSUMPTION		1.52221	0.22528

A second pathway through which trade liberalization affects poverty is the enterprise pathway, where employment takes place. Table 5.7 shows that both agriculture and service value-added are significant for employment. Exports are also important for employment, however, there is a negative relationship which can be explained by the fact that trade liberalization comes with technology transfer, which increases capital labour and hence the negative relationship with employment.

Table 5.7: Regression Results on Employment

Dependent Variable: EMPLOYMENT				
Method: Least Squares				
Date: 04/06/12 Time: 05:41				
Sample(adjusted): 1971 1999				
Included observations: 29 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8769013.	1243867.	7.049800	0.0000
DTRADERATIO	46754311	9765746.	4.787582	0.0001
DEXCHANGE	629309.1	134170.8	4.690358	0.0001

DEXPORTS	-0.000233	5.05E-05	-4.604663	0.0001
DAGRICULTURE	0.000163	7.71E-05	2.109110	0.0460
DDSERVICES	0.000221	9.38E-05	2.358967	0.0272
R-squared	0.635647	Mean dependent var.		12248750
Adjusted R-squared	0.556440	S.D. dependent var.		3632895.
S.E. of regression	2419520.	Akaike info criterion		32.41803
Sum squared resid.	1.35E+14	Schwarz criterion		32.70092
Log likelihood	-464.0614	F-statistic		8.025112
Durbin-Watson stat	1.376283	Prob. (F-statistic)		0.000168

Over this period of time, merchandise export data shows that manufactured exports have been increasing, and given that firms use capital and labour value-added, the negative relationship between exports and employment implies that with trade liberalization, firms have been switching to more capital intensive production for higher productivity of exports, hence the negative relationship between employment and exports. Table 5.8 further shows that there is no cointegration in the model in Table 5.7. However, it is interesting to note that the Granger causality test shows that there is a causal relationship from employment to trade liberalization. This implies that there is an intricate feedback mechanism from employment to trade liberalization, which can be explained as follows: given that firms and individuals have seen the new market opportunities arising from trade liberalization, they respond by increasing production geared towards export markets through export market promotions, fairs and incentives facilitated by government.

Table 5.8: Cointegration Test using Unit Root

ADF Test Statistic	-4.372960	1% Critical Value*	-2.6486
		5% Critical Value	-1.9535
		10% Critical Value	-1.6221

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(RESID33)
 Method: Least Squares
 Date: 04/06/12 Time: 05:41
 Sample(adjusted): 1972 1999
 Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID33(-1)	-0.779856	0.178336	-4.372960	0.0002
R-squared	0.408429	Mean dependent var		262880.3
Adjusted R-squared	0.408429	S.D. dependent var		2606069.
S.E. of regression	2004423.	Akaike info criterion		31.89467
Sum squared resid	1.08E+14	Schwarz criterion		31.94225
Log likelihood	-445.5254	Durbin-Watson stat		1.834545

Table 5.9: Granger Causality Employment and Trade Liberalization

Pairwise Granger Causality Tests			
Date: 04/06/12 Time: 06:06			
Sample: 1970 2010			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Probability
EMPLOYMENT does not Granger Cause DTRADERATIO	28	4.57776	0.04234
DTRADERATIO does not Granger Cause EMPLOYMENT		0.33009	0.57074

In the ‘Enterprise Pathway’, employment is not a significant determinant of household consumption, as shown in Table 5.10; moreover, the Granger causality test on Table 5.11 shows no causal connection between the two.

Table 5.10: Determinants of Household Consumption

Dependent Variable: DHHCONSUMPTION					
Method: Least Squares					
Date: 04/06/12 Time: 05:01					
Sample(adjusted): 1971 1999					
Included observations: 29 after adjusting endpoints					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	-6.91E+09	9.59E+09	-0.720876	0.4779	
EMPLOYMENT	-264.8192	669.5743	-0.395504	0.6960	
DNATIONALINCOME	30.91809	10.77386	2.869734	0.0084	
DGDS	-1.238454	0.137126	-9.031533	0.0000	
DGDP	0.847856	0.179570	4.721594	0.0001	
R-squared	0.867536	Mean dependent var		2.05E+10	
Adjusted R-squared	0.845459	S.D. dependent var		2.98E+10	
S.E. of regression	1.17E+10	Akaike info criterion		49.36506	
Sum squared resid	3.30E+21	Schwarz criterion		49.60080	
Log likelihood	-710.7934	F-statistic		39.29550	
Durbin-Watson stat	2.658167	Prob(F-statistic)		0.000000	

Table 5.11: Granger Causality Test on Employment and consumption

Pairwise Granger Causality Tests

Date: 04/06/12 Time: 05:05

Sample: 1970 2010

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Probability
DHHCONSUMPTION does not Granger Cause EMPLOYMENT	28	2.20222	0.15031
EMPLOYMENT does not Granger Cause DHHCONSUMPTION		1.21925	0.28002

The results presented on tables 5.1 to 5.11 show that first, there is a transmission path between trade liberalization and poverty, since all variables that are linked to poverty such as national incomes, employment, household consumption, gross domestic product, exports and exchange rates are all significant determinants of trade liberalization. Trade liberalization has been found to affect poverty through national incomes which in turn affect household consumption expenditure. This is the first trade liberalization-poverty pathway, which has been established to be stochastic in nature since there is an error term. **At this point, the null hypothesis (there is no statistically significant relationship between trade liberalization and poverty) can be rejected.** There is, however, a more complex relationship between trade liberalization and poverty through the household consumption path, namely, this is not just a one-way relationship. It appears in this regard, from Granger causality tests performed for the purposes of this study (see Table 5.6), that household consumption also causes trade liberalization. The implication of this is that there is not solely a one-way relationship between trade liberalization and household welfare, but that contemporaneous feedback loops are present. Because of the presence of such feedback loops, it will not be possible to accept the alternative hypothesis which only states a single direction with respect to impact flows, namely from trade liberalization to household poverty.

The link between trade liberalization and poverty, through employment, appears to be weak. While employment is a significant determinant of trade liberalization, it is not a significant determinant of household consumption. There is, however, a strong causal connection from

employment to trade liberalization. Trade liberalization has the tendency of altering the labour-capital intensity ratio towards more capital intensive production, so that with open markets, there is increased demand for high skilled labour and capital; this tends to increase demand for capital over labour, and since one of the main sources of household income is employment, its impact on consumption, therefore it becomes insignificant. At the same time, because households know the incentives that come with trade liberalization, they tend to produce for export. This can explain the causal connection between employment and trade liberalization.

5.2.3 Multiplier Effect of Trade Openness to Household Poverty Determinants

This subsection attempts to establish the multiplier effects of changes in trade openness to some of the major poverty determinants. The following variables have been used: GDP per capita has been used as a proxy to household income, employment, household consumption, the consumer price index, exchange rate and gross capital formation, which includes both capital stocks and investments. One major challenge for undertaking such an analysis is the unavailability of household poverty indicator data in time series format, such as household income, assets, poverty incidence (head count ratios). For this reason, GDP per capita has been used to proxy household income, while when gross capital formation (DGCF) was interacted with the selected variables it was found to significantly increase the level of significance of both variables and models.

Table 5.12 presents the results of the regression of the multiplier effects of trade openness. GDP per capita, which is a proxy for household income, decreases by less than 0.005 per cent with relative increase in openness. However, the challenge of usage of GDP per capita is that income inequality has not been factored in, for the reason that this variable is collected periodically and is not available in time series. The other variables that have positive and significant increases are household consumption, consumer price index, exchange rate and investments. There is a positive,

but very small, change in employment which is also not significant. These findings provide the overall macro picture of how trade openness affects poverty determinants however, the insufficiency of time series data necessitates the use of a social accounting matrix to reinforce the current findings and to further fill in the missing gaps from time series analysis.

Table 5.12: Multiplier Effect of Trade Openness to Household Poverty Determinant

Dependent Variable: DLTRADERATIO				
Method: Least Squares				
Date: 11/10/12 Time: 12:45				
Sample(adjusted): 1972 2010				
Included observations: 39 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.065863	0.016712	-3.940974	0.0004
DGDPPERCAPITA	-5.20E-05	1.55E-05	-3.363868	0.0020
DEMPLOYMENT	6.57E-09	9.88E-09	0.665175	0.5107
DHHCONSUMPTION	1.85E-12	5.11E-13	3.632300	0.0010
DDCPI	0.004724	0.002352	2.008761	0.0531
DEXCHANGE	0.007685	0.002473	3.107679	0.0039
DGCF	2.40E-12	5.95E-13	4.032104	0.0003
R-squared	0.605652	Mean dependent var.	-0.006096	
Adjusted R-squared	0.531712	S.D. dependent var.	0.100364	
S.E. of regression	0.068680	Akaike info criterion	-2.357558	
Sum squared resid.	0.150944	Schwarz criterion	-2.058970	
Log likelihood	52.97239	F-statistic	8.191114	
Durbin-Watson stat	1.884891	Prob. (F-statistic)	0.000021	

5.3 COMPUTABLE GENERAL EQUILIBRIUM (CGE) MODEL

The CGE model builds up from the time series analysis. The time series analysis has confirmed, empirically, that there are pathways through which trade liberalization affects poverty. It has also shown that the relationship is stochastic in nature. Further, step-by-step movement from trade liberalization to poverty (proxied by household consumption) has also been established. The ‘consumption path’ through, which trade liberalization affects poverty, has been clearly established, and there are multiplier effects associated with trade openness to household welfare. However, the analysis fails to provide a strong connection from employment to poverty; this is largely attributed to unavailability of household income data which could be linked to employment. The time series

methodology, however, limits the analysis given that variables such as poverty rates are not available in time series; therefore, the analysis up to this point has shown that there is a connection between trade liberalization and poverty. The CGE model will therefore provide the dynamics that take place within the economy when trade liberalization takes place at one point in time (using SAM 2003 on Table 4.1). The use of a SAM-based CGE model is intended to bridge the gaps arising from the time series analysis since variables such as employment and household income are available. Three scenarios have been examined:

1. **Scenario 1 - Limited trade liberalization (Ltd. TL):** Total elimination of tariff on all commodities excluding special/sensitive products.
2. **Scenario 2 - Full trade liberalization (Full TL):** Total elimination of tariffs on all commodities including special/sensitive products
3. **Scenario 3 - Full trade liberalization + FDI (Full TL + FDI):** Total elimination of tariff with a 10 per cent increase in foreign direct investment (FDI).

The CGE model will be able to provide the changes in household consumption which will be used for micro simulations in the KIBHS 2005/06 data, set to establish whether household welfare has improved using poverty incidence as a measure. This is achieved by, first, removing tariffs that are included in imports (cell 11, 2). Removal of these tariffs are then accompanied by protection of sensitive/special products, which means exclusion of these products in the analysis or foreign direct investment injected in foreign savings (cell 9, 11), as shown on Table 5.1.

5.3.1 Price Transmission Mechanism

The price transmission path is based on the works of McCulloch *et al.* (2000), which draws the transmission path from imports through the trading domain and how household consumption is then affected. Removal of tariffs affects import prices, which in turn affect the quantity of imports

consumed. Since exchange rate is the equilibrating factor in the current account, changes in imports will result in the exchange rate adjusting to maintain equilibrium; this in turn will affect both export prices and quantities. When exports prices increase, quantity of exports also increase, domestic sales will decrease since producers are switching to production for exports. The overall effect on production will depend on whether there was a strong substitution arising from cheaper imports or income effect due to exchange rate and export quantities adjustments. In interpreting the simulation results, one needs to review the expected results of the respective simulations and compare with the actual results, then proceed to intuitively explain them using theory and existing data.

