UNIVERSITY OF CAPE COAST

POVERTY IMPLICATIONS OF TRADE LIBERALISATION FINANCING IN GHANA

BY

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

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Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

Balancing government budget in the midst of trade liberalisation requires reducing expenditure levels or increasing existing taxes and or introducing new taxes. This study investigated the impact of the option of increasing existing domestic taxes, value added tax, corporate tax and income tax, to compensate for lost tariff revenue from trade liberalisation on poverty at the national and household levels in Ghana.

A recursive dynamic computable general equilibrium and a microsimulation model were used for the study for the period 2005 to 2015. The main source of data was the 2005 Social Accounting Matrix. The policy simulations implemented were trade liberalisation; trade liberalisation with lost tariff revenue replaced by 31% upward adjustment in value added tax; trade liberalisation combined with 50% increase in corporate tax; and finally, trade liberalisation accompanied by 40% rise in income tax. The simulation rates were enough to keep government revenue neutral.

The study concludes that trade liberalisation combined with value added tax, corporate tax, and income tax, separately, reduce the incidence, depth and severity of poverty. It is recommended that government uses all three tax instruments with special emphasis on income tax to compensate for shortfall in tariff revenue resulting from trade liberalisation.

The administrative staff of the Department of Economics, University of Cape Coast, also deserves special commendation for supporting me while writing my thesis. I am indebted to all of them, especially, Mrs. Gifty Dzansi, for helping me to type the preliminary chapters of my thesis.

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I am entirely responsible for any errors in this thesis.

DEDICATION

To my dear wife, Leticia, and lovely children, Kevin, Papa Yaw, Papa Kofi, and Kwadwo.

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LIST OF ACRONYMS

AIDADS	IMPLICIT DIRECT ADDITIVE DEMAND SYSTEMS
BAU	BUSINESS AS USUAL
CES	CONSTANT ELASTICITY OF SUBSTITUTION
CET	CONSTANT ELASTICITY OF SUBSTITUTION
CGE	COMPUTABLE GENERAL EQUILIBRIUM
CPI	CONSUMER PRICE INDEX
CPP	CONVENTIONAL PEOPLES PARTY
DCGE	DYNAMIC COMPUTABLE GENERAL EQUILIBRIUM
ECOWAS	ECONOMIC COMMUNITY OF WEST AFRICAN STATES
EPZ	EXPORT PROCESSING ZONE
EU	EUROPEAN UNION
EXR	EXCHANGE RATE
FGT	FOSTER, GREER AND THORBECKE
GDP	GROSS DOMESTIC PRODUCT
GIPC	GHANA INVESTMENT PROMOTION COUNCIL
GLSS	GHANA LIVING STANDARDS SURVEY
GNP	GROSS NATIONAL PRODUCT
GSAV	GOVERNMENT SAVINGS

HICE	HOUSEHOLD INCOME, CONSUMPTION AND EXPENDITURE SURVEY
HIPC	HIGHLY INDEBTED POOR COUNTRIES
IMF	INTERNATIONAL MONETARY FUND
ISI	IMPORT SUBSTITUTION INDUSTRIALISATION
ISIC	INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION
ISSER	INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH
LES	LINEAR EXPENDITURE SYSTEM
MFN	MOST FAVOURED NATION
MOFEP	MINISTRY OF FINANCE AND ECONOMIC PLANNING
NLC	NATIONAL LIBERATION COUNCIL
NPP	NATIONAL PATRIOTIC PARTY
PNDC	PROVISIONAL NATIONAL DEFENCE COUNCIL
PP	PROGRESS PARTY
ROW	REST OF THE WORLD
SAM	SOCIAL ACCOUNTING MATRIX
SAP	STRUCTURAL ADJUSTMENT PROGRAMME

TFP	TOTAL FACTOR PRODUCTIVITY
VAT	VALUE ADDED TAX
WAEMU	WEST AFRICAN ECONOMIC AND MONETARY UNION
WB	WORLD BANK
WTO	WORLD TRADE ORGANISATION
YG	GOVERNMENT INCOME

CHAPTER ONE

INTRODUCTION

Background to the study

The past decades have seen a significant shift in trade policy direction of the world from an interventionist posture to a more liberal position (Nissanke & Thorbecke, 2005). The shift in policy direction is necessitated by the burning desire to deal decisively with the persistent poverty that has plagued the world economies over the ages. It is commonly believed, though contentiously, that integration into the world economy will ensure the desired sustainable growth and poverty reduction (Dollar & Kraay, 1992; 2001; 2002). The argument is that integrating into the world economy bestows static and dynamic welfare gains onto a country.

The static welfare gains result from efficient resource allocation that comes with integration into the global economy. In other words, static gains arise from the reallocation of resources to more productive industries and firms, as those resources are no longer used to produce goods that could be imported at lower costs – whiles consumers' welfare would rise as consumers' real incomes increase (Krugman & Obstfeld, 2003).

The dynamic gains are realized over time, since increased competition and innovation may need more time to take effect. Among the dynamic gains are the benefits that arise from accessing better technology, inputs and

intermediate goods; taking greater advantage of economies of scale and scope; greater domestic competition and the availability of favourable growth externalities (Helpman & Krugman, 1999).

In contrast, the critics of globalisation, particularly trade liberalisation, argue that, in developing countries, integration into the world economy makes the poor poorer and the rich richer. The most frequent criticism of trade liberalisation is that it augments poverty and inequality (Rodrik, 2000; Rodriguez & Rodrik, 2001; Ravallion, 2001; Lubker, Smith &Weeks, 2002; Wei, 2002; Chen & Ravallion, 2004).

One channel of external integration is trade liberalisation, which is narrowly defined as the complete removal of import tariffs. Operationalising trade liberalisation as complete elimination of import tariffs will, theoretically, lead to the attainment of maximum welfare. The complete removal of trade tariffs will offer people the opportunity to consume a wide variety of goods and services, exploit their productive potential, and promote economic growth. Depending upon how the gains from economic growth are distributed in a country, growth could lead to poverty reduction or increase poverty.

It is pertinent to note that trade liberalisation can destroy opportunities as much as it creates new ones. For instance household groups that have been favoured by protection will see their incomes decline as an economy is liberalised, and the resulting restructuring of the economy may create economic dislocations in the short run. There is increasing awareness that some of those who lose from trade liberalisation are the poorest members of society, who have fewer assets to draw on to protect themselves during hard

times, and are thus less able to absorb adjustment costs, than their follow citizens. Even a transitory loss of income can cause the poor to lose opportunities to acquire human capital through education, health care, and better nutrition and thus can reduce their chances of escaping poverty. The vulnerability of the poor justifies looking more carefully at the effects of trade liberalisation on the poor and asking whether trade liberalisation can be designed to minimize its negative effects (Bannister & Thugge, 2001).

However, the link between trade liberalisation and poverty is not clear as exemplified by Winters, McCulloch and McKay (2004):

> "If trade liberalisation and poverty were both easily measured, and if there were many historical instances in which liberalisation could be identified as the main economic shock, it might be easy to derive simple empirical regularities linking the two. Unfortunately, these conditions do not hold, so there is relatively little direct evidence on the question" (p.72).

Winters (2000a & 2002) have, however, identified four channels through which the link between trade liberalisation and poverty can be theoretically analysed. These are the price channel; the growth channel; wages and employment channel; and the government channel.

Trade reforms impact directly on the poor through the transmission of price signals. If a trade policy allows for an increase in the price of something poor households produce, and/or forces downward the price of something poor households consume, it will increase the real income of poor households and move more poor people above the poverty line. On the contrary, if trade policy

reform causes a reduction of the price of what poor households produce, but increases the price of what poor households consume, real incomes of the poor will decrease and poverty may rise (Bibi & Chatti, 2006).

The extent to which poor households benefit from trade liberalisation through the price channel depends on whether the poor households are able to take advantage of price changes or not. For instance, if the price of what poor households produce increases and poor households are able to increase production to take advantage of the price increase, income of poor households will increase and poverty will reduce. On the other hand, if prices rise, but poor households are unable to supply more to take advantage of the price increase, then trade liberalisation through the price channel may not help the poor much (Winters et al, 2004).

The labour market is another channel through which trade liberalisation impacts poverty. The labour effect of trade liberalisation is discussed in light of the "specific factors" trade model. This model assumes that some production factors (e.g. capital equipment) are immobile across sectors, and is suited for a short-run appraisal of the effects of trade policy shocks on labour demand. After trade liberalisation, labour shifts from the shrinking import-competing sectors to the expanding export-oriented ones. At the end of the reallocation process, overall labour demand may either rise or fall, depending on the relative labour intensity of import-competing and export-oriented industries (Slaughter, 1999). Thus, trade liberalisation may create and destroy markets and this may have implications for employment, incomes and poverty (Winters et al, 2004).

If trade liberalisation causes an increase in the demand for a labour-intensive product, the demand for labour will increase. Either employment or wage or both will increase, depending upon the nature of the labour market. Under a situation of high unemployment, an increase in demand for labour will cause employment to increase and poverty may change depending upon the level of the wage rate vis-a-vis the poverty level. If the wage rate is below the poverty line, then poverty levels may not change. On the contrary, if the wage rate is above the poverty line, then poverty will reduce. In a state of full employment, on the other hand, the wage rate will rise. If the wage rate rises above the poverty line, then income inequality will be reduced as well as take many people out of poverty. On the contrary, if the increased wage rate is below the poverty line, welfare will increase, the poverty gap and severity may reduce but poverty headcount will not be affected. Again, if the trade liberalisation is accompanied by skill-biased technical change, skilled labour may benefit relative to unskilled labour. Income equality will widen in this case, while poverty is unaffected (Winters et al, 2004).

Economic growth is one of the indirect channels through which freer trade can contribute to poverty alleviation. Indeed, trade openness reduces the anti-export bias of production, allows efficient allocation of scarce resources, increases the ability to import complementary inputs and provides incentive to investment and innovation. In addition, trade reform is usually associated with higher flows of foreign direct investments with attendant spillovers of imported technologies, new business practices, and other positive effects on

domestic firms, thus increasing the overall level of productivity and growth (Winters et al, 2004).

In turn, economic growth becomes a powerful force for permanent and sustained poverty alleviation. The extent to which growth affects poverty, however, depends on how the additional income generated by growth is distributed across the population, which in turn depends on the character of growth. If growth takes place in a sector that is capital intensive, the benefits of growth may be limited. However, if growth takes place in the sector that employs more people, labour income will increase and poverty will fall. The more the income of the bottom segment of the poor rises, the more the growth pattern is deemed pro-poor (Bibi & Chatti, 2006; Fields, 1980).

Trade liberalisation is therefore expected to help the poor, given the positive relationship between openness and growth (Dollar & Kraay, 2001; Greenaway, Morgan, & Wright, 2002) and growth and poverty reduction (Winters et al, 2004). However, it is clear from the above discussion that trade reform alone cannot be the panacea and relying solely on the growth effect of a liberal trade regime is not sufficient to address any country's poverty problem (Economic Commission for Africa, 2004; Fields, 1980). Trade liberalisation should be supported by a stable macroeconomic environment and a competitive real exchange rate. Furthermore, it should be supplemented with a menu of other pro-poor growth policies targeted directly towards the vulnerable segments of society (Economic Commission for Africa, 2004; Bibi & Chatti, 2006; Mabugu & Chitiga, 2007).

In this regard, government has an important role to play in fostering rural development, encouraging diffusion and absorption of new technologies, expanding access to education, ensuring the development of efficient and competitive labour market, providing basic social services to poor people, and investing in infrastructure (Winters et al, 2004). However, efforts to liberalize trade could, arguably, result in revenue losses (Greenaway & Milner, 1991). This is particularly so for developing countries which rely heavily on trade taxes as a source of revenue. The fiscal constraint can hinder government's effort at introducing complementary policies to enhance the benefits from trade reforms. This is the fourth channel through which trade liberalisation influences poverty.

The link between trade liberalisation and government revenues is not clear (Greenaway & Milner, 1993). Indeed, the link between tariff cut and government revenue depends on the price elasticity of demand for imports. Trade tax cut may lead to a fall in domestic price of imports and if demand for imports is price elastic, then the percentage increase in import demand will be more than the percentage cut in import taxes, which will make government revenue to increase. On the other hand, if the demand for imports is price inelastic then the percentage increase in the demand for imports will be lower than the percentage fall in the import taxes thereby causing government revenue to fall (Irwin, 1998). Trade tax revenue could also fall base on the structural features of developing economies. These features include low income, large subsistence sectors, heavy dependence on the taxation of trade for revenues and on primary product exports, and the fact that these economies

have small tax bases (Kubota, 2000 cited in Economic Commission on Africa, 2004).

Developing countries faced with the problem of declining government revenue resulting from trade liberalisation have two options to balance their budgets; either to cut expenditure, or replace the foregone revenue from trade by revenue from domestic sources. Either policy could have dire consequences for different socio-economic groups in the economy. For instance, if government decides to cut its expenditure on health and education in order to balance its budget, the poor will be the most hurt because they have very little resources to adjust to such changes (Bannister & Thugge, 2001).

On the contrary, government may use domestic direct and indirect taxes to compensate for the foregone tariff revenue. However, the taxes will introduce distortions of their own into the economy that may influence decision making, investment, employment, income distribution, welfare and poverty alleviation in the economy (Konan & Maskus, 2000). Given the rigidities in the government budget, it is more likely that an increase in domestic taxes will be adopted (Kim & Kose, 2008).

The question then is whether such revenue losses can be recouped from the domestic tax system while maintaining the gains from the trade reform itself. In theory, it is easy to do so, most obviously by strengthening domestic indirect taxes, and there is now a fairly extensive theoretical literature on how to do this. For example, tariff cuts combined with one-for-one increases in consumption taxes will under certain conditions increase social welfare and public revenues (Keen & Ligthart, 2002; 2004).

What is easy in principle, however, is not always easy in practice. In particular, the well-known relative administrative ease of collecting customs duties may mean that replacement from other sources requires significant reform of wider tax practices with higher administrative cost. Much of the revenue from a value-added tax (VAT), for instance, is collected at the border, often half or more, in many developing countries, but implementation of the inland part rests on methods of self-assessment quite different from those commonly used to collect customs duties (Kubota, 2000 cited in Economic Commission for Africa, 2004).

The impact of raising domestic taxes to compensate for revenue lost from tariff cuts on poverty remains inconclusive without a comprehensive framework of analysis (Siddiqui, Kemal, Siddiqui & Kemal, 2008). Lower domestic prices resulting from the cuts in trade taxes on imported consumer goods may increase real incomes, consumption and hence households' welfare (Khondker, Mujeri & Raihan, 2008). On the other hand, the reduction in government revenue due to cutting import duty rates may force government to implement painful fiscal measures, such as increase in domestic tax rates or reduction in transfer to households. This will negatively affect disposable income of households, who must, ceteris paribus, reduce consumption. Such an impact on poverty is therefore negative. The overall impact on households' consumption and poverty depends largely on the incidence of tax increases or the impact of expenditure cuts (Siddiqui, Kemal, Siddiqui & Kemal, 2008).

The identification of the link between trade liberalisation with alternative tax replacement mechanisms on poverty in an empirical context

can be a complex exercise. The complexities come from the existence of different channels, which transmit impulses of trade policy shocks towards individual households, and from the difficulty in isolating the trade policy impacts from impacts coming from other numerous policy-induced shocks or natural shocks. Therefore, case studies which use more comprehensive analytical frameworks such as general equilibrium framework would be expected to shed more light onto the ongoing debate on trade Liberalisation and poverty in developing countries (Khondker, Mujeri & Raihan, 2008).

The economy of Ghana experienced serious economic decline, with negative GDP growth rates, large budget deficits, and high inflation from the early 1970s to the early 1980s (Killick, 2010). Like many other developing countries, Ghana implemented comprehensive economic reforms in 1983 to reverse the economic decay characteristic of the economy then. Prominent among the reforms that were carried out was trade reforms which commenced in 1986 with import liberalisation and tariff reforms. Tariff reforms had taken the form of gradual removal of most quantitative restrictions, including import licensing, and the reduction in the level and range of tariffs. For instance, the simple average tariff rate fell from 32.6 percent for the period 1972-82 to 11.3 percent for the period 1990 -2003. The decline in the average tariff rate caused the contribution of trade taxes to government revenue to fall from 85 percent in 1979 to about 18 percent in the 2000s (Oduro, 2000).

To compensate for the loss in government revenue, the government of Ghana increased taxes on domestic goods and services and also introduced higher direct taxation (Economic Commission for Africa, 2004). For instance,

Value Added Tax (VAT), which is imposed on domestic production as well as on imports, was introduced at 17.5 percent in 1995 to replace sales tax of 15 percent as a revenue generating measure. However, VAT was withdrawn because of implementation difficulties and re-introduced at 10 percent in 1998 (Chapman, 2001). Such policy changes affect different socio-economic groups directly and indirectly through changes in prices and real income, and hence welfare and poverty (Bannister & Thugge, 2001).

Statement of the problem

From independence until the 1980s, Ghana adopted a regulated trade regime. Over the last couple of decades, however, the country has been gradually liberalised. During the 1980s and throughout the 1990s, Ghana implemented various World Bank and IMF-supported stabilization and structural adjustment programmes with the view to improving the level of efficiency and consequently increasing growth, employment and reduce poverty in the country. Trade reforms, which commenced in 1986, featured prominently in the economic re-engineering programme. In the initial stages, quota restrictions were removed and protection was provided through tariffs. Later, the government of Ghana focused on the rationalization of its tariff structure.

Even though Ghana has achieved sustained growth and significant poverty reduction over the last twenty years and has been touted as one of the fastest liberalisers in Africa (Economic Commission for Africa, 2004), the direct role of trade liberalisation in poverty alleviation has not received the

desired attention in the literature. Thus, there is a need to explore explicitly the link between trade liberalisation and poverty using appropriate quantitative framework.

Trade liberalisation also had implications for government revenue. The initial impact of the liberalisation process was to increase trade tax revenue, as trade volumes clearly compressed in the pre-liberalisation regime began to grow. Indeed, international trade tax revenues went up from 4.6 percent of GDP to 5.02 percent of GDP between 1995 and 1998 reflecting the fact that the expansion of the tax-base was initially sufficiently strong to more than offset the effect of lower tax rates (Economic Commission for Africa, 2004). During the same period, total tax revenues as a percent of GDP also increased from 14.69 percent to 15.78 percent (Owuse-Afriyie, 2009). In the late 1990s, however, trade liberalisation had negative impact on trade tax revenues, as it fell by 45 percent between 1998 and 2002, which affected total tax revenue negatively causing it to fluctuate from one year to the other between 1998 and 2002 (Economic Commission for Africa, 2004; Oduro, 2000).

Faced with budgetary difficulties, the government of Ghana responded to the revenue shortfall by increasing direct and indirect domestic taxes (Oduro, 2000; Economic Commission for Africa, 2004). For instance, Value Added Tax (VAT) was introduced at 17.5 percent in 1995 to replace sales tax of 15 percent as a revenue generating measure (Chapman, 2001). If the tax structure distorted consumption and production decisions, it could have dampened the welfare gains from trade reforms. In fact, the long run impact of tax-tariff policy reform on poverty is not known for Ghana. Results from

related studies, for example, Konan and Maskus, 2000; Rutherford, Rutstrom and Tarr 1997, indicate that the impact of trade liberalisation on welfare depend on the tax instrument used to compensate for the lost government revenue.

The critical question that will be answered in this thesis after considering the above issues is as follows: What will be the impact of trade liberalisation under alternative tax replacement mechanisms on poverty in Ghana? This question is timely because any further liberalisation of the economy like the imminent Economic Partnership Agreement with the EU, which ECOWAS Commission is negotiating on behalf of ECOWAS member states will reduce the share of trade taxes (currently about 18 percent) in total revenue, which will have to be made up domestically. This exercise is essential to the extent that it will bring to the fore the most poverty-friendly tax instrument to use to make up any revenue shortfall that will result from further trade liberalisation in Ghana.

Objectives of the study

The general objective of the thesis is to quantify the impact on household poverty of trade liberalisation, defined as unilateral elimination of import tariffs, in the presence of alternative compensatory fiscal measures in Ghana.

The specific objectives of the study are the following:

1. Explore the effect of complete removal of import tariff, otherwise called trade liberalisation, on government revenue and on the incidence, depth and severity of poverty.
2. Determine the effect of trade liberalisation combined with an increase in income tax on the incidence, depth, and severity of poverty.
3. Investigate the impact of trade liberalisation combined with an increase in value added tax (VAT) on the incidence, depth and severity of poverty.
4. Examine the consequences of trade liberalisation combined with a rise in corporate tax on the incidence, depth and severity of poverty.
5. Compare the poverty implications of the identified ways of financing trade liberalisation and make policy recommendations.

Significance of the study

This thesis contributes to the literature by simulating the effects of trade liberalisation on poverty in the presence of alternative fiscal compensatory policies in Ghana using a Dynamic Computable General Equilibrium (DCGE) model and Microsimulation model. Previous Computable General Equilibrium (CGE) analysis of Ghana's trade policy reforms have been carried out within the static framework with all pointing to the fact trade liberalisation complemented with other policies can be used to alleviate poverty (Bhasin & Annim, 2005; Bhasin & Obeng, 2005a; 2005b; 2006). It is important to note that these models assume a short-term perspective in which no changes in investment or the growth path of the

economy can occur. But the more important gains from liberalisation come from dynamic gains, such as more efficient patterns of investment and technological diffusion. For this reason, previous studies are likely to significantly overstate liberalisation's costs and understate its benefits, even for the poor. Over the medium term, changes in investment and economic growth can significantly exceed the negative distributional effects of changes in prices that result from trade liberalisation. It is to overcome these limitations that the DCGE model and the Microsimulation model will be used to study the effects of trade liberalisation on poverty in Ghana.

A fundamental point of departure of a dynamic CGE model from a static one is the incorporation of intertemporal structure of consumption and investment decisions in the dynamic model. A standard static CGE model examines one-period sectoral reallocation of resources, while, in contrast, a dynamic CGE model allows for the analysis of the path of a transitional dynamic toward a new steady state after an initial shock. Moreover, in contrast to a static CGE model, a dynamic counterpart is characterised by the inclusion of a driving force to move the economy from period to period. This driving force may be growth in the underlying labour force and/or a change in the level of technology in one or more sectors of the economy. These changes are facilitated by new investments and the growth of the capital stock in the economy.

The use of a dynamic CGE model for this study has been necessitated by the fact that there is interrelationship between the exports and import-competing sectors that are directly affected by trade liberalisation policy and

the rest of the Ghanaian economy. These linkages are both direct and indirect and some run way into time. To be able to capture all these effects the analysis should explicitly account for the linkages between sectors and consider the responsiveness of producers and consumers to changes in the prices of consumer goods, government expenditure levels, and various forms of taxation. Furthermore, in light of the economy-wide apprehension about trade liberalisation, it is essential to examine the effect of trade liberalisation on income distribution, economic welfare, capital formation and economic growth.

The analytical approach used is a dynamic CGE model that disaggregates the economy into 59 sectors, 9 household categories, a foreign sector, and the government sector. This level of aggregation allows for an assessment of the direct effects as well as the indirect effects of price change in production of goods following a change in trade liberalisation. By measuring these effects it is possible to identify the extent to which producing and consuming sectors and households groups gain or lose. Furthermore, the model runs over a 10 year time horizon and so it is capable of showing changes in spending, as well as changes in investment and economic growth and poverty.

There is an on-going debate on the empirical effect of trade liberalisation on government revenue. While some economists argue that trade liberalisation will reduce government revenue (Yagci, Kamin, & Rosenbaum (1985) as cited in Greenaway & Milner, 1993), others opine that if the initial tariff is above the revenue-maximizing tariff rate, tariff reduction will

argument the tax base and thereby lead to increase tariff collections (Greenaway & Milner, 1993).

However, if the initial tariff is below the maximum-revenue tariff, tariif revenue will fall. The net effect of general tariff liberalisation depends on the frequency distribution of existing rates above and below the maximum-revenue rates on specific categories of imports, the nature of the tariff rate change, the shares of specific imports in total imports, and the relevant own and cross price elasticities of demand and supply (Greenaway & Milner, 1993). This study will contribute to this debate by exploring the impact of complete removal of import tariff on government revenue in Ghana.

For countries that face the possibility of decline in government revenue resulting from trade liberalisation, two fiscal policy options have been prescribed in the literature for them; either they cut expenditure, or replace the foregone revenue from trade by revenue from domestic sources. Either policy could have dire consequences for different socio-economic groups in the economy. In the instance where government decides to reduce spending on social services such as health and education in order to balance its budget, the poor will be the most hurt because they have very little resources to adjust to such changes. If, on the other hand, government decides to use domestic direct and indirect taxes to compensate for the foregone tariff revenue, the taxes will introduce distortions of their own into the economy that may influence decision making, investment, employment, income distribution, welfare and poverty alleviation in the economy. This thesis seeks to also contribute to this aspect of the debate by using Ghana as a case study.

Organisation of the study

In order to achieve the objectives outlined earlier, this thesis is organised under ten chapters structured as follows: The next chapter, Chapter Two, provides an overview of the economy, history and description of trade liberalisation, compensatory fiscal measures and poverty in Ghana. A survey of related theoretical and empirical literature on the linkage between trade liberalisation and poverty will be presented in Chapter Three. The main focus of the survey will be to highlight the poverty capturing mechanisms available in CGE models. The presentation of the CGE model for Ghana will be done in Chapter Four. Chapter Five will present the results of trade liberalisation. In Chapter Six, the results of trade liberalisation combined with VAT are dealt with. The findings of trade liberalisation financed with corporate tax are presented in chapter seven. Chapter Eight deals with the results of trade liberalisation financed with income tax. A comparison of trade liberalisation and tax reforms is presented in Chapter Nine. Finally, a summary, conclusions and policy recommendations of the study are dealt with in Chapter Ten.

CHAPTER TWO

THE ECONOMY OF GHANA

Introduction

This chapter presents an overview of the Ghanaian economy from independence in 1957 to 2009. The purpose is to show the evolution of economic policy over the years and how that has impacted on macroeconomic performance. Economic management of the economy since independence in 1957 to date can be broadly categorized into two distinctive phases. Phase one (1957-1982) can be described as the period of controlled economic management with very little integration into the world economy, and phase two (1983-2009) as the period of liberalised economic management with increased integration into the world economy.

The rest of the chapter is outlined as follows: In the next section, a review of the first phase of economic management will be presented with emphasis on macroeconomic policy and performance of the economy. The next section will outline the second phase of economic management highlighting the economic reforms that have been implemented and the achievements thereof. The chapter will also highlight the fiscal policy reforms that have been carried out during the reforms and end with some stylized facts about, employment, earnings and poverty trends in Ghana.

The economy of Ghana, 1957 – 1992

At independence in 1957, Ghana had one of the richest economies in Sub-Saharan Africa. The country was the world's leading producer of cocoa and its per capita income of US$ 200 was amongst the highest in Sub-Saharan Africa (Killick, 2010). The net external reserves of the country stood at US$269 million. In its quest to fast-track the development of the country, the first democratically elected civilian President, Dr. Kwame Nkrumah and his Socialist party, the Conventional Peoples Party (C.P.P) drew its first Seven-Year development plan for the period 1963/64-1969/70. In this plan, government sought to, inter alia, modernise the economy through import substitution industrialisation. The state also provided free education up to age 16 and a free national health service to all men and women, and introduced mechanization of agriculture (Aryeetey & Fosu, 2002).

There was a common believe among leaders of the time that for newly-independent states to catch-up with their colonial master in terms of development, they had to industrialise. And the industrialisation strategy that was catchy at that time was import-substitution industrialisation (ISI). This strategy involved setting-up industries to produce goods that the country imports from abroad. And to help these industries grow, government provided protection in the form of high tariffs on similar goods imported from abroad. The argument was that the industries in the developing economies were infant industries and so needed time to grow, hence the protection. The industries were supposed to produce for the local market and as well as export. So through ISI, the government taught firms could add value to their exports and

so be able to earn more foreign exchange to prosecute its developmental agenda. The free education and health services were instituted to produce the right caliber of local personnel that is healthy to keep the machinery of government running. The motive behind the modernisation of agriculture was to provide enough food to feed the people and have enough raw materials to feed the industries. Government in pursuance of this objective, built many irrigation dams, established many state farms, agriculture research institutions and produce marketing boards. The main source of funding for this grandiose plan was the huge external reserves of the country and foreign exchange earnings from cocoa, which was at that time doing very well on the international market.

The execution of this ambitious plan marked the beginning of the macroeconomic problems of Ghana. The huge reserves were depleted and cocoa price were tumbled on the international market. Indeed, as shown in Table 1, the reserves which stood at US$269 million in 1957, was –US$391 million by 1966, reflecting deterioration in the balance of payment position of the country and also the poor credit rating of the country. The country recorded three consecutive years of negative growth in GDP between 1964 and 1966. Government run fiscal deficit from 1959 to 1966, all in the bid to see through its economic modernization agenda. The yawning fiscal deficit was initially financed by borrowing from the central bank. This led to excessive increase in money supply, which caused inflation to rise from a low of 1% in 19957 to 22.7% in 1965. The high cost of living at that time led to a fall in the saving/GNP ratio from 12.4 in 1957 to 8.0 in 1966.

Table 1: Macroeconomic indicators, 1957-1966

Year	GDP Growth rate	Trade balance	Current Account	Gross Reserves	Net Reserves	Inflation (%)	Govt Budget Bal.
1957	-1.0	-	-	273	269	1.0	14,456
1958	-4.7	-	-	281	277	0.0	9,802
1959	10.0	-	-	304	295	2.9	-16,146
1960	3.4	-10	-129	294	259	0.9	-49,438
1961	1.1	-72	-203	163	159	6.2	-58,891
1962	2.4	13	-109	197	180	5.9	-94,784
1963	1.0	-41	-177	219	187	5.6	-96,265
1964	-0.2	0	-130	136	89	15.8	-75,954
1965	-2.4	-163	-310	118	-10	22.7	-77,573
1966	-2.1	-55	-173	113	-391	14.8	-37,502

Source: Aryeetey & Fosu, 2002

The worsening economic situation and declining standards of living led to the overthrow of Dr. Nkrumah's government by the National Liberation Council (N.L.C) in 1966. The N.L.C subsequently handed over power in 1969 to the civilian elected Progress Party (P.P) government of Dr. Kofi Abrefa Busia. Both governments were pro-private capital and so changed the economic management style of the country from 1966 to 1972. Indeed, for the period 1966 to 1969, disinflationary policies aimed at stabilizing the macro economy were implemented. There was a reduction in domestic investment, tighter control over import licenses and a devaluation of the cedi (Killick, 1978).

Between 1970 and 1972, International Monetary Fund (IMF)-sponsored reforms, which included devaluation of the cedi and liberalisation of the external sector, were implemented (Frimpong-Ansah, 1991). As Table 2 shows, the objective of stabilization was largely achieved. GDP growth increased from -0.2 % in 1967 to 1.2% in 1967. The balance of trade moved into surplus and the current account and government budget deficits were also reduced. Inflation fell from 22.7% in 1965 to 6.9% by 1969. By 1972, the economy found itself in the same position as it was in 1965 with increasing fiscal and current account deficits. The government responded with a devaluation of the cedi at the end of 1971. The economic difficulties and the devaluation served as the basis for a military coup d'etat in January, 1972, which ended Ghana's second democratic experiment.

Table 2: Macroeconomic indicators, 1967-1974

Year	GDP Growth rate	Trade balance	Current Account	Gross Reserves	Net Reserves	Inflation (%)	Govt Budget Balance
1967	-0.2	26	-117	95	-52	-9.7	-59.706
1968	1.8	59	-69	106	-44	10.7	-69,209
1969	1.2	81	-70	80	-103	6.5	-39,019
1970	4.6	143	-21	74	-24	3.0	81,400
1971	2.5	-36	-191	53	-11	8.8	81,400
1972	-5.3	-	-	115	126	10.8	9,400
1973	2.5	-	-	194	212	17.1	-10,600
1974	3.7	-	-	108	2	18.8	-29,000

Source: Aryeetey & Fosu, 2002

From 1972 to 1983, there were four Military governments, who pursued similar policies. In particular, the liberal regimes of the late 1960s and earlier 1970s were replaced with a controlled regime with the government as a major producer. The policies of the period emphasized import substitution, underpinned by a restrictive foreign exchange rate regime, quantitative restrictions upon imports and price controls. Indeed, the country recorded its worst macroeconomic performance during this period (Killick, 2010).

Within this period, and in particular, between 1972 and 1983, GDP per capita declined by more than 3% per annum, industrial output by 4.2% per annum, and agricultural output by 0.2% per annum, with the main backbone of the economy, cocoa, mineral and timber production on the decline. Cocoa exports fell from 382,000 metric tonnes in 1974 to 159,000 metric tonnes in 1983. Mineral exports fell from an index value of 100 in 1975 to 46 by 1983. Production of starchy staples fell from 7,988,000 tonnes in 1974 to 3,657,000 tonnes by 1983 (see Table 3) (Killick,2010).

Although in 1983 food production was affected by the worst drought in Ghana's history, the decline was mainly due to the massive migration suffered by the rural sector. This exodus was partly a result of the deteriorating economic conditions and also to the 1973/4 oil boom in Nigeria, which induced more than two million Ghanaians to leave in search of greener pastures in Nigeria. Inadequate food prices intensified the demand for food imports, and the diminishing capacity to import deprived agriculture as well as other sectors of inputs, the shortage of which hampered production still further.

Particularly hard hit was government's tax base, as those activities that provided it with the bulk of its revenue shrank disproportionately. Central government revenues, which amounted to 21% of GDP in 1970, fell to only 5% of a smaller GDP in 1983. The revenue collapse increased the reliance on the banking system to finance expenditures. Between 1974 and 1983 the monetary base expanded from ¢697 million to ¢11,440 million. The loss of monetary control accelerated inflation which increased from 18.45 in 1974 to 116.5% by 1981 in the midst of a regime of controlled prices (Table 3). The period of decline was also characterized by negative real interest rates, and domestic savings and investment decreased from 12% and 14% of GDP, respectively, to less than 4%.

All this while, successive governments continued the policy of overvaluing the Cedi, mindful of the fate that befell the Busia government's attempt at devaluation in 1972. Between 1974 and 1983 the Cedi was devalued only once in 1978 despite a hundred-fold increase in domestic prices. As Table 3 shows, the current account deficit of US$2.7 in 1975 increased to US$ 294 million by1983. The current account deficits not only depleted the gross official foreign reserves but also involved an accumulation of external debts. Arrears amounted to the equivalent of 90% of annual export earnings in 1982.

Table 3: Macroeconomic indicators 1974 -1983

Year	GDP Growth rate	Trade balance	Current Account	Gross Reserves	Inflation (%)	Govt Budget Balance
1974	3.39	-	-	-	18.1	357
1975	-12.87	150.4	-2.7	-4.5	29.8	624
1976	-3.52	88.8	-25.5	59.3	56.1	870
1977	2.29	29.4	-144.4	-109.4	116.5	1479
1978	8.48	112.5	-109.3	-80.4	73.7	1906
1979	-7.82	262.6	40.4	3.1	53.9	1646
1980	6.25	195.3	-53.7	124.1	50.1	4440
1981	3.5	-243.6	-508.1	47.2	116.5	4675
1982	6.92	-18.3	-192.3	6.6	22.3	3593
1983	4.56	-60.6	-294.2	-4.8	122.8	4511

Source: Aryeetey & Fosu, 2002

Successive governments responded with import controls, which fell disproportionately on consumer goods. Consumer goods as a proportion of imports fell from 20.2% in 1975 to 17.1% in 1980. The continuing economic decline was, once again, the pretext under which Flt. Lt. Jerry John Rawlings staged a coup d'etat in December 1981, establishing the Provisional National Defence Council (PNDC).

The PNDC government was hostile to the private sector, because it believed that it was the cause of the economic hardships of the time. To increase government's hold on the economy, price controls, import duties and tariffs were imposed on certain commodities produced or imported into the country. These measures worsened the already dire economic situation. In

addition to the worsening economic situation, the country experienced the worst drought and bushfires in its history. What is more, over a million Ghanaians were expulsed from Nigeria.

It was against this background that the government of the Provisional National Defence Council (PNDC) with the support of the International Monetary Fund (IMF) and the World Bank (WB) launched the Structural Adjustment Programme (SAP) in April 1983 with the aim of improving the economic performance of the country. The programme which involved exchange rate policy reforms, fiscal and monetary policy rationalization, privatisation and trade policy reforms was geared towards achieving macroeconomic stability and moving the economy onto rapid and sustained growth path. The exchange rate reforms fostered major progress toward correcting the initial overvaluation of the cedi and eventually led to the achievement of a market determined exchange rate. The financial sector has been liberalised and interest rates, as a result, are market determined. The securities market has expanded with the opening up of the stock exchange market and the weekly auctions of government securities. Fiscal adjustment led to the lowering of the overall deficit and foreign inflow, on the other hand, has increased.

The implementation of these policies led to some remarkable improvement in economic performance in the period between 1983 and 1992. As Table 4 shows, GDP growth rates have averaged 5% per annum since 1983, with the output of cocoa, cereals, starchy staples, minerals and timber recording significant increases. Inflation fell from 123% in 1983 to 10% in

1992. Savings and investment picked up strongly. Also, interest rates turned positive and government budget recorded surpluses from 1986 to 1991.

Table 4: Macroeconomic indicators 1983-1992

Year	GDP Growth rate	Trade balance	Current Account	Gross Reserves	Inflation (%)	Govt Budget Balance
1983	-4.6	-60.6	-156.9	-4.8	122.8	-4933.3
1934	8.6	329	-76.5	-146.7	39.6	-48430
1985	5.1	-36.3	-156.5	-36.3	10.4	-7579
1986	5.2	14.2	-85.3	14.2	24.6	0.3
1987	4.8	-107.1	-98.0	-107.1	39.8	4.1
1988	5.6	-122.4	-66.9	-112.4	31.4	3.9
1989	5.1	-203.4	-89.7	-203.4	25.2	10.3
1990	3.3	-308.2	-223.1	-308.2	37.2	3.3
1991	5.3	-321	-251.6	-321	18.0	39
1992	3.9	-470.2	-376.2	-470.2	10.0	-144.4

Source: IFS, 2000

In 1992, however, the economy showed signs of adjustment fatigue. The government budget recorded a large deficit, equivalent to almost 5% of GDP, which was financed largely by borrowing from the banking system (Table 5).

Table 5: Budget deficit/surplus (narrow definition), 1984 -1992 (in real 1987 billion Cedis

Year	Nominal overall Deficit/surplus (billion cedis)	Real overall Deficit/Surplus (billion Cedis)	Deficit/surplus % of Expenditure	Deficit/Surplus % of GDP
1984	-4.8	-9.2	-17.6	-1.8
1985	-7.6	-13.2	-15.8	-2.2
1986	0.3	0.4	0.4	0.1
1987	4.1	4.1	3.8	0.5
1988	3.9	3.0	2.6	0.4
1989	10.3	6.3	5.1	0.7
1990	3.4	1.5	1.3	0.2
1991	39.0	14.6	11.0	1.5
1992	-114.7	-49.3	-28.5	-4.5

Source: Aryeetey & Fosu, 2002

Export growth was 11% for the period 1985-1989, but it recorded no growth during the 1990 -1996 period. Meanwhile, import which grew about the same percentage as exports in the first period, grew at the rate of 5% in the second period when export experienced no growth. Consequently, the current account balance worsened further to about 9.0% of GDP, from its earlier reform ratio of 5%.

The Ghanaian economy, 1992 - 2009

The country returned to civilian rule in 1992, with Flt. Lt. John Jerry Rawlings as the President. He ruled for 8 years, that is, from 1992 to 2000. As noted earlier on, the economy of Ghana had been fairly stable since the commencement of the reforms in 1983. However, the performance of the economy slipped from 1992 when large macroeconomic imbalances were recorded. Indeed, broad macroeconomic performance was unstable for the period 1992 to 1998. GDP growth rate for 1992–98 was uneven averaging around 4.2 percent. In particular, and as shown in Table 6 and Figure 1, GDP growth rate rose from 3.9 percent in 1992 to 4.8 percent in 1993, fell to 3.8 percent in 1994 and then rose to 4.7 percent by 1998.

Table 6: Selected economic indicators, 1992-1998

Year	GDP Growth rate	Trade Balance	Current Account (US$)	Gross Reserves	Inflation (CPI, %)	Govt Budget Balance
1992	3.9	-470.2	-377.0	122.8	10.1	-144.4
1993	4.8	-664.4	-559.8	-53.3	25.0	-97.3
1994	3.8	-342.2	-254.6	-172.1	24.9	11.7
1995	4.0	-256.6	-144.6	-250.8	59.5	70.3
1996	4.6	-366.9	-324.7	20.4	46.6	-335.5
1997	4.2	-638.3	-549.7	-26.7	27.9	-297.6
1998	4.7	-805.7	-380.0	-107.8	14.6	1048.8

Source: IFS, 2000

Real per capita growth went from 0.2 percent per annum in 1990 to 1.3 percent in 2000, but gross domestic product (GDP) per capita twice peaked at 2.0 percent, in 1993 and 1998. Per capita GDP grew by 10 percent between 1992 and 1998, from US$363 to US$399, indicating an overall improvement in welfare.

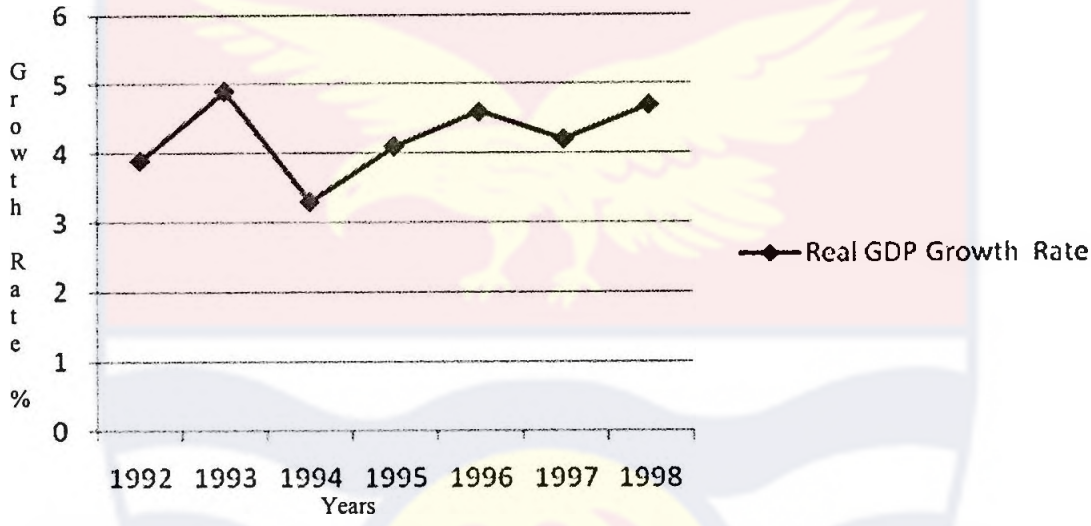

Figure 1: Real gross domestic product growth rate, 1992 – 1998
Source: Bank of Ghana, 1983 - 2010

Growth in the Ghanaian economy for the period 1992 to 1998 was driven mainly by the service sector which grew at the rate of 4.8 percent per annum. During the same period, the agriculture, sector grew at 2.7 percent per annum because its growth prospects had been dampened by the removal of the fertilizer subsidy, lack of access to credit and marketing problems. The industrial sector also grew at 1.8 percent per annum, the lowest growth rate of the three sectors for the period 1992 to 1998.

The poor macroeconomic performance of the period 1992 – 1998 can be traced to the huge fiscal deficits Ghana recorded during the period. As indicated in Table 6, with the exception of 1994 and 1995, Ghana recorded negative fiscal balances for the period under consideration. Figure 2 captures

the fiscal performance of Ghana as a percentage of GDP. Indeed, the fiscal deficit as a percentage of GDP rose from 3.4 percent in 1992 to 8.6 percent in 1997 and then fell to 6.8 percent in 1998. In 1994 and 1995, however, the country recorded surplus fiscal balances of 2.8 and 1.7 percent of GDP, respectively.

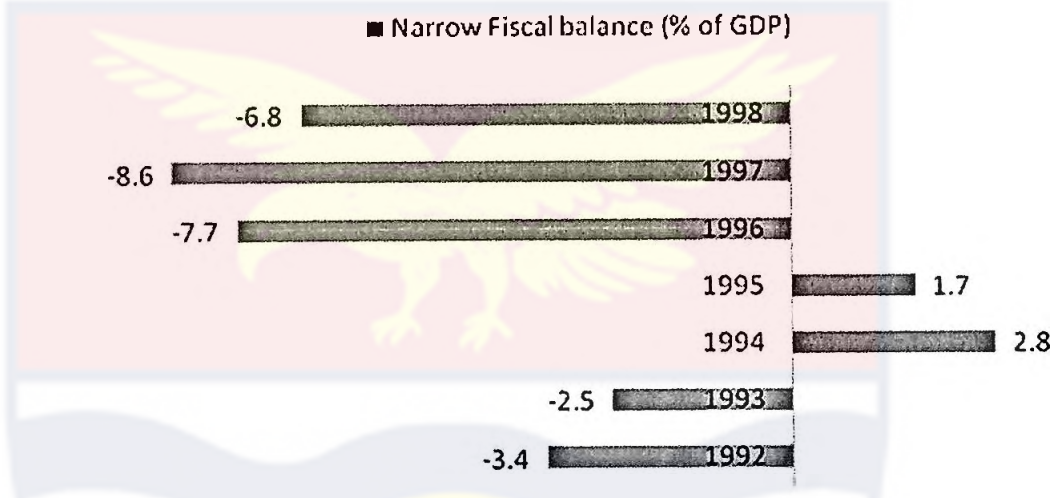

Figure 2: Narrow fiscal balance (percentage of gross domestic product), 1992 – 1998
Source: Bank of Ghana, 1983 - 2010

The huge fiscal deficits of the period 1992 -1998 resulted from the narrow and weak revenue base and the low marginal propensity to tax of the Ghanaian economy (Dordunoo, 1994). On the expenditure side, the 1992 election process saw new fiscal indiscipline set in: civil service pay was increased by 80 percent, a poor cocoa harvest produced a shortfall in tax revenue, and election pressures pushed up rural development expenditure. The 1996 election again raised fiscal pressures, leading to heavy government borrowing from the Bank of Ghana and high inflation rates.

The overall fiscal deficit (including divestiture) was 8.5 per cent of GDP in 2000 as compared with 6.5 per cent in 1999. Tax revenue collections grew on account of good performance from direct taxes, indirect and trade

taxes. The actual tax revenue yielded 3,731.7 billion as against an estimate of 3,957.3 billion. However the petroleum tax and cocoa export tax under performed. The reluctance of Government to increase the ex- pump price of petrol in the face of increased f.o.b. price of crude oil accounted for the under performance of the petroleum tax which recorded only 531.8 billion. Although the volume of cocoa exported during the year increased, the depressed f.o.b. price of cocoa hurt tax collection from the industry. Non-tax receipts amounted to 396.1billion. Total expenditure amounted to 7,524.9 billion, which was 1.8 per cent less than programmed. Non-interest outlays were 3,000.7 billion, which was 13.2 per cent higher than budgeted. Total interest payments amounted to 2,033.3 billion, showing an over- expenditure of 17.5 per cent.

The fiscal deficits of the 1990s contributed to an unstable macroeconomic environment. The increased borrowing from the central bank which resulted in rapid growth of money supply contributed to high inflation which hit the 59.5 percent mark in 1995. Inflation, however, fell consistently to reach 12.4 percent in 1999 (see Table 6 and Figure 3).

There was a strong upsurge in inflationary pressures in the economy during the 2000 fiscal year compared with price developments in 1999. The end-of-period inflation for the 12 months ending December 2000 rose from 13.8 per cent in December 1999 to reach a high level of 40.5 per cent. Similar to the persistent rise in the rate of end-of period inflation in 2000, the average yearly inflation more than doubled from 12.4 per cent in December 1999 to

25.2 per cent in December 2000 after stagnating at an average rate of 12.4 per cent between December 1999 and February 2000.

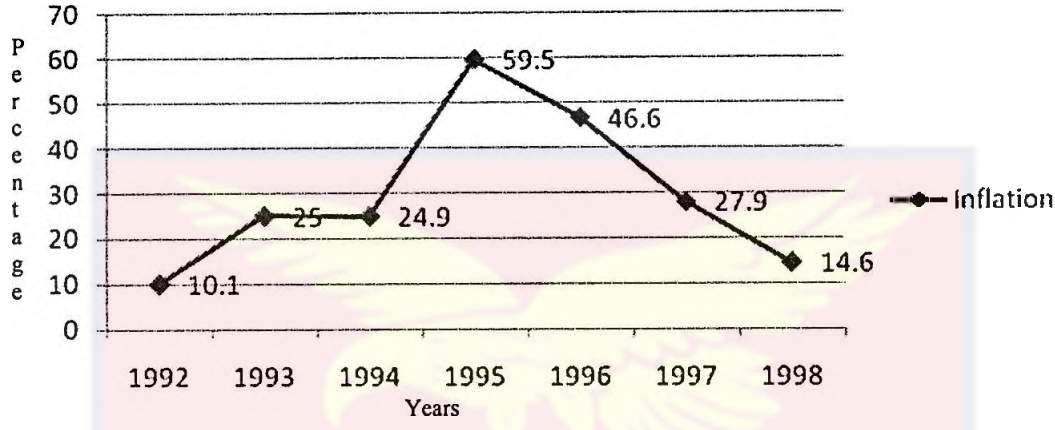

Figure 3: Inflation, end-of-year), 1992 - 1998
Source: Bank of Ghana, 1983 - 2010

Furthermore, the persistent fiscal deficits of the 1992 -1998 period also resulted in increased crowding-out of the private sector. Because the government borrowed largely from the central bank to finance the fiscal deficits, the Treasury bill rate rose from 22.5 percent in 1992 to 43 percent in 1997 before falling to 39 percent in 1998. This enabled the government to attract financial resources meant for the private sector from the banking sector. The high lending rates coupled with the rapid exchange rate depreciation characteristic of the period under review, created uncertainty in the domestic economy thereby discouraging private investment. Specifically, and as indicated in Figure 4, private investment increased from 4.7 percent of GDP in 1992 to 12.7 percent of GDP in 1993. It then declined to 7 percent of GDP in 1996, after which it rose to 11.1 percent of GDP in 1997. In 1998 private investment fell to 11.1 percent of GDP.

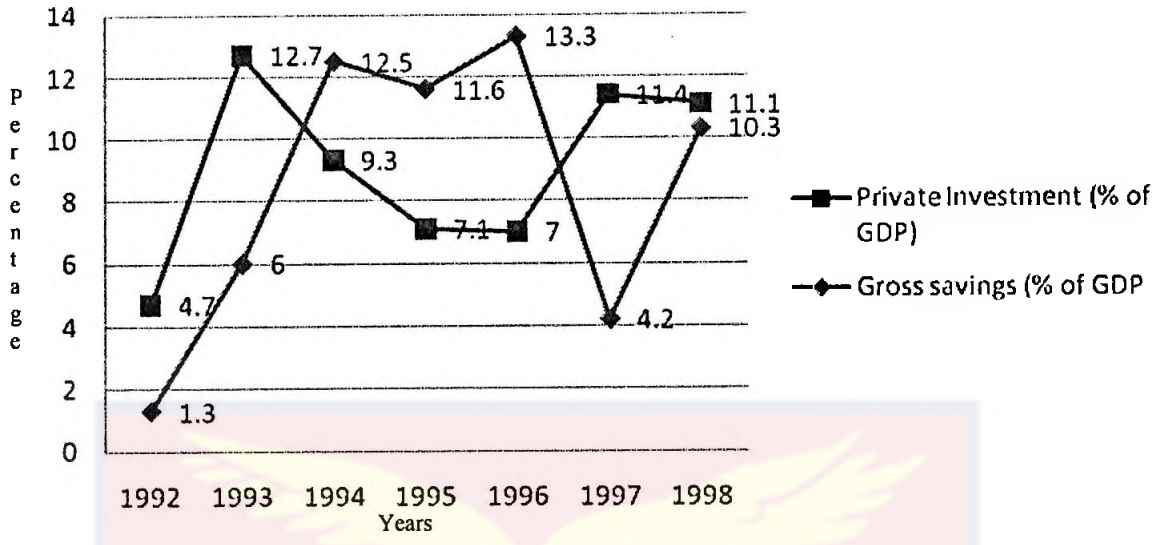

Figure 4: Gross Domestic Savings and Private investment (percentage of gross domestic product), 1992- 1998

Source: Bank of Ghana, 1983 -2010

The poor performance of private investment during the period under review was against the background of a slow and erratic expansion in gross domestic savings. As shown in Figure 4, gross domestic savings increased from 1.3 percent of GDP in 1992 to 13.2 percent of GDP in 1996. It then fell to 4.2 percent of GDP in 1997 and then rose to 10.3 percent of GDP in 1998.

There was an overall balance of payments deficit of US$124.3 million in 1992. The balance of payments situation improved from 1993 until 1995. However, in 1996 Ghana recorded a balance of payments deficit of US$19 million. Between 1997 and 1998, the country recorded balance of payments surplus, but the external position again deteriorated in 1999 when a deficit of US$90.7 million was recorded. The balance of payments deficit increased to US$194.8 million in 2000. The poor state of the external position of the country under the period of review was due to the deterioration in the terms of trade of the country. While the prices of cocoa and gold, Ghana's main exports

fell, the price of oil, Ghana's main import rose. This led to 20 percent deterioration in the terms of trade of the Ghana during the period 1992 – 1998.

Total export receipts for 2000 was US$1,940.4 million compared to an amount of US$2,012.1 million realized in 1999. Earnings from cocoa exports fell by 21 per cent, from US$552.3 million in 1999 to US$436.8 million in 2000 mainly on account of a fall in price. The average price of cocoa beans exported fell by 24 per cent from US$1,434.0 per tonne in 1999 to US$1,092.0 per tonne in 2000.

Gold proceeds amounted to US$702.0 million compared to US$710.8 million in the preceding year. The average price of gold exported was US$280.4 per fine ounce, slightly higher than the average price of US$278.7 per fine ounce realized in 1999. Gold volume exported, however, went down from 2,550,766 fine ounces in 1999 to 2,503,858 ounces in 2000. Despite a 15.2 per cent increase in the volume of timber exports over the 1999 level, the export value was US$175.2 million, just about the same value received in 1999 and 1998. This was as a result of significant drop in the average prices of about 13 per cent, from US$401.7 per cubic metre in 1999 to US$351.3 per cubic metre in 2000.

Miscellaneous exports (including non- traditional exports) are valued at US$568.7 million, compared to US$680.0 million in 1999 and US$612.0 million in 1998. The total value of imports (fob) was US$2,832.4 million for 2000 showing a fall of 12.3 per cent from the 1999 level. Non-oil imports declined significantly by about 20 per cent due to the sharp depreciation of the cedi. The value of crude oil and refined oil products rose by 56 per cent from

US$333.3 million in 1999 to US$520.1 million in 2000. This was due entirely to the increase in crude oil prices from an average of US$18 per barrel in 1999 to US$30.8 in 2000.

The current account excluding official transfers recorded a deficit of US$605.0 million (11.2 per cent of GDP) compared with a deficit of US$1,074.0 million (13.8 per cent of GDP) in 1999, including transfers, the deficit reduced to US$474.1 million (8.7 per cent of GDP compared to US$925.9 million in 1999. The improvement in the current account resulted from developments in the trade account as well as larger inflows of private unrequited transfers. Net private unrequited transfers increased from US$472.0 million to US$495.7 million in the year.

The foreign exchange market experienced difficulties during the 1992 - 1998 period. As illustrated in Figure 5, the real effective exchange rate was 153 in 1992 and appreciated to 108 in 1994. After 1994, however, the cedi consistently depreciated against foreign currencies until it reached 155 in 1999.

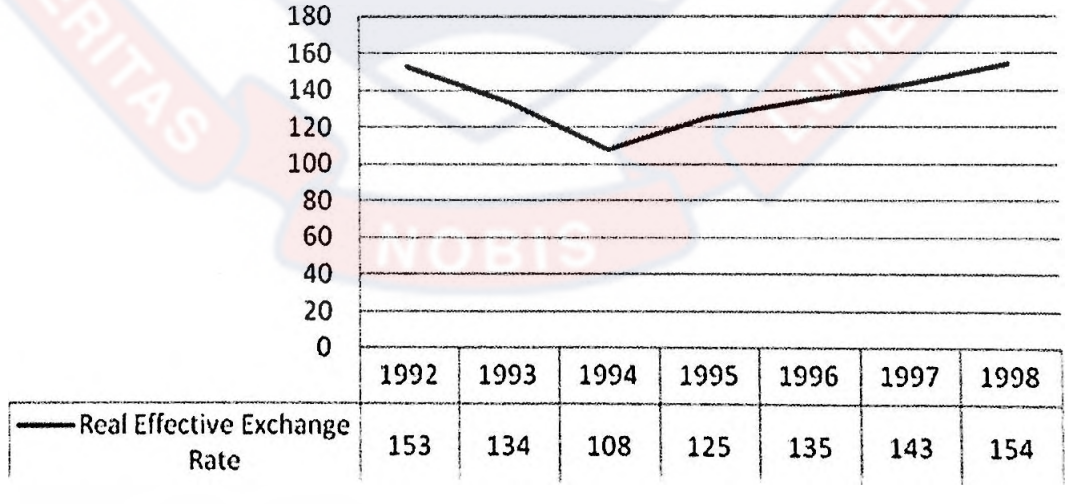

Figure 5: Real effective exchange rate index, 1992 – 1998
Source: ISSER, 2010.