Table 5.13: Price Transmission Effects and Volumes Changes (%)

	Scenario 1 Limited TL		Scenario 2 Full TL		Scenario 3 Full TL+FDI	
	Price	Qty	Price	Qty	Price	Qty
Imports						
Agricultural Imports	-0.89	3.28	-5.65	12.30	-6.30	13.52
Manufactured Imports	-9.41	44.22	-9.87	45.37	-10.47	47.42
Services Imports	1.84	-2.20	2.00	-2.43	1.24	-0.54
All Imports	-5.16	24.69	-7.04	28.41	-7.67	30.15
Domestic Sales						
Agricultural Domestic Sales	0.59	-0.80	0.10	-1.41	0.01	-1.34
Manufactured Domestic Sales	-1.88	-3.10	-2.01	-3.06	-2.32	-3.00
Services Domestic Sales	0.37	-0.15	0.43	-0.18	0.58	-0.02
All Domestic Sales	-0.16	-1.28	-0.40	-1.55	-0.50	-1.46
Exports						
Agricultural Exports	1.85	2.49	2.01	5.10	1.21	3.71
Manufactured Exports	1.86	7.60	2.02	7.91	1.17	6.61
Services Exports	1.84	2.04	2.00	2.22	1.24	0.53
Exchange Rate	1.84		1.99		1.24	
All Exports	1.85	4.47	2.01	5.84	1.20	4.45
Output						
Agricultural Output	0.64	-0.54	-0.09	-0.30	-0.23	-0.16
Manufactured Output	-2.86	1.55	-2.92	1.61	-3.32	2.05
Services Output	0.41	-0.23	0.47	-0.26	0.59	-0.05

	Scenario 1 Limited TL		Scenario 2 Full TL		Scenario 3 Full TL+FDI	
	Price	Qty	Price	Qty	Price	Qty
All Output	-0.40	0.13	-0.74	0.24	-0.88	0.49

Source: Author's Calculation from SAM 2003.

The removal of tariffs reduces the import price of commodities as shown by the overall reduction in all imports by 5.16 per cent under scenario 1. As a result, quantity demanded of total imports increases by approximately 25 per cent. Given this fall in import price and increase in import quantities, local producers are confronted with a reduction in domestic demand so that under scenario 1, the supply price of domestic commodities adjusts downwards by 0.16 per cent, resulting in a 1.28 per cent reduction in quantity demanded of domestic goods. This reduction in demand can be attributed to competition from cheaper imports. At the same time, given that the current account balance is fixed, a rise in import demand must be offset by real exchange rate depreciation in order to generate an equivalent increase in exports. Secondly, producers also respond to the declining demand for domestic commodities by increasing their sales to the export market. So a 1.85 per cent depreciation of the export price brought about by exchange rate depreciation will lead to export quantities increasing by 4.5 per cent.

The overall impact of tariff reduction on output will largely depend on which effect outweighs the other, whether it is income effect (due to an increase in exports brought about by depreciation of the exchange rate), or substitution effect (due to a switch to cheaper imports). In this case there was a strong income effect so that the output price reduced by 0.14 per cent leading to a 0.4 per cent increase in overall output. We also note the difference in the magnitudes of adjustments for the three trade liberalization scenarios. Scenario 1 has the lowest magnitude since sensitive commodities were excluded from the analysis. Scenario 2 considers a situation where all commodities are subjected to tariff reduction. Trade liberalization accompanied by FDI has the

biggest magnitude of the three scenarios. This is because FDI has the tendency to increase the demand for input and intermediate goods; this demand, in the Kenya case, is met through imports given the high import concentration. Evidence from Waheed and Jawaid (2010) equally shows that FDI is expected to encourage investments so that inward FDI will result in more investment in enterprises, and given that most manufacturing enterprises rely on imported intermediate for production, it is expected that demand for imports with injection of FDI will increase.

By examining the broad categories of commodities, i.e., agriculture, manufactures and services, we find that manufactured commodities, whether imports, exports or domestic, record the largest magnitude of change as compared to agriculture and services. This occurrence can be explained by the fact that Kenya has a high import penetration of 52 per cent of which manufactures constitute more than 50 per cent of the total merchandise imports. Mwega (1993) equally found significant changes in import volumes after trade liberalization for manufactured commodities. Agricultural commodities have a lower magnitude of change, given that in most cases they have a lower elasticity of transformation from domestic production to exports. The changes in service prices and quantities are largely associated with the indirect effects tariff reduction which passes through the exchange rate adjustment. From this section, one is able to establish how prices are transmitted from import prices to overall output prices and quantities.

5.3.2 Enterprise: Value-Added and Factor Movement

Trade liberalization is said to generate efficiency gains by moving resources towards an economy's comparative advantage, implying that there is efficient allocation of resources due to trade liberalization, and as a result, there are always winners and losers. Determination of winners and losers in sectoral employment adjustment following trade liberalization will also depend on which magnitude is greater; the substitution effect arising from switching to cheaper imports or the

income effect arising from export expansion. Milner and Wright (1998) explain short-run effects of trade liberalization on employment, so that in the short run, given that capital is fixed and labour is mobile between sectors, reduction in tariffs will result in an income effect which increases exports. Following the Stolper Samuelson theorem, there will be increased demand for the abundant factor which will drive wages up in the exportable sector. Given that the price of imports reduce because of tariff reduction, imports become cheaper compared to domestic goods, so that producers switch to exports; the overall output will either increase or decrease, depending on the substitution or income effect. Therefore, the overall change in employment will depend on whether income or substitution effect is stronger.

With trade liberalization, the value of intermediate inputs will increase, resulting in more demand for value-added in order to produce the output.

Table 5.14: Change in Factor Movements and Value-Added by Broad Sectors (%)

Scenario	Labour	Agriculture	Manufactures	Services	ALL
Scenario 1 Limited TL	Skilled	-0.14	-0.22	-0.2	-0.17
	Semi-skilled	-0.05	0.22	-0.25	-0.03
	Un-skilled	0.08	0.62	0.01	0.20
	Value Added	-0.02	0.39	-0.1	0.07
Scenario 2 Full TL	Skilled	-0.55	0.74	-0.25	-0.16
	Semi-skilled	-0.47	0.99	-0.3	-0.02
	Un-skilled	0.2	1.63	-0.02	0.51
	Value Added	-0.12	0.55	-0.12	0.06
Scenario 3 Full TL + FDI	Skilled	-0.77	-0.17	0.1	-0.4
	Semi-skilled	-0.57	0.21	0.17	-0.16
	Un-skilled	-0.38	0.27	-0.01	-0.09
	Value Added	-0.19	0.19	-0.01	-0.03

Source: Authors Calculations

Table 5.14 provides the demand for different factors and the change in overall quantity of value-added by sectors. In scenario 1, overall quantity of value-added increased by 0.07 per cent, this increase led to a decrease in the demand for skilled labour (0.17%), semi-skilled labour (0.03 %) while unskilled labour increased by 0.20 per cent. Disaggregating the labour demand by broad

sectors, unskilled labour demand increased by 0.08 per cent in agriculture, while the skilled and semi-skilled recorded reductions in demand. In this sector, substitution effect was stronger than income effect so that the quantity of value added reduced. While this is so, when labour is divided into categories, unskilled labour increased overall in the agricultural sector. While services had a decrease in quantity of value-added, labour demand for unskilled labour increased by 0.01 per cent.

Under scenario 2, the overall quantity of value-added increased by 0.06 per cent, resulting in decrease in skilled labour (0.16 %), semi-skilled labour (0.02%) and increase in unskilled labour by 0.51 per cent. The quantity of value added decreased in agriculture by 0.12 per cent, and in terms of labour demand by categories, while there was a decrease in demand for skilled (0.55%) and semi-skilled (0.47%) labour, unskilled labour demand increased by 0.20 per cent. Manufactures recorded an overall increase in quantity of value-added by 0.55 per cent with demand for skilled, semi-skilled and unskilled labour increasing by 0.74, 0.99 and 1.63 per cent, respectively. Under scenario 3, there is an overall decline in the quantity of value-added by 0.03 per cent and reduction in demand for all labour categories by 0.40, 0.16 and 0.09 per cent, respectively, for skilled, semi-skilled and unskilled labour. The decrease in this scenario is much higher than scenario 1 and 2. It can be recalled that in this scenario, there is trade liberalization accompanied by a 10 per cent injection of foreign direct investment (FDI). FDI tends to increase the demand for input and intermediate goods, so that full tariff reduction will result in the substitution effect of switching to cheaper imports being larger than the income effect of export expansion. A larger substitution effect implies that overall output decreases, this in turn reduces the quantity demanded of value-added and demand for labour, so that the quantity of agricultural value added decreases by 0.19 per cent while demand for skilled, semi-skilled and unskilled labour decreases by 0.77, 0.57 and 0.38, per cent, respectively. The quantity for value added in manufacturing sector increased by 0.19 per cent while semi-skilled and unskilled labour increased by 0.21 and 0.27 per cent, respectively, the demand for skilled labour

decreased by 0.17 per cent. For services, the overall demand for value-added decreased by 0.01 per cent, with demand for unskilled labour reducing by 0.01 per cent while skilled and semi-skilled labour increasing by 0.10 and 0.17 per cent, respectively.

5.3.3 Welfare Effects

5.3.3.1 Incomes

The changes in household incomes by deciles are presented in Table 5.15 for the three simulation scenarios.

Table 5.15: Change in Total Household Incomes from Base Scenario (%)

	Rural			Urban		
	Scen.1 Ltd. TL	Scen. 2 Full TL	Scen. 3 Full TL + FDI	Scen.1 Ltd. TL	Scen. 2 Full TL	Scen.3 - Full TL + FDI
Decile 0	1.72	1.79	1.33	-0.27	-0.24	0.55
Decile 1	1.53	1.61	1.32	1.02	1.11	1.08
Decile 2	1.35	1.43	1.29	1.31	1.39	1.20
Decile 3	1.31	1.39	1.25	1.61	1.71	1.54
Decile 4	1.17	1.23	1.23	1.63	1.73	1.46
Decile 5	1.16	1.23	1.25	0.42	0.47	0.85
Decile 6	1.13	1.20	1.26	0.36	0.42	0.79
Decile 7	1.09	1.16	1.24	0.83	0.91	1.03
Decile 8	1.09	1.16	1.25	0.29	0.34	0.87
Decile 9	0.86	0.93	1.19	0.75	0.81	1.19

Source: Author's Calculation.

For the three scenarios, rural households in deciles 0 to 3 have higher changes in income as compared to the richer deciles and also to their urban counterparts in the same decile. These changes can be attributed to income compositions which largely come from land. In scenario 3, trade liberalization accompanied by FDI resulted in lower income changes compared to the other scenarios; this can be explained by the fact that injection of FDI has a stronger substitution effect,

so that the total effect of tariff reduction (income and substitution effect) is less as compared to those of scenarios 1 to 2, and as a result, income in scenario 3 increases but by a lesser magnitude.

The poorest urban decile recorded reductions in incomes for scenario 1 to 3 of 0.27, 0.24, and 0.24 per cent, respectively. The poorest urban decile earns its income from enterprises only (commonly known as *Jua Kali* sector, i.e., scorching sun); they are not able to take advantage of increased labour demand and incomes that arise from efficient reallocation of resources. However, injection of FDI increases the incomes of the urban poorest by 0.55 per cent. This can be explained by the fact that the final recipients of FDI are firms who will then demand more factors of production, i.e., capital and labour from which urban households provide their labour resulting in more incomes. Urban decile households 3 and 4 record the highest increase in incomes from the three scenarios; it can be noted that these households derive most of their income from semi-skilled labour, which gained more from increased factor demands. The urban deciles 8 and 9 do not record much increase in income as compared to urban decile 3 and 4.

Comparing increases in rural and urban incomes by deciles, the rural households seem to be more favoured than the urban households. This can be largely attributed to the household sources of incomes. Rural households have land as a major source of income, secondly, semi-skilled labour is a major source of labour income and given that, generally, this category of labour is demanded more with trade liberalization, it follows that the household that provides more labour of this category gains more.

5.3.3.2 Consumption

The consumption patterns for the 20 households are presented in Table 5.16. All rural households recorded positive changes in consumption, the lowest and the second deciles experienced the highest increase in consumption. In the urban area, deciles 1-4 have larger increases

in consumption as compared to urban deciles 5 and 8, which record a decrease in consumption for scenario 1-3. The richest urban decile, i.e., decile 9 records a 0.1 per cent increase in consumption for scenario 1 and 1.0 per cent increase in scenario 4. Decile 9 has most of its income from enterprises, and since FDI positively affect enterprise incomes, it follows that consumption, which is strongly correlated with income, will also increase.

Table 5.16: Household Consumption Change (%)

	Scenario 1 Limited TL	Scenario 2 Full TL	Scenario 3 Full TL +FDI		Scenario 1 Limited TL	Scenario 2 Full TL	Scenario 3 Full TL +FDI
Rural 0	1.40	1.50	1.60	Urban 0	2.00	2.90	4.30
Rural 1	1.20	1.30	1.60	Urban 1	1.10	1.40	2.00
Rural 2	0.90	1.00	1.50	Urban 2	1.80	2.00	2.50
Rural 3	0.90	1.00	1.40	Urban 3	1.50	1.70	2.20
Rural 4	0.70	0.80	1.40	Urban 4	1.80	1.90	2.30
Rural 5	0.70	0.70	1.30	Urban 5	-0.20	-0.20	0.90
Rural 6	0.70	0.70	1.40	Urban 6	0.50	0.60	1.60
Rural 7	0.50	0.60	1.20	Urban 7	0.80	0.90	1.60
Rural 8	0.50	0.50	1.20	Urban 8	-0.30	-0.30	0.90
Rural 9	0.30	0.20	1.10	Urban 9	0.10		1.00
All	0.30	0.30	1.20				

Source: Author's calculations.

While most rural and urban households had increases in consumption, urban household deciles 5 and 8 recorded decreases in consumption. This decline can be attributed to two factors; first, these households consume commodities that recorded decreases in domestic sales due to tariff liberalization, and furthermore these households had small increases in their income so that the overall effect of these factors results in reduction in consumption. Overall, real consumption constitute both home produced and marketed commodities; real consumption by households increased by 0.30 per cent for scenario 1 to 3 and 1.2 per cent for scenario 4. Increase in consumption in scenario 3 can also be attributed to increased incomes from enterprises.

5.3.3.3 Welfare Indicators

The welfare effect of trade liberalization on households forms the gist of this analysis as the thesis intends to establish whether households have gained or lost due to trade policy reforms. The measure of welfare is examined using equivalent variation (EV), and is used to answer the question “*how much money would we take away from an individual at the original price in order to have the same equivalent effect on his/her welfare?*” EV is used to measure the income change that affects utility. EV has the advantage that they can be compared between households and that utility functions have been converted to metric terms. Positive welfare effects largely arise from the reduction in consumer prices characterized by a reduction in the consumer price index. All rural households under the three trade liberalization scenarios (Table 5.17) have a positive equivalent variation, implying that welfare has generally improved for all rural households. All the rural households have higher welfare under trade liberalization accompanied by FDI as compared to other trade liberalization scenarios.

Lower tariffs have the tendency to reduce prices of imported commodities and depending on whether the substitution or income effect is higher, overall output prices could increase or decrease. If prices of goods that are largely consumed by households decrease there will be increased consumption and this would improve welfare. The entire rural households recorded price decreases especially households in the third decile; this can largely be explained by the fact that their consumption basket consisted of commodities such as maize and milling, which recorded major price reductions. Nominal incomes also increased for these households following the changes in the various sources of incomes as has already been seen. Poorer households have higher increases in nominal incomes; this can be largely attributed to the composition of incomes which came from land and unskilled labour. The overall demand for these labour categories increased with trade liberalization, which in turn had a positive impact on the income changes. The differences in EV of

the rural households can be explained by the variations in their consumption baskets and income sources.

Urban households had varied results for changes in consumer welfare using equivalent variation; under scenario 1, the poorest urban household, Urban0, has a decrease in nominal income, this can be explained by the fact that this group relies on income from enterprises which forms 100 per cent of its income and incomes from enterprises have been affected negatively by trade liberalization. Urban0 further experienced decreases in CPI, implying that prices for the commodities that they consumed decreased. For this household, the decrease in CPI can be associated with the fact that households consume maize and milling which constitute more than 70 per cent of consumption expenditure and these commodities recorded reduction in prices of domestic sales, this household is able to consume more which is reflected in the EV. In scenarios 2 and 3, Urban0 has a decrease in nominal incomes while equivalent variation is positive. The EV can be associated with the price changes of Urban0's consumption basket. In scenario 4, Urban0 households have an increase in nominal income and a decrease in CPI, the increase in incomes of this household can be attributed to the injection of FDI which affects enterprises, which largely increases consumption hence utility measured by EV.

Decile5 had a decrease in EV even though there were a decrease in CPI and increase in nominal income; this means that these changes were not sufficient enough to increase the utility levels of these households. Decile9 equally had no change in equivalent variation even though the CPI decrease and nominal incomes increased. It can be noted that decile0 to 4 had higher EV than decile5 to 9. This difference can be attributed to the varied consumption and income mix by the households providing the varied results. From this analysis, it can be seen that the impact of trade liberalization on households heavily depends on the income shares of factors in total household incomes, so that if a household's main source of income is greatly affected, then the household

welfare is affected. Moreover, the price index segregated by household also depends on the consumption mix of the household in question, so that if there is a reduction in prices of certain commodities, the impact will be felt in the household if the commodity constitutes a greater proportion of the household consumption expenditure.

Table 5.17: Impact on Welfare of Households

	Decile0	Decile1	Decile2	Decile3	Decile4	Decile5	Decile6	Decile7	Decile8	Decile9
	Rural Households									
Scenario 1 Limited TL										
Equivalent Variation	1.4	1.2	0.9	0.800	0.700	0.700	0.600	0.500	0.500	0.200
Change in CPI (%)	-0.4480	-0.4529	-0.4533	-0.4537	-0.4537	-0.2727	-0.3623	-0.4492	-0.3575	-0.3537
Change in Nominal Income (%)	1.719	1.534	1.352	1.313	1.165	1.164	1.132	1.090	1.092	0.863
Scenario 2 Full TL										
Equivalent Variation	1.500	1.300	1.000	1.000	0.800	0.700	0.700	0.600	0.500	0.200
Change in CPI (%)	-0.6272	-0.6341	-0.6346	-0.6352	-0.6352	-0.4545	-0.4529	-0.5391	-0.4468	-0.3537
Change in Nominal Income (%)	1.789	1.606	1.425	1.389	1.234	1.231	1.198	1.162	1.162	0.926
Scenario 3 Full TL + FDI										
Equivalent Variation	1.600	1.600	1.400	1.400	1.400	1.300	1.300	1.200	1.200	1.000
Change in CPI (%)	-0.6272	-0.6341	-0.6346	-0.7260	-0.6352	-0.4545	-0.4529	-0.5391	-0.4468	-0.4421
Change in Nominal Income (%)	1.325	1.317	1.289	1.247	1.231	1.249	1.258	1.244	1.249	1.188
	Urban Households									
Scenario 1 Limited TL										
Equivalent Variation	1.900	1.100	1.700	1.500	1.700	-0.200	0.500	0.700	-0.300	0.100
Change in CPI (%)	-2.8869	-1.0220	-1.3622	-0.9190	-1.1236	-0.3350	-1.1245	-0.9909	-0.4252	-0.4252
Change in Nominal Income (%)	-0.265	1.018	1.307	1.608	1.628	0.418	0.363	0.829	0.294	0.748
Scenario 2 Full TL										
Equivalent Variation	2.800	1.400	2.000	1.700	1.900	-0.200	0.500	0.800	-0.300	

	Decile0	Decile1	Decile2	Decile3	Decile4	Decile5	Decile6	Decile7	Decile8	Decile9
Change in CPI (%)	-3.7690	-1.2579	-1.6026	-1.0860	-1.2039	-0.5025	-1.2048	-1.1561	-0.5102	-0.4252
Change in Nominal Income (%)	-0.235	1.112	1.389	1.711	1.728	0.472	0.418	0.905	0.340	0.810
Scenario 3										
Full TL + FDI										
Equivalent Variation	4.200	2.000	2.400	2.100	2.200	0.900	1.600	1.600	0.800	0.900
Change in CPI (%)	-3.7690	-1.3365	-1.6827	-1.1696	-1.2841	-0.5863	-1.2851	-1.1561	-0.5952	-0.4252
Change in Nominal Income (%)	0.550	1.083	1.204	1.537	1.455	0.852	0.789	1.025	0.871	1.187

Source: Author's Calculation.

5.4 MICRO SIMULATIONS

5.4.1 Poverty and Inequality

In establishing the incidence of poverty, the FGT class of poverty measure by Foster *et al.* (1984) was used. The poverty lines for the analysis were Kshs. 2,193 for the urban areas and Kshs. 1,562 for the rural area. Table 5.18 provides a summary of the poverty incidence using the FGT measures of poverty, i.e., headcount (P_0), income gap (P_1) and severity (P_2). In the rural simulations, the headcount rate is reducing for all the four simulations. After scenario 1, for example, the poverty headcount ratio has changed by 0.57 percentage points from base results. For scenario 2, the headcount ratio of the poor has reduced by 0.60 percentage points, while for scenario 3 the headcount ratio has reduced by 0.85 percentage points. Similar trends are recorded for simulations under income gap and poverty severity. In all cases, poverty incidence for these measures is decreasing albeit by small percentages.

Table 5.18: Poverty Incidence

	Headcount (%)	Change in % points	Poverty Gap (%)	Change in % points	Severity (%)	Change in % points
	P_0		P_1		P_2	
Rural						
Base	49.71		17.80		8.91	
Scenario1 Limited TL	49.14	-0.57	17.47	-0.33	8.70	-0.21
Scenario 2 Full TL	49.11	-0.60	17.44	-0.36	8.68	-0.23
Scenario3 Full TL + FDI	48.86	-0.85	17.33	-0.47	8.63	-0.28
Urban						
Base	34.43		11.65		5.57	
Scenario 1 Limited TL	33.56	-0.87	11.31	-0.34	5.34	-0.23
Scenario 2 Full TL	33.38	-1.05	11.24	-0.41	5.32	-0.25
Scenario 3 Full TL + FDI	33.01	-1.42	11.10	-0.55	5.23	-0.34

Source: Author's Calculation.

The incidence of poverty is much lower in the urban areas as compared to the rural areas, as can be seen on Table 6.21. Under P_0 the poverty incidence for the urban areas is 34.34 per cent as compared to the rural area which is 49.71 per cent; for P_1 , the poverty gap for rural households is 11.65 per cent the rural area is 17.80 per cent; and for P_2 , rural incidence is 8.91 per cent while the urban severity gap incidence is 5.57 per cent. The urban, like the rural area, also exhibit decreasing poverty trends with the different simulation scenarios. Clearly, both urban and rural households show that there is decrease in poverty due to different trade liberalization scenarios. This kind of finding is not sufficient to excite a researcher if one does not proceed to decompose poverty in order to examine the contribution of each group to overall poverty and how each group's contribution to poverty changes with the simulations. Table 5.19 provides a summary of the household's contribution to overall poverty at national level.