The cedi continued to depreciate strongly against foreign currencies in the year 2000. At the beginning of the year, the cedi, seemed to have stabilized, as the sharp depreciation experienced in the last quarter of 1999 slowed down. However, this was short-lived, as the second quarter recorded even sharper depreciation throwing the foreign exchange market into crisis. By the end of the third quarter through the last quarter of the year the cedi remained relatively stable. In the forex bureau market, the depreciation of the cedi was not very different from what was observed in the inter-bank market. The cedi/dollar rate increased from 3,550.00 at the beginning of the year to 6,800.00 at the end of the year, showing an annual depreciation of 91.5 per cent. The reasons for the sharp depreciation of the cedi can be found in the deteriorating fiscal conditions since 1999 which increased the savings investment gap for the Ghanaian economy. This was aggravated by unfavourable developments in the international economic environment which negatively affected foreign exchange inflows into the economy.

World Bank figures show that Ghana's total external debt exceeded US$4 billion by 1991; this figure rose to nearly US$4.3 billion in 1992.The total debt stock of Ghana, however, stood at 41.10 trillion at the end of December 2000. Out of this amount, 31.70 trillion (US$5.80 billion) was external and 9.40 trillion (US$1.7 billion) was domestic. The total debt represented 224 per cent of exports, 709 per cent of budget revenue and 124 per cent of GDP. In present value terms, it was 395 per cent of revenue. The domestic debt stock was mostly composed of short-term Treasury Bills bearing high interest rates. Interest on domestic debt represented 43 per cent of

budget revenue in 2000. Total debt service (excluding the cost of rolling over the Treasury Bills) absorbed almost 100 per cent of domestic budget revenue, leaving virtually no room for domestic financing of other expenditure.

On January 7, 2000, the New Patriotic Party (NPP) government led by Mr. Agyekum Kufour took over the reins of the country, and ruled for 8 years. At the time of assuming the management of the economy, the state of the economy was chaotic. Government, therefore, initiated a macroeconomic stabilization programme in 2001 and this brought about progress in stabilizing the economy.

As a result of the reforms, Ghana's main macroeconomic indicators showed marked improvement. Average annual GDP growth was 5.1% between 2000 and 2006, up from 4.4% between 1995 and 1999. Real GDP growth had picked up continuously, attaining 5.8% in 2004 and 2005, and 6.2% in 2006, and 7.0% in 2008, the highest rate since the early 1990s (Figure 6). It, however, fell to 4.1 percent in 2009. Real GDP per capita growth has followed the growth rate of real GDP. Consequently, the decrease in the growth rate of real GDP in 2009 translated into a decline in real per capita GDP growth rate from 4.8 percent in 2008 to 2.2 percent in 2009. The expansion in the real GDP and per capita GDP prior to 2009 was driven largely by significant growth in the agriculture sector, which increased its contribution to GDP to nearly 38% in 2006, supported by productivity increases and favourable international cocoa prices. Sectoral GDP shares had remained largely constant for industry and most services subsectors. The

decline in the real GDP growth and per capita GDP growth rates in 2009 has been attributed to the global economic crisis.

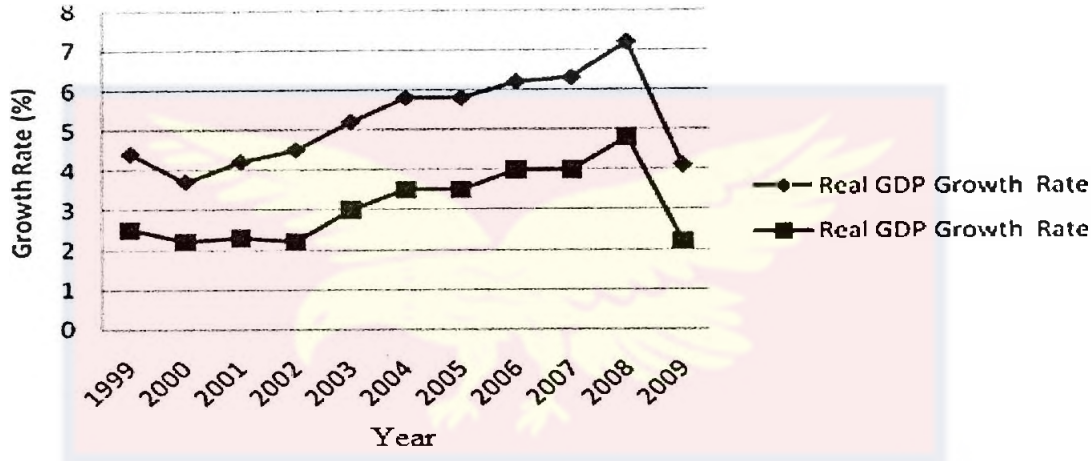

Figure 6: Real gross domestic product growth rate and real per capita gross domestic product, 1999-2009
Source: Bank of Ghana, 1983-2010

Since 2000, inflation rates have shown a declining trend, albeit still at two-digit levels. As measured by changes in the consumer price index, inflation was 10.9% in 2006 and 10.2 percent in the first quarter of 2007, down from 24 percent in 2003 and over 40 percent in 2000. By 2008, however, inflation had gone up to 18 percent, up from 12.8 percent in 2007. In 2009, however, inflation fell to 15.97 percent (See Figure 7). Interest rates had fallen considerably during the review period: the Bank of Ghana's prime rate fell from 27 percent in 2000 to 12.5 percent in 2007; this decrease led to a significant reduction of lending rates, which ranged between 15.5 percent and 33.5 percent in September 2007.

Table 7: Selected economic indicators, 1999-2009

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
GDP growth rate	4.4	3.7	4.2	4.5	5.2	5.8	5.8	6.2	6.3	7.2	4.1
Trade Bal.	-1274.4	830.2	-1101.4	-691.8	-672.2	-1592.8	-2545.1	-2940.2	-3893.98	-4998.77	-2206.56
Current Account	-766	-386.5	-324.6	-32.0	-302.3	-315.8	-813.5	-730	-2151.47	-3543.12	-1200.76
Gross reserves	420.1	233.4	364.8	640.4	1425.6	1732.4	1894.8	2266.7	-	-	-
Inflation (CPI, %)	13.8	40.5	21.3	15.2	23.6	11.8	14.8	10.9	10.7	18.13	15.97
Budget Bal. (Million GH¢)	-177.05	-299.06	-166.67	-297.32	-233.48	-260.30	-192.18	-883.18	1131.57	-288.05	-2209

Source: Bank of Ghana Annual Report (1983-2010)

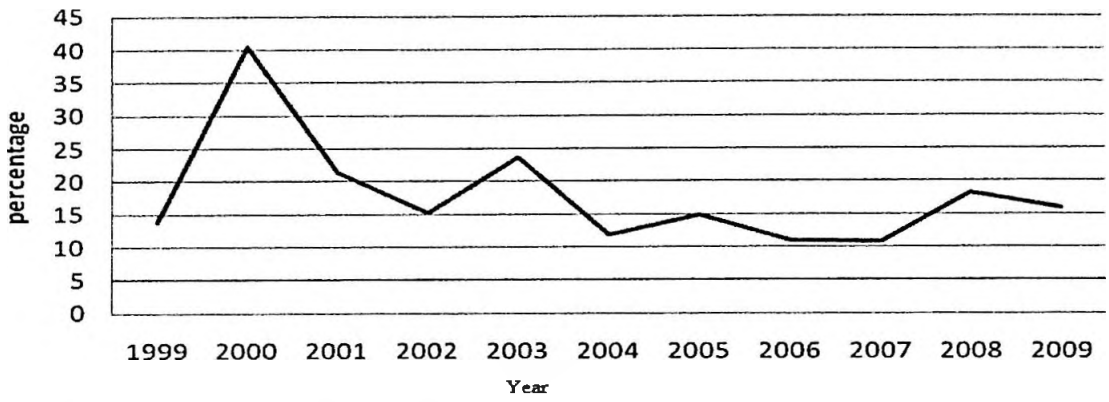

Figure 7: Inflation (Year-On-Year), 1999 – 2009

Source: Bank of Ghana, 1983 - 2010

Over the period 2005 to 2009, the budget performed continually much worse than planned. The trends over the period are shown in Table 7 and Figure 8. The overall broad balance had registered deficits which had widened from 2 percent of GDP in 2005 to 7.8 percent of GDP in the following year, 2006. The figure was far above its target in the budget and over two and a half times the previous outcome. The upward trend in the overall broad balance commenced in 2006 was sustained until 2008 when Ghana recorded an overall broad fiscal deficit of 11.5 percent of GDP. The overall broad fiscal deficit, however, reduced to 10.2 percent of GDP in 2009.

The primary budget balance, defined as the difference between domestic revenue and primary expenditure, has also followed a downward trend since 2006. The primary deficit which was 4.9 percent of GDP in 2006 increased to 10.3 percent in 2008. As was in the case of the overall broad fiscal deficit, the primary deficit decreased from 10.3 percent of GDP in 2008 to 4.7 percent of GDP in 2009.

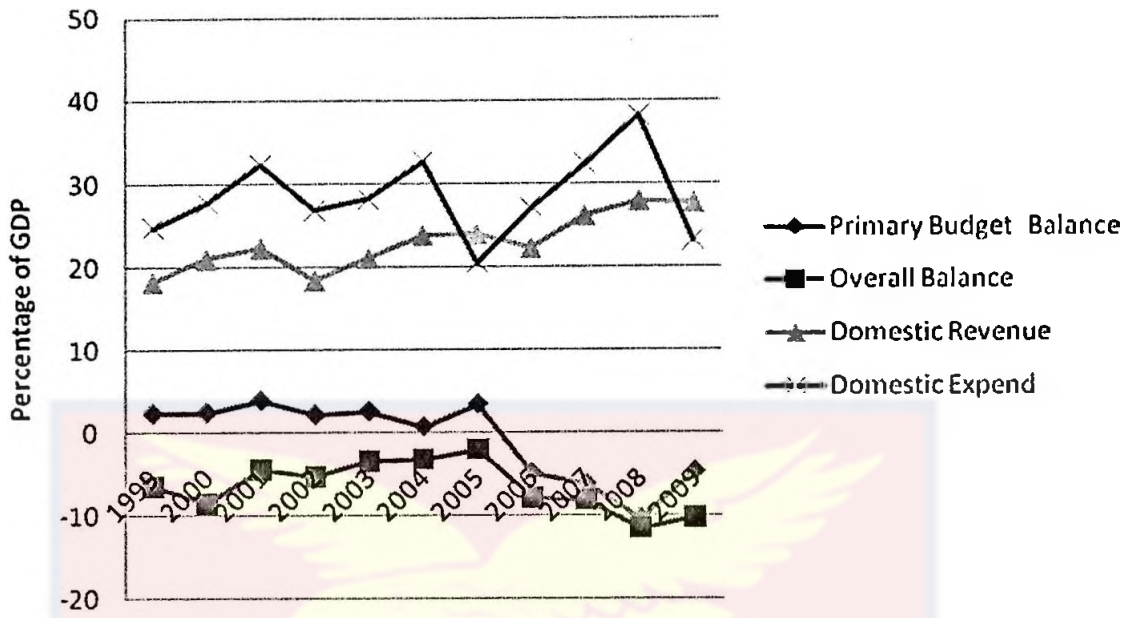

Figure 8: Government Domestic Revenues, Expenditure, Primary Balance and Overall Broad balance (percentage of gross domestic product), 1999 - 2009

Source: Bank of Ghana, 1983 -2010

The primary reason for the deteriorating fiscal performance over the last four years has been the rapid growth of expenditure. In each of these years, expenditure has risen faster than revenue (shown in Figure 8 by the rising trend of the share in GDP of domestic expenditure) and overshot the budgetary provision by considerable margins. Thus, from a share of 21 percent of national income in 2005, the share of domestic expenditure in GDP (i.e. excluding foreign-financed expenditure) rose to 27 percent in 2006, then to an estimated 32 percent in 2007, and then to 38 percent in 2008. Domestic expenditure, however, decreased from 38 percent of GDP in 2008 to 23 percent of GDP in 2009 in line with the stabilization policy of the government.

The cedi had depreciated constantly against the U.S. dollar since 2000, although the depreciation had slowed since 2003. Against the euro, the cedi depreciated between 2000 and 2004 and in 2006, but appreciated in 2005. As at September 2007, the nominal exchange rate for the new Ghana cedi was US$1.08 and €0.8. A new Foreign Exchange Act entered into force in December 2006, bringing with it a shift away from tight exchange controls. In particular, the Act allowed residents to hold foreign currency accounts. However, the repatriation and conversion requirement for certain export proceeds had remained in place.

Ghana's current account had generally been in deficit since 2001; deficits in merchandise and service trade accounts had not been offset by transfer surpluses. Merchandise exports had increased strongly, but their growth was outpaced by rising imports in most years, leading to a widening trade deficit. In 2006, the trade deficit amounted to nearly US$2.8 billion, equivalent to 22.7% of GDP.

Private transfers from foreign-based non-governmental organizations and Ghanaians living abroad have increased considerably in recent years, to over US$1.8 billion in 2006. Net official transfers also grew considerably, mainly due to debt relief under the HIPC initiative. Under the HIPC initiative, Ghana reached the completion point in July 2004 with a cancellation of foreign debts of US$3.5 billion in nominal terms. At end 2006, Ghana's outstanding foreign debt amounted to US$3.3 billion, of which US$2.38 billion was long-term debt. Debt relief had led to a significant improvement in Ghana's debt service indicators.

Ghana's gross international reserves grew nearly tenfold between 2000 and 2006, to nearly US$2.3 billion. As a result, and despite strongly growing imports, reserves covered nearly three months of imports of goods and services in 2006, up from less than one month in 2000.

Ghanaians went to the polls in December 2008 to elect a successor to former president John Agyekum Kufuor. After two rounds of voting, Professor John Evans Atta Mills from the opposition National Democratic Congress (NDC) party won the presidential elections.

After about a decade of relatively strong economic performance with real gross domestic product (GDP) growing at an average of about 6% annually over the last five years, there was greater uncertainty about Ghana's economic growth prospects at the beginning of 2009. Unsurprisingly, economic growth slowed in 2009, to a mere 4.7%, the lowest since 2002, after rising to a two-decade high of 7.3% in 2008. Economic growth recovered modestly to 5.9% in 2010 (MOFEP, 2011) and is expected to accelerate to 8.3% in 2011 on the back of global recovery, exceptional public investment in the rising oil sector, and revenues from anticipated new oil discoveries.

Inflationary pressures were high in the first half of 2009 because of an excessive expansion of the money supply in the run-up to general elections in December 2008, and the food and energy crises of 2008. But increases in the general price level slowed down in the third quarter of the year. By December 2009, inflation had reached 16% after hitting a peak of 20.7% in June 2009. This puts the average inflation rate for 2009 at 19.3% – the highest in five years. As at June 2010, inflation had fallen to 9.52%.

Despite years of impressive performance, Ghana's economy remains bedeviled by huge structural challenges. Agriculture still accounts for 34.5% of GDP, while the industrial sector contributes 24.9% and service accounts for 32.3%. Growth in the agricultural sector was very strong, relative to previous years, and to other sectors. Growth in services dropped from 9.3% in 2008 to 4.6% in 2009. Growth in industry in 2009 was also about 4.3 percentage points lower than in 2008 (Ghana Statistical Service, 2009).

Although the global financial crisis has been relatively favourable to Ghana's terms of trade so far, the country remains vulnerable because of its over-dependence on a few primary commodities. Exports constitute a significant part of Ghana's GDP, but exports are not diversified in terms of products and destinations. Gold and cocoa dominate, accounting for over 68.1% of exports in 2009 with respective shares of 43.7% and 24.4% (ISSER, 2009). Manufacturing accounts for a mere 9% of output, despite the rhetoric of successive governments about encouraging industrialisation.

Trade liberalisation: Ghana's experience

Ghana's first experience with a fairly liberal trade regime was between 1950 and 1961. During this period, Ghana was a member of the sterling zone; there were comparatively no restrictions on payments to and from member countries but payments to countries outside of the sterling zone were restricted. But substantial increases in government spending with high import content resulted in huge budget deficits and a quick drain of the country's foreign exchange reserves. Response to this was the introduction of foreign

exchange controls coupled with comprehensive import licensing in 1961. The ever-increasing trade restrictions further depleted foreign exchange reserves, compelling the government to resort to increased external borrowing. The controlled regime continued until July 1967, which saw the beginning of a liberalised import regime.

Under the liberalised import regime in 1967, the domestic currency was devalued by about 43% and import duties on some selected items were reduced. The rapid increase in government expenditures and imports through the open general licence caused the balance of payments position of the country to deteriorate. Alongside this, there was an upsurge in inflation, which eroded the gains from devaluation and cheapened imports because of real exchange rate appreciation. With an upsurge in government's budget deficit in 1971 and 1972, a substantial rise in domestic prices eroded import taxes and export subsidies. Over the same period, world cocoa prices also fell, thereby worsening the country's trade balance and depleting foreign exchange reserves. The end result was a political overthrow and resort to control measures in 1972, thus completing the first cycle of Ghana's trade policy.

Between 1972 and 1982, trade policy in Ghana was characterized by strict import controls. The main features of this regime included the revaluation of the domestic currency by 26%, resort to import controls including use of import licences as main instrument, and the maintenance of exchange controls. Others were the wide variations in import duties and frequent changes in import taxes aimed basically at revenue generation. These wide variations in import duties made tax evasion possible through

misclassification of imported goods. By 1982, import volumes, cocoa export volumes and real government revenue had fallen to their lowest levels since 1960. The economy suffered severe foreign exchange constraints and a general deterioration in most economic fronts. Thus, the resort to trade reforms after 1982 with the long-term goal of replacing quantitative restrictions with price instruments and creating a liberal trade regime was most welcome.

Trade liberalisation under structural adjustment programme, since 1983

Trade liberalisation under the adjustment programme since 1983 can be categorised into three phases. These are: the period of attempted liberalisation or transition to import liberalisation; the period of import liberalisation; and the period of liberalised trade regime.

The period of attempted liberalisation or transition to import liberalisation covers the period 1983–1986. This period is characterized by the introduction of a system of bonuses and surcharges, and their later replacement by frequent nominal devaluations. Import tariff rates were adjusted downward, but the range of rates with the import licensing system and import programming were maintained. Aside from these, the period witnessed a decline in export tax rates that was greater than the decline in the import tariffs.

The period of import liberalisation per se ran from 1986 to 1989. This period was characterized by the introduction of a formal dual exchange rate system, which was later unified into a single exchange rate system based on

auctioning and a further liberalisation of the exchange rate system. Other features of this phase of the liberalisation process include a redefining of the import licensing categories, a reduction of the import tax schedule and a reduction in the sales taxes on imported goods by 10 percentage points. The foreign exchange retention scheme was liberalised in 1987, whilst the cocoa export tax rate (made up of the ratio of cocoa duties to cocoa export earnings) was reduced.

A liberalised trade regime has been in place since 1989. This period has been characterized by a replacement of retail auctioning with wholesale auctioning in the foreign exchange market in 1990, abolishing of the import licensing system, decline in import tax rates on raw materials and capital goods and reduction in sales tax on imported basic consumer goods. Over this same period, protective duty rates were introduced for specific goods in 1990 and 1994, and the export retention scheme was phased out. The most-favoured nations (MFN) tariffs apply on most imports, except those from ECOWAS member countries, which have attracted duty free rates since 1996.

Economic community of West African States' trade liberalisation scheme

Under the ECOWAS trade liberalisation scheme established in 1990, Ghana initially provided preferential tariff reductions of 20% on imports of a few goods from some countries that had been granted community status. Products from member states that qualified for preferential treatment attracted rates of 8%, 16% and 20%, whilst similar items from other countries attracted duty rates of 10%, 20% and 25%, respectively.

Since 1996, however, most imports from member countries have attracted duty-free rates. Ghana provides duty-free preferences on a range of unprocessed agricultural products and several industrial products imported from producing enterprises, cited within member countries, and that are eligible to receive such preferential treatment. Eligibility is based on whether the imports meet ECOWAS rules of origin and have sourced at least 60% of their raw materials from within the Community.

Ghana's tariff structure

Over the pre-adjustment period, several changes were made to the tariff rates in a bid to influence the amount and composition of imports, and to generate revenue. Objectives were set with targets for both direct controls and the tariff. In particular, the import duty and import licence levy on some selected items were increased with the aim of generating revenue. This goal was not achieved, however. It is instructive to note that the effective collection rate declined from an average of 21.8% during the 1965–1971 period to an average 15.4% of over the 1972–1982 period. The standard deviation of the average official tariff rate over the pre-adjustment period also indicates a widening of the range of rates, which gave room for evasion through misclassification of imports. Clearly, the controlled regime was characterized by high average duty rates and comparatively wide disparities across rates. The simple average rates over the control period ranged from 26% to almost 49%, with standard deviations ranging from 18% to 42 %.

Reduction in the level of rates and disparities characterized the move towards liberalisation during the 1983–1986 period. Effective collection rates over this period did not show any marked improvement in customs duty collection. In 1988, a special import tax of 10% was introduced to provide temporary protection for a number of selected industries, such as certain drugs, garments, cosmetics and non alcoholic beverages. A higher special tax of 40% was set for alcoholic beverages. The inclusion of the special import taxes raised the simple average tariff from 17.5% to 22% for that year.

Further reforms to the tariff structure ensured further lowering of the tariff levels, but the structure became more disparate and thus less uniform between 1990 and 1996. The re-introduction of the special import taxes in 1990 with an extension of its coverage between 1990 and 1992 raised the average duty rates to about 17% for 1991 and 1992. Again, the adjustment period was characterised by increased dispersion of the import tax rate. This was, in part, responsible for the decline in the effective collection rate over this period. Another possible cause for the decline in the effective collection rate was the widespread use of exemptions despite substantial growth in the total value of imports. Growth in imports is partially attributed to the removal of most direct quantitative restrictions on imports. Notably, the import licensing system was abolished in 1989, but the widespread use of exemptions created a gap in the government's tax base, both directly through legitimate imports of exempted goods and indirectly through the misuse of the exemptions offered. Available data indicate that total exempt imports constituted close to 40.1% of total imports in 1998. A little over 50% of such

goods were exempted on the basis of the third schedule of the Customs and Excise Act, whilst the rest were exempt because of clearance through bonded warehouses and free zones (WTO, 2001).

On an annual basis, significant progress has been made in tariff reforms since the mid 1990s, particularly with further lowering of the level of tariff rates. However, the collection rates have remained low. This could mean that despite the upsurge in imports, revenues collected from import duties have not improved to match increases in imports. Growth in real imports over the adjustment period averaged 32.4%, which far exceeded the 17.7% average growth in duty revenue. The question, then, is whether trends in tariff revenue can be sufficiently explained by import liberalisation alone. Revenue leakages from duty evasion and wide use of exemptions could be a major cause of the low effective collection rates for some years.

Ghana's tariff since 2007 has consisted of four bands: 0% for basic and social goods, 5% for raw materials, 10% for intermediate goods, and 20% for finished goods. The average applied Most Favoured Nation (MFN) tariff in 2007 was 12.7%, down from 14.7% in 2006. The coefficient of variation was 0.5, which indicates moderate tariff dispersion. MNF rates on agricultural products are generally higher, with an average of 17.5%, with the highest rates applicable to dairy products and tobacco. Tariffs on non-agricultural products remain lower, with an average of 12.0%. Using the ISIC (Revision 2) definition of sectors, agriculture remained the most tariff protected sector, with an average tariff of 15.7%, followed by manufacturing (12.6%), while imports

of mining and quarrying products face the lowest tariffs (11.2%) (WTO, 2007).

On aggregate, Ghana's tariff in 2007 displayed negative escalation, with an average tariff of 14.3% on products at the first stage of processing, 13.0% for semi-finished goods, and 12.3% for finished products. Further disaggregation to ISIC (Revision 2) two-digit level, however, showed pronounced positive tariff escalation from stage one to stage three of processing in a number of important subsectors, i,e. food and beverages, textiles, and apparels, chemicals, and non-metallic products. This implies high effective protection to these industries, thereby influencing resource allocation. The tariff displayed mixed escalation on wood and paper products, and negative escalation on other manufactured products. In general, this tariff structure impedes the competitiveness of certain exports from Ghana (WTO, 2007).

Quantitative restrictions

As indicated earlier, the pre-reform period was characterized by a complex system of quantitative restrictions and high tariffs on external trade, with frequent changes in the levels of rates and within various commodity categories.

Unlike tariffs, which were used to generate revenues, quantitative restrictions were used to directly control imports for a favourable balance of payments position. Quantitative restrictions were implemented in two forms. One was through the issue of import licences and also through banning of

items. The banning of items was mainly as a protective measure. There was an increase in the special licence tax from 20% in 1984 to 50% in 1986. The import licensing system was abolished in 1989, however, on the premise that the introduction of a liberal exchange rate system made the operation of the import licensing system ineffective and redundant.

Since the phasing out of the import licensing system, import tariffs and the exchange rate are now the main instruments employed in the implementation of import trade policy in Ghana.

Trade structure and performance

Exports, imports and net exports values from 2000 to 2009 are illustrated in Table 8. As shown in Table 8, exports have increased strongly, but their growth was outpaced by rising imports in most years, leading to a widening trade deficit, with the 2009 figure being US$2.2 billion. Export growth was supported by favourable international prices and increased production levels of Ghana's major export products, but also by growing non-traditional exports. Cocoa beans and other cocoa products, gold, and wood products are Ghana's most important export products. The share of cocoa beans in Ghana's exports depends on harvested quantities and world market prices: it was 15.4 percent in 2000, but rose to 24.4 percent in 2009. The share of gold in total exports rose from 36.5 percent in 2000 to 43.7 percent in 2009, and wood articles and timber exports accounted for 9 percent of total exports in 2000, but fell to 3.1 percent in 2009. Various non-traditional exports, such as bananas, textiles, footwear, have increased their share in total exports.

Increases of imports were triggered by domestic growth and rising oil prices. The structure of imports remained relatively stable between 2000 and 2009: most were manufactured products (70% in 2006), mainly machinery, transport equipment, semi-manufactures. Agricultural goods and fuels each accounted for about 15% of imports.

Table 8: Exports, imports, and trade balance, 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Exports (US$m)	1,936.3	1,867.1	2,015.2	2,562.4	2,704.5	2,802.2	3,735.1	4,172.1	5,259.7	5,839.7
Cocoa Beans (%)	15.4	15.1	15.3	29.0	24.6	29.2	27.9	23.4	23.3	24.4
Wood Products	9.0	9.1	9.1	6.8	7.8	8.1	5.4	6.0	6.0	3.1
Gold	36.5	35.9	34.6	35.6	23.9	15.5	30.7	41.6	42.6	43.7
Imports (US$m)	-2,766.6	-2,968.5	-2,707.0	-3,232.8	-4,297.3	-5,347.3	-6,523.6	-8,066.1	-1,0268.5	-8,046.3
Fuels (%)	21.5	23.8	18.2	18.6	14.4	8.1	13.1	26.0	23.0	18.5
Manufactures (%)	58.1	52.8	58.0	59.1	68.1	74.5	69.4	-	-	-
Machinery and Transport Equip. (%)	29.9	26.4	28.2	29.3	34.5	35.2	33.9	-	-	-
Other semi-manufactures (%)	9.3	8.7	10.3	9.3	8.9	11.1	10.8	-	-	-
Trade Bal. (US$m)	-830.23	-1,101.4	-691.8	-670.4	-1,592.8	-2,545.1	-2,788.5	-3,898.9	-4,998.8	-2,206.6

Source: Author's own computation based on data submitted to the WTO, and ISSER, 2009.

Tax structure and compensatory measures

The fiscal position of the Ghanaian economy has been the major concern of both the immediate past government and the current government. The underpinning issue to contend with is the nation's ability to restrict its expenditure within the limits of its revenue capacity. The composition of tax revenue and non-tax revenue for the period 1999 – 2009 is presented in Table 9.

On the average, tax revenue contributes slightly above three quarters of the total revenue in Ghana with the non-tax (grants, income and fees and divestiture) contributing the remaining quarter. In 1999, the share of tax revenue in total revenue was 82.21% and that of the non-tax revenue to total revenue was 17.79%. The tax revenue comes from direct taxes, indirect taxes, and international trade taxes. The non-tax revenue comes from grants, income and fees, and divestiture of public enterprises.

Direct taxes are levied on income and property of individuals and businesses. In 1999, direct taxes contributed about 29.72% to the total tax revenue, which increased to 38.28% in 2009. Corporate tax has been the major source of direct tax revenue from 1999 until 2006 when income tax took over. Indirect taxes comprise Value added tax (VAT) on both domestic and imported products, petroleum tax and other indirect taxes. In 1999, indirect taxes contributed 44.12% to the total tax revenue and 49.87% in 2009. The major source of indirect tax revenue was VAT followed by petroleum tax for the period under consideration.