Table 5.19: National Households Contribution to Overall Poverty (alpha=0)

	Headcount	Population Share	Absolute Contribution	Relative Contribution
		National		
Base				
Decile 1	1.0000	0.1310	0.1310	0.2808
Decile 2	1.0000	0.1238	0.1238	0.2655
Decile 3	1.0000	0.1190	0.1190	0.2551
Decile 4	0.8429	0.1099	0.0926	0.1986
Population	0.4664	1.0000	0.4664	1.0000
Scenario 1 Limited TL				
Decile 1	1.0000	0.1310	0.1310	0.2847
Decile 2	1.0000	0.1238	0.1238	0.2692
Decile 3	1.0000	0.1190	0.1190	0.2586
Decile 4	0.7854	0.1099	0.0863	0.1875
Population	0.4601	1.0000	0.4601	1.0000
Scenario 2 Full TL &				
Decile 1	1.0000	0.1310	0.1310	0.2851

	Headcount	Population Share	Absolute Contribution	Relative Contribution
Decile 2	1.0000	0.1238	0.1238	0.2696
Decile 3	1.0000	0.1190	0.1190	0.2590
Decile 4	0.7795	0.1099	0.0856	0.1864
Population	0.4594	1.0000	0.4594	1.0000
Scenario 3 Full TL +FDI				
Decile 1	1.0000	0.1310	0.1310	0.2867
Decile 2	1.0000	0.1238	0.1238	0.2711
Decile 3	1.0000	0.1190	0.1190	0.2605
Decile 4	0.7550	0.1099	0.0829	0.1816
Population	0.4567	1.0000	0.4567	1.0000

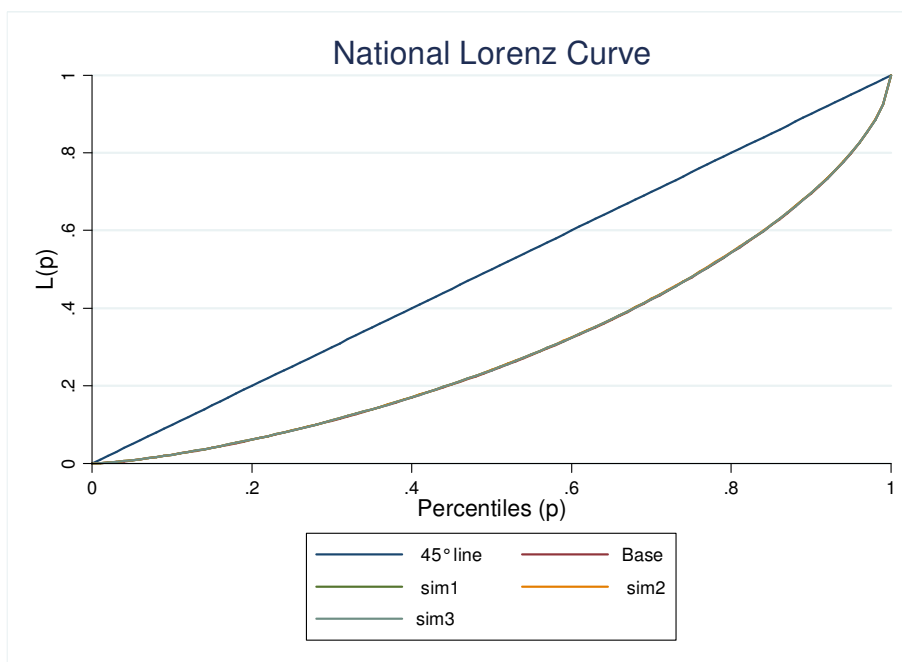
Source: Author's Calculation.

Column two provides the ratio of deciles below the poverty line. Clearly, decile 4 is the poverty cut-off decile since approximately 84 per cent of the households are below the poverty line when the rest of the households in this decile are above the poverty line. The focus of the analysis is therefore households 1-4 that are poor and their absolute contribution to poverty. In the base simulations, decile 1 contributes approximately 13 per cent to overall poverty, decile 2 contributes approximately 12 per cent to national poverty, decile 3 contributes approximately 26 per cent to national poverty while 84 per cent of decile 4 contributes around 11 per cent to national poverty. It is important to examine if the contribution of these deciles to national poverty decreases with the different simulations. As we move from scenario 1 to 3, only decile 4's contribution to national poverty reduces by the following: in scenario 1 there is reduction by 0.0063 from base figures, for scenario 2, the reduction is by 0.007, while in scenario 3 the reduction is by 0.0097, which translates to 0.97 percentage point change.

The changes can further be confirmed using the Lorenz concentration curves which will tell the cumulative benefits of the various households accruing from changes in incomes due to the

simulations. Figure 5.1 provides the national Lorenz curve. For all the simulations, it can be seen that the concentration curves for scenarios 1 to 3 do not change much at national levels; the level of inequality remains the same.

Figure 5.1: The Lorenz and Concentration Curves



Source: Author's Calculation.

5.5 DISCUSSION AND CONCLUDING REMARKS

This chapter is of paramount importance since it has empirically proven that the potential pathways through which trade liberalization affects poverty as identified by McCulloch *et al.* (2000) actually exists. This is a key finding since most empirical studies review, such as Balat and Porto (2006), Ianchovichina *et al.* (2001), Ravallion (1989), Minot and Daniels (2002), and Ravallion and Van de Walle (1991) have assumed that the relationship exists without undertaking any empirical tests. This study has, not only found the existence of a stochastic relationship between trade liberalization and poverty, but has been able to establish a step-by-step transmission pathway from national income to household consumption and a feedback mechanism from household

consumption to trade liberalization. This means that households are also benefiting from trade liberalization through consumption of more imported goods; this implied that the households are more pro-open markets.

A second pathway which the study has found, but was weak, is the trade liberalization path through employment. While employment is a significant determinant of trade liberalization, it is not a significant determinant of household consumption which is a proxy for household welfare. Interestingly, there is a feedback mechanism from employment to trade liberalization, implying that the labour market tends to adjust to produce the skills required to meet the demands of open markets. The weak link between employment and household consumption which proxies household welfare is that trade liberalization has the tendency to increase the capital intensity of production over labour intensity, yet households are producers of labour. A review of empirical evidence on the 'enterprise pathway' such as Cockburn (2001), Akinboade (1996), and Revenga (1994), all assumed that a pathway exist between trade liberalization and employment. A common finding from this sample of studies is that, the effects of trade liberalization on employment plays out more in the labour market more than the household level.

The advantage of the multi-method approach is that while we have examined relationships using time series methodology, it is possible to go into details by examining the dynamics of trade liberalization at a point in time using a general equilibrium model. From the study, it is possible to see how prices are transmitted from imports to domestic sales, exports and overall output. In this case tariff reduction have had a larger income effect on exports as compared to the substitution effects associated with cheaper imports resulting in overall output prices decreasing so that overall output has increased. In this study, manufactured commodities record highest increase in output due to trade liberalization, so that value-added in the sector also increased. Interestingly, there is increased demand for unskilled and semi-skilled labour. A second advantage of this multi-method

approach is that, while it was not possible to link employment to household incomes due to data limitations, under the CGE model, the changes in demand for labour can be seen to increase incomes of all household deciles given that most of the household incomes come from labour. It also follows that consumption of households also increase leading to higher welfare.

With this approach, we are also able to establish whether poverty incidence has increased or reduced by moving from the CGE model to undertaking micro simulations of the changes in consumption to households. Most studies that have used CGE models have gone straight to building the models without first establishing the causal connections. Poverty is found to have decreased due to trade liberalization. In conclusion, this integrated approach of analysis has enabled us address a macroeconomic issue which manifests itself at the micro (household) level without overlooking any issues or making assumptions that might or might not hold. From this chapter, we can conclude that trade liberalization has resulted in poverty reduction. Table 5.20 provides an overall picture of the multi-method approach used in testing the stated hypothesis. Each approach summarises the key evidence used in either accepting or rejecting the null hypothesis.

Table 5.20: Multi-method Approach on the Impact of Trade Liberalization on Poverty

Methodology	Null Hypothesis- Reject/Accept	Evidence Used
Theory	<ul style="list-style-type: none"> • Rejected 	<ul style="list-style-type: none"> • Neoclassical theory of international trade Marrewijk (2000) provide the theoretical benefits if trade liberalization • McCulloch <i>et al.</i> (2000) provide theoretical linkage between trade liberalization and poverty.
Time Series	<ul style="list-style-type: none"> • Rejected • Alternative cannot be accepted 	<ul style="list-style-type: none"> • There is a stochastic relationship between trade openness and poverty based on the proxy variables: employment, household consumption, GDP, exports, national income and exchange rate. This is established using the R-squared, the Durbin-Watson test and the Akaike Information Criteria. • Granger causality tests on employment and household consumption show existence of

Methodology	Null Hypothesis- Reject/Accept	Evidence Used
		<p>feedback mechanism back to trade liberalization.</p> <ul style="list-style-type: none"> • Trade liberalization has positive and significant multiplier effects on household consumption, consumer price index and GDP per capita.
CGE Model	<ul style="list-style-type: none"> • Rejected 	<ul style="list-style-type: none"> • Full trade liberalization accompanied by FDI has the greatest impact on incomes, consumption and demand for labour.
Micro Simulations	<ul style="list-style-type: none"> • Rejected 	<ul style="list-style-type: none"> • Overall poverty incidence has reduced due to trade liberalization.

6 CONCLUSION AND POLICY RECOMMENDATIONS

6.1 INTRODUCTION

The main objective of this thesis was to examine the impact of trade liberalization on household welfare in Kenya. The specific objectives set out were to:

1. Establish the theoretical macro-micro linkage between trade liberalization and household welfare using poverty incidence as a measure of welfare.
2. Establish the existence of trade liberalization–household welfare transmission path and the dynamics of the transmission, using a multi-method approach which includes times series analyses, a computable general equilibrium (CGE) and micro simulation model.
3. Establish the nature of the trade liberalization-household welfare relationship for policy recommendations.

These objectives were to be achieved by testing the hypothesis that there is no statistically significant relationship between trade liberalization and poverty in Kenya, against the alternative hypothesis of a statistically significant relationship. This hypothesis was tested using a multi-method approach, consisting of examining the theoretical and empirical evidence that exists on the impact of trade liberalization on poverty. Based on the theoretical evidence, a time series analysis of the impact of trade liberalization on poverty was undertaken using data from 1970 to 2010, in order to establish the nature of the trade liberalization-poverty relationship. Given that detailed household data is not available in time series, the thesis examined the dynamics of trade liberalization on poverty at household level at a point in time using 2003 social accounting matrix data and a CGE model. Lastly, the changes in consumption for the CGE model were used to establish the changes in poverty incidence using household level data.

This was based on the background that poverty has been a key subject in Kenya's development plans and sessional papers, while at the same time Kenya undertook trade liberalization under the SAPs and the multilateral trading framework of the WTO. While trade liberalization has been taking place, there have been arguments that this would lead to improvement in welfare by reduction in poverty. While there were strong arguments in favour of trade liberalization resulting in poverty alleviation, there were those stakeholders who did not agree and equally put a strong argument. Unfortunately, the arguments put forward were not backed by any theories or empirical evidence. There was a strong need to establish the theory linking trade liberalization and poverty and find an appropriate methodology that would aid in establishing if trade liberalization resulted in welfare improvement.

6.2 RELEVANCE OF THEORIES APPLIED

The Neoclassical theory of international trade provided the cornerstone for analysing the welfare effects of trade liberalization. The Neoclassical theory is made up of four main theorems; the Heckscher-Ohlin theorem, the Stolper-Samuelson theorem, the Rybczynski theorem and the factor-price equalization theorem. These theorems all bring out issues that are either related to prices and output which affect welfare. The theory of linking trade liberalization and poverty as explained by McCulloch *et al.* (2000) was fundamental in establishing the trade liberalization and poverty potential pathways which were then tested using the appropriate methodology. The latter theory brought out how two indirectly linked issues can be analysed in a systemic manner. Empirical evidence emanating from literature review was important for the determination of expected results. The theories reviewed therefore required an integrated approach for analysis.

6.3 METHODOLOGY APPLIED IN THE STUDY

There were various data sources used: time series data on household consumption, employment, trade ratios, imports, exports, exchange rate and consumer price index, the social accounting matrix for Kenya 2003 and the Kenya Integrated Household Budget Survey 2005/06. The choice of the multi-method approach was guided by the demand of the study: The unit root and granger causality tests were meant to establish the nature of the trade liberalization-poverty relationship, the CGE model was appropriate for understanding the trade liberalization poverty dynamics at a point, while micro simulations were undertaken in order to link macro and micro issues. Based on methodological literature review, the IMF (2008) multi-layered approach was found to be the most appropriate since the results from one model were easily fed into the linked model from the macro level up to the micro level. The use of this method ensured that the conclusion reached emerged from research hypothesis and the theories reviewed.

6.4 MAIN FINDINGS: TRADE LIBERALIZATION AND POVERTY QUESTION

The main findings in this study are that first, the trade liberalization poverty relationship is stochastic in nature with a transmission pathway from trade liberalization to poverty following the theoretical framework provided by McCulloch *et al.* (2002). Trade liberalization affects national incomes which in turn affect household consumption. Furthermore, there was a causal connection from household consumption to trade liberalization implying that there are strong feedback mechanisms from households that favour trade liberalization since there is a large consumption array for household when the market open up and cheaper commodities also come in. Trade liberalization also affects employment, which affects income; however, it was not possible to establish this linkage since household income data was unavailable, however, on using household

consumption as a proxy for income, there was no statistically significant relationship, even though there was strong causal connection from employment to trade liberalization.

The time series analysis was important for empirically establishing whether theoretical pathways by McCulloch *et al.* (2002) existed. Secondly, trade liberalization was found to have strong positive multiplier effect on household consumption, consumer price index, exchange rate and GDP per capita even though the multipliers were small in magnitude. With this successfully done, it was important to find out the impact of trade liberalization on poverty at a point in time using a SAM-based CGE model and household micro simulations. The reason for this being that poverty data is not available in time series in Kenya therefore, the use of time series limits data that can be used. It will also be possible to establish whether the CGE findings reinforce the time series results at the macro level. Trade liberalization was found to have a strong price transmission mechanism, especially when full trade liberalization was accompanied by FDI. Overall import prices reduced by around 5 per cent, resulting in a 30 per cent increase in import quantities. With competition from imports, overall domestic prices reduced by 0.5 per cent resulting in around 1.5 per cent increase in domestic sales. The exchange rate adjustment was necessary in order to establish equilibrium in the balance of payments leading to export prices and quantities increasing by 1.2 and 4.5 per cent, respectively. The price and quantity adjustment resulted in stronger substitution effect so that overall output prices reduced by 0.88 per cent resulting in a 0.5 per cent increase in output.

There were three scenarios examined in the CGE model: limited liberalization where sensitive commodities were not subjected to trade liberalization; full liberalization of all commodities and full liberalization accompanied by FDI. There was a 0.5 per cent points in the first two scenarios with regard to increase in output from the base scenario, bringing to question whether protection of sensitive commodities was really necessary. Trade liberalization accompanied by FDI had the greatest impact on welfare. On the demand for value-added, which constitutes capital and labour,

there was a reduction in demand for the three labour categories (skilled, unskilled and semi-skilled); on further disaggregation, there was increase in the demand of semi-skilled and unskilled labour in the manufacturing sector, although the increase in demand was less than 0.5 per cent. Overall, the demand for employment would decrease with trade liberalization largely due to the fact that trade liberalization tends to reduce domestically produced goods in favour of imports which in turn affect demand for labour. In the time series model, gross capital formation which constitutes both capital stock and investment was found to be significant as it affect both trade openness and made other variables in the model significant while in the CGE model, foreign direct investment was equally significant in raising incomes of poor households in order to raise them out of poverty.

In terms of welfare changes associated with the price and output changes, both incomes and consumption increased for all households when trade liberalization was accompanied by FDI. The urban poorest benefited most since all their incomes came from enterprises. When these changes in consumption were simulated in a micro-model, in order to establish the changes in poverty incidence, rural poverty reduced by 0.85 percentage points while in the urban areas there was a 1.85 percentage point decrease. While it is expected that at least households in each decile moved to higher income decile when trade liberalization took place, the change in consumption only affected the fourth decile so that it is only this decile that experienced a reduction in poverty.

6.5 POLICY IMPLICATIONS OF STUDY

The following policy recommendations are provided based on the findings of the study.

1. The rationale for protecting sensitive commodities or sectors in the economy should be thoroughly reviewed and the development initiatives put in place should ensure that the protected sectors are being developed, so that when they are open to competition from trade liberalization, they are able to compete. Currently, the difference between outputs when there is

full liberalization and selected liberalization is less than 0.5 percentage points, implying that more should be done in the protected sectors so that full liberalization has a higher impact.

2. Trade liberalization positively affects employment while employment also affects trade liberalization. The government should first of all embark on collecting appropriate employment and household income data that is important for policy analysis and prescription. Secondly, the government should create a conducive business climate in the manufacturing sector so that with trade liberalization, the manufacturing sector can be able to employ more labour which will result in increases in household incomes.
3. Trade liberalization accompanied by foreign direct investment has greater impact on output and welfare, particularly for poor urban households whose incomes come from enterprises. The government should embark on initiatives that increase FDI that positively affect the poor urban household. This will serve to increase overall output and at the same time narrow the incomes imbalances in the urban areas.
4. The government should also develop the agricultural sector so that it can have higher outputs associated with trade liberalization. Increasing output in this sector will not only raise incomes of rural households whose main source of income is land, but also reduce the regional development disparities between the urban and rural areas.
5. Given that agricultural sector has strong links to the rural households while the manufacturing sector has shown to have strong links with urban poor households, deliberate initiatives by government to strengthen the strong forward and backward linkages between the manufacturing and agricultural sector will ensure that investment injections in any of the sectors will result in positive spill over effects that spur growth and development.

6.6 AREAS OF FURTHER RESEARCH

One main challenge in undertaking this study was the inability to fully establish the ‘enterprise pathway’ of trade liberalization, i.e., how trade liberalization affects households through enterprises. This was largely due to unavailability of annual household income data. This is an area that requires further research, especially given that employment has been found to have feedback mechanisms that also affect trade liberalization. Secondly, given that trade liberalization has been found to strongly affect manufacturing, there should be more research undertaken to establish how this sector can be used to alleviate poverty. Lastly, there is also need to undertake research on the third trade liberalization-poverty transmission path which is through government spending. This is an important area of focus since government’s ability to provide the environment for economic growth and public services depends on government revenue; tariffs form more than 25 per cent of government revenue.

There are also areas for further research that need to be examined based on the current trade negotiations going on the WTO and debates at UNCTAD. There should be more policy analysis research focused on how trade can be used as an effective mechanism for reducing poverty, instead of the narrow focus of trade liberalization only. One of the approaches would be to establish how trade liberalization policies can be combined with other macroeconomic or complementary policies that ensure that trade results in poverty reduction. If trade is to be used as a tool for poverty reduction, more research should look at aspects of trade that constrain poverty reduction so that policy measures can be taken to ensure that trade supports poverty reduction. Further research on commodity composition of trade, and its impact on pro-poor growth and poverty reduction, is paramount if trade is to be used as an effective mechanism for poverty reduction.

6.7 CONCLUSION

The study has established, through theoretical and empirical literature review, the macro-micro linkage between trade liberalization and poverty. Trade liberalization has been found to affect household welfare through the following pathways: enterprise, price transmission (i.e., trading domain) and government spending. The multi-method approach, used in the study, empirically found a strong transmission through the ‘consumption pathway’. Trade liberalization affected national income, which in turn affected household consumption. Trade liberalization increased household consumption which resulted in poverty incidence at the household level decreasing. There was also feedback mechanism from household consumption causing trade liberalization to take place. On the “enterprise pathway”, trade liberalization was found to positively affect employment; conversely, employment had strong feedback mechanisms that also caused trade liberalization to take place. While there were no strong relationship between employment and consumption at the macro level, which can be attributed to unavailability of household income data, which serves as an intermediary between employment and consumption, employment was found to affect income which in turn affected consumption at the micro level.

Having established the transmission pathways using time series data, the CGE model, used to establish the dynamics of transmission, found that trade liberalization had a strong income effect related to export increases, which offset the substitution effect associated with cheaper imports; as a result, overall output level increased with trade liberalization. The increase in output resulted in higher demand for value-added, particularly semi-skilled and unskilled labour in agriculture, services and manufactures. The manufacturing sector was found to have the biggest magnitude of change associated with trade liberalization as compared to services and agriculture. The increase in the demand for labour increased incomes and consumption of households on the average. Therefore, trade liberalization was found to improve welfare in general and decrease the incidence of poverty.

While it has been established that trade liberalization positively affects household welfare and thus reducing poverty, selective trade liberalization, while protecting sensitive commodities and sectors, does not have much impact on welfare as compared to full liberalization. Trade liberalization accompanied by foreign direct investment was found to have a greater impact on poverty reduction as compared to liberalization without any accompanying policies. Furthermore, the incomes of the poorest urban households increase much more when trade liberalization is accompanied by FDI, given that these households tend to receive a large proportion of their income from enterprises. While trade liberalization has improved welfare in general, inequality has remained the same even with the injection of FDI. Lastly, the null hypothesis that there is no statistically significant relationship between trade liberalization and poverty is rejected; however, it is not possible to accept the alternative hypothesis since there are strong feedback mechanisms from household consumption and employment that equally affect trade liberalization. This implies that trade liberalization in Kenya is a two-way relationship, given the feedback mechanisms at play.