Table 9: Composition of Tax and Non-Tax Revenue, 1999-2009

Component	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Direct taxes (% of total tax revenue)	29.72	31.93	32.29	32.70	30.58	30.71	32.84	30.88	30.50	32.19	38.28
PAYE	33.81	34.97	31.90	33.23	-	35.71	36.81	42.70	42.70	42.01	44.35
Self-employed	6.63	5.46	5.36	6.18	-	5.35	5.24	4.96	5.52	5.46	4.24
Companies	53.95	50.42	45.54	41.55	43.10	43.79	46.99	41.95	42.52	43.02	38.55
State enterprise	1.55	1.51	-	-	-	-	-	-	-	-	-
Other direct taxes	4.05	7.64	17.23	19.04	-	15.15	10.96	9.78	9.30	9.51	12.16
Indirect taxes (% of total Tax revenue)	44.12	45.72	43.69	43.96	43.88	47.41	46.74	45.83	50.78	49.33	49.87
VAT (Domestic and import)	58.11	63.02	68.56	61.45	59.79	54.73	52.96	55.16	53.31	56.66	51.42
Petroleum tax	30.15	26.35	22.57	28.70	30.95	37.81	39.84	38.19	25.77	20.11	11.30

Table 9 (Continued)

Other indirect taxes	11.74	10.63	8.87	9.80	9.26	7.46	7.20	6.65	20.92	23.23	37.28
International trade taxes (% of total tax revenue	26.16	22.35	23.92	23.34	20.14	21.89	20.42	23.29	18.71	18.48	17.0
Import duties	68.56	81.88	80.87	81.51	80.98	74.88	84.58	76.96	94.20	94.44	97.80
Export duties	31.44	18.12	19.13	18.49	19.02	25.88	15.42	23.04	5.81	5.56	5.45
Grants (% of total non- tax revenue)	8.04	10.06	18.22	14.75	77.03	75.59	62.88	73.36	88.37	86.71	70

Source: Ministry of Finance

International trade taxes are levied on imports and exports. In 1999, international trade taxes contributed 26.16% to the total tax revenue, which decreased to 17.0% in 2009. The major source of international trade tax revenue was import duties followed by export duties. Import duties contributed 68.56% and export duties contributed 31.44% towards the total revenue of the government in 1999. In 2009, however, the figures for import duties and export duties were 97.80 and 2.20, respectively. In 1999, grants accounted for 8.04% of the total non-tax revenue, but this figure increased to 70% in 2009.

The elimination of trade taxes will reduce the revenue of the government by close to one-fifth, if tax base is not enlarged, and as a result, public savings will be reduced. This is also going to reduce investment, which is not good for the economy. The government of Ghana is unlikely to implement such type of tax reform. The government can consider various other options. The first fiscal policy option is for the government can combine the elimination of trade taxes with increases in non-distortion lump-sum taxes, so that the revenue of the government does not fall and this type of fiscal reform does not reduce investment. However, if the rates of lump-sum taxes are already high then this option is less likely to be implemented. The second option is to combine the elimination of trade taxes with a corresponding reduction in public consumption, so that the public savings do not fall. This option is likely to increase poverty.

As part of the economic reforms, government undertook and continues to reform the tax system by broadening the tax base and lowering the tax rate

to serve as incentive for domestic production, encourage compliance, and enhance revenue growth and stability. The reforms encompassed both direct and indirect taxes. For instance, a value added tax of 10% was introduced in 1998 to replace sales tax. The VAT rate is currently 15.5%. The tax is on imports as well as domestic goods and services, and it forms part of the final price the consumer pays for goods and services. There is also a flat rate VAT scheme that applies a marginal tax rate of 3%, on the value of taxable goods supplied by retailers.

There were also reforms of both personal and corporate taxes. Both taxes were reduced. The tax free bracket for personal income tax has been persistently increased whilst marginal rates have been lowered so as to reduce the average effective rates. Moreover, to reduce tax evasion by individuals shifting incomes between corporate profits and personal taxes, the marginal tax rates of the top brackets on the personal income scale have been made equal to corporate tax rates. The basis for assessing corporate taxes was changed in the 1980s from profits to income. Corporate tax rates have also been unified and reduced for all sectors. The rate fell from 55% in 1986 to 35% by 1993(Osei & Quartey, 2005; Addison & Osei, 2001; Kusi, 1998). The general corporate tax rate is currently 25%. The figure, however, varies depending on the sector and location of the companies (Internal Revenue Service, 2010). As shown in the figures below, these taxes have since become major sources of tax revenue with the performance of VAT being outstanding.

Figure 9 shows the tax structure of the country for the period 1983 to 2009. We identify three broad classes of taxes. These are direct taxes, indirect

taxes, and international trade taxes. In particular, international trade taxes were the dominant taxes in 1983, but lost its position to indirect taxes and direct taxes by 2009. Indeed in 1983, international trade taxes made up 59 percent of tax revenue, but this has consistently declined to 17 percent in 2007, while indirect taxes which were 20 percent of tax revenue in 1983 rose to about 50 percent by 2009. Direct taxes follow indirect taxes in terms of prominence because its share of tax revenue increased steadily from 21% in 1983 to 38.3 percent in 2009.

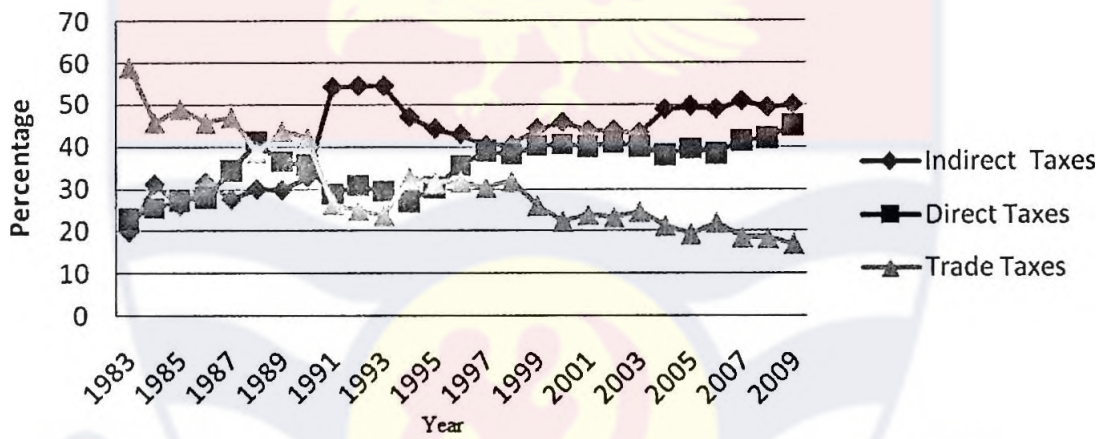

Figure 9: Structure of Tax Revenues, 1983 – 2009
Source: Bank of Ghana, 1983-2010

The components of direct taxes as percentage of total tax revenue are displayed in Figure 10. The components of direct taxes are company taxes, personal and property taxes, and taxes of the self-employed. The dominance of company tax in direct taxes in 1983 remained until 2009 when taxes on personal income and property assumed the largest proportion. Whilst company tax accounted for 41.1 percent of direct taxes, personal income and property taxes constituted 28.1 percent in 1983, but the proportion reversed to 40.64 percent and 44.34 percent, respectively in 2009. Taxes from the self-employed

has declined consistently from 27.3% of direct taxes in 1983 to 4.29 percent in 2009, while other direct taxes have also increased broadly from a proportion of 3.5% in 1983 to 10.73 percent in 2009 (ISSER, 2009).

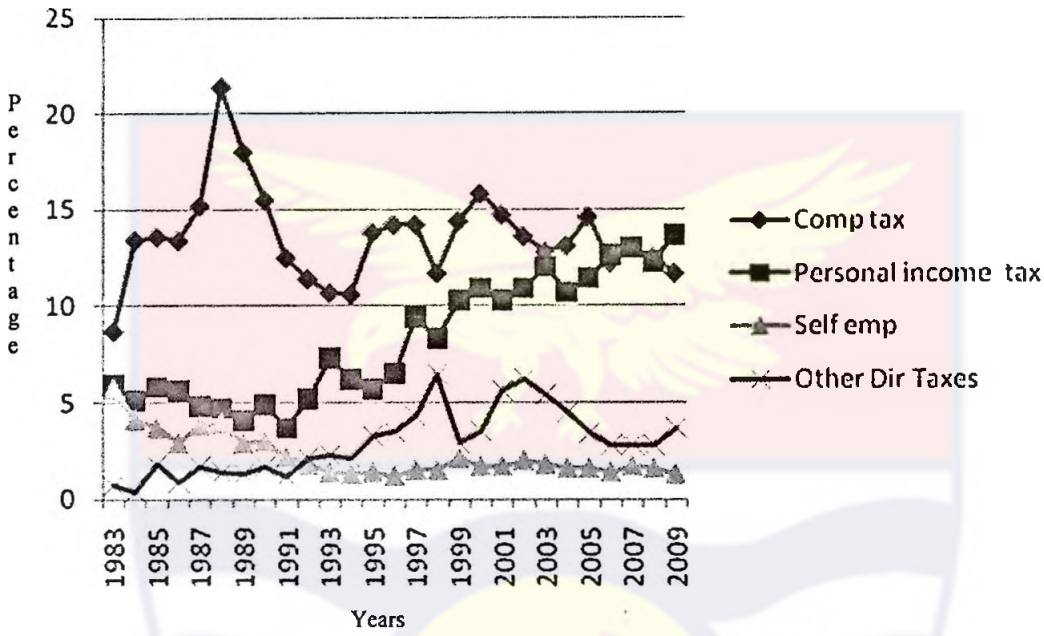

Figure 10: Components of Direct Taxes, 1983 - 2009
Source: Bank of Ghana, 1983 – 2010

In Figure 11, the components of indirect taxes and how they have been affected by the reforms are displayed. The major components are VAT, petroleum taxes and other indirect taxes including excise duty. Other indirect taxes were dominant in 1983, but lost that position to VAT by 2007. Petroleum taxes have been a significant source of indirect tax from 1986 when they were introduced until 1993, after which they have declined since.

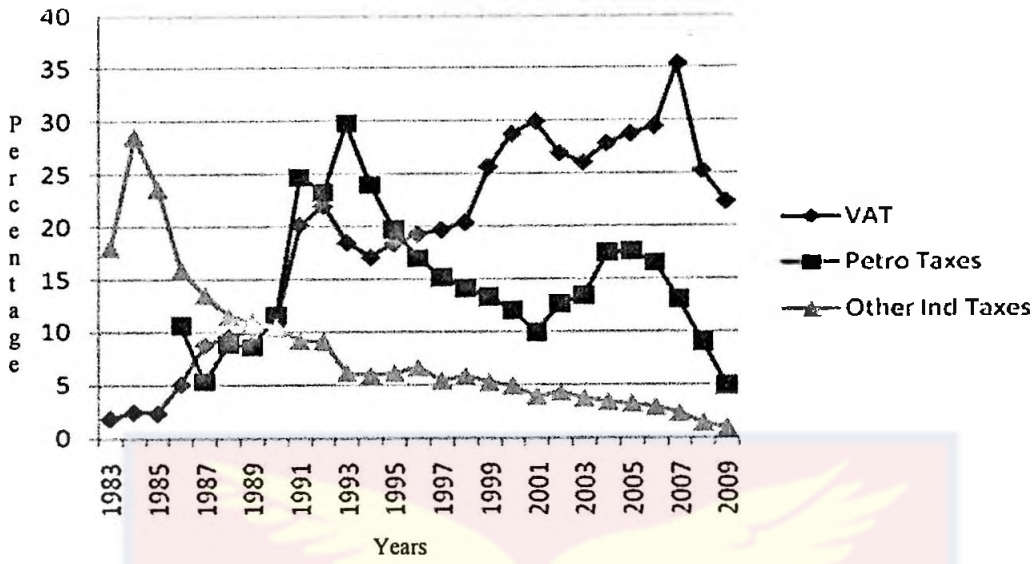

Figure 11: Components of Indirect Taxes, 1983 - 2009
Source: Bank of Ghana, 1983 -2010

The components of trade taxes are captured in Figure 12. These are import duties and export duties. Export duties were very dominant in 1983, but have since lost their position to import taxes, even though, the significance of both taxes in tax revenue has reduced consistently since the reforms in 1983. In the light of this export duty which constituted 56.1 percent of international trade taxes in 1983, declined in its relative significance to 23 percent in 2006 and 5.45 percent in 2009. However, the contribution of import duties to international trade taxes has soared from 43.9% in 1983 to 94.55% in 2009 (ISSER, 2009).

It is clear from the preceding analysis that the tax structure has been transformed so as to enhance revenue generation. What is not clear is how the tax reform has impacted on poverty, especially, as trade has been extensively liberalised. In particular, it is important to look at the poverty impact of alternative forms of taxation introduced to cover any shortfall in revenue due to trade liberalisation.

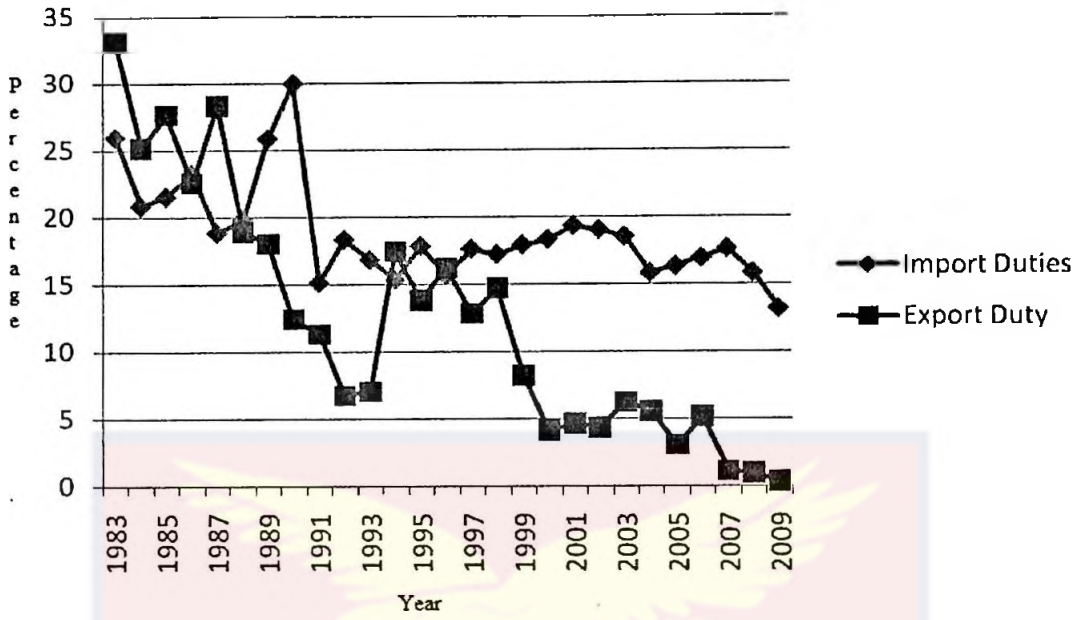

Figure 12: Components of Trade Taxes, 1983 -2009
Source: Bank of Ghana, 1983 -2010

Trade liberalisation is expected to lead to reduction in prices, but the full incidence of taxes on households is unclear. The implication for poverty, therefore, is an empirical issue. Using the information from Social Accounting Matrix (SAM) for Ghana for 2005 and the Ghana Livings Standard Survey 5 (GLSS 5), and a dynamic computable general equilibrium model and a microsimulation model, we want to assess the impact of this fiscal reform on the incidence, depth, and severity of poverty of nine groups of households chosen according to their locality.

Trade liberalisation and employment

Trade theory, specifically, the Stolper-Samuelson theory, posits that an increase in trade will shift incentives to the tradable sector and would therefore cause employment within the sector to increase. The increased employment will translate into increased incomes and therefore help to reduce poverty.

Trade has been extensively liberalised in Ghana, but employment growth has not been consistent with the dictates of the theory.

The economy of Ghana has grown consistently since the commencement of the reforms in the early 1980s. This growth has been attributed to a number of factors, including improvements in traditional exports such as cocoa, gold, and timber, and service activities. The growing economy has not been accompanied by a similar growth in the number of jobs, especially, during the early years of the reforms. For instance, in the early years of the reforms, formal employment actually decreased (Aryeetey et al, 2005). Indeed, as shown in Table 10, formal sector employment increased from 337,200 in 1981 to 464,000 in 1985, after which it decreased to 186,300 in 1991. The trend was the same at the industry level, with services, the dominant employment sector, for example, increasing from 154,300 in 1980 to 243,500 in 1985, and then decreasing to 99,200 in 1991.

Evidence from the third, fourth, and the fifth rounds of the Ghana Living Standards surveys (GLSS, 3, 4, & 5), however, indicates that employment levels have kept pace with the growth of the economy from 1991 to 2006. Employment has therefore grown keeping unemployment low. In particular, the increase in employment in the private sector, both formal and informal, has more than compensated for the public sector retrenchment that was carried out some years ago.

Table 10: Formal sector employment by industry and activity ('000)

Sector	1980	1985	1991
Agriculture, Hunting, forestry and Fishing	43.5	45.6	11.7
Industrial	69.8	87.8	37.6
Manufacturing	27.8	41.8	16.5
Mining and Quarrying	19.0	20.4	13.7
Construction	17.6	18.8	6.2
Services	5.1	6.4	1.3
Total	337.2	464.3	186.3

Source: Aryeetey et al, 2005

As shown in Table 11, in absolute terms, there has been an increase in employment between 1991 and 2006 of about 1.0 million jobs, which represents an increase of 27% of the 1991 figure. Employment figures for all sectors have gone up over the period of interest, with agriculture remaining the dominant employer of labour, followed by trading and manufacturing.

At the industry level, the increase in employment was not equally shared across sectors. There has been a fall in the share of the population in agriculture from 62.2% in 1991 to 56.0% in 2006, as well as community and other social services from 9.3% in 1991 to 8.4% in 2006. There is however, growth in employment for all other sectors, especially, manufacturing. The decline in the contribution of agriculture to employment over the period is significant for two reasons.

First, to the extent that the agriculture sector remained the dominant sector over the period and continued to have the highest incidence of poverty

over the period, it could be argued that liberalisation did not improve the poverty situation within the sector.

Second, given that there was a shift from agriculture sector to other sectors that potentially offered higher wages, it can be argued that liberalisation helped reduced underemployment and, therefore, impacted positively on reducing poverty.

Indeed, the poverty impact of the shift depends on its source, that is, whether it is the unemployed skilled labour that got employed in the other sectors, or it was the underemployed labour agriculture released that got employed in the potentially high-earning sectors. Whereas the former case is a win-win situation, the latter depends on the differential between the agriculture and manufacturing wages.

Extensive trade liberalisation is expected to shift incentives towards the production of tradable goods. Thus, participation in the export sector should become attractive and lead to a rise in labour for that sector. Indeed, the proportion of export farmers in the population should rise, and this is confirmed by GLSS data for 1991/92 and 1998/99, where the population share of export farmers rose slightly from 6.3% to 7.0%.

Table 11: Employment by type of industry, 1991/92 -2005/06('000)

Sector	1991/92		1998/99		2005/06	
	Absolute	%	Absolute	%	Absolute	%
Agriculture	3744.4	62.2	5566.0	55	4755.4	56
Mining/ Quarrying	30.1	0.5	70.8	0.7	59.4	0.7
Manufacturing	493.6	8.2	1184.0	11.7	993.5	11.7
Utilities	6.0	0.1	10.1	0.1	17.0	0.2
Construction	72.2	1.2	141.7	1.4	144.4	1.7
Trading	951.2	15.8	1852.0	18.3	1477.6	17.4
Transportation/ Communication	132.4	2.2	222.6	2.2	229.3	2.7
Financial services	30.1	0.5	81.0	0.8	93.4	1.1
Community/ Social Services	559.9	9.3	991.8	9.8	713.3	8.4
Total	6020.0	100.0	10120.0	100.0	8491.7	100.0

Source: Ocran & Adjasi, 2009; Coulombe & Wodon,2007

Data from the Export Processing Zones (EPZ) and the Ghana Investment Promotion Centre (GIPC), as displayed in Tables 14 and 15 support this fact. In particular, employment in the EPZ has increased from 3500 in 1996/97 to 4300 in the first two quarters of 2003 (see Table 15), while employment by foreign and joint Ghanaian-foreign enterprises involved in export trade has increased from 88 in 1994 to 2947 in 2006 (see Table 13) .

Table 12: Production, exports and employment in the export processing zones

	1996/97	1998	1999	2000	2001	2002	2003
Production (Million $)	800	158.8	167.2	134.4	103.6	222.5	42.3
Exports (Million $)	550	145.4	184.1	165.1	291	174.3	36.5
Employment	3500	4000	5000	6900	7745	9500	4300

Source: Aryeetey et al, 2005

Table 13: Employment creation by foreign and joint Ghanaian-foreign enterprises involved in export trade

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Ghanaian	82	285	297	130	120	121	250	140	66	266	116	439	330
Foreign	6	30	39	23	16	18	14	52	3	13	11	19	61
Annual Total	88	315	336	153	136	139	264	192	69	297	127	458	391
Cumulative Total	88	403	739	892	1028	1167	1431	1623	1692	1971	2098	2556	2947

Source: Aryeetey, et al, 2005; 2003-2006 are author's own computations using GIPC (2007)

Earning trends

It is assumed that increased trade will translate into increased employment, which will reflect in increased earnings. The increased growth of Ghana was matched by rapid growth in employment, and accordingly, earnings have, on the whole, gone up. Generally, earnings in Ghana have gone up since the early 1990s. For instance, the average annual individual earnings increased from 5.3 million cedis in 1991/92 to 5.8 million in 1998/99, and then to 8.8 million cedis in 2005/06. A detailed analysis of the available evidence contained in Table 14 shows that there are inequalities, though, between sexes, regions, sector of employment and industry type. For instance, the age-long earning inequality between male and females persisted from the early 1990s to the late 2000's. Indeed, earnings of males increased from Gh¢ 5.8 million in 1991/92 to Gh¢ 7.0 million in 1998/99, and then to Gh¢ 10.5 million in 2005/06, while that of females increased from Gh¢ 4.9 million in 1991/92 to Gh¢ 4.6 million in 1998/99, and to Gh¢ 8.9 million in 2005/06.

Region wise, while earnings in Accra increased from Gh¢ 9.4 million in 1991/92 to Gh¢12.1 million in 1998/99 and then fell marginally to Gh¢11.95 million in 2005/06, average earning in other urban areas and rural areas increased significantly over the period under consideration. In terms of the sector of employment, it is clear from Table 14 that public sector employees have been the topmost income earners in the country. In particular, the earning of public sector employees increased from Gh¢8.7 million in 1991/92 to Gh¢11.3 million in n1998/99, and then leapt to Gh¢16.97 million in 2005/06. They are closely followed by wage private formal employees,

whose earnings increased from Gh¢7.8 million in 1991/92 to Gh¢12.2 million in 2005/06, and the self-employed Non-Agricultural workers, with the self-employed farmers coming with the real.

At the industry level, workers of financial institutions are the highest income earners, followed by workers in the utility industry, with workers of agriculture being the lowest income earners for the period under consideration. Being the lowest income earner may be bad news for poverty because agriculture continues to be the largest employer of labour. In so far as the sector lost some labour to the other sectors may be exciting news for poverty because those other sectors are on top of agriculture when it comes to income earnings. That is to say, labour has been released from a low income earning sector to a high earning sector. As said, this will be exciting news of poverty alleviation provided the labour agriculture lost, found employment in those high income paying sectors. This concern is critical because there are growing worries that the growth that Ghana has experienced over the years has not been equally shared.

Table 14: Average annual earnings (in '1000 cedis, Accra January 2006 (prices), 1991/92- 2005/06

	Earnings		
	1991/92	1998/99	2005/06
Ghana	5353	5815	8842
Sex			
Male	5775	7006	10450
Female	4913	4635	14646

Table 14 (Continued)

Locality			
Accra			
Male	11018	14318	14
Female	8290	9880	8937
All	9276	12055	11953
Other Urban			
Male	8430	8678	14455
Female	6714	6298	9749
All	7507	7379	12072
Rural			
Male	4206	5039	7450
Female	3414	2823	5137
All	3843	3964	6368
Status of Employment			
Wage Public	8790	11388	16968
Wage Private formal	7768	9067	12241
Wage Private Informal	5513	4816	7642
Self-employment Agriculture	2696	2730	5077
Self-employment Non-agric	7122	7174	10271
Industry			
Mining/Quarrying	2861	2850	5266
Manufacturing	12088	16310	18641
Utilities	7806	10138	20406

Table 14 (Continued)

Construction	6833	7335	11789
Trading	6839	7405	10154
Transport/Communication	9567	14914	13614
Financial Services	14147	17409	21524
Communication & Other services	8759	7922	13128

Source: Coulombe & Wodon, 2007

Trends in Poverty

Poverty in Ghana has many dimensions. Poor communities are characterised by low-income, malnutrition, ill health, illiteracy, and insecurity. There is also a sense of powerlessness and isolation. These different aspects interact to keep households and communities in persistent poverty. Using the Ghana Living Standards Surveys (GLSS) data, the Ghana Statistical Service (2000) classified the incidence (including extreme poverty), the depth, and severity of poverty into two broad groups of rural and urban. Each of these groups was in turn subdivided into forest, coastal and savannah regions, with the capital, Accra, standing alone. It also gave the contribution of ecological zones to total poverty in the country.

Both the Food Energy Intake and the Cost of Basic Needs Methods were used in determining the poverty lines used in the construction of the poverty profile. Upper and lower poverty lines were used, with the latter being used as the extreme or critical poverty line.

Using the GLSS 3, 4, and 5, a comparison of the poverty levels for the periods 1991/92, 1998/99, and 2005/06 was carried out. This is captured in Table 15. The overall trend in poverty during the 1990s has been broadly favourable in Ghana. Taking the upper poverty line of 900, 000 Cedis, the percentage of the Ghanaian population defined as poor fell from 51.7% in 1991/92 to 39.5% in 1998/99 and then to 28.5% in 2005/06 . At the national level, the incidence of consumption poverty has fallen by 22.2% over the 1990/91 to 2005/26. Poverty is substantially higher in rural areas than urban areas, even though poverty fell by 23% in the rural areas as against 16% in the urban areas for the period under consideration, and is disproportionately concentrated in the rural savannah. The decline, however, is not evenly distributed according to ecological zones and regions.

This reduction in consumption poverty has been uneven geographically, with urban Coastal and the urban forest ecological zone posting the highest declines for the 1991/92 to 2005/06 period. Poverty actually rose in Accra from 4% in 1998/99 to 10.6% in 2005/06. Coulombe and Wodon (2007) have argued that the sharp increase in poverty in Accra, as well as the steep drop in poverty in urban coastal and forest regions in 2005/06 could be due to sampling errors, and so the findings should be interpreted with care.

In some areas, poverty has fallen only very marginally, or has even increased. In some of these areas, notably in the Rural Savannah, the situation of the very poorest has worsened. Despite the fact that the incidence of poverty has fallen, the depth of poverty for those who remain poor has

remained relatively stable. The declines in poverty have been concentrated mostly in Western, Central, Volta, Eastern, Ashanti and Brong Ahafo, Northern, and Upper East regions. Only Accra experienced an increase in poverty. The poverty figure for Upper West region for 2005/06 is 21% higher than the 1991/92 figure, even though it represents a fall of 0.3% from the 1998/99 figure. Large poverty reductions have occurred among public sector workers, private sector employees in both the formal and informal sectors, and non-working households. Poverty levels are relatively lower, even though they have declined, among the self-employed in agriculture. Export farmers have experienced the largest reduction in consumption poverty. Poverty reduction among the large numbers of food crop farmers, on the other hand, has been smaller.

Poverty is a multi-dimensional phenomenon and consumption-based measures need to be supplemented by other welfare indicators. Poverty can be analysed in terms of household ownership of durable goods and housing characteristics (drinking water, toilet facilities, and use of electricity). Poverty can also be analysed in terms of human development indicators (health and education). The proportions of households owning most durable goods have shown large increases between 1991-92 and 1998-99, these increases being observed in both urban and rural areas. In addition, there have been significant improvements during this period in the number of households obtaining their drinking water from a safe source, using adequate toilet facilities and having access to electricity in both rural and urban areas. As far as health services are concerned, compared to 1991-92, Ghanaians are less likely now to consult

well-qualified health personnel, or to go to a hospital when they are ill or injured. As far as education is concerned, enrolment rates in primary and secondary school have improved quite sharply during this period. Now, more than four out of five Ghanaian children in the relevant age group are attending primary school. The increases in net enrolment rates at secondary level have been much bigger for girls than boys, but even still rates for girls remain below those for boys.