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APPENDIX

APPENDIX 1: IMF AND WORLD BANK POLICY REFORMS

Appendix Table 1: IMF and World Bank Policy Reform Loans 1974-1996

Year	IMF Policy Reforms Loans			World Bank/IDA Loans		
	Loan Type	Amount (Million SDR)	Comments	Loan Type	Amount (Million USD)	Comments
1974	Oil Facility	63.9	Drawn during 1974-76	Program Loan	30.0	
1975	Extended Facility	67.2	Only SDR 7.7 million drawn			
1975	Standby	12.0	Drawn and fully repaid in the same year			
1976	Compensatory Facility	24.0				
1978	Standby	17.25	Fully disbursed by August 1979			
1979	Standby	122.5	Not drawn, cancelled 14 October 1980			
1979	Supplemental Facility	70.7	Not drawn, cancelled 14 October 1980			
1979	Compensatory Facility	69.0				
1980	Standby	241.5	Only SDR 90 million drawn			
1980	Supplemental Facility	184.8	Only SDR 50.1 million drawn, cancelled 7 January 1982			
1982	Standby	151.5	Only SDR 90 million drawn, cancelled January 1983	Structural Adjustment loan II	130.9	\$70.0 million on IDA terms, \$60.9 million on IBRD terms
1982	Supplemental	96.8				
1982	Compensatory	60.4				
1983	Standby	175.9				
1985	Standby	85.2				
1986	Compensatory Facility	37.9		Agricultural Sector Adjustment Operation I	40.0	IDA terms. Also IDA reflows of \$20.8 million
1988	Standby	85.0	Only SDR 62.6 million drawn, cancelled 15 May 1989	Industrial Sector Adjustment	102.0	IDA terms. Also IDA reflows of \$63.1 million

Year	IMF Policy Reforms Loans			World Bank/IDA Loans		
1988	Structural Adjustment Facility	99.4	Only SDR 28.4 million drawn, replaced by ESAF 15 May 1989			
1989	Enhance Structural Adjustment Facility	261.4	SDR 216.2 drawn prior to November 1991 was suspended January 1992, expired March 1993. Balance renegotiated December 1993, drawn by December 1994.	Financial Sector Adjustment	120.0	IDA terms. Also IDA reflows of \$114.6 million
	Loan Type	Amount (Million SDR)	Comments	Loan Type	Amount (Million USD)	Comments
1990				Export Development Program	100.0	IDA terms. Also IDA reflows of \$53.0 million
1991				Agricultural Sector Adjustment Operation II	75.0	IDA terms. Only \$30.9 million of balances of payments support disbursed, balance cancelled December 1992
1991				Education Sector Adjustment Credit	100.0	IDA terms. 2 nd and 3 rd tranche affected by November 1991 aid freeze, credit not fully disbursed until 1995. Also IDA reflows of \$96.2 million
1996	Enhance Structural Adjustment Facility	149.6	Only SDR 25.0 million drawn, suspended July 1997 expired April 1999.	Structural Adjustment Credit I	90.0	IDA terms. Only \$44.5 million of credit and \$35.3 million of IDA reflows disbursed. Balance of IDA reflows cancelled June 1998

Source: Adopted from Ryan and O'Brien (2001).

APPENDIX 2: TIME SERIES DATA

	Agricu- lture*	Manufa- cturing*	Services*	Exports*	Imports*	HH. Cons.*	Gov. Cons.*	GDP*	Gross domestic savings*	Final Cons.*	National Income*	Employ- ment	CPI	Exrate
1970	90.9	18.3	103.0	105.9	128.5	187.7	31.0	253.7	52.2	194.5	3.3	6,682,326	1.6	7.1
1971	105.6	23.7	127.2	110.8	149.3	272.1	35.6	310.0	34.5	269.0	3.9	6,936,239	1.7	7.1
1972	117.6	31.4	138.6	98.9	125.4	307.8	38.7	362.9	53.0	302.0	4.6	7,210,940	1.8	7.1
1973	120.8	35.8	144.1	107.5	123.5	287.6	40.1	384.4	72.6	287.6	4.6	7,498,611	1.9	7.0
1974	117.9	37.7	150.0	123.8	148.0	330.6	43.5	400.0	47.7	327.0	4.6	7,790,046	2.3	7.1
1975	126.5	37.9	154.9	109.4	112.8	324.1	48.7	403.5	42.3	329.0	4.6	8,094,434	2.7	7.3
1976	129.0	37.5	161.2	111.5	109.8	307.4	52.3	412.2	62.6	320.6	4.8	8,410,772	3.0	8.4
1977	141.8	43.4	171.0	114.6	129.9	333.6	58.6	451.2	88.3	350.5	5.6	8,739,644	3.5	8.3
1978	147.2	48.9	181.3	116.5	165.5	381.6	67.3	482.4	60.3	401.4	5.6	9,084,799	4.1	7.7
1979	151.2	52.5	203.2	111.2	134.0	396.9	71.2	519.1	60.7	428.6	5.9	9,462,692	4.4	7.5
1980	152.8	55.3	214.4	117.2	147.4	406.8	72.8	548.1	68.3	452.7	6.3	9,841,790	5.0	7.4
1981	161.9	57.2	229.2	112.3	116.4	391.6	68.9	568.8	86.2	435.7	6.5	10,246,129	5.6	9.0
1982	173.8	58.5	235.1	115.9	97.6	403.9	67.9	577.4	72.3	438.5	6.2	10,672,823	6.7	10.9
1983	177.0	61.2	244.0	113.2	79.7	390.8	73.7	584.9	78.6	430.4	6.3	11,127,457	7.5	13.3
1984	170.9	63.8	252.2	114.2	93.9	421.8	73.7	595.2	68.8	459.3	6.4	11,572,577	8.2	14.4
1985	177.7	66.7	266.2	121.9	87.2	393.0	74.4	620.8	90.6	439.7	6.5	12,013,353	9.3	16.4
1986	186.5	70.5	283.9	133.8	101.9	467.7	79.7	665.3	76.5	508.2	7.0	12,446,090	9.6	16.2
1987	194.3	74.6	298.5	134.1	115.4	508.3	82.3	704.8	82.7	543.6	7.5	12,872,791	10.4	16.5
1988	203.1	79.0	314.7	140.3	125.9	551.5	83.8	748.6	83.3	589.4	8.0	13,298,275	11.6	17.7
1989	211.5	83.7	331.2	153.5	138.2	584.2	85.0	783.7	84.2	613.4	8.3	13,730,078	13.3	20.6
1990	218.8	88.1	346.0	188.1	142.8	582.5	89.0	816.5	85.6	619.9	8.3	14,208,110	15.6	22.9
1991	217.3	91.4	358.5	185.8	136.4	596.5	94.1	828.3	95.2	632.1	8.7	14,684,343	18.7	27.5
1992	210.1	92.5	369.0	184.3	133.2	590.4	102.7	821.7	86.4	642.0	8.7	15,191,466	23.9	32.2
1993	203.2	94.2	377.1	242.4	178.3	581.3	110.4	824.6	101.4	635.6	8.9	15,686,603	34.8	58.0
1994	209.4	96.0	390.0	239.6	208.3	591.9	142.9	846.3	93.0	694.3	9.5	16,178,806	44.9	56.1
1995	219.5	99.7	410.8	221.3	244.7	674.8	156.9	883.6	49.5	793.7	9.7	16,662,297	45.6	51.4
1996	229.3	103.4	432.0	231.4	249.2	692.3	161.2	920.2	66.7	810.2	10.1	17,156,097	49.6	57.1

	Agricu- lture*	Manufa- cturing*	Services*	Exports*	Imports*	HH. Cons.*	Gov. Cons.*	GDP*	Gross domestic savings*	Final Cons.*	National Income*	Employ- ment	CPI	Exrate
1997	222.3	103.3	439.4	206.7	275.5	718.7	160.4	924.6	45.4	854.6	10.7	17,622,866	55.3	58.7
1998	240.7	101.2	449.2	196.6	288.3	751.7	166.1	955.0	37.2	879.2	11.3	18,112,733	59.0	60.4
1999	257.8	98.8	458.6	214.9	284.1	782.5	162.2	977.0	32.3	892.3	11.4	18,660,884	62.4	70.3
2000	254.5	99.5	467.2	217.3	289.5	779.5	158.6	982.9	44.8	884.1	11.2	11,857,503	68.6	76.2
2001	284.1	99.8	466.5	225.2	345.9	811.8	163.0	1020.0	45.3	949.0	12.1	12,128,979	72.5	78.6
2002	274.2	99.9	479.1	241.2	306.9	818.6	165.6	1025.6	41.3	938.6	12.1	12,402,335	74.0	78.7
2003	280.9	105.8	491.3	258.6	306.7	836.7	175.6	1055.7	43.4	935.8	12.1	12,672,164	81.2	75.9
2004	285.8	110.5	516.4	291.2	344.4	856.9	176.6	1109.5	76.0	982.0	12.8	12,950,966	90.7	79.2
2005	305.5	115.7	540.1	318.5	395.8	912.3	175.2	1175.1	87.5	1047.8	13.9	13,236,023	100.0	75.6
2006	319.1	123.0	575.3	326.2	466.3	984.1	177.8	1249.3	87.4	1138.9	15.3	13,653,568	114.5	72.1
2007	326.6	130.7	622.3	350.0	517.9	1056.0	185.7	1336.8	95.2	1213.7	16.4	14,089,676	125.6	67.3
2008	312.7	135.3	639.0	375.5	552.3	1041.7	190.5	1357.3	125.0	1217.5	16.3	14,529,994	158.6	69.2
2009	305.0	137.0	668.0	341.2	554.3	1087.5	201.3	1393.2	104.4	1281.9	17.0	14,983,191	173.2	77.4
2010	324.1	143.0	706.9	397.3	575.4	1159.6	219.3	1470.5	124.7	1310.8	0.0	15,456,039	180.1	79.2

*Billion Kshs

Source: World Development Indicators Database.

APPENDIX 3: UNIT ROOT TESTS

ADF Test Statistic	-4.750830	1% Critical Value*	-3.6117
		5% Critical Value	-2.9399
		10% Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(NATIONALINCOME,2)
 Method: Least Squares
 Date: 04/03/12 Time: 05:35
 Sample(adjusted): 1972 2009
 Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NATIONALINCOM E(-1))	-0.774061	0.162932	-4.750830	0.0000
C	2.68E+08	84395085	3.170018	0.0031
R-squared	0.385355	Mean dependent var	1548659.	
Adjusted R-squared	0.368281	S.D. dependent var	4.90E+08	
S.E. of regression	3.89E+08	Akaike info criterion	42.44872	
Sum squared resid	5.46E+18	Schwarz criterion	42.53491	
Log likelihood	-804.5257	F-statistic	22.57038	
Durbin-Watson stat	1.955207	Prob(F-statistic)	0.000032	

ADF Test Statistic	-5.118160	1% Critical Value*	-4.3082
		5% Critical Value	-3.5731
		10% Critical Value	-3.2203

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(EMPLOYMENT)
 Method: Least Squares
 Date: 04/03/12 Time: 05:24
 Sample(adjusted): 1971 1999

Included observations: 29 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EMPLOYMENT(-1)	-0.063882	0.012481	-5.118160	0.0000
C	635223.8	70148.43	9.055424	0.0000
@TREND(1970)	35594.60	5215.587	6.824658	0.0000
R-squared	0.946925	Mean dependent var	413053.7	
Adjusted R-squared	0.942843	S.D. dependent var	80993.41	
S.E. of regression	19363.57	Akaike info criterion	22.67787	
Sum squared resid	9.75E+09	Schwarz criterion	22.81932	
Log likelihood	-325.8291	F-statistic	231.9383	
Durbin-Watson stat	0.944502	Prob(F-statistic)	0.000000	

ADF Test Statistic	-6.587281	1% Critical Value*	-3.6067
		5% Critical Value	-2.9378
		10% Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(EXPORTS,2)
 Method: Least Squares
 Date: 04/02/12 Time: 16:53
 Sample(adjusted): 1972 2010
 Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXPORTS(-1))	-1.182825	0.179562	-6.587281	0.0000
C	8.45E+09	3.18E+09	2.660038	0.0115
R-squared	0.539757	Mean dependent var	1.32E+09	
Adjusted R-squared	0.527318	S.D. dependent var	2.71E+10	
S.E. of regression	1.86E+10	Akaike info criterion	50.18589	

Sum squared resid	1.29E+22	Schwarz criterion	50.27120
Log likelihood	-976.6248	F-statistic	43.39228
Durbin-Watson stat	1.857185	Prob(F-statistic)	0.000000

ADF Test Statistic	-7.602950	1% Critical Value*	-3.6117
		5% Critical Value	-2.9399
		10% Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(GOVCONSUMPTION,3)
 Method: Least Squares
 Date: 04/02/12 Time: 16:14
 Sample(adjusted): 1973 2010
 Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GOVCONSUMPTI ON(-1),2)	-1.245164	0.163774	-7.602950	0.0000
C	4.34E+08	1.10E+09	0.392634	0.6969
R-squared	0.616225	Mean dependent var	2.33E+08	
Adjusted R-squared	0.605564	S.D. dependent var	1.08E+10	
S.E. of regression	6.81E+09	Akaike info criterion	48.17226	
Sum squared resid	1.67E+21	Schwarz criterion	48.25845	
Log likelihood	-913.2729	F-statistic	57.80485	
Durbin-Watson stat	2.059469	Prob(F-statistic)	0.000000	

ADF Test Statistic	-5.922238	1% Critical Value*	-3.6067
		5% Critical Value	-2.9378
		10% Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(HHCONSUMPTION,2)
 Method: Least Squares
 Date: 04/02/12 Time: 22:37
 Sample(adjusted): 1972 2010
 Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(HHCONSUMPTIO N(-1))	-0.952772	0.160880	-5.922238	0.0000
C	2.17E+10	6.02E+09	3.597110	0.0009
R-squared	0.486631	Mean dependent var	-	3.15E+08
Adjusted R-squared	0.472756	S.D. dependent var	4.08E+10	
S.E. of regression	2.96E+10	Akaike info criterion	51.11154	
Sum squared resid	3.25E+22	Schwarz criterion	51.19686	
Log likelihood	-994.6751	F-statistic	35.07290	
Durbin-Watson stat	1.960717	Prob(F-statistic)	0.000001	

ADF Test Statistic	-8.330188	1% Critical Value*	-3.6117
		5% Critical Value	-2.9399
		10% Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(CPI,3)

Method: Least Squares

Date: 04/03/12 Time: 09:09

Sample(adjusted): 1973 2010

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPI(-1),2)	-1.347139	0.161718	-8.330188	0.0000
C	0.311249	0.851339	0.365599	0.7168
R-squared	0.658418	Mean dependent var	-0.205744	
Adjusted R-squared	0.648930	S.D. dependent var	8.833651	
S.E. of regression	5.234042	Akaike info criterion	6.199441	
Sum squared resid	986.2272	Schwarz criterion	6.285630	
Log likelihood	-115.7894	F-statistic	69.39203	
Durbin-Watson stat	1.983889	Prob(F-statistic)	0.000000	

ADF Test Statistic	-5.431027	1% Critical Value*	-3.6067
		5% Critical Value	-2.9378
		10% Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXCHANGE,2)

Method: Least Squares

Date: 04/03/12 Time: 09:12

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCHANGE(-1))	-0.885406	0.163027	-5.431027	0.0000

C	1.642173	0.858116	1.913697	0.0634
R-squared	0.443576	Mean dependent var	0.048234	
Adjusted R-squared	0.428538	S.D. dependent var	6.661486	
S.E. of regression	5.035760	Akaike info criterion	6.120926	
Sum squared resid	938.2784	Schwarz criterion	6.206237	
Log likelihood	-117.3581	F-statistic	29.49606	
Durbin-Watson stat	1.980250	Prob(F-statistic)	0.000004	

ADF Test Statistic	-3.117570	1% Critical Value*	-3.6067
		5% Critical Value	-2.9378
		10% Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP,2)

Method: Least Squares

Date: 04/03/12 Time: 05:54

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.459282	0.147321	-3.117570	0.0035
C	1.40E+10	5.26E+09	2.652108	0.0117
R-squared	0.208035	Mean dependent var	5.41E+08	
Adjusted R-squared	0.186631	S.D. dependent var	2.10E+10	
S.E. of regression	1.89E+10	Akaike info criterion	50.21464	
Sum squared resid	1.32E+22	Schwarz criterion	50.29995	
Log likelihood	-977.1855	F-statistic	9.719245	
Durbin-Watson stat	1.770164	Prob(F-statistic)	0.003520	

ADF Test Statistic	-5.768889	1% Critical Value*	-3.6067
		5% Critical Value	-2.9378
		10% Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TRADERATIO,2)

Method: Least Squares

Date: 04/02/12 Time: 23:05

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRADERATIO(-1))	-0.924573	0.160269	-5.768889	0.0000
C	-0.004009	0.009271	-0.432401	0.6680
R-squared	0.473535	Mean dependent var		0.002657
Adjusted R-squared	0.459306	S.D. dependent var		0.078120
S.E. of regression	0.057443	Akaike info criterion		-2.826129
Sum squared resid	0.122089	Schwarz criterion		-2.740819
Log likelihood	57.10952	F-statistic		33.28008
Durbin-Watson stat	1.902029	Prob(F-statistic)		0.000001

APPENDIX 4: THE SAM NOTATIONS

Activities	Commodities		Activities	Commodities		Households	
amaiz	cmaiz	Maize	aelec	Celec	Electricity	hrur0	Rural/urban
awhea	cwhea	Wheat	acons	Ccons	Construction	hrur1	rur Rural
arice	crice	Rice	atrad	Ctrad	Trade	hrur2	urb Urban
abarl	cbarl	Barley	ahotl	Chotl	Hotels	hrur3	
acott	ccott	Cotton	atran	Ctran	Transport	hrur4	Expenditure decile (0-9)
aogr	cogr	Other cereals	acomm	Ccomm	Communication	hrur5	0 Low
asugr	csugr	Sugarcane	afsrv	Cfsrv	Finance	hrur6	9 High
acoff	ccoff	Coffee	arest	Crest	Real estate	hrur7	
atea	ctea	Tea	aosrv	Cosrv	Other services	hrur8	
aroot	croot	Roots & tubers	aadm	Cadm	Administration	hrur9	
acoils	coils	Pulses & oil seeds	aheal	Cheal	Health	hurb0	
afru	cfru	Fruits	aeduc	Ceduc	Education	hurb1	
avege	cvege	Vegetables				hurb2	
acut	ccut	Cut flowers		Factors		hurb3	
aocrp	cocrp	Others crops		lab1	Skilled labor	hurb4	
abeef	cbeef	Beef		lab2	Semi-skilled labor	hurb5	
adair	cdair	Dairy		lab3	Unskilled labor	hurb6	
apoul	cpoul	Poultry		Cap	Capital	hurb7	
agoat	coliv	Sheep, goat and lamb for slaughter		Lnd	Land	hurb8	
aoliv	cgoat	Other livestock				hurb9	
afish	cfish	Fishing					
afore	cfore	Forestry				Other accounts	
amine	cmine	Mining				trcd	Domestic transaction costs
ameat	cmeat	Meat & dairy				trce	Export transaction costs
amill	cmill	Grain milling				trcm	Import transaction costs
abake	cbake	Sugar & bakery & confectionery				ent	Enterprises
abev	cbev	Beverages & tobacco				stax	Sales taxes
aomfd	comfd	Other manufactured food				dtax	Direct taxes
atext	ctext	Petroleum				mtax	Import tariffs
afoot	tfoot	Textile & clothing				gov	Government
awood	cwood	Leather & footwear				s-i	Savings and investment
aprnt	cprnt	Wood & paper				dstk	Change in stocks
apetr	cpetr	Printing and publishing				row	Rest of world

Activities	Commodities		Activities	Commodities		Households	
achem	cchem	Chemicals				total	Total
amach	cmach	Metals and machines					
anmet	cnmet	Non- metallic products					
aoman	coman	Other manufactures					
awatr	cwatr	Water					

APPENDIX 5: MODEL SETS PARAMETERS AND VARIABLES

Symbol	Explanation	Symbol	Explanation
Sets			
$a \in A$	activities	$c \in CNE$ ($\subset C$)	non exported commodities
$a \in ACES$ ($\subset A$)	set of activities with a CES function at the top of the technology nest	$c \in CND$ ($\subset C$)	commodities without domestic market sales of domestic output
$a \in ALEO$ ($\subset A$)	set of activities with a Leontief function at the top of the technology nest	$c \in CMN$ ($\subset C$)	set of non-imported commodities
$c \in C$	- set of commodities	$f \in F$	factors
$c \in CM$ ($\subset C$)	set of imported commodities	$i \in INS$	institutions
$c \in CT$ ($\subset C$)	set of domestic trade inputs (distribution commodities)	$i \in INSD$ ($\subset INS$)	domestic institutions
$c \in CE$ ($\subset C$)	set of exported commodities	$i \in INSDNG$ ($\subset INSD$)	domestic non-government institutions
$c \in CD$ ($\subset C$)	set of commodities with domestic sales of domestic output	$h \in H$ ($\subset INSDNG$)	households
$c \in CX$ ($\subset C$)	set of commodities with domestic output	$c \in SP$ ($\subset C$)	Sensitive products
Parameters			
pwm_c	import price (cost insurance and freight) in foreign currency	$int a_a$	quantity of intermediate input per unit of activity a
tm_c	import tariff rate	tva_a	value added tax for activity a
$icm_{c,c}$	quantity of commodity c. as trade input per imported unit of c.	$ica_{c,a}$	Proportion of commodity c to aggregate intermediate input in activity a
pwe_c	export price free on board	$shif_{i,f}$	share of domestic institution I in income of factor f
te_c	Export tax rate	$trnsfr_{i,f}$	transfer from factor f to institution i
$ice_{c,c}$	quantity of commodity c. as trade input per exported unit of c.	$shii_{i,i}$	share of net income of domestic non government institution to domestic non government institution.
$icd_{c,c}$	quantity of commodity c. as trade input per unit of c produced and sold domestically	tf_f	direct tax rate of factor f
θ_{ac}	Yield of output c per unit of activity a	\overline{qg}_c	base year quantity of government demand

Symbol	Explanation	Symbol	Explanation
$ica_{c,a}$	Quantity of c per unit of aggregate intermediate input a	$qdst_c$	Stock change (qty)
ta_a	tax rate for activity	\overline{tins}_i	exogenous direct tax for domestic institution i
$cwts$	Weight of commodity c in the consumer price index	$\overline{tins01}_i$	parameter which takes value 1 for institutions with potential for flexible interest rate
$dwts$	Weight of commodity c in the producer price index	0-1	
iva_a	quantity of value added per unit of activity a	\overline{mps}_i	base savings rate for domestic institution i
α_a^a	Efficiency parameter in the CES activity function	$\overline{mps01}_i$	0-1 parameter with 1 for institution with potentially flexed direct tax rates
α_a^{va}	Efficiency parameter in the CES value-added function	δ_c^t	CET function share parameter
α_c^{ac}	Shift parameter for domestic commodity aggregation function	δ_{fa}^{va}	CES value-added function share parameter for factor f in activity a
α_c^q	Armington function shift parameter	γ_{ch}^m	Subsistence consumption of marketed commodity c for household h
α_c^t	CET function shift parameter	$\gamma_{a,c,h}^h$	Subsistence consumption of home commodity c from activity a by household h
$\beta_{a,c,h}^h$	Marginal share of consumption spending on home commodity c from activity a for household h	θ_{ac}	Yield of output c per unit of activity a
β_{ch}^m	Marginal share of consumption spending on marketed commodity c for household h	ρ_a^a	CES production function exponent
δ_a^a	CES activity function share parameter	ρ_a^{va}	CES value-added function exponent
δ_{ac}^{ac}	Share parameter for domestic commodity aggregation function	ρ_c^{ac}	Domestic commodity aggregation function exponent
δ_c^q	Armington function share parameter	ρ_c^q	Armington function exponent
		ρ_c^t	CET function exponent
Exogenous Variables			
\overline{CPI}	Consumer price index	\overline{MPSADJ}	Savings rate scaling factor (= 0 for base)
\overline{DTINS}	Change in domestic institution tax share (= 0 for base; exogenous variable)	\overline{QFS}_f	Quantity supplied of factor
\overline{FSAV}	Foreign savings (FCU)	$\overline{TINSADJ}$	Direct tax scaling factor (= 0 for base; exogenous variable)
\overline{GADJ}	Government consumption adjustment factor	\overline{WFDIST}_{fa}	Wage distortion factor for factor f in activity a
\overline{IADJ}	Investment adjustment factor		
Endogenous Variables			
\overline{DMPS}	Change in domestic institution		