The poverty measures developed by Foster, Greer, and Thorbecke (FGT) (1984) are used in this thesis. The FGT is formally defined as:

$$P_\alpha = 1/n \sum_i I(y_i < z)[(z - y_i)/z]^\alpha \quad , \quad (\alpha \geq 0) \qquad (1)$$

where n is the sample size; i subscripts the household; y is income; z is the poverty line; I is an indicator function that takes the value of one if the statement is true and zero if it is not; and α is a parameter indicating a specific poverty index within the class of indexes. When $\alpha = 0$, the resulting measure is the incidence of poverty (P_o). When $\alpha = 1$, we have the depth of poverty, and when $\alpha = 2$, the poverty measure is the severity of poverty.

The first poverty index considered is the incidence of poverty. The incidence of poverty is the proportion of the population whose income level is below the poverty line. From equation 1, the incidence of poverty, Po, is derived when $\alpha = 0$, in which case equation 1 reduces to equation 2.

$$P_o = 1/n \sum_i I(y_i < z) \qquad (2)$$

The definition of the terms remains the same as in equation 1.

Table 15: Poverty measures by Locality and Urban/ Rural, 1991-2006

	Population Share	Average Welfare (thousands)	Poverty indices			Contribution to national poverty		
			P0	P1	P2	C0	C1	C2
			1991/92					
Region								
Urban	33.3	1580	0.277	0.074	0.029	17.8	13.2	10.9
Rural	66.8	909	0.636	0.240	0.117	82.2	86.8	89.1
Western	-	-	59.6	20.5	9.1	-	-	-
Central	-	-	44.3	12.9	5.7	-	-	-
Gt. Accra	-	-	25.8	6.3	2.3	-	-	-
Volta	-	-	48.0	15.9	6.6	-	-	-
Eastern	-	-	57.0	20.1	9.1	-	-	-
Ashanti	-	-	41.2	12.9	5.6	-	-	-
Brong Ahafo	-	-	65.0	22.8	10.2	-	-	-

Table 15 (Continued)

Northern	-	-	63.4	29.9	17.2	-	-	-
Upper East	-	-	88.4	41.3	23.3	-	-	-
Upper West	-	-	66.9	28.7	15.2	-	-	-
Locality								
Accra	8.2	1840	0.231	0.051	0.017	3.7	2.2	1.6
Urban coastal	8.7	1430	0.283	0.070	0.024	4.7	3.3	2.3
Urban forest	11.0	1620	0.253	0.064	0.022	5.5	3.8	2.8
Urban savannah	5.3	1320	0.378	0.136	0.069	3.9	3.9	4.2
Rural coastal	14.2	1090	0.525	0.161	0.067	14.4	12.3	10.8
Rural forest	29.6	938	0.616	0.227	0.0106	35.3	36.4	35.8
Rural savannah	23.1	763	0.730	0.305	0.0161	32.6	38.1	42.5
National	100	1276	0.517	0.185	0.088	100.0	100.0	100.0

Table 15 (Continued)

Region								
Urban	33.7	1950	0.194	0.053	0.021	16.6	12.9	10.5
Rural	66.3	1140	0.496	0.182	0.089	83.4	87.1	89.5
Western	-	-	-	27.3	7.0	2.5	-	-
Central	-	-	-	48.4	14.8	6.0	-	-
Gt. Accra	-	-	-	5.2	1.1	0.3	-	-
Volta	-	-	-	43.7	15.6	7.4	-	-
Eastern	-	-	-	37.7	9.9	3.8	-	-
Ashanti	-	-	-	27.7	8.5	3.7	-	-
Brong Ahafo	-	-	-	35.8	9.8	3.9	-	-
Northern	-	-	-	69.2	29.9	15.5	-	-
Upper East	-	-	-	83.9	38.8	22.7	-	-
Upper West	-	-	-	88.2	44.0	25.1	-	-
Locality								
Accra	11.2	2460	0.044	0.009	0.003	1.3	0.7	0.4

Table 15 (Continued)

Urban coastal	5.9	1510	0.310	0.092	0.037	4.6	3.9	3.3
Urban forest	11.8	2010	0.182	0.051	0.020	5.4	4.3	3.6
Urban savannah	4.8	1190	0.430	0.114	0.042	5.2	4.0	3.1
Rural coastal	14.4	1230	0.456	0.142	0.061	16.7	14.8	13.3
Rural forest	31.3	1300	0.380	0.108	0.044	30.1	24.3	20.7
Rural savannah	20.6	827	0.700	0.323	0.178	36.6	48.0	55.5
National	100	1513	0.395	0.139	0.066	100.0	100.0	100.0
Region		2005/2006						
Urban	37.6	2560	0.108	0.031	0.013	14.3	12.1	10.6
Rural	62.4	1430	0.392	0.135	0.066	85.7	87.9	89.4
Western	-	-	-	18.4	4.2	1.4	-	-
Central	-	-	-	19.9	4.3	1.4	-	-
Gt. Accra	-	-	-	11.8	3.1	1.1	-	-
Volta	-	-	-	31.4	7.3	2.4	-	-

Table 15 (Continued)

Eastern	-	-	-	15.1	3.3	1.3	-	-
Ashanti	-	-	-	20.3	5.2	1.9	-	-
Brong Ahafo	-	-	-	29.5	7.8	3.0	-	-
Northern	-	-	-	52.3	20.7	10.5	-	-
Upper East	-	-	-	70.4	32.7	18.4	-	-
Upper West	-	-	-	87.9	48.0	30.2	-	-
Locality								
Accra	11.8	2720	0.106	0.029	0.011	4.4	3.5	2.8
Urban coastal	5.8	3030	0.055	0.009	0.002	1.1	0.6	0.3
Urban forest	14.6	2520	0.069	0.017	0.007	3.5	2.6	2.2
Urban savannah	5.4	1820	0.276	0.095	0.045	5.2	5.4	5.3
Rural coastal	11.0	1630	0.240	0.053	0.018	9.2	6.0	4.2
Rural forest	28.0	1520	0.277	0.068	0.024	27.2	19.8	14.4
Rural savannah	23.4	1220	0.601	0.254	0.139	49.3	62.1	70.7
National	100	2050	0.285	0.096	0.046	100.0	100.0	100.0

Source: Adapted from Coulombe & Wodon, 2007

The higher the incidence of poverty, the higher the proportion of the population that is poor and the smaller the figure the smaller the proportion of the population that is poor. The incidence of poverty does not give information about how poor the poor are.

The second poverty index used in this study is the depth (gap) of poverty (P_1). The depth of poverty measures the extent to which the individual falls below the poverty line as proportion of the poverty line. Again, starting from equation 1, when $\alpha = 1$, the resulting poverty measure is the depth of poverty, which is defined formally as:

$$P_1 = 1/n \sum_i I(y_i < z)[(z - y_i)/z] \quad (3)$$

Equation 3 is the formal definition of the poverty gap and the definition of the terms remains the same as in equation 1. The higher the figure, the farther away is the income of the poor from the poverty line. A smaller figure, on the other hand, means that the income of the poor is very close to the poverty line. The depth of poverty is very informative in that it shows exactly how much money the poor needs to escape poverty.

The third measure of poverty considered in this thesis is the severity of poverty (P_2). The severity of poverty is the weighted sum of the gap of poverty as a proportion of the poverty line, where the weights are the proportionate poverty gaps themselves. Formally, it is derived when $\alpha = 2$ in equation 1 as:

$$P_2 = 1/n \sum_i I(y_i < z)[(z - y_i)/z]^2 \quad (4)$$

The definition of the terms in equation 4 remains the same as in equation 1. The severity of poverty provides information about the degree of poverty among the poor. When the severity of poverty is high it means that income

distribution among the poor is unequal and when it is small, the distribution of income among the poor is getting more equal. While the incidence of poverty provides information about the proportion of the population that is poor, the depth of poverty indicates how poor the poor are and also how many poor people are in the population. The severity of poverty, on the other hand, gives information on the distribution of income among the poor. This way, the depth of poverty and the severity of poverty provide complementary information on the incidence of poverty. Finally, the depth of poverty and severity of poverty are sensitive to income distribution, but the incidence of poverty is not (Jolliffe, 2003).

CHAPTER THREE

REVIEW OF RELATED LITERATURE

Introduction

This chapter deals with a review of related literature. There are two sections. The first section dwells on the theoretical link between trade liberalisation and poverty and the second section concentrates on review of empirical literature. The empirical literature review will be done in two parts: the first sections will review empirical CGE- based studies on the link between trade liberalisation and poverty; and the second section will deal with empirical CGE-based studies that look at trade liberalisation, fiscal policy reforms, and poverty.

Theoretical Literature review

This section explores the theoretical link between trade liberalisation and poverty. The Stolper-Samuelson (1941) theorem is the starting point because it focuses on the distributional consequences of trade.

The Stolper-Samuelson theorem simply states that the most abundant factor in a country benefits from international trade (McCulloch, 2005). The theorem assumes two countries, each of which produces two goods in autarky. The goods are a capital-intensive good and a labour-intensive good. There are two factors of production, labour and capital. One country has more capital

than labour while the other has more labour than capital. There is perfect competition in the product and factor markets and factors of production can move freely within sectors, but not between countries. Furthermore, the theory assumes that the level of technology is the same for the two countries. Under these conditions, if the two countries decide to trade then each country will concentrate on the production and export of the good that uses intensively its abundant factor.

This is because the abundant factor would tend to be cheaper relatively to the scarce factor, so the goods requiring intensive use of the abundant factor would tend to be relatively cheap and hence would enjoy comparative advantage in foreign trade. Thus, the labour-rich country will produce and export the labour-intensive good while the capital-rich country will specialize in the export of the capital-intensive good. In other words, for each of the countries, the export sector will be expanding while the import-competing sector will contract. In effect, there will be increase in the demand for the factor used intensively in the export sector and this will lead to increase in the real income of the factor (McCulloch, 2005).

In the specific case of developing and developed countries, developing countries have unskilled labour in abundance and so they have comparative advantage in the export of labour-intensive goods while developed countries have advantage in the export of capital–intensive goods. Within the Stolper-Samuelson framework, therefore, unskilled labour or the poor have the most to benefit from trade liberalisation in developing countries while capital stands to

gain from trade liberalisation in developed countries (Krueger, 1983; Srinivasan & Bhagwati, 2002; Bhagwati, 2004).

The relevance of the Stolper-Samuelson theorem to this research lies in the fact that it highlights how trade liberalisation affects wages through changes in relative prices. However, the assumptions of the theorem are so unrealistic that the model cannot be applicable to Ghana. The disconnection between the prediction of the Stolper-Samuelson theorem and empirical evidence has drawn stern criticisms from many scholars. For instance, Winters (2000a) notes that if one or more assumptions of the Stolper-Samuelson model are violated, the model outcome does not offer definitive conclusions. Rajan (2002) argues that the link between trade liberalisation and income distribution is complicated because factors of production have different degrees of mobility over time. Similarly, Davis and Mishra (2007) indicate that a poor country might no longer have a comparative advantage in producing unskilled labour intensive goods in a world of many countries and many goods.

The imperfection in the labour market in Ghana makes the specific factor model a more appropriate framework for studying the link between trade liberalisation and poverty, at least in the short run. The specific factor model, which is a variant of the Ricardian model, was originally developed by Viner and was generally known as Ricardo-Viner model. However, Jones (1971) and Mussa (1974) have further developed this model and formalized it mathematically. This model focuses on the short run implications of international trade on income distribution.

The specific factor model assumes that an economy consists of two industries which produce two goods, an exportable commodity and an import-competing commodity, in a perfectly competitive market. Moreover, the industries use only two factors of production, labour and capital, in the production process of the above commodities. Furthermore, the model assumes that in the short run only one factor, labour, is mobile within industries while the other, capital, is specific and immobile between industries. Moreover, it is also assumed that the economy is in full employment. Additionally, labour is assumed to be homogenous. Given these assumptions, the model predicts a positive relationship between protection and returns to factors of production (Jones 1971).

Workers may gain from trade reforms depending on which sectors, exporting or import-competing, they are attached to. For instance, a trade reform that reduces protection for the import-competing sector will lead to a fall in incomes of workers who previously produced goods for that sector and are unable to relocate elsewhere. Thus, the fall in protection will lead to a decrease in the price of the protected good, which will cause the demand for labour to fall. A boom in exports will, on the other hand, increase the price of the export commodity, increase the demand for labour and so workers attached to that sector will benefit from the exports boom (Harrison, 2007).

The specific factor model is relevant to this research because it underscores the specific sectors workers belong (import-competing or exporting) in determining winners and losers from trade liberalisation.

However, the applicability of this model to the situation of Ghana is limited in that its assumptions are unrealistic and it is also a short–run model.

Empirical literature

CGE models are models that deal with the simultaneous interactions among consumers, producers, sectors, and macroeconomic variables. CGE models used for empirical trade policy studies are of two types. These are static CGE models and dynamic CGE models.

Static CGE models allow for consumers and producers to make "optimal" decisions within a single period. Static CGE models ignore the dynamic adjustments in economic variables, focusing only on the final state of these variables, which corresponds to the situation of the economy after all the adjustments to the shock.

Dynamic CGE models, on the other hand, describe the behaviour of consumers and producers over time. Dynamic CGE models track the transitional dynamics of the economy, which is particularly useful when the focus of the study is in tracing the progressive adjustment of economic variables between the initial and the final period.

Static CGE models are excellent when it comes to short run studies. Thus, static CGE are able to only capture the reallocation of resources associated with trade policy reforms. However, static CGE models are unable to deal with the growth (accumulation) effect of trade policy reforms.

Dynamic CGE models, on the other hand, are designed for long run studies and so they are able to capture the growth effects of economic policy

reforms. In addition, dynamic CGE models allow the study of the transition path of the economy from one equilibrium condition to another when there is an external shock. The adjustment along the transition path can induce increase in costs that can affect can affect the poverty status of households.

A considerable number of CGE-based studies on the poverty implications of trade liberalisation have been done. However, majority of those studies used static CGE modeling technique while a handful of them used dynamic CGE framework. Among the dynamic CGE-based studies so far cited by the author are Annabi, Khondker, Raihan, Cockburn and Decaluwa (2006), Annabi, Cisse, Cockburn and Decaluwa (2005), Nwafor, Adenikinji and Ogujuibe (2007), Mabugu and Chitiga (2007) and Lofgren, El-Said and Robinsom (1999) and Feraboli (2007).

Annabi et al, (2006) used a sequential dynamic CGE model and SAM for 2000 to investigate the impacts of WTO agreements and domestic trade policy reforms on welfare and poverty in Bangladesh. The model include 15 production sectors, four factors of production namely, skilled and unskilled labour, agricultural and non-agricultural capital and nine household groups, five in rural areas and four in urban areas.

The policy simulations performed involved rest of the world reductions in tariffs, subsidies and domestic support with no domestic tariff cuts (Doha), rest of the world full trade liberalisation with no domestic tariff cuts, full domestic trade liberalisation with no rest of the world trade liberalisation, rest of the world and full domestic trade liberalisation and increase in remittances.

The results show that Doha scenario has negative implications for the overall macro economy, household welfare and poverty in Bangladesh. Terms of trade deteriorate and consumer prices, particularly food prices, increase more than nominal incomes, especially among poor households. Free world trade has similar, but larger, impacts. Domestic trade liberalisation induced an expansion of agricultural and light manufacturing sectors, favourable changes in the domestic terms of trade. Although the short run welfare and poverty impacts were negative, these turn positive in the long run when capital had adjusted through new investments. Rising unskilled wage rates made the poorest household the biggest winners in terms of welfare and poverty reduction. Domestic liberalisation effects far outweigh those of free world trade when these scenarios are combined. And finally, remittances constitute a powerful poverty-reducing tool given their greater importance in the income of the poor. This study is similar to the current research in that it highlights the importance of the long run growth effect (accumulation) on poverty. The current research will extend the discussion further by considering the long run effects of financing trade liberalisation in a developing country, Ghana.

In a related study, Annabi, Cisse, Cockburn and Decaluwe (2005) employed an integrated dynamic microsimulation model calibrated to a 1996 SAM of Senegal and the 1995 Senegalese household expenditure survey to analyse the linkages among trade liberalisation, growth (accumulation), income distribution and poverty in Senegal. The authors further decomposed changes in poverty into growth and distribution components in order to

examine whether trade liberalisation and factor accumulation were pro-poor or not.

The model included 3278 household types from the 1995 Senegalese household expenditure survey, 3 factors of production – land, labour and capital- and three sectors, that is, agriculture, industry and services.

The policy simulation performed by the authors involved complete elimination of trade taxes. The short run results indicate that full trade tax removal results in a small increase in poverty and inequality as well as contraction of the initially protected agricultural and industrial sectors. In the long run, trade liberalisation enhances capital accumulation, particularly in the service and industrial sectors, and brings substantial increases in welfare and decreases in poverty. However, a decomposition of poverty changes shows that income distribution worsens, with greater gains among the urban dwellers and the non-poor. This study is similar to the current research in that it uses a long run framework in which a household survey data is integrated into a dynamic CGE model and so it is able to capture the growth effects of trade liberalisation on poverty.

The current study will, however, use a dynamic CGE model, from which changes in representative household's expenditure is linked with a group of households it represents in the microsimulation model and then poverty changes are calculated. In addition, the study will focus mainly, on the impact of trade liberalisation financing options on poverty in Ghana.

Diallo, Kone, and Kamagate (2010) used a sequential dynamic CGE model to analyse the impacts of a partial and complete unilateral trade

liberalisation and multilateral trade liberalisation on income distribution and welfare in Cote D'lvoire. The model had 16 sectors, four factors of production; skilled labour, unskilled labour, land and capital and 9 household groups.

Three policy experiments were carried out. These simulations are complete and unilateral elimination of all customs tariffs; a unilateral 24% reduction in customs tariffs; and multilateral trade liberalisation.

The simulation results show that unilateral trade liberalisation would result in a decrease in GDP, household income and welfare. Multilateral trade liberalisation, on the other hand, results in positive economic growth, income, consumption and welfare of all household groups. The liberalisation of external trade, however, does not affect inequality significantly. This study is similar to the current research in that it uses a dynamic CGE model. It is therefore able to capture the dynamic effects of trade liberalisation on the economy of Cote D'lvoire. This research is however, different from Diallo et al, (2010). Not only will the current study focus on poverty, but it will examine the impact of financing trade liberalisation on poverty in Ghana using a dynamic CGE model and a microsimulation model.

In a related study, Nwafor, et al (2007) used a sequential dynamic CGE model and a 2005 SAM to investigate the impacts of Economic Community of West African States (ECOWAS) trade liberalisation scheme on poverty in Nigeria for the period 2005 to 2020. The SAM had 7 production sectors (Agriculture exports, Agriculture food, Oil, manufacture consumer goods, manufactured intermediate goods, manufactured capital goods, and services)

and two households, rural and urban. The policy experiments involved setting Nigeria's tariffs to the ECOWAS Common External Tariff (CET) rates. In this respect, four simulations were carried out: the first simulation involved setting the tariff on medical goods and other necessities to 0%; second, the tariff for unprocessed raw materials and capital goods was set at 5%; third, the tariff for intermediate goods was set at 10%; and finally, the tariff for consumer goods was fixed at 20%.

The results show that only two out of the seven sectors, that is, oil and manufactured capital goods, benefited from the scheme in terms of value added. Now as the winning sectors from the scheme are capital intensive, capital income improves over time while land and labour income are reduced, with positive implications for urban households and negative implications for rural households due to the dependence of the latter on mostly land and labour income. As a result, urban poverty decreases in both the short and long run while rural poverty increases in both periods. The authors recommended that policies to improve the agriculture sector be implemented before or concurrently with trade liberalisation in order for it to have a pro-poor effect. This study has some similarity with the current research in that it uses a dynamic CGE framework to analyse the effects of ECOWAS trade liberalisation on poverty in Nigeria. However, it does not deal with the financing of the revenue shortfalls resulting from trade liberalisation and the impact of that on poverty, which the current study considers.

Mabugu and Chitiga (2007) utilized an aggregated 2000 SAM for the South African economy that has 10 sectors, 3 factors and 16 households and a

dynamic microsimulation computable general equilibrium model to investigate the effect of trade liberalisation on poverty for the period 2007 to 2020. Trade liberalisation has been simulated by a complete removal of all tariffs on imported goods and services, and by a combination of tariff removal and an increase of total factor productivity.

The main findings are that a complete tariff removal on imports has negative welfare and poverty reduction impacts in the short run which turns positive in the long term due to the accumulation effects. When the tariff removal simulation is combined with an increase of total factor productivity, the short and long run effects are both positive in terms of welfare and poverty reduction. To this effect, they suggested that measures such as skill training should be put in place so as to increase the chances that future tariff cuts generate substantial total factor productivity growth. The implication of this finding is that when trade liberalisation is accompanied by complementary policies, its welfare and poverty impacts increase. This study is instructive in so far as it stresses the need to complement trade liberalisation with pro-poor domestic policies. However, the current study will highlight alternative fiscal policies to compensate for tariff revenue lost as a result of trade liberalisation and the implications for poverty alleviation.

Lofgren et al, (1999) employed a dynamically recursive general equilibrium model to explore the impacts of the European Union agreement with Morocco for the period 1998 to 2012. The model included forty-five activities and four households. The model had a detail treatment of agricultural and rural economy in Morocco.

The authors performed 6 policy simulations. First, there was a gradual elimination of tariffs on industrial imports from the EU. The second simulation was tariff unification. Third, there was tariff unification plus non-tariff barriers cut. The fourth policy experiment was in the form of a tariff unification and reduction plus non-tariff barriers cut. The fifth simulation the authors performed involved a combination of simulation 4 and transfers to owners of rain fed agricultural resources in each period fully compensating for loss resulting from simulation 1. The final simulation was a combination of simulation 4 and augmenting the stock of rural skilled labour by 5 percent with the additional labour coming from the unskilled labour of rural households.

The results of the trade liberalisation scenarios indicate that tariff unification has small positive aggregate effects whereas the removal of non-tariff barriers has strong positive aggregate effects in that factor incomes and household welfare expand considerably more rapidly than for the base. However, trade liberalisation does not favour the rural poor, especially those in rain fed areas. When complementary domestic policies with a non-distorting transfer programme that fully compensates the owners of rain fed resources and skill upgrading for the rural labour force were introduced, the results indicated a marked improvement in the welfare of all household groups. The results show that if combined with complementary domestic policies, trade liberalisation can lead to a win-win outcome than if status-quo policies are followed. This study highlights the importance of complementary domestic policies in implementing trade reforms and so is in line with the

current study. However, this thesis will focus on the poverty implications of financing trade liberalisation within a recursive CGE model in Ghana.

Similarly, Feraboli, (2007) employed an intertemporal dynamic CGE model and SAM for 1998 to probe the effects of EU-Jordan Association Agreement (AA) on consumers' welfare and macroeconomic variables in Jordan. The model included 10 production sectors, and a representative household.

Three policy simulations were performed. In the first scenario, gradual tariff cuts on EU import goods were accompanied by a decrease in government transfers to households; the second experiment involved gradual reduction of tariff rates on EU import goods complemented by an upward adjustment of domestic income tax rate; and the third policy experiment involved gradual tariff cut on EU import goods followed by a decrease in government transfer and an increase by 10% in the Value Added Tax (VAT) rate.

The simulation results show that the implementation of the EU-Jordan Association Agreement raises consumer welfare and has positive effects on all macroeconomic variables in the long-run, but it reduces consumption in the short-run. The results further show that trade liberalisation and government counteracting actions affect negatively private consumption in the short run. This study is similar to the current study to the extent that it considers alternative fiscal policies to compensate for tariff revenue loss from trade liberalisation. However, this study considers only the welfare and not poverty

of household categories. The current research will cover the poverty impact of trade liberalisation accompanied by alternative fiscal policy reforms.

Bibi and Chatti (2006) explored the poverty impact of trade liberalisation in Tunisia using a recursive dynamic CGE (DCGE) model and microsimulation model. The DCGE was calibrated to the 1998 SAM of Tunisia and it had fourteen (14) production sectors, four (4) factors of production made up of unskilled labour, skilled labour, capital and land, and six (6) household categories.

The authors performed three policy simulations. The first simulation is an annual ten (10) percent decrease of all tariffs on non-agricultural imports for ten years, compensated for by an annual nine (9) percent increase of all consumption taxes until 2008 and after which the consumption taxes remained fixed for the rest of the simulation period. Second, simulation one is combined with an increase in total productivity. Third, removal of subsidies on agricultural goods and food processing over the period 1998 – 2015 and allocating the saved amount to increase both investments in education, health and infrastructure.

The results of the study indicated that trade liberalisation and food subsidy removal were not pro-poor in the short run, but were pro-poor in the long run. The study explores the role of trade liberalisation and complementary policies in poverty alleviation in Tunisia, but did not examine the contribution of each of the complementary policies to poverty alleviation. The current thesis will compare the contribution of a number of

complementary fiscal policies and make policy recommendations based on the findings.

In a related study, Bchir, Bibi, Boughzala, Chatti and Rajhi (2005) used a dynamic CGE model, which captures adequately the labour market (both formal and informal) and the financial sector and calibrated to 1998 SAM to explore the link among trade liberalisation combined with fiscal reforms on growth, employment and income distribution in Tunisia. The model had fourteen (14) production sectors and three factors of production – land, labour (skilled and unskilled) and capital.

The policy experiments performed by the authors include, first, ten percent tariff reduction on non-agricultural goods until complete tariff elimination in 2008 with lost government revenue compensated for by about seven percent increase in VAT. Second, ten percent tariff reduction on non-agricultural goods until complete tariff elimination in 2008 combined with an increase in total factor productivity; third, ten percent tariff reduction on non-agricultural goods until complete tariff elimination in 2008 combined with an increase in total factor productivity plus a gradual reduction in income taxes. Fourth, ten percent tariff reduction on non-agricultural goods until complete tariff elimination in 2008 combined with gradual decrease in corporate taxes. Fifth, ten percent tariff reduction on non-agricultural goods until complete tariff elimination in 2008 combined with reduction in food subsidies.

The results of the study indicated that technical progress increases growth, wages remain sticky in all scenarios, and skilled labour employment increases under fiscal regimes. The findings of the study further showed that

growth and wages were higher and unemployment lower and the size of the informal sector was smaller in the model without the financial sector than the one with the financial sector explicitly specified. While explicitly exploring the link among trade liberalisation and fiscal reforms on growth and employment, the study did not investigate the effects of these policies on poverty. This thesis will consider the poverty implications of trade liberalisation combined with fiscal reforms in Ghana.

Although all the nine studies reviewed so far used dynamic CGE models, the first four studies did not discuss the poverty implications of fiscal responses aimed at overcoming the loss in government revenue. Mabugu and Chitiga (2007) and Lofgren et al, (1999), on the other hand, considered increase in productivity and transfers in kind, respectively. It is instructive to note that in the few cases that domestic complementary policies were implemented as part of trade liberalisation, the impact on poverty was substantial. The only study among the lot that considers tax reforms to accompany trade liberalisation is Feraboli (2007). However, the author limited the discussion to household welfare and also did not separate the welfare effects of the Jordan-EU Association Agreement from those of the domestic fiscal reforms. The current research will contribute to the literature by using a dynamic CGE model with a microsimulation model to examine the poverty implications of trade liberalisation combined with domestic fiscal reforms.

Quite a number of studies have looked at trade liberalisation combined with tax policy reforms within the static CGE framework. One such study that used a static CGE model to study bilateral trade liberalisation with the US

with fiscal policy reforms, i. e. VAT and direct taxes (income tax), is by Wong, Arguello and Rivera (2008). The authors use the 2004 SAM of Ecuador, which has 27 sectors, two factors of production, labour and capital, and six categories of households identified by region.

The policy simulations carried out by the authors were, first, tariff elimination combined with adjustment in the VAT system. Three variants of this policy simulation were carried out; adjustment of the VAT rate while preserving its current structure; adjustment to the VAT rate, and eliminating current exemptions; adjustments to the VAT rate, using a flat rate for all goods and services. The second simulation was a combination of VAT rate adjustment while maintaining its current structure and an increase in indirect taxes. The third and final simulation was an increase in the direct tax rate to compensate for loss tariff revenue.

The results of the study indicate that adjusting VAT to make up revenue lost from trade liberalisation worsens household incomes and poverty, while compensating for revenue loss resulting from trade liberalisation using direct taxes improves household incomes and reduce poverty. The authors recommend that government should resort to direct taxes for making up tariff revenue losses so as to achieve pro-poor growth. The study is very insightful because it gives a clear indication of the impact on poverty of making up loss revenue from trade liberalisation with either VAT or income tax. The limitation of the study is that the model is static and so does not capture the dynamic effects of trade liberalisation on poverty. It is also important to stress that efficiency gains coming from capital reallocation in a post-trade shock are

expected to contribute to growth and have poverty reducing effects in the long run. This thesis will therefore adopt a long-term perspective so it can capture all these effects in accessing the poverty impacts of trade liberalisation and fiscal reforms in Ghana.