Symbol	Explanation	Symbol	Explanation
	savings rates (= 0 for base; exogenous variable)		
DPI	Producer price index for domestically marketed output	QH_{ch}	Quantity consumed of commodity c by household h
EG	Government expenditures	QHA_{ach}	Quantity of household home consumption of commodity c from activity a for household h
EH_h	Consumption spending for household	$QINTA_a$	Quantity of aggregate intermediate input
EXR	Exchange rate (LCU per unit of FCU)	$QINT_{ca}$	Quantity of commodity c as intermediate input to activity a
$GSAV$	Government savings	$QINV_c$	Quantity of investment demand for commodity
QF_{fa}	Quantity demanded of factor f from activity a	QM_c	Quantity of imports of commodity c
MPS_i	Marginal propensity to save for domestic non-government institution (exogenous variable)	QQ_c	Quantity of goods supplied to domestic market (composite supply)
PA_a	Activity price (unit gross revenue)	QT_c	Quantity of commodity demanded as trade input
PDD_c	Demand price for commodity produced and sold domestically	QVA_a	Quantity of (aggregate) value-added
PDS_c	Supply price for commodity produced and sold domestically	QX_c	Aggregated quantity of domestic output of commodity
PE_c	Export price (domestic currency)	$QXAC_{ac}$	Quantity of output of commodity c from activity a
$PINTA_a$	Aggregate intermediate input price for activity a	$TABS$	Total nominal absorption
PM_c	Import price (domestic currency)	$TINS_i$	Direct tax rate for institution i ($i \in INSDNG$)
PQ_c	Composite commodity price	$TRII_{ii'}$	Transfers from institution i' to i (both in the set INSDNG)
PVA_a	Value-added price (factor income per unit of activity)	WF_f	Average price of factor
PX_c	Aggregate producer price for commodity	YF_f	Income of factor f
$PXAC_{ac}$	Producer price of commodity c for activity a	YG	Government revenue
QA_a	Quantity (level) of activity	YI_i	Income of domestic non-government institution
QD_c	Quantity sold domestically of domestic output	YIF_{if}	Income to domestic institution i from factor f
QE_c	Quantity of exports	$INVSHR$	investment share in nominal absorption
QG_c	Government consumption demand for commodity	$GOVSHR$	government share in nominal absorption

APPENDIX 6: MODEL EQUATIONS

Price and Production Equations

$$PM_c = pwm_c \times (1 + tm_c) \times EXR + \sum_{c' \in CT} PQ_{c'} \times icm_{c'c} \quad (1)$$

$$PE_c = pwm_c \times (1 - te_c) \times EXR - \sum_{c' \in CT} PQ_{c'} \times ice_{c'c} \quad (2)$$

$$PDD_c = PDS_c + \sum_{c' \in CT} PQ_{c'} \times icd_{c',c} \quad (3)$$

$$PQ_c (1 - tq_c) \times QQ_c = PDD_c \times QD_c + PM_c \times QM_c \quad (4)$$

$$PX_c QX_c = PDS_c \times QD_c + PE_c \times QE_c \quad (5)$$

$$PA_a = \sum_{c \in C} PXAC_{a,c} \times \theta_{a,c} \quad (6)$$

$$PINTA_a = \sum PQ_c ica_{c,a} \quad (7)$$

$$PA_a (1 - ta_a) \times QA_a = PVA_a \times QVA_a + PINTA_a \times QINTA_a \quad (8)$$

$$\overline{CPI} = \sum PQ_c \times cwts \quad (9)$$

$$\overline{DPI} = \sum PDS_c \times dwts \quad (10)$$

$$QA_a = \alpha_a^a \times \left(\delta_a^a \times QVA_a^{-\rho_a^a} + (1 - \delta_a^a) \times QINTA_a^{-\rho_a^a} \right)^{\frac{1}{\rho_a^a}} \quad (11)$$

$$\frac{QVA_a}{QINTA_a} = \left(\frac{PINTA_a}{PVA_a} \times \frac{\delta_a^a}{1 - \delta_a^a} \right)^{\frac{1}{1 + \rho_a^a}} \quad (12)$$

$$QVA_a = iva_a \times QA_a \quad (13)$$

$$QINTA_a = int a_a \times QA_a \quad (14)$$

$$QVA_a = \alpha_a^{va} \left(\sum_{f \in F} \delta_{f,a}^{va} \times QF_{f,a}^{-\rho_a^{va}} \right)^{\frac{1}{\rho_a^{va}}} \quad (15)$$

$$WF_f \times \overline{WFDIST}_{f,a} = PVA_a (1 - tva_a) \times QVA_a \times \left(\sum_{f \in F} \delta_{f,a}^{va} \times QF_{f,a}^{-\rho_a^{va}} \right)^{-1} \times \delta_{f,a}^{va} \times QF_{f,a}^{-\rho_a^{va} - 1} \quad (16)$$

$$QINT_{c,a} = ica_{c,a} \times QINTA_a \quad (17)$$

$$QXAC_{a,c} + \sum_{h \in H} QHA_{a,c,h} = \theta_{a,c} \times QA_a \quad (18)$$

Commodities

$$QX_c = \alpha_c^{ac} \left(\sum_{a \in A} \delta_{a,c}^{ac} \times QXAC_{a,c}^{-\rho_c^{ac}} \right)^{\frac{1}{\rho_c^{ac} - 1}} \quad (19)$$

$$PXAC_{a,c} = PX_c \times QX_c \left(\sum_{a \in A'} \delta_{a,c}^{ac} \times QXAC_{a,c}^{-\rho_c^{ac}} \right)^{-1} \delta_{a,c}^{ac} \times QXAC_{a,c}^{-\rho_c^{ac} - 1} \quad (20)$$

$$QX_c = \alpha_c^t (\delta_c^t \times QE_c^{\rho_c^t} + (1 - \delta_c^t) \times QD_c^{\rho_c^t})^{\frac{1}{\rho_c^t}} \quad (21)$$

$$\frac{QE_c}{QD_c} = \left[\frac{1 - \delta_c^t}{\delta_c^t} \times \frac{PE_c}{PDS_c} \right]^{\frac{1}{\rho_c^t - 1}} \quad (22)$$

$$QX_c = QD_c + QE_c \quad (23)$$

$$QQ_c = \alpha_c^q (\delta_c^q \times QM_c^{-\rho_c^q} + (1 - \delta_c^q) \times QD_c^{-\rho_c^q})^{\frac{1}{\rho_c^q}} \quad (24)$$

$$\frac{QM_c}{QD_c} = \left(\frac{PDD_c}{PM_c} \times \frac{\delta_c^q}{1 - \delta_c^q} \right)^{\frac{1}{1 + \rho_c^q}} \quad (25)$$

$$QQ_c = QD_c + QM_c \quad (26)$$

$$QT_c = \sum_{c' \in C'} (icm_{c,c'} \times QM_{c'} + ice_{c,c'} \times QE_{c'} + icd_{c,c'} \times QD_{c'}) \quad (27)$$

Institutions

$$YF_f = \sum_{a \in A} WF_f \times \overline{WFDIST}_{f,a} \times QF_{f,a} \quad (28)$$

$$YIF_{i,f} = shif_{i,f} \times \left[(1 - tf_f) \times YF_f - transfr_{row,f} \times EXR \right] \quad (29)$$

$$YI_i = \sum_{f \in F} YIF_{i,f} + \sum_{i' \in INSDNG} TRII_{i,i'} + transfr_{i,gov} \times \overline{CPI} + transfr_{i,row} \times EXR \quad (30)$$

$$TRII_{i,i'} = shii_{i,i'} \times (1 - MPS_{i'}) \times (1 - TINS_{i'}) \times YI_{i'} \quad (31)$$

$$EH_h = \left(1 - \sum_{i \in INSDNG} shii_{i,h} \right) \times (1 - MPS_h) \times (1 - TINS_h) \times YI_h \quad (32)$$

$$PQ_c \times QH_{c,h} = PQ_c \gamma_{c,h}^m + \beta_{c,h}^m \left(EH_h - \sum_{c' \in C} PQ_{c'} \gamma_{c',h}^m - \sum_{a \in A} \sum_{c \in C} PXAC_{a,c'} \gamma_{a,c',h}^h \right) \quad (33)$$

$$PXAC_{a,c} \times QHA_{a,c,h} = PXAC_{a,c} \times \gamma_{a,c,h}^h + \beta_{a,c,h}^h \left(EH_h - \sum_{c' \in C} PQ_{c'} \gamma_{c',h}^m - \sum_{a \in A} \sum_{c \in C} PXAC_{a,c'} \gamma_{a,c',h}^h \right) \quad (34)$$

$$QINV_c = \overline{IADJ} \times qinv_c \quad (35)$$

$$QG_c = \overline{GADJ} \times qg_c \quad (36)$$

$$YG = \sum_{i \in INSDNG} TINS_i \times YI_i + \sum_{f \in F} tf_f \times YF_f + \sum_{a \in A} tva_a \times PVA_a \div QVA_a + \sum_{a \in A} ta_a \times PA_a \times QA_a \quad (37)$$

$$+ \sum_{c \in CM} tm_c \times pwm_c \times QM_c \times EXR + \sum_{c \in CE} te_c \times pwe_c \times QE_c \times EXR + \sum_{c \in C} tq_c \times PQ_c \times QQ_c$$

$$+ \sum_{f \in F} YIF_{gov} + transfr_{gov,row} \times EXR$$

$$EG = \sum_{c \in C} PQ_c \times QG_c + \sum_{i \in INSDNG} transfr_{i,gov} \times \overline{CPI} \quad (38)$$

System Constraints and Macroeconomic Closure

$$\sum_{a \in A} QF_{f,a} = \overline{QFS}_f \quad (39)$$

$$QQ_c = \sum_{a \in A} QINT_{c,a} + \sum_{h \in H} QH_{c,h} + GC_c + QINV_c + qdst_c + QT_c \quad (40)$$

$$YG = EG + GSAV \quad (41)$$

$$\sum_{c \in CM} pwm_c \times QM_c + \sum_{f \in F} trnsfr_{row,f} = \sum_{c \in CE} pwe_c \times QE_c + \sum_{i \in INSD} trnsfr_{i,row} + \overline{FSAV} \quad (42)$$

$$\sum_{i \in INSDNG} MPS_i \times (1 - TINS_i) \times YI_i + GSAV + EXR \times \overline{FSAV} = \sum_{c \in C} PQ_c \times QINV_c + \sum_{c \in C} PQ_c \times qdst_c \quad (43)$$

$$TINS_i = \overline{tins}_i \times (1 + \overline{TINSADJ} \times \overline{tins01}) + \overline{DTINS} \times t \quad (44)$$

$$MPS_i = \overline{mps}_i \times (1 + \overline{MPSADJ} \times \overline{mps01}) + \overline{DPMS} \times \overline{mps01}_i \quad (45)$$

$$TABS = \sum_{h \in H} \sum_{c \in C} PQ_c \times QH_{c,h} + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{a,c} \times QHA_{a,c,h} + \sum_{c \in C} PQ_c QG_c \quad (46)$$

$$+ \sum_{c \in C} PQ_c \times QINV_c + \sum_{c \in C} PQ_c qdst_c$$

$$INVSHR \times TABS = \sum_{c \in C} PQ_c \times QINV_c + \sum_{c \in C} PQ_c qdst_c \quad (47)$$

$$GOVSHR \times TAB = \sum_{c \in C} PQ_c QG_c \quad (48)$$