In a related study, Siddiqui, Kemal, Siddiqui and Kemal (2008) explored the short run and long run impacts of trade liberalisation on household incomes, welfare, and poverty under various fiscal scenarios in Pakistan. The authors used a static CGE model and a 1990 SAM with 10 households, 12 production activities, and two factors of production for their investigation.

Four simulations were carried out by the authors. These are (i) full trade liberalisation with sales tax adjustment; (ii) full trade liberalisation with income tax adjustment; (iii) partial trade liberalisation with sales tax adjustment; and (iv) partial trade liberalisation with sales tax adjustment combined with mobile capital.

The conclusion of the study is that trade reforms improves the average welfare of urban households, but reduces the welfare of rural households. In terms of poverty, tariff cuts reduce poverty in urban households except agriculture household groups, for which the depth and severity of poverty increase. On the contrary, in the rural areas poverty worsened in poorer households and decreases for richer households.

In the second simulation, trade liberalisation was accompanied by an increase in income tax. The rise in income tax of 6% caused a decline in disposable incomes of households and so the incidence of poverty increased,

while the gap and severity of poverty declined. A comparison of the results of simulation one and two shows that poverty declines more in urban areas and rises more in rural areas in simulation two than simulation one.

In the third policy exercise, partial trade liberalisation is accompanied by an increase in sales tax, which will cause domestic cost of production to rise. For this simulation, the results indicate that while urban poverty declined, rural poverty increased. In the final exercise, the authors implemented partial trade liberalisation with sales tax increase assuming capital is mobile (Long run). The results of the final simulation exercise show that poverty declined for all urban households, except employees and agricultural households, while it rises among poorer rural households, but decline among richer households in the rural areas.

The authors concluded that trade liberalisation is pro-rich in both urban and rural areas. The authors recommended the use of sales tax to compensate for trade tax revenue loss resulting from trade liberalisation because it had favourable impact on poverty. They argued against the use of trade liberalisation with direct tax (income tax) adjustment for the same purpose because it increases incidence of poverty, but reduces the depth and severity of poverty, due to the fact that income tax has a direct effect on poverty and income distribution.

Although the study examines the impact of trade liberalisation under various fiscal scenarios in the short run and in the long run, it does so using a static CGE model, thus missing out on the accumulation effects of a dynamic

CGE model. The dynamic effects of these policy simulations will be examined in this current study.

In another study, Siddiqui (2009) employed a gender-aware static CGE model to investigate the effects of revenue-neutral trade liberalisation on men and women in Pakistan. The model was calibrated to the 1990 SAM with twenty market sectors, capital and eight types of labour identified by gender and educational levels, and two households, urban and rural households, with urban households grouped by educational levels while rural households are grouped into female-headed households and male-headed households. The study measured household welfare using consumption of market goods only and consumption of both market and nonmarket goods. In addition, three measures of poverty were considered in the study. These measures are capability poverty, income poverty, and time poverty.

The policy simulation carried out was a fifty percent cut in the average tariff compensated by an endogenous adjustment in average domestic taxes by three percent so that government revenues remains constant. The results of the study indicated that revenue-neutral trade liberalisation increased women's employment in unskilled jobs and increased women's real wage income more than men's for all types of labour, but kept the division of labour biased against women. The results further showed that trade liberalisation adversely affected women in relatively poor households by increasing their workload, deteriorating capabilities, and increasing relative income poverty. However, the effects remained gender neutral or favoured women in the richest group of households.

The study highlights the importance of replacing lost government revenue on poverty, but the analysis is carried out in static framework and no comparison of fiscal policy instruments are made to arrive at the most poverty-friendly instrument. This thesis will explore these issues that have not been covered by the study under review.

Related to the above study is the one by Khondker, Mujeri and Raihan (2008). The authors employed a static CGE model to examine the impact of trade liberalisation on welfare and poverty in Bangladesh. The was calibrated to the 1995/96 SAM of Bangladesh and it had 26 production sectors, 7 factors of production – 6 different types of labour and 1 capital and 7 household categories.

The authors conducted three simulations. The first was complete elimination of tariffs combined with 55 % increase in production tax. The second simulation consisted of complete elimination of tariffs with the lost government revenue compensated for by 300 % increase in income tax. The third simulation was a reduction in tariffs with the lost government revenue compensated by imposition of new taxes on the construction sector.

The results of the study indicated that welfare losses were progressive for rural households but regressive for urban households in the first two simulations. The pattern was regressive among the urban households but it is inconclusive for the rural households. Rural poverty declined due to tariff-income tax reforms and tariff rationalization but worsened in the case of tariff-production tax reforms.

The study is in line with the current study in that it explores the combined effects of trade liberalisation and compensatory measures on poverty. However, this is carried out within a static CGE framework, thus making it impossible to capture the long term effects of these policies on poverty. The current study addresses this shortcoming.

Cattaneo, Hinojosa-Ojeda and Robinson (1999) used a static CGE model calibrated to the 1991 SAM of Costa Rica to investigate the impact of trade liberalisation under alternative fiscal policy options to compensate for loss tariff revenue on welfare and income distribution. There were 25 sectors in the model, 7 household types and one aggregate enterprise account.

The policy simulations conducted by the authors include, first, full trade liberalisation with fixed foreign savings; second, full trade liberalisation with flexible foreign savings; and third, partial trade liberalisation across the board. For the first two full trade liberalisation scenarios, the authors compensated for forgone tariff revenue by running a deficit, adjusting upwards the corporate tax and third, by an upward adjustment in the sales tax.

The results of the study show that trade liberalisation generates greater efficiency of production and higher levels of output and welfare. The results further indicate that trade liberalisation reduces government revenues and cutting government spending to balance the budget would have drastic consequences on efficiency, and welfare. The authors found sales taxes rather than capital taxes to be the most neutral fiscal instruments to raise government revenues. Yet the efficiency gains from trade liberalisation are reduced by the new distortions introduced to compensate for the loss in tariff revenue.

The study is similar to the current research in that it looked at compensating mechanism for lost tariff revenue and how these mechanisms affect efficiency and welfare. The current research, however, will consider trade liberalisation under alternative tax replacements mechanisms paying particular attention to their impact on poverty in Ghana within a dynamic CGE framework.

Wang and Zhai (1998) utilized a static CGE model and 1992 SAM of China to evaluate the efficiency and equality effects of trade liberalisation and government tax replacement policies. The model has twenty-two production sectors, twelve households and five primary factors of production. In all eighteen policy simulations were carried out by the authors.

The policy simulations included three tariff reducing scenarios, namely, reducing 1994 tariffs to the level of currently applied tariff schedules, a 50 percent cut in current tariff levels across all sectors, and introduction of a uniform tariff rate on all imports. Each of these three tariff reducing experiments were repeated using five taxes to replace lost government revenues from trade liberalisation. The taxes include a value-added tax on domestic products, a uniform sales tax on final demand, a corporate income tax, a progressive household income tax, and a lump-sum replacement tax that reduces government transfers to households. An additional simulation with no government tax replacement was also conducted for each of the tariff reducing scenarios. In all these experiments, government revenue was fixed in real terms and tax rates were adjusted endogenously.

The results of the study showed that trade liberalisation enhance both economic efficiency and income equality. All the three tariff-reducing scenarios reduce government tariff revenue significantly and any of the government tax replacement had an efficiency cost. However, among the four types of tax replacement policies, household income tax yielded the greatest increase in real absorption with the largest reduction in Gini coefficient for all three tariff-reducing scenarios. The result for corporate tax was similar to that of household income, but the reduction in inequality was much smaller. Value-added tax generated the lowest efficiency gains because it distorts production incentives.

The authors also found that aggregate welfare improved for all household categories under all the alternative government tax policies. The results of the study show that the choice of a government tax replacement policy matters in the trade-off between efficiency and equality. The model used is static, which does not allow for the accumulation effect of trade liberalisation. In addition, the study did not consider the poverty effects of trade liberalisation combined with any of the tax replacement policies. This thesis will capture the long effect of trade liberalisation combined with tax replacement policies as well as compare the results of the policy simulations to determine which one has the greatest impact on poverty.

Furthermore, Cororaton et al (2005) examined the impact of the Doha round and trade reforms on poverty in the Philippines, using a CGE model. Classification of households was based on location, education and occupation.

Five scenarios were simulated. The first experiment involved Doha-specified reductions in world and domestic tariff rates, export subsidies and domestic support and indirect tax as replacement tax. The second experiment consisted of free trade in the rest of the world (ROW) and in the Philippines, and indirect tax as replacement tax. The third experiment involved free trade in both the rest of the world (ROW) and in the Philippines and income tax as replacement tax. In the fourth experiment, the authors looked at ROW free trade, no domestic liberalisation and indirect tax as replacement tax. In the fifth and final experiment, the authors looked at full domestic liberalisation, no ROW trade reform, and indirect tax as replacement tax.

It was observed that poverty increased slightly with the implementation of the expected Doha agreement, especially among rural households and the agricultural self employed and unemployed. Full liberalisation involving ROW and domestic liberalisation with a compensatory indirect tax reduced the incidence of poverty marginally, but increased the poverty gap and poverty severity substantially. When an income tax is used instead of an indirect tax, poverty increased more in both rural and urban areas. The results further showed that whereas ROW liberalisation favoured rural households and actually increased urban poverty, domestic liberalisation favoured urban households, but was poverty-increasing in rural areas in the Philippines.

The findings of the study revealed that tax replacement policies matter in assessing the impact of trade liberalisation on poverty. However, the study was done using a static CGE framework. The current research will contribute

to the literature by using a dynamic CGE model to investigate the poverty implications of various tax replacement policies following trade liberalisation in Ghana.

In a related study Cororaton (2008) uses a static CGE model calibrated to the 1994 SAM of the Philippines to investigate the effect of trade reforms on welfare and poverty. The model had 12 production sectors, 12 households and four labour categories and capital. The policy exercises carried out include reducing tariffs to reflect the actual levels in the economy, setting all tariffs to zero and finally, setting all tariffs at 5 percent. All policy simulations were conducted to keep government revenue neutral.

The results of the study indicate that welfare rises and poverty decreases for all household groups except the poorest. Finally, urban households gained more from trade liberalisation than rural households. This study is related to this thesis in that it looks at the effect of trade liberalisation on poverty at the households. However, it uses a static CGE model and so it is unable to capital the long run effects of trade liberalisation on poverty. The current study will focus on the long run effect of trade liberalisation on poverty at the household level in Ghana.

Adjovi, Decaluwe and Robichaud (2008) used a static CGE model and household data to analyse the effects of complete abolition of import duties and institution of compensatory tax on commodities sold on the domestic market in Benin.

The results of the study indicated that total and unilateral elimination of import tariffs and the institution of a compensatory consumption tax

enhance the well-being of households in the urban areas than those in the rural areas. Moreover, the policy reforms reduced poverty in urban households, but contributed to worsening poverty conditions of the poorest people in rural areas. This study is similar to this research in that it uses a CGE model to investigate the effects of trade liberalisation on poverty in an African country. The difference, however, lies in the fact that Adjovi et al, (2008) used a static CGE model and so did not capture the growth effects of trade liberalisation on poverty in Benin. This current study will use a dynamic CGE model and so will be able to capture the growth effects of trade liberalisation on poverty in Ghana.

Another study that used the static CGE frame is that of Emini et al (2005). The authors calibrated the static CGE model to the 2001 SAM for Cameroon to investigate the impact of the Doha round on poverty. Four broad categories of production activities were considered in this study, namely, agriculture, industry, services and non agricultural. The classification of households was based on location, gender and poverty status. Three scenarios were considered, namely, complete elimination of import tariffs, first for the rest of the world and then Cameroon, and then in both the rest of the world and Cameroon. To compensate for lost tariff revenue, a neutral replacement tax, VAT and a uniform consumption tax were introduced.

The results indicated that elimination of import tariffs in the rest of the world strongly alleviated poverty, at least at the national level. Cameroon's unilateral trade liberalisation worsened poverty and inequality. When the multilateral trade liberalisation and Cameroon's unilateral trade liberalisation

were combined, the adverse impacts of the latter strongly outweighed the favourable outcomes of the former. Poverty worsened when an imperfect VAT was used instead of a neutral replacement tax to compensate for the lost tariff revenue, and got even worst when consumption tax was used.

The study is carried out within a static framework and so does not allow for the long run effects of trade liberalisation on growth and hence poverty to be captured. The current research will contribute to the literature by using a dynamic CGE model to analyse the poverty implications of financing trade liberalisation in Ghana.

Akapaiboon (2007) used an approach which links the results from a static CGE model to household survey data to investigate the effect of trade liberalisation on poverty and income distribution in Thailand. The CGE model was calibrated to the 1998 Thailand SAM with 15 production sectors, 3 factors of production and 3 household groups.

The author performed 4 policy simulations which included first, 50 percent tariff cut with flexible government saving; second, 50 percent tariff cut with fixed government saving; third, 100 percent tariff cut with flexible government saving; and finally, 100 percent tariff cut with fixed government saving.

The results of the study indicate that manufacturing output expands after trade liberalisation, while agricultural output declines. The results also suggest that poverty for all household groups declines after trade liberalisation.

This study is relevant to the current one in that it deals with the effect of trade liberalisation on poverty using a static CGE model. It is therefore, unable to account for the long run effects of trade liberalisation on poverty. This study will capture the long run impact of trade liberalisation on poverty in Ghana.

Aka (2003) used a CGE model to analyse the effects of fiscal adjustment required to compensate for the drop in fiscal receipt because of trade liberalisation and adoption of external common tariff in West Africa Economic and Monetary Union (WAEMU) countries on income distribution and poverty in Cote d'Ivoire. The author utilized an aggregated SAM with 3 tradable branches and a non-tradable branch, nine groups of households based on the 1998 survey data and 1993 Cote d'Ivoire national accounts.

Four simulations were carried out in this study; the first consisted of the elimination of taxes on agricultural exports; the second consisted of elimination of taxes on agricultural export goods combined with 20 percent increase in indirect taxes; the third simulation consisted of elimination of taxes on agricultural exports combined with elimination of taxes on imported goods and the fourth simulation was simulation 3 combined with an indirect taxation of 20 percent.

The results of the study revealed that the first two simulations led to more poor households than in the pre-shock situation, while simulations 3 and 4 resulted in reduction in poverty. This study is related to the current research in that it deals with trade liberalisation combined with alternative fiscal replacements and their impacts on poverty of different household categories.

However, the study uses a static CGE framework and so does not consider the growth effect of trade liberalisation on poverty. This current research will add to the literature by using a dynamic CGE model to study the impact of trade liberalisation on poverty in Ghana.

The rest of the studies that follow are static CGE-based studies that investigate the effect of trade liberalisation on poverty. One such study is by Nahar and Siriwardana (2009). The authors explored the poverty implications of trade liberalisation in Bangladesh using a 2000 SAM and a static CGE model. The model had 86 sectors and 3 factors of production, i. e. land, labour and capital. There were also 9 household groups identified by location. The policy experiment performed was a 100 percent tariff cut across the board.

The simulation results indicate that the complete removal of tariffs favour export-oriented sectors in the economy. With trade liberalisation, rural and urban areas experience an overall reduction in poverty in the short-run. However, a marginal increase in the poverty gap and severity of poverty for the urban area is projected, implying that the poor become poorer in urban areas. Moreover, poverty incidence varies among households. In the short-run, poverty incidence increase for rural landless and urban illiterates and low educated household groups. In contrast, the long-run results highlight that trade liberalisation reduces absolute poverty for all groups, both rural and urban areas. This study is related to my study to the extent that it looks at trade liberalisation and poverty. However, the authors used a static CGE model which does not capture the long run effects of the policy shock. A dynamic CGE model would have helped to capture all the effects of the policy on

poverty. In addition to that, the study did not consider the effects on poverty of any alternative fiscal policy to compensate for revenue loss coming from the complete removal of tariffs. This thesis will address all these issues.

Similarly, Chemingui and Thabet (2008) used a CGE and microsimulation model calibrated to 1996 SAM to examine the impacts of agriculture unilateral trade liberalisation and agricultural multilateral trade liberalisation on poverty in Tunisia. The model had 19 activities, 2 factors of production-labour and capital- and 1 representative household. The simulations that were performed were, first, cutting tariffs on manufactured imports from the EU. The second policy experiment was cutting tariffs on all imports from the EU. The third policy exercise was tariff reduction on imports from non-EU countries. Fourth, tariff reduction on imports from non-EU countries combined with a multilateral agricultural liberalisation.

The results of the simulations indicated that unilateral trade liberalisation reduces poverty significantly. Moreover, the combined effects of unilateral liberalisation and multilateral liberalisation are more pro-poor than the effect of unilateral liberalisation alone. This study highlights the impacts of unilateral and multilateral trade liberalisation with the EU on poverty in Tunisia using a static CGE model. The static nature of the model does not make it possible for the dynamic effects of trade liberalisation to be captured. The current study will use a dynamic CGE model to take care of the dynamic effects of trade liberalisation of poverty in Ghana.

Chan and Dung (2008) used a static CGE model calibrated to 1996 SAM of Vietnam to investigate the efficiency and distributional effects of

trade liberalisation in the context of fiscal reforms. The model had 10 household categories, 2 factors and 33 production sectors.

The simulation exercises conducted by the authors included first, reducing all tariffs to 5 percent and second, complete removal of tariffs combined with sales tax adjustment, VAT adjustment, corporate tax adjustment, and factor tax adjustment to keep government revenue neutral.

The results of the study indicated small gains from trade liberalisation for Vietnam as a whole, but with sharp redistributive effects against the poor. The social cost of raising additional funds through a corporate tax is negligible. This study is related to the current research in that it deals with trade liberalisation combined with tax reforms. However, the analysis is done within a static framework, thus not be able to capture the long run effects of tariff reduction on poverty. This issue will be taken up in this study.

In a related study, Chitiga and Mabugu (2005) used a static CGE model calibrated to SAM for Zimbabwe for 1995 to investigate the effects of trade liberalisation on income distribution and poverty in Zimbabwe. The SAM had 8 sectors and 5 household types.

The policy experiment carried out was an across the board removal of trade tariff. The results of the study indicated that incomes have increased for all household groups and that all poverty measures- incidence, depth and severity- reduced for all households, but more so for richer household types. In other words, the results showed increased income inequality among households even though overall poverty fell for all household groups.

The study used a static CGE model and so did not capture the growth effect of trade liberalisation. In addition, even though government income fell by about 18.48% no attempt was made to compensate for the loss in government income. In this current study, a dynamic CGE model will be used so as to capture the growth effects on poverty. Secondly, any loss in government income resulting from trade liberalisation will be compensated for and the poverty impact examined.

Yet another study by Aredo, Fekadu, and Workneh (2007) investigated the effect of trade liberalisation on poverty and inequality in Ethiopia using a CGE microsimulation model, a 2001/2002 SAM and the HICE survey of 1999/2000 covering 17332 households. The model had 10 production sectors, 10 factors of production and 3 households.

The main policy experiment was a total elimination of tariff. The results of the study indicate that a complete elimination of tariff increases poverty at the national level. Again, the study finds that while the welfare of farm households increases that of wage earners decreases, with no significant impact on the welfare of entrepreneurs. Finally, the study finds no significant effect of trade liberalisation on inequality.

Trade liberalisation has a long run effect on the economy but the study was limited to the short-run, thus the actual results may be either overestimated or underestimated. The study did not also examine how various compensatory measures used to make up the revenue loss from tariff cuts impact on poverty of household categories. The current thesis will consider the effects on household poverty of alternative fiscal policy to compensate for

tariff revenue loss from trade liberalisation and it will also adopt a long-run perspective.

In their studies, Sahn, Dorosh and Younger (1997), and Dorosh and Sahn, (2000) examined the impacts of trade and exchange rate liberalisation on income distribution and poverty in Cameroon, Gambia, Madagascar and Niger, using SAMS for the period 1989 – 93. The authors disaggregated households into the urban non-poor, urban poor, rural non-poor and the rural poor. Four simulations were carried out in this study: simulation one consisted of setting an implicit tariff on imports high enough to keep real exchange rate fixed. The second simulation was real exchange rate depreciation. The third was exchange rate depreciation and a reduction in government spending. The fourth simulation was maintaining government revenue through increased taxes. The finding of the studies indicates that trade and exchange rate liberalisation benefits poor households in urban and rural areas.

Bautista and Thomas (1997) also investigated the impacts of import liberalisation on poverty in Philippines using SAM for the period 1979. Five households were considered in this model – three were rural and the remaining two were urban. Experiments carried out in the study include import rationing, uniform surcharge on imports, tariff liberalisation, tariff reduction and 50% reduction in current account deficits. The results indicate favourable effects of import liberalisation on income and poverty in Philippines.

Mbabazi (2002) explored the short run welfare effects of trade liberalisation in Uganda using a static CGE model calibrated to a 1992 Ugandan SAM. There were 52 production sectors in the model, 2 factors of

production – labour and capital- and 10 household categories. The policy simulation carried out by the author was reduction in tariffs. The results of the study showed that the welfare effects of trade liberalisation are minimal and it accrues mainly to agricultural households. The findings also indicated that transfers and exchange rate movements are crucial in determining the differential impact of trade liberalisation on household welfare. This study incorporates household welfare effects and then highlights the role transfers and exchange rate movements play in determining the differential impact of trade liberalisation on household categories. The model is however, a static one which does not capture the growth effects of trade liberalisation and also does not explore the poverty effect of trade liberalisation as well as policies to keep government revenue constant.

Pradhan and Sahoo (2008) use a static CGE model to investigate the welfare and poverty effects of trade liberalisation in India. The model had 28 production activities, 3 factors of production made up of labour, land and non-land capital and 9 household categories based on the principal sources of income. The model is calibrated to the 1999 SAM for India.

Three policy simulations were carried out by the authors. These include the complete removal of import tariffs across board without any compensating mechanism regarding government revenue. The second simulation involved relaxing import quota on agriculture products. The third simulation involved the complete removal of import tariffs and an increase in uniform indirect tax rate on domestic demand to keep government revenue constant.

The results of the study indicate that general cut in import tariffs decreases overall welfare and increases poverty in India. Using indirect tax to keep government revenue constant increases overall poverty in India. Quota reduction on agriculture and food products results in a gain in welfare and a bigger reduction in poverty with rural households gaining more than urban households. This study uses a static model and so is not able to capture the dynamic effects of trade liberalisation on welfare and poverty. This current study will give much attention to the dynamic effects of trade liberalisation in Ghana.

In another study, Decaluwe, Patry, Savard, and Thorbecke (1999) used a Computable General Equilibrium (CGE) model of an archetype African developing economy to analyse the impact of a fall in the price of export crop and an import tariff on poverty and income distribution. The model considered six sectors, six categories of households, and five primary factors of production. The results show that the reductions in import tariffs are beneficial to the alleviation of social poverty. On the other hand, the three measures of poverty for the society rise with a decline in the world price of the country's export crop.

Konan and Maskus (2000) employed a static CGE model to analyse the effect on welfare of various trade liberalisation scenarios combined with domestic taxes to keep real government revenue fixed in Egypt. The model was calibrated to the 1990 SAM of Egypt. The factors of production in the model are labour and capital and there is only one representative household.

The policy simulations carried out by the authors are first, tariff unification; second, a free trade agreement with the EU; and third, unilateral free trade on a global basis. For each of these policy scenarios, the authors allowed distortionary domestic taxes, i. e. consumption tax, capital tax or lump-sum tax, to vary endogenously in order to keep real government revenue constant. Other policy experiments carried out by the authors include tax reforms, i. e. removal or unification of the consumption tax, capital tax, or both and a combined reform of domestic and trade taxes while replacing lost government revenue, separately, with consumption tax, capital tax, or lump-sum taxation. The welfare effects of the policy simulations were decomposed into effects from tax reform, trade reform, and their interaction.

The results of the study indicated that both the trade taxes and the domestic taxes are distortionary and that they interact in determining the efficiency costs of revenue-generating policies. A combined reform of trade policy and domestic taxes produced a better welfare effect than separate reform of trade policy or domestic taxes. The results further showed that welfare is more enhancing when forgone trade tax revenue is compensated with consumption tax than with capital tax. While this study explored the most welfare-enhancing tax to replace lost trade taxes, no attempt was made to examine the poverty implications of trade liberalisation combined with the tax replacement mechanism in the long run.

Rutherford, Tarr and Rutstrom (1997) used a static CGE model to analyse the effects of Morocco's free trade agreement with the EU on welfare. The model was calibrated to the 1980 SAM of Morocco. The model had 39

production sectors, two factors of production, labour and capital, and one representative household.

Six policy simulations were carried out by the authors. These policy experiments are, first, improved access for Moroccan fruits and vegetables in the EU; second, unilateral tariff reductions in Morocco against the EU alone without improved access to EU agricultural markets; third unilateral tariff reductions in Morocco against imports from the rest of the world alone without improved access to EU agricultural markets; fourth, unilateral tariff reductions in Morocco against imports from all trading partners without improved access to EU agricultural markets; fifth, cooperative tariff reductions with the EU, where on the EU side this implies extended market access for Moroccan fruit and vegetables; sixth, full trade liberalisation with the EU augmented by unilateral liberalisation of tariffs against rest of the world imports. Each of these simulations was performed assuming that the rate of VAT would be altered so that revenue to the government is kept constant.

The results indicated that full trade liberalisation with the world enhances welfare more than a free trade agreement with the EU. This study is similar to the current thesis in that it incorporated forgone revenue replacement taxes in the analysis, but did not explore the poverty impact of the tax replacement policy. Secondly, the analysis was carried out in a static framework, which does not allow for the growth effects of trade liberalisation on either welfare or poverty. The current thesis will address both issues.

Previous Computable General Equilibrium (CGE) analysis of Ghana's trade policy reforms have been carried out within the static framework with

all pointing to the fact trade liberalisation complemented with other policies can be used to alleviate poverty (Bhasin & Annim, 2005; Bhasin & Obeng, 2005a; 2005b; 2006).

In their study, Bhasin and Annim (2005) used a static CGE model calibrated to 1999 SAM of Ghana to analyse the effect of trade liberalisation combined with VAT on poverty. The model had 3 sectors, 2 factors of production and 5 household groups. Two policy experiment carried out by the authors are, first, a complete elimination of import taxes combined with an increase of VAT by 100 percent; and second, a complete elimination of export taxes accompanied by a 100 percent increase in VAT. The results of the study indicated that poverty levels of all household groups reduced under the first simulation, while household poverty increased for all household categories under simulation two.

In a related study, Bhasin and Obeng (2005a) used a static CGE model to study the impact of trade liberalisation combined with remittances on poverty in Ghana. The sectors considered in the study were agriculture, industry and services. The model had 2 factors of production, labour and capital and 5 household types.

The authors carried out two policy experiments. These simulations are, first, a complete elimination of import taxes combined with an increase in remittances; and second, a complete elimination of export taxes accompanied by an increase in remittances. The results of the study showed that the incidence of poverty, the depth of poverty and severity of poverty of all household groups reduced under the first simulation, while the incidence of

poverty, depth of poverty and severity of poverty increased for all household categories under simulation two.

Similarly, Bhasin and Obeng (2005b) employed a static CGE model to investigate the impact of trade liberalisation combined with increase in technology on poverty and income distribution in Ghana. There were two factors of production in the model, labour and capital; three sectors of production, agriculture, industry and services; and five household groups.

Two simulations were performed by the authors. These simulations are a 100 percent cut in import taxes combined with increase in technology and a 100 percent cut in export taxes accompanied by increase in technology. The results revealed that 100 percent cut in import taxes combined with increase in technology reduces poverty in Ghana, while a 100 percent cut in export taxes accompanied by increase in technology increases poverty in Ghana.

In yet another study, Bhasin and Obeng (2006) utilized a static CGE model to investigate the impact of trade liberalisation combined with increase in foreign borrowing on poverty and income distribution in Ghana. There were two factors of production in the model, labour and capital; three sectors of production, agriculture, industry and services; and five household groups.

Two simulations were performed by the authors. These simulations are elimination of import taxes combined with increase in foreign borrowing and elimination of export taxes accompanied by increase in foreign borrowing. The results of the study indicated that elimination of import taxes combined with increase in foreign borrowing reduced the incidence of poverty, depth of poverty and severity of poverty of all household groups, while elimination of

export taxes accompanied by increase in foreign borrowing increased the incidence of poverty, the depth of poverty and the severity of poverty of all household categories. The study results further showed that income distribution improved under the first simulation, but it worsened under the second simulation.

It is important to note that the last set of studies reviewed assumes a short-term perspective in which no changes in investment or the growth path of the economy can occur. But the more important gains from liberalisation come from dynamic gains, such as more efficient patterns of investment and technological diffusion. For all this reason, the studies are likely to significantly overstate liberalisation costs and understate its benefits, even for the poor. Over the medium term, changes in investment and economic growth can significantly exceed the negative distributional effects of changes in prices that result from trade liberalisation. Besides, these studies do not separate the poverty impacts of trade liberalisation from the poverty effects of the complementary policies to compensate for government revenue loss. To account for the limitations of the previous studies for Ghana and also contribute to the literature, this study proposes to use a dynamic CGE and microsimulation model to study the effects of trade liberalisation and accompanying revenue compensating policies on poverty in Ghana.

Dynamic CGE models used for empirical analysis of trade policy are of two types: intertemporal dynamic CGE models and sequential (or recursive) dynamic models. Intertemporal dynamic CGE models assume that economic agents have perfect foresight and so are solved at one go. The assumption of

perfect foresight makes intertemporal dynamic CGE models not suitable for a developing country like Ghana, where information is scarcely available (Annabi et al, 2005).

Recursive dynamic CGE models, on the other hand, assume that economic agents have myopic behaviour and so are solved one period at a time. In fact, a recursive dynamic CGE model is made up of a number of static models linked together by behavioural equations for both endogenous and exogenous variables such as capital, population, public expenditure, transfers, technological change and debt accumulation. The assumption of myopic behaviour of economic agents makes a recursive dynamic CGE model more applicable to the economic circumstances of Ghana. Therefore, this current thesis uses a dynamic recursive CGE model because it is able to capture the growth effect of trade liberalisation financing and also allows for the study of the transition path from one equilibrium condition to another following an exogenous policy shock (Annabi et al, 2005).

CHAPTER FOUR

METHODOLOGY

Introduction

This chapter presents the methodology used for the study and the order of presentation will be as follows: The first section will deal with the justification for the use of Computable General Equilibrium (CGE) model for this study and then followed by a presentation of the model. The rest of the chapter then will focus on the description of the data and the policy simulations that were carried out in the study.

Justification for the use of Computable General Equilibrium model

The link between trade liberalisation and poverty can be studied using several methods (McCulluch & Calandrino, 2001; Reimer, 2002). McCulluch and Calandrino (2001) have identified the descriptive or qualitative approach, the data-base approach and the modeling approach as the main empirical approaches used by various researchers in exploring the link between trade and poverty.

The descriptive approach mainly explores the historical patterns of implementation of trade policy and the evolution of the incidence of poverty over a period. The main advantage of this approach is that it helps to obtain a better understanding of the nature of the trade reform process and it

simultaneously allows the researchers to broadly appreciate the welfare status during the same period of interest. However, this approach does not provide any scientific evidence on the linkage of trade and poverty, nor does it allow us to test any theoretical hypothesis on this linkage.

The data-based approach in turn provides a much richer framework than the previous method by allowing researchers to empirically test theoretical hypothesis on this linkage based on empirical data. This approach is, however, constrained by the availability of data and also ignores some qualitative variables. Moreover, due to the backward looking nature of the analysis, it is difficult to use them for forward looking policy projections.

In the modeling approach, models are firmly grounded on theory are constructed. Furthermore, these models can be used to represent empirical realities by estimating parameters using actual data. The major advantage of this approach is the ability to conduct counterfactual analysis – analysis of what might have happened if an alternative policy had been implemented. Thus, this method would be used to generate forward looking policy projections, an invaluable tool for planning and policy analysis. Moreover, models provide policy makers with the flexibility to incorporate different types of linkages that exists between trade reforms and poverty.

McCulluch and Calandrino (2001) have further identified that the modeling approach consists of different types of models mainly based on the point of focus. For instance, they categorise models based on geographic focus – global multi-country or regional models, sectoral focus; models that incorporate single sector or multiple sectors; dynamic models – models that

allow investigation of the time path by which a new equilibrium is reached; and finally, a focus on household disaggregation –models with highly aggregated or disaggregated households. Reimer (2002) has also listed cross-country regressions, partial equilibrium / cost of living analysis, general equilibrium simulations and micro – macro synthesis as the main empirical approaches employed by researchers to study the trade and poverty link. However, these methods can fit perfectly into the data-based and modeling approaches identified by McCulluch and Calandrino (2001).

Empirical investigation of the relationship between trade and poverty has been a complex issue due to many reasons. These reasons range from measurement issues (Winters, 2002) to the fact that simultaneous impacts coming from various other policy measures and exogenous shocks cannot be isolated and finally, to the fact that there are many channels through which trade shocks are transmitted, both directly and indirectly, to households. The commonly identified channels are through factor payments, government transfers and product prices in the short to medium term, while adjustment to human capital accumulation and productivity would yield long term consequences (Winters, 2000a; 2000b; Agenor, 2002, and Banister & Thugge, 2001).

Despite the complexities, the majority of empirical studies attempting to investigate the trade and poverty link rely on the partial equilibrium analytical framework (See for example, Case, 2000; Minot & Goletti, 2000; Dercon; Dollar & Kraay, 2001; 2002 and Huang, Ninghui & Rozelle, 2003). The partial equilibrium framework, however, ignores the mutual relationship

between prices, output of various goods and factors. Thus, the partial equilibrium framework may be assumed to provide an incomplete picture of this complex transmission mechanism (Coxhead, 2003).

Hence, these complexities demand a better experimental design in order to isolate the trade shocks from numerous other policy induced or neutral shocks while tracing different channels through which this trade impulse transmission mechanism is operated.

The counterfactual analysis within a general equilibrium framework provides an ideal experimental setting to investigate this relationship. The general equilibrium framework not only allows analysts to capture the direct as well as the indirect interactions among different agents and markets, but also provides a convenient framework to carry out controlled policy experiments where the impact of trade reforms could be isolated from other shocks by fixing their impacts. The CGE models, the numerical counterparts of the well-known Walrasian general equilibrium analysis, are the most widely used general equilibrium analytical tool. For instance, Srinivasan and Whalley (1986) have noted:

> "The major feature of the numerical general equilibrium approach is its attempt to blend theory and policy so as both to improve the analytical foundations of policy evaluation work and to bring the theoretical work that already exists in the literature more fully into the policy debate" (p.4).

The CGE models, due to their capability of generating highly disaggregated micro level results while maintaining a consistent macro

framework, dominates the whole spectrum of counterfactual analytical approaches (Dervis, de Melo & Robinson, 1982; Adelman & Robinson, 1988; Taylor, 1990; De Janvry, Sadoulet & Fargix, 1991; and Bourguignon, de Melo, & Suwa, 1991)

A major criticism of CGE modeling, however, is that it is too theoretical, which often incorporates abstraction from the real workings of an economy. Other criticisms have been directed at the functional form of the model, the data base used to describe the initial equilibrium and the behavioural parameters – elasticities - used in the functional form (McDougall, 1993; Bianchi, 2004). On balance, the advantages exceed the disadvantages. In addition, the Dynamic computable general equilibrium (DCGE) model adapted for this study, to a very large extent, reflects the specific characteristics of the Ghanaian economy.

It is clear from the above analysis that the link between trade liberalisation and poverty is complex. Studying such a complex situation will require an estimation tool/technique that can capture all these linkages. The Computable General equilibrium (CGE) technique has been adopted for this study because it can capture all the complex channels of transmission between trade liberalisation and poverty.

Dynamic computable general equilibrium model

The DCGE model adopted in this thesis was developed by Breisinger, Diao and Thurlow (2009). It has as its origins the static CGE model developed at the International Food Policy Research Institute (IFPRI) and documented in

Lofgren, Harris and Robinson (2002). This class of model developed from the neoclassical modeling tradition originally presented in Dervis, de Melo and Robinson (1982).

The assumptions underlying the model are first, capital stock is formed endogenously by the model following a Tobin Q investment function. Second, both labour and land supply grows by a determined growth rate. Third, capital is fully employed in all sectors, whereas land is employed only in sub-sectors of agriculture. Fourth, certain amounts of labor are not employed, modeled by a Phillips curve determining the level of unemployment. Fifth, governmental consumption is determined by a fixed share from the GDP. Sixth, following the assumption of a small country, both world export and import prices are fixed. Finally, for the model closure, flexible exchange rate adjusts to the level of fixed foreign savings.

The model is recursive dynamic and so it is solved one period at a time through updating parameters such as investment spending and population growth rate to reflect changes that have taken place in the current period (see Appendix A for a complete mathematical specification of the model). The model is adopted to investigate the poverty implications of trade liberalisation in Ghana from 2005 to 2015. The choice of the study period is informed by the fact that the most recent comprehensive living standards survey data set for Ghana was completed in 2005 and 2015 is the year when the world is expected to cut the 1990's poverty levels in half.

A recursive dynamic CGE model can be separated into within-period and between-period components. The former describes a static single-period

model in which consumers and producers behave myopically without factoring future expectations into their current decision-making. The dynamics of the model involve updating the subsequent-period's parameters to reflect either changes that have taken place in the current period, such as investment spending, or exogenous changes in the economic environment, such as population growth.

The model represents a small open economy that has no influence on international markets and it is calibrated to the Social Accounting Matrix (SAM) of Ghana for the year 2005. The economy is assumed to have three production sectors, three factors of production and nine categories of households.

The mathematical specification of the core static model is presented first followed by the dynamics of the model. All variables and equations are shown in the appendix. The mathematical equations forming the static model are broken down into sections. Initially the production and price structure of the model is described, which includes the determination of import and export demand (Equations 1 to 25). Having generated incomes for the factors of production, the description shifts to determining the level of institutional incomes and consumption, as well as the remaining components of demand (Equations 26 to 34). The third and final block describes the equilibrium conditions imposed on the model (Equations 35 to 39). The remaining equations (40 to 45) govern the accumulation of capital, which is the endogenous component of the dynamic model.

Production is characterized by a two-level nesting structure and involves the combining of factors and intermediate inputs. Aggregate intermediate quantity and price are determined by a Leontief or 'fixed share' aggregation of individual intermediate commodities. This is shown in Equations 1 and 2, where the aggregate quantity of intermediates for an activity ($QINTA_a$) is composed of the fixed shares of the individual intermediate commodities used in that activity's production ($QINT_{ca}$).

$$QINT_{ca} = ica_{ca} \times QINTA_a \quad 1$$

$$PINTA_a = \sum_{c \in C} PQ_c \times ica_{ca} \quad 2$$

The use of fixed coefficients (ica_{ca}) (as opposed to allowing substitution between intermediates) follows from the assumption that the intermediate demands of a particular activity are predetermined by technology. Since intermediate commodities are purchased in the market, the aggregate price of the intermediate inputs ($PINTA_a$) for an activity is equal to the market price of each intermediate commodity (PQ_c) multiplied by its share (ica_{ca}) in total intermediate use. With the exception of nontraded goods, each intermediate commodity comes from domestic and foreign sources and, therefore, is treated as a composite input. Firms are able to substitute between domestic and foreign intermediate inputs through the constant elasticity of substitution (CES) function given by Equation 21.

Unlike the Leontief treatment of intermediates, factors are combined into a composite primary factor under a CES function as shown in equations 3 and 4, which combine the factor demands of an activity (QF_{fa}) into an aggregate quantity of value-added inputs for that activity (QVA_a).

$$QVA_a = \alpha_a^{va} \times \left(\sum_{f \in F} \delta_{fa}^{va} \times (\alpha_{fa}^{vaf} \times QF_{fa})^{-\rho_a^{va}} \right)^{\frac{1}{\rho_a^{va}}} \quad 3$$

$$W_f \times \overline{WFDIST_{fa}} = PVA_a \times QVA_a \times \left(\sum_{f \in F} \delta_{fa}^{va} \times (\alpha_{fa}^{vaf} \times QF_{fa})^{-\rho_a^{va}} \right)^{-1} \times \delta_{fa}^{va} \times (\alpha_{fa}^{vaf})^{-\rho_a^{va}} \times (QF_{fa})^{-\rho_a^{va}-1} \quad 4$$

This allows for substitution between factors when determining composite factor inputs. Interfactor substitutability increases when the value of ρ_a^{va} (which is a transformation of the elasticity of factor substitution) is reduced. An activity's factor demand is driven by cost-minimization based on the relative prices of factors, such that their marginal revenue product equals their marginal cost. The marginal cost of the composite factor at the top of the factor demand nest for each sector is equal to its marginal revenue product, where marginal cost is the economy-wide average wage (W_f) multiplied by a sector-specific distortion term ($WFDIST_{fa}$). Total factor productivity (TFP) is reflected by α_a^{va} and factor-specific productivity by α_{fa}^{vaf}.

Demand for individual factors at lower levels of the nested demand system is given in Equations 5 and 6, where the latter is the first-order condition.

$$QF_{fa} = \alpha_{fa}^{van} \times \left[\sum_{f' \in F} \delta_{ff'a}^{van} \times QF_{f'a}^{-\rho_{fa}^{van}} \right]^{\frac{1}{\rho_{fa}^{van}}} \quad 5$$

$$W_{f'} \times WFDIST_{f'a} = W_f \times WFDIST_{fa} \times QF_{fa} \times \left[\sum_{f' \in F} \delta_{ff'a}^{va} \times QF_{f'a}^{-\rho_{fa}^{van}} \right]^{-1} \times \delta_{ff'a}^{van} \times QF_{f'a}^{\rho_{fa}^{van}-1} \quad 6$$

In these equations f' and f'' are the lower-level factors. Demand for an individual factor f' in a given level of the nested structure is driven by cost-minimization based on the relative prices of all factors f'' both at the same level and with substitution possibilities with f'. Substitution possibilities are determined by ρ_{fa}^{van}, which is a transformation of the elasticity of factor substitution.

The composite factor quantities and aggregate intermediate quantities are combined under a Leontief specification (Equations 7 and 8) to arrive at a final level of output for each activity (QA_a).

$$QVA_a = iva_a \text{ x } QA_a \qquad 7$$

$$QINTA_a = \text{int}\, a_a \times QA_a \qquad 8$$

This production function is strongly separable, since the composite primary factor cannot be substituted for the aggregate intermediate, nor can intermediates of one sector be substituted for intermediates of another. This additive separability can be seen in equation 9 where the aggregate price of one unit of output from each activity (PA_a) is calculated as the weighted sum of factor and intermediate prices exclusive of producer taxes (ta_a).

$$PA_a \text{ x } (1 - ta_a) \text{x } QA_a = PVA_a \text{ x } QVA_a + PINTA_a \text{ x } QINTA_a \qquad 9$$

Since each activity can produce more than a single commodity, equations 10 and 11 convert each activity's output and price into a commodity output ($QXAC_{ac}$) and price ($PXAC_{ac}$) based on fixed shares (θ_{ac}).

$$QXAC_{ac} = \theta_{ac} \text{ x } QA_a \qquad 10$$

$$PXAC_{ac} = \sum_{c \in C} \text{ x } PXAC_{ac} \text{ x } \theta_{ac} \qquad 11$$

Conversely, since each commodity can be produced by more than one activity, it is necessary to combine these commodities from their various sources. Although it is assumed that an activity's production of commodities is fixed by technology, it is assumed that demanders of a commodity are relatively indifferent to which activity produced the final commodity. As such, the aggregation of commodities across activities is governed by imperfect substitution or a CES function. Equations 12 and 13 show the CES aggregation function and its first-order conditions. In these equations output from each activity ($QXAC_{a\ c}$) is combined across activities to form a composite commodity output (QX_c). Similarly the composite output's price (PX_c) is the aggregation of each activity's commodity price ($PXAC_{a\ c}$).

The output of each commodity is then distributed across domestic and foreign markets. Under the small-country assumption, the price of an exported commodity, shown in equation 14, is equal to the commodity's world export price (pwe_c) multiplied by the exchange rate (EXR).

$$PE_{cr} = pwe_{cr} \text{ x } EXR - \sum_{c' \in CT} \text{x } PQ_c \text{ x } ice_c \qquad 14$$

Furthermore, since the export price represents the amount received by producers per unit sold abroad, the transaction costs per unit of output are removed from this price. This is equal to the share of transaction costs per commodity unit (ice_c) times the market price at which these transaction commodities are sold (PQ_c).

For commodities sold both domestically and abroad, equations 15 and 16 represent the constant elasticity of transformation (CET) function

determining the quantity and price of exported and domestically sold commodities.

$$QX_c = \alpha_c^t \text{ x } \left(\sum_\tau \delta_{cr}^t \text{ x } QE_{cr}^{\rho_c^t} + (1 - \sum_\tau \delta_{cr}^t) \text{ x } QD_c^{\rho_c^t} \right)^{\frac{1}{\rho_c^t}} \quad 15$$

$$\frac{QE_{cr}}{QD_c} = \left(\frac{PE_{cr}}{PD_c} \text{ x } \frac{1 - \sum_\tau \delta_{cr}^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t - 1}} \quad 16$$

These equations represent the ease at which producers are able to substitute production between the two markets. Domestic and foreign commodities become more homogenous as the elasticity of transformation increases towards infinity. This imperfect substitution reflects the view that a producer can shift small amounts of resources between production for the domestic and foreign markets without any loss of productive efficiency. However larger shifts in production towards a different market will require the use of factors that are less efficient. Thus the CET is concave and the final allocation of a given output is determined by the relative domestic and export prices.

Some commodities are produced solely for the domestic or foreign market. Equation 17 allocates production (QX_c) to one of these markets.

$$QX_c = QD_c + \sum_\tau QE_{cr} \quad 17$$

In such cases either the quantity of goods supplied to the domestic market (QD_c) or the quantity exported (QE_c) is zero. In Equation 18, the value of output (PX_c x QX_c) must be equal to either the value of exports (PE_c x QE_e) or the value of domestic sales (PDS_c x QD_c), where PDS_c is the domestic supply price. In Equation 19 the domestic supply price of a commodity (PDS_c) is

converted into the demand price of a domestically produced commodity (PDD_c) by incorporating domestic marketing and trade margins. These are calculated by multiplying a commodity's transactions cost share ($icd_{c'c}$) by the market price at which the transactions commodities are sold ($PQ_{c'}$).

The demand for a commodity can either be satisfied by domestic or foreign supply. The price of an imported commodity (PM_c), shown in equation 20, is equal to the commodity's world import price (pwm_c) multiplied by the exchange rate (EXR) and any import tariffs (tm_c).

$$PM_{cr} = pwm_{cr} \times (1 + tm_{cr}) \times EXR + \sum_{c' \in CT} PQ_{c'} \times icm_{c'c} \qquad 20$$

Any additional transactions costs are added, and are equal to the share of these costs per commodity unit (icm_c) multiplied by the market price of these transaction commodities (PQ_c).

For those commodities that have both domestic and foreign supply, Equations 21 and 22 represent the constant elasticity of substitution (CES) or Armington function determining the final quantity and price of imported ($c\,QM$) and domestically supplied ($c\,QD$) commodities.

$$QQ_c = \alpha_c^q \times \left(\sum_r \delta_{cr}^q \times QM_{cr}^{-\rho_c^q} (1 - \sum_r \delta_{cr}^q) \times QD_c^{-\rho_c^q} \right)^{-\frac{1}{\rho_c^q}} \qquad 21$$

$$\frac{QM_{cr}}{QD_c} = \left(\frac{PD_c}{PM_c} \times \frac{\delta_c^q}{1 - \sum_r \delta_{cr}^q} \right)^{\frac{1}{1+\rho_c^q}} \qquad 22$$

These two commodities are combined to form a composite commodity ($QQ\,c$) that is then supplied to the market. The elasticity of substitution, which is a

transformation of ρ_c^q, represents the ease at which consumers are willing to shift demand between domestic and foreign products.

Equation 24 is the total value of absorption or, alternatively, the total spending on a commodity at demander prices.

$$PQ_c \times (1 - tq_c) \times QQ_c = PD_c \times QD_c + \sum_{\tau} PM_{c\tau} \times QM_{c\tau} \qquad 24$$

The value of absorption is composed of the final composite commodity's price exclusive of sales taxes ($PQ_{cc} \times (1 - tq)$) multiplied by the quantity of the composite ($QQ\ c$). Except for those commodities that are solely exported, this value of absorption is equal to the sum of the value of domestic ($PDD_{cc} \times QD$) and foreign supply ($PM\ c\ c \times QM$). The composite commodity is supplied to the domestic market and is purchased at market prices (PQ_c) to satisfy intermediate ($QINT_{c,a}$), household ($QH_{c,h}$), government (QG_c), and investment ($QINV_c$) demand.

The final production and price equation (25) calculates consumer price index. The consumer price index (CPI) is equal to the weighted sum of the market price of each commodity ($c\ PQ$), where the weight ($cwts_c$) is the share of each commodity in the household consumption basket.

$$cpi = \sum_{c \in C} PQ_c \times cwts_c \qquad 25$$

The consumer price index is used as the numéraire in the model. The model is homogenous of degree zero in prices, since a doubling of the numéraire will leave relative prices and, hence, the real allocation of resources, unchanged.

The equations have so far defined the production and price structure of the model. The next block of equations determines the generation of

institutional incomes and how this in turn generates demand for commodities. The model distinguishes between a number of institutions including enterprises, households, and the government. Factor employment in the production process generates factor incomes as shown in Equation 26.

$$YF_f = \sum_{a \in A} WF_f \text{ x } wfdist_{fa} \text{ x } QF_{fa} \quad 26$$

Total income for each factor (YF_f) is equal to its economy-wide wage (WF_f) multiplied by both the quantity employed (QF_{fa}) in each activity and its sector-specific wage distortion term ($WFDIST_{fa}$). Factor incomes are then either transferred to domestic institutions or to the rest of the world. Equation 27 shows how foreign factor remittances measured in domestic prices ($trnsfr_{rowf}$ X EXR) are removed from factor incomes, before the remaining income is distributed across domestic institutions based on fixed shares ($shif_{if}$) to arrive at a total value of factor income for each institution (YIF_{if}).

$$YIF_{if} = shif_{if} \text{ x } \left[YF_f - trnsfr_{rowf} \times EXR \right] \quad 27$$

Direct payments from factors (YIF_{if}) only form part of the total income (YI_i) earned by domestic nongovernment institutions. As shown in equation 27, other income sources include transfers received from other institutions ($TRII_{ii'}$), CPI-indexed transfers from the government ($trnsfr_{igov}$ x CPI), and domestically-valued transfers from the rest of the world ($trnsfr_{irow}$ X EXR).

$$YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in INSDNG'} TRII_{ii'} + trnsfr_{igov} \text{ x } cpi + trnsfr_{irow} \text{ x } EXR \quad 28$$

$$TRII_{ii'} = shii_{ii'} \text{ x } (1 - mps_{i'}) \text{ x } (1 - tins_h) \text{ x } YI_{i'} \quad 29$$

Domestic nongovernment institutions make transfers to other institutions ($TRII_{i\,i'}$) in Equation 29. For example, households make transfers to each other, and enterprises transfer dividend income (or indirect capital income) to households. The value of these transfers is a fixed share ($shii_{i\,i'}$) of the institution's income ($YI_{i'}$) after paying taxes ($tins_h$) and savings ($MPS_{i'}$).

Having determined households' income, equation 30 calculates the amount of income available for consumption spending ($EH\,h$).

$$EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih}\right) \text{x} \, (1 - mps_h) \, \text{x} \, (1 - tins_h) \, \text{x} \, YI_h \qquad 30$$

This is equal to total household income less payments for direct taxes ($tins_h$), savings (MPS_h), and the share of income transferred to other institutions ($shii_{i\,h}$). Households maximize a Stone-Geary utility function subject to a budget constraint. The resulting first-order condition is referred to as a Linear Expenditure System (LES) since spending on individual commodities ($QH_{c\,h}$) is a linear function of total spending (EH_h). Total household expenditure is distributed across commodities in equation 31.

$$PQ_c \, \text{x} \, QH_{ch} = PQ_c \, \text{x} \, \gamma^m_{ch} + \beta^m_{ch} \, \text{x} \left(EH_h - \sum_{c' \in C} PQ_{c'} \, \text{x} \, \gamma^m_{c'h} \right) \qquad 31$$

A portion of consumption for each commodity ($PQ_c \times \gamma^m_{ch}$) is treated as independent of the level of disposable income available for consumption spending. The remaining income is then distributed across commodities according to fixed shares (β^m_{ch}). Household utility is weakly separable since domestic and foreign commodities are imperfectly substitutable. Together with the linear homogeneity of the LES demand system, this implies that the

consumers' decisions can be decomposed into 'two-stage budgeting'. At the first stage consumers maximize the Stone-Geary utility function of composite commodities subject to a given level of income and composite prices. At the second stage consumers maximize the subutility functions subject to the expenditure allocated to each commodity in the first decision stage.

Fixed investment demand ($QINV_c$) across commodities is defined in equation 32 as the base-year quantity ($qinv_c$) multiplied by an adjustment factor ($IADJ$).

$$QINV_c = IADJ \times qinv_c \qquad 32$$

By using an adjustment factor, which has a value of one in the base, the assumption is that the commodity composition of the investment bundle remains unchanged as the level of investment adjusts. Another component of final demand is government consumption spending (Equation 33).

$$EG = \sum_{c \in C} PQ_c \times qg_c + \sum_{i \in INSDNG} trnsfr_{igov} \times cpi \qquad 33$$

This is treated in the same way as investment demand. Base-year government spending on commodities (qg_c) is multiplied by an adjustment factor ($GADJ$) to arrive at a final level of spending on each commodity (QG_c). The total value of total government spending (EG) is equal to the market value of government consumption spending ($PQ_c \times QG_c$), as well as CPI-indexed transfers to other institutions ($trnsfr_{igov} \times CPI$).

Government expenditure is financed by government revenue (YG).

$$YG = \sum_{i \in INSDNG} tins_i \times YI_i + \sum_{f \in F} tf_f \times YF_f$$

$$+ \sum_{a \in A} tva_a \times PVA_a \times QVA_a + \sum_{a \in A} ta_a PA_a \times QA_a + \sum_{c \in CMNR} tm_c \times pwm_c \times QM_c \times EXR$$

$$+\sum_{c\in CE} te_c \text{ x } pwe_c \text{ x } QE_e\text{EXR} + \sum_{c\in C} tq_c \text{x } PQ_c \text{ x } QQ_c + \sum_{f\in F} YF_{govf} + trnsfr_{govrow} \text{ x } EXR$$

34

As shown in equation 34, income-sources include direct taxes ($tins_i$), activity taxes (ta_a), import tariffs (tm_c), export tariffs (te_c) sales taxes (tq_c), factor income ($YF_{gov\,f}$), and transfers received from the rest of the world ($trnsfr_{gov\,row}$). Depending on changes in government spending, changes in revenues and the deficit can therefore affect the level of investment or savings in the economy by influencing the availability of loanable funds. The extent to which this is possible depends on the adjustment mechanisms in the economy.

The third block of equations describes system constraints and model closures. These equilibrium constraints embody assumptions or 'closure rules' determining how the macro-economy and commodity and factor markets work. Equilibrium exists in the commodity market if total demand equals total supply for each commodity. Equation 35 shows how total supply for the composite commodity (QQ_c) has to equal the sum of intermediate demand ($QINT_{c\,a}$), household consumption ($QH_{c\,h}$), government consumption (QG_c), investment demand ($QINV_c$), and changes in inventories ($qdst_c$). Inventory demand is treated as exogenous in the model and remains fixed at base-year values.

$$QQ_c = \sum_{a\in A} QINT_{ac} + \sum_{h\in H} QH_{ch} + qg_c + QINV_c + qdst_c \qquad 35$$

Factor market equilibrium, as shown in Equation 36, implies that the sum of factor demands across all activities ($QF_{f\,a}$) must equal the total supply of that factor (QFS_f).

$$\sum_{a \in A} QF_{fa} = QFS_f \qquad 36$$

Three closures are possible for each factor in the model: (i) factors are mobile across sectors but total supply is fixed; (ii) factor supply is fixed and factors are immobile across sectors; or (iii) factor supply is perfectly elastic at a fixed real wage. Capital supply is determined dynamically (described below) but is immobile across sectors within a given time period, thus reflecting short run constraints.

Macroeconomic closures affect the government balance, the current account balance, and the workings of savings and investment in the economy. The government balance is shown in Equation 37.

$$YG = EG + GSAV \qquad 37$$

Here total government income (YG) is equal to total government spending (EG) and government savings ($GSAV$). If the government budget is in deficit, then the value of government savings is negative (i.e., the government is borrowing or dis-saving). Three variables embodied in the government account are relevant to its macroeconomic closure. These include government savings, the level of government spending, and the level of government income from the direct taxation of domestic institutions. One of these three variables must be held constant in order for equation 37 to be defined. In this model the direct tax rates imposed on domestic nongovernment institutions are held fixed thus assuming that the government is constrained in raising taxes to cover additional public spending.

The current account balance is defined in equation 38. The outflow of foreign currency is shown on the left hand side as the sum of import spending

(pwm_c x QM_c) and transfers paid to the rest of the world ($trnsfr_{row\,f}$), both of which are measured in foreign currency.

$$\sum_{cr \in CMNR} pwm_{cr} \times QM_{cr} = \sum_{cr \in CENR} pwe_{cr} \times QE_{cr} + \sum_{i \in INSD} trnsfr_{irow} + fsav \quad 38$$

In equilibrium this outflow must be matched by an inflow of currency. Total inflows include earnings from exports ($pwe_{c\,c}$ x QE), transfers received from the rest of the world ($trnsfr_{i\,row}$), and total foreign savings or borrowing ($FSAV$). In order for current account equilibrium to be defined either the level of foreign borrowing ($FSAV$) or the exchange rate (EXR) must be held fixed. In this model the level of foreign savings is fixed, thus assuming that the country cannot borrow to finance additional spending.

The final macroeconomic account reflects the balance between savings and investment.

$$\sum_{i \in INSDNG} mps_i \times (1 - \overline{tins_i}) \times YI_i + GSAV + EXR \times fsav = \sum_{c \in C} PQ_c \times QINV_c + \sum_{c \in C} PQ_c \times qdst_c$$

39

In equation 39, total savings is the sum of private savings from post-tax disposable income ($MPS_i\ X\ (\ 1 - tins_i\ )\ X\ YI$), government savings ($GSAV$), and foreign savings (EXR X $FSAV$). In equilibrium this must equal the combined value of fixed investment (PQ_c X $QINV_c$) and inventory investment (PQ_c X $qdst_c$). Macroeconomic closure of this account implies that either investment is savings-driven (with MPS_i fixed), or savings is investment-driven (with $IADJ$ fixed). In this model a savings-driven investment closure is adopted in which investment adjusts endogenously to the availability of loanable funds.

The description so far has outlined a static version of the CGE model, while the remainder of this section describes the dynamic extension of the model. A number of exogenous and endogenous changes take place over time and are important for capturing the growth process. Together these changes form a projected or counterfactual growth path for the economy. These interperiod adjustments include population and labor force growth, capital accumulation, factor productivity changes, and changes in foreign capital inflows and government expenditure. Population growth is assumed to enter the model through its direct and positive effect on the level of private consumption spending. As shown in equation 31, each representative household consumes commodities under a Linear Expenditure System (LES) of demand. This system allows for an income-independent level of consumption ($PQ_c \times \gamma_{ch}^m$) measured as the market value of each household's consumption of each commodity that is unaffected by changes in disposable income. The remaining terms in equation 31 determine the level of additional consumption demand that adjusts with changes in income. During the dynamic updating process and as the population grows, the level of each household's consumption of a particular commodity is adjusted upwards to account for greater consumption demand. This is achieved by increasing the quantity of income-independent demand (γ_{ch}^m) at the rate of population growth.

The method of updating the relevant parameters to reflect changes in land and labor supply in the current model depends on the factor market closure chosen. Since land and labor supply is fixed under full employment, total land and labor supply (QFS_f in Equation 45) are adjusted upwards each

year in the models to reflect exogenously-determined estimates of land and labor force growth. This specification allows for other exogenous demographic factors to be taken into account, which the model would otherwise be unable to capture. Unlike labor supply all changes in total capital supply are endogenous in the dynamic model. In a given time period the total available capital is determined by the previous period's capital stock and investment spending. However, what remains to be decided is how the new capital stock resulting from previous investment is to be allocated across sectors. An extreme specification of the model would allocate investment in proportion to each sector's share in aggregate capital income or profits. However, in the current dynamic model, these proportions are adjusted by the ratio of each sector's profit rate to the average profit rate for the economy as a whole. Sectors with a higher-than average profit rate receive a larger share of investment than their share in aggregate profits. This updating process involves four steps captured in equations 40 to 45.

$$AWF_{fl}^{a} = \sum_{a}\left[\left(\frac{QF_{fat}}{\sum_{a'} QF_{fa't}}\right) \text{x } WF_{fl} \text{ x } wfdist_{fat}\right] \quad 40$$

$$\eta_{fat}^{a} = \left(\frac{QF_{fat}}{\sum_{a'} QF_{fa't}}\right) \text{x } \left(\beta^{a}\left[\frac{WF_{fl} \times wfdist_{fat}}{AWF_{fl}^{a}} - 1\right] + 1\right) \quad 41$$

$$\Delta K_{fat}^{a} = \eta_{fat}^{a} \text{ x } \left(\frac{\sum_{c} PQ_{ct} \text{ x } qinv_{ct}}{PK_{fl}}\right) \quad 42$$

$$PK_{ft} = \sum_{c} PQ_{ct} \times \frac{qinv_{ct}}{\sum_{c'} qinv_{c't}} \quad 43$$

$$QF_{fat+1} = QF_{fat} \times \left(1 + \frac{\Delta K^{a}_{fat}}{QF_{fat}} - vf\right) \quad 44$$

$$QFS_{ft+1} = QFS_{ft} \times \left(1 + \frac{\sum_{a} K_{fat}}{QFS_{ft}} - vf\right) \quad 45$$

Equation 40 describes the first step at which the average economy-wide rental rate of capital (AWF_{aft}) is calculated for time period t. This is equal to the sum of the rental rates of each sector weighted by the sector's share of total capital factor demand. In the second step (equation 41) each sector's share of the new capital investment (η^{a}_{fat}) is calculated by comparing its rental rate to the economy-wide average. For those sectors with above average rental rates, the second term on the right-hand side of Equation 41 will be greater than one. The converse would be true for sectors with rental rates that are below average. This term is then multiplied by the existing share of capital stock to arrive at a sectoral distribution for new capital. The intersectoral mobility of investment is indicated by β^{a}. In the extreme case where β^{a} is zero there is no intersectoral mobility of investment funds, and all investment can be thought of as being funded by retained profits. Equation 42 shows the third step of the updating procedure in which the quantity of new capital is calculated as the value of gross fixed capital formation divided by the price of capital (PK_{ft}). This is then multiplied by each sector's share of new capital (η^{a}_{fat}) to arrive at a final quantity allocated to each sector (ΔK^{a}_{fat}). The determination of the unit capital price is shown in Equation 43. In the final

step the new aggregate quantity of capital ($QFS_{f\ t+1}$) and the sectoral quantities of capital ($QF_{f\ a\ t+1}$) are adjusted from their previous levels to include new additions to the capital stock. Over and above these changes there is also a loss of capital to account for depreciation (υf).

Along with changes in factor supply, the dynamic model also considers changes in factor productivity. This is done by multiplying either the α_a^{va} parameter in equation 4 by the percentage change in total factor productivity (TFP), or α_{fa}^{vaf} in the case of factor-specific productivity. Finally, government consumption spending and transfers to households, as well as foreign transfers, are fixed in real terms within a particular period it is necessary to exogenously increase these payments between periods. This is done by increasing the value of qg_c in equation 33 for government consumption spending, $trnsfr_{i\ gov}$ in equation 33 for government transfers to households, and $trnsfr_{i\ row}$ in equation 38 for foreign transfers.

Finally, the model is linked to a household expenditure survey by taking endogenous changes in commodity consumption from each aggregate household and adjusting the level of expenditure for the corresponding disaggregated households in the survey. As the data used to calibrate the model (that is, social accounting matrix) is constructed using the survey data, there is a direct mapping between commodities and households in the model and survey. Therefore changes in $QH_{c\ h}$ from equation 31 (measured in base year prices) are used to update household expenditure in the survey. Standard poverty measures (including the poverty-growth elasticity) are then

recalculated using the updated expenditure estimates and the unchanged poverty line.

Data sources

The main source of data for this thesis is the 2005 Social Accounting Matrix (SAM) of Ghana. The SAM reflects a snapshot of all the goods and services that have been produced and the flow of incomes and expenditures in Ghana for the year 2005. It also captures inflow of resources from the rest of the world to Ghana as well as payments from Ghana to the rest of the world. The SAM also contains detailed information on the demand and production structure of 59 sectors, made up of 27 agricultural sub-sectors, 22 industrial sub-sectors and 10 service sub-sectors. There is also information on three factors of production (land, labour and capital) and the incomes and expenditures of nine household categories. Finally, the SAM contains information on the sources of government revenue and expenditure.

The SAM was constructed from a wide range of data sources. In building the SAM, use was made of the national accounts provided by the Ghana Statistical services (GSS), Crop and livestock data supplied by the Ministry of Food and Agriculture (MOFA), mining, manufacturing and energy sector data from the 2003 Industrial census (GSS), households income and consumption data from 2005/06 Ghana Living Standards survey (GLSS5), and export and import data at the commodity-level provided by the Bank of Ghana, MOFA and GSS.

Policy simulations

To achieve the objectives of the thesis set out in chapter one, the following policy experiments were carried out to investigate the poverty implications of trade liberalisation financing in Ghana:

1. 100 percent cut in import tariff, otherwise called trade liberalisation. Theoretically, complete removal of import tariff will ensure maximum welfare.

2. Trade liberalisation combined with 31 percent increase in value added tax rate. To compensate for the 4.3 percent reduction in government revenue (Refer to Table 16) resulting from complete removal of import tariffs, various percentage increases in the VAT rate over the current rate of 15 percent were tried and 31 percent was found to be the percentage increase in the VAT rate that will keep government revenue constant in the short run.

3. Trade liberalisation combined with 50 percent upward adjustment in corporate tax rate. In this simulation exercise, several percentage increases of the corporate tax rate of 25 percent were tried and 50 percentage increase was found to keep government revenue at the level before the complete removal of import tariffs in the short run.

4. Trade liberalisation combined with 40 percent upward adjustment in income tax. Complete removal of import tariffs leads to 4.30 percent decrease in government revenue in the short run. To make up for the lost in government revenue, various percentage increases of the household income tax rate of 3.5 percent (calculated from the SAM as government household income tax revenue divided by household income multiplied by 100) were tried. By

increasing the income tax rate by 40 percent government revenue in the short run went back to the initial value, and so 40 percent was taken as the percentage increase in income tax that will keep government revenue constant after complete import tariff removal in the short run.

This chapter presented a justification for using a CGE model in this study, described the model, explained the policy simulations that were implemented and explained the sources of data. The remaining chapters present and discuss the results of the study.

CHAPTER FIVE

TRADE LIBERALISATION

Introduction

This chapter presents the simulated results of complete import tariff removal on macroeconomic variables and poverty of different household categories. The presentation is done under two broad headings: macroeconomic impact and poverty impact. The first section will trace the macro and sectoral effects, factor market effects, and household's income and consumption effects, whereas the second section will describe the effect of trade liberalisation on poverty in Ghana.

Macroeconomic effects

The impact of the complete elimination of imports tariffs on key macroeconomic variables such as absorption -private consumption, government consumption, investment and stock change-, exports, imports, GDP, and exchange rate are summarized in the second column of Table 16. All the figures are expressed as percentages of the base values. The base run results are results obtained given that the economy grows at its current rate of growth without any policy changes. The base is alternatively called Business As Usual (BAU). The simulated results are derived after a policy experiment has been implemented.

A major finding of the simulation exercise is that cut in trade taxes reduces government revenue in the short run. In this particular instance, government income reduces by 4.3 percent as shown in Table 16. This result confirms theory and literature (ECA 2004; Ekpo, 2003; Agbeyegbe, Stotsky & Wolde, 2003; Khattry, 2002; Ebrill, Stotsky & Gropp, 1999; Cattaneo, Hinojosa-Ojeda & Robinson 1999; Wang & Zhai 1998). This can be explained to mean that when trade tariffs are high, cutting tariffs causes the tax base to expand significantly to offset the effect of the low tariff rate. But as tariffs are cut further, the tax base will not grow fast enough to offset the low tariff effect causing revenue to fall.

Table 16: Trade liberalisation and macroeconomic indicators

GDP items	Base	Trade Liberalization (%)
Absorption	24659.64	2.69
Private consumption	134436.88	5.29
Government consumption	25644.83	3.59
Fixed investment	444529.55	5.66
Stock change	48.13	1.29
Export	51425.96	5.66
Imports	91159.57	9.58
GDP(Value Added)	164925.76	2.34
Government revenue	39853.87	-4.30

Source: simulation Results

In the long run, however, complete removal of import taxes (Trade liberalisation) leads to increase in absorption. As shown in Table 16, absorption increases by about 2.7 percent over the base scenario. There is also an increase of about 5.3 percent in private consumption. Increase in private consumption is sustained by rise in imports. Other components of absorption have equally been affected positively by the policy experiments. For instance, government consumption increases by about 3.6 percent, and investment rises by about 5.7 percent. The rise in absorption is an indication that import tariff elimination (trade liberalisation) enhances overall welfare in Ghana for the study period of 2005 - 2010. Other components of aggregate demand that have seen improvements as a result of the policy change are exports and imports. Exports increase by about 13.8 percent while imports rise by about 9.6 percent. The increase in absorption, exports and imports has reflected in the positive change in GDP at market prices. There is an increase of about 2.3 percent in GDP at market prices. The finding supports the results of Diallo et al (2010), Wong et al (2008), Feraboli (2007), Bchir et al (2005) and Cattaneo et al (1999).

The improvement in the macroeconomic variables is justified in the sense that tariff removal improves the competiveness of the economy of Ghana. Tariff reduction results in a decrease in import prices which makes imports cheaper than domestic import-competing substitutes. Consumers therefore, shift from the domestic import-competing substitutes to demand more of imported goods and services. The import-competing sectors which were initially heavily protected will see a decline in output and employment.

In this simulation exercise, the sectors that were heavily protected are rice, chicken, dairy products, textiles, leather and footwear, paper products, publishing and printing, fertilizer and clothing as indicated in Table 17.

The increase in imports causes depreciation of the local currency because the current account is assumed fixed. Again, the fall in the prices of imported inputs reduces domestic costs of production. These two effects will lead to a reduction in the domestic costs of production for the expanding sectors of the economy. Output in these expanding sectors will rise, employment will grow, and the productive factors from the declining sectors will relocate to these growing sectors.

Table 17: Initial tariff rates

Sector	Tariff rate
Rice	20.4
Chicken	18.9
Forestry	5.5
Dairy Products	28.7
Meat and fish Processing	6.1
Textiles	32.1
Clothing	7.1
Leather and footwear	35.1
Paper products, publishing and printing	39.2
Fuel	0.8
Fertilizer	10.2
Other chemicals	4.9
Metal products	2.7

Source: Ghana 2005 SAM

The reduction in costs of production and the depreciation of the local currency leads to increase in competiveness of the export sector. As a result of the increase in the domestic price of exports, the export industry expands, investment increases, production of exportables increase, export of goods and services rise, employment in the export sector rises, incomes increase; this creates a multiplier effect of incomes and expenditures leading to further increase in GDP. Examples of expanding exports sectors include non-traditional exports such as fruit, tree nuts, vegetable and industrial crops, and traditional exports like cocoa, forestry products, fish products and wood products (see Table 18).

Table 18: Trade liberalisation and value added

Commodity	Base level	Trade Liberalisation (%)
Maize	831.54	-1.31
Rice	365.64	-43.91
Sorghum/Millet	1070.68	-0.20
Cassava	707.14	4.00
Yams	132.30	0.55
Cowpea	294.23	0.72
Soyabea	65.01	2.85
Groundnuts	732.68	-3.07
Tree nuts	226.79	10.84
Fruit domestic	500.99	3.29
Vegetable domestic	1572.36	-5.07

Table 18 (Continued)

Plantains	129.57	3.28
Fruit export	55.81	4.98
Vegetable export	122.82	4.83
Palmoil	207.30	3.89
Cocoa beans	1896.40	4.62
Other crop	129.20	21.93
Export Industrial crop	548.43	5.85
Chicken	8.88	-15.83
Eggs	28.60	9.17
Beef	539.18	-6.30
Goat	346.17	6.24
Other meat	434.77	3.25
Forestry	4963.44	0.47
Fishery	2197.22	8.97
Mining	6592.86	0.83
Other formal food processing	573.64	5.21
Cocoa processing	728.95	3.05
Dairy	655.34	-12.66
Meat and fish processing	2171.27	3.88
Textile	328.63	-59.06
Clothing	1274	-5.87
Leather and footwear	600.97	-38.15
Wood production	1695.08	11.57

Table 18 (Continued)

Paper products, publishing and printing	324.62	-2.65
Petroleum	519.98	6.19
Diesel	436.47	5.59
Other fuels	12.82	2.67
Other chemicals	1430.29	22.61
Metal production	1679.38	7.94
Acapt	1459.64	10.28
Construction	15749.79	-5.42
Water	268.62	5.24
Electricity	4748.71	7.88
Trade services	7582.82	7.49
Other services	1025.24	4.59
Transport services	4575.34	5.46
Communication	2829.49	7.08
Business	2389.17	15.12
Real Estate	3752.11	6.34
Community and other services	3045.86	3.68
Administration	18902.66	0.07
Education	4018.46	0.04
Health	1167.06	1.11

Source: Simulation Results

These are the sectors in which Ghana has comparative advantage and, more importantly, are also labour intensive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income for majority of households in the country, household incomes will rise and poverty rate may decrease.

It is not only the exports sector that expands in response to the policy shock. Table 18 shows that other non-tradable sectors of the economy of Ghana have equally expanded. Some of the other sectors that have expanded include administration, health, water, education, trade, transport and communication, real estate, mining, trading, other services, etc. Majority of the sectors have expanded to provide supporting services to the export sector (backward linkages). Examples of these services include road transport, business services including telecommunication, public sector services, water and electricity, health and education. The expansion of the service sector which includes retail trade is significant in that it provides employment for many people. Construction contracts because as a non-tradable it had benefited enormously from the tariff protection.

These results suggest that additional trade liberalisation brings welfare gains to Ghana. The findings confirm those of Wang and Zhai (1998) for China, Siddique et al (2008) for Pakistan, but contradict that of Pradhan and Sahoo (2008) for India.

Sectoral impact

Complete removal of import tariffs across the board results in the reduction of the domestic prices of imports. As is to be expected, the reduction

in import prices is highest in sectors with high initial tariff. As mentioned earlier and also captured in Table 17, the protected sectors are rice, chicken, dairy products, textiles, clothing, leather and footwear, paper products, publishing and printing and fertilizer. The removal of the import tariffs causes significant reduction in their prices as recorded in Table 19.

Table 19: Trade Liberalisation and import prices

Commodity	Base Level	Trade Liberalisation (%)
Maize	1.55	4.10
Rice	3.76	-12.83
Other cereals	1.00	4.10
Other crops	2.66	4.26
Chicken	1.00	-11.79
Beef	1.00	4.25
Sheep and Goat	1.00	4.24
Other meat	1.00	4.23
Other formal food processing	1.00	4.25
Dairy products	1.00	-18.26
Meat and fish processing	1.00	-1.62
Textiles	1.00	-20.16
Clothing	1.00	-2.52
Leather and footwear	1.00	-22.01
Paper product, publishing and printing	1.00	24.27

Table 19 (Continued)

Crude and other oils	1.00	4.26
Other fuels	1.00	3.52
Fertilizer	1.00	-5.17
Other chemicals	0.88	-0.54
Metal products	0.48	1.45
Electricity	1.00	4.14

Source: Simulation Results

As depicted in Table 19, the price of rice, chicken, dairy products, textiles, leather and paper products decreases the most as a result of the complete cut in import tariffs. The decline in the domestic price of imports brought about by tariff removal causes the quantity of imported goods in the consumer goods sector to rise. Examples of such imported consumer goods include rice, dairy products, chicken, processed food, textiles, clothing, and paper products (see Table 20). Other products that have seen improvement in their imports are crude oil and related products and fertilizer. The increase in fertilizer import is, particularly, significant because it will boost agriculture production, ceteris paribus. Because imported goods are now cheaper relative to domestic import-competing substitutes, demand for imports in Ghana rises. Demand for domestic import-competing substitute falls, profits in that sector falls, and local production decreases. Because the earnings of factors of production fall under these circumstances, factors may relocate to the expanding sectors of the economy.

Table 20: Trade Liberalisation and imports

Commodity	Base Level	Trade Liberalisation (%)
Maize	188.71	-9.36
Rice	1054.42	32.07
Other cereals	136.74	3.34
Other crops	64.49	-15.09
Chicken	1782.82	17.41
Beef	740.93	7.30
Sheep/ Goat	175.44	8.64
Other meats	374.20	4.75
Other formal food processing	8352.54	4.34
Dairy products	144.19	13.65
Meat and fish processing	2396.95	16.00
Textiles	1689.67	3.80
Clothing	4358.93	4.67
Leather and footwear	1069.50	4.99
Paper product, publishing and printing	503.28	5.27
Crude and other oils	10104.97	6.44
Other fuels	4787.27	4.48
Fertilizer	2879.73	0.31
Other chemicals	7356.46	0.87
Metal products	6335.89	-5.36
Electricity	86.36	-13.92

Source: Simulation Results

The expanding sectors are mainly in the agricultural, industrial and export subsectors. The expanding agriculture sectors include maize, other crops, other cereals, vegetable farming, goat and sheep rearing and cocoa farming. Other food processing, other chemicals, electricity and metal sectors constitute the expanding industrial sectors. For the export sector, the growing sectors include non-traditional exports such as fruit exports, tree nuts, vegetable exports and export industry crops, and the traditional exports like cocoa, forestry products, fish products and wood products, while in industrial sectors, sectors like electricity, water, and mining, among others have expanded their output (See Table 21). The expanding sectors, particularly, agriculture employ over 50 percent of the labour force and by extension provides income to many households in Ghana.

It is instructive to note that most of the expanding agricultural and export-oriented sectors are labour-intensive productive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income to majority of households in Ghana, household incomes will increase and many people will come out of poverty. The rise in incomes in the agricultural and export sectors will lead to increased demand for non-tradable goods and services. Cattaneo et al (1999) obtained a similar result for Costa Rica.

The expansion of the agricultural sector, industrial sector and export sector will cause ancillary sectors such as those in the services sector to also grow. In particular, the transportation industry such as road transport will have to expand to deal with the increasing volumes of cocoa, wood products and the

transportation of all the agricultural products from the farm gate to the marketing centres. Other service sector activities that are expected to grow to support the expanding sectors in agriculture, industry, and exports, are telecommunication and business services, banking and finance, insurance and real estate.

Table 21: Trade liberalisation and exports

Commodity	Base level	Trade Liberalisation (%)
Cocoyam	92.31	-2.81
Palm oil	163.02	-0.73
Groundnuts	46.58	-.03
Tree nuts	473.63	1.37
Fruit export	660.77	22.05
Vegetable export	47.78	4.91
Cocoa beans	874.65	5.77
Export of industrial crops	79.43	5.53
Forestry	7726.40	2.05
Fishing	1679.71	15.06
Mining	11292.39	0.93
Cocoa processing	1927.72	0.03
Meat and fish processing	1927.72	16.78
Textiles	118.52	-4.30
Wood products	3246	14.35
Other chemicals	119.45	6.36
Repairing, hotel and restaurant	8203.77	6.04

Source: Simulation Results

Factor earnings

As noted earlier, the decreased cost of imported inputs causes the domestic costs of production to fall and coupled with the depreciation of the local currency will lead to increase in the competitiveness of the exports of Ghana. Because domestic export prices rise under these circumstances, it induces production of more export crops, so export volume increases. As can be seen in Table 21, export volumes of all non-traditional exports such as true nuts, fruits, vegetables, fish, processed meat and fish increase. These sectors are labour intensive activities and as output in these sectors expand, the demand for labour will increase, wages go up, and labour from the contracting sectors, i. e. import-competing sectors of the economy, will be attracted to these sectors. This development has implications for factor employment, factor earnings and sectoral allocation of productive resources. Returns to labour has accordingly risen as shown in Table (22).

As shown in Table 22, with the exception of change in return to capital, there is a positive change in return to self-employed labour (agriculture), and land in all the ecological zones as a result of the removal across board of import tariff. This finding is not surprising as most of the expanding sectors are agricultural activities with high labour intensities. It is pertinent, however, to note that the change in returns to self-employed agricultural labour is more than that of skilled labour non-agriculture and unskilled labour non-agriculture. Similarly, the change in returns to land exceeds change in returns to skilled labour non-agriculture and unskilled labour non-agriculture. This pattern in the change of factor returns is because

trade liberalisation allows Ghana to realize its comparative advantage in producing labour-intensive commodities that use agriculture labour and land intensively. As noted earlier, most of the expanding sectors of the economy are agriculture-related activities, which use agricultural labour and land intensively. Hence, the demand for self-employed agricultural labour and land increase relatively more than other factors, pushing up their relative returns.

Table 22: Trade liberalisation and factor returns

Factor	Base	Trade Liberalisation (%)
Self-employed agricultural labour	8.76	7.37
Skill labour (non-agricultural)	26.26	5.35
Unskilled labour (non-agricultural)	12.49	5.11
Capital	0.21	-2.36
Land (coast)	3.26	8.00
Land (forest)	2.39	6.62
Land (south)	3.90	6.46
Land (north)	2.17	5.85

Source: Simulation Results

Equally important, earnings of skilled labour (non-agriculture) and unskilled labour (non-agriculture) have risen. The increase in income of non-agriculture skilled and unskilled labour emanates from the expansion in some sectors in the industrial sector such as electricity, water, the service sectors such as retail and wholesale activities, transportation, etc.

The decline in the returns to capital is expected as the capital released by the declining sectors cannot be absorbed in the expanding sector thereby causing the returns to capital to fall. The expanding sectors are not able to absorb the capital released from the contracting sector because of the specificity of capital. Specificity of capital means that the capital equipment is meant to be used for only one particular activity and so the capital cannot be redeployed for use in other productive activities. An example of the contracting sectors is textile. Capital used in the textile industry will not be suitable for an expanding sector in agriculture, say, vegetable farming.

Another reason that accounts for the decline in the returns to capital is that installed capacity utilization of firms is very low in Ghana. According to Asante, Nixson, and Tsikata (2000) capacity utilization of the manufacturing sector in Ghana was 46 percent in 1993. Among the numerous factors accounting for the low capacity utilization in manufacturing are lack of domestic demand for manufactured products, inadequate supply of raw materials, lack of spare parts and the use of obsolete machinery and plants. Now, with this huge unutilized capacity in the manufacturing sector and with the underlying cause of the problem, i.e. lack of domestic demand for locally manufactured goods unresolved, there is no way that capital released from a contracting sector will be absorbed by an expanding sector because the expanding sector will just put its idle capacity back to use.

The description of the changes in factor returns appears to be in line with the prediction of the Stolper-Samuelson theorem. The theory states that when a country opens up to trade, returns to factors that are used intensively in

its export sector will increase while returns to the factors used intensively in its import-competing sector will decrease. The results of the policy shock indicate expansion in the traditional and non-traditional export sectors of the economy. These are labour-intensive activities and so the returns to all categories of labour have increased. On the other hand, there has been contraction of the import-competing sectors, which use capital intensively. Consequently, returns to capital have declined for the period of study.

Household incomes

Table 23 considers income change for the different household groups. As noted earlier, labour income constitutes the major source of income to households and within the agricultural sector earnings of land ownership are the second most important source of income to households. With the expansion of the labour-intensive sectors of the economy, as a result of tariff reduction, demand for factors of production, especially, labour increases and labour earnings also increases. Consequently, income change for all categories of household has been positive. Under trade liberalisation, for example, rural households benefit more from the income change than urban households. The observed income change is attributable to the change in production pattern observed earlier. Incomes are higher in the urban areas than the rural areas.

Table 23: Trade liberalisation and household income

Household	Base	Trade Liberalisation (%)
Accra	31410.95	4.77
Urban coastal	9781.06	4.50
Urban Forest	16148.56	4.66
Urban south	15545.99	4.50
Urban North	3370.75	5.02
Rural Coastal	8940.74	6.98
Rural Forest	23154.69	5.08
Rural South	22835.35	5.92
Rural North	13595.84	6.83

Source: Simulation Results

Household consumption

Table 24 shows that consumption change favours all household groups. This is expected as income change for all households have been positive too. Overall, consumption change is higher in the rural areas than in the urban areas under Trade Lib. In the rural areas, Rural Coastal has the highest consumption change of 6.43 percent, followed by Rural South with 5.08 percent and Rural Forest with 5.01 percent. Accra has the highest consumption change in the urban zone with 4.89 percent, followed by Urban Forest with 4.92 percent and Urban Coastal with 4.63 percent.

The increased consumption is for both imported goods and local import-competing substitutes whose prices have been forced down by the increased inflow of cheap imports. As noted earlier, high quantities of

agricultural imports (for example, rice, dairy products, chicken), and manufactured goods (for example, food processing, textiles, clothing, and paper products) have been imported forcing the prices of their local substitutes to reduce. This implies that trade liberalisation is welfare-enhancing for all household groups. This result contradicts the findings of Pradhan and Sahoo (2008) who found out that trade liberalisation reduces welfare of households in India. The fall in disposal income due to the decline in relative factor prices and government transfers to households accounted for the fall in household welfare in India (Pradhan & Sahoo, 2008).

Table 24: Trade liberalisation and household consumption

Household	Base Level	Trade Liberalisation (%)
Accra	28159.92	4.89
Urban coastal	9539.28	4.63
Urban Forest	14985.44	4.92
Urban South	14870.72	4.17
Urban North	3391.31	4.12
Rural Coastal	8746.83	6.43
Rural Forest	20229.58	5.01
Rural South	21958.29	5.08
Rural North	12555.50	4.51

Source: Simulation Results

Poverty implications

The analysis so far indicates that import tariff removal has a positive impact on employment, factor earnings, household incomes and household consumption. These outcomes have implications for poverty in the country. Poverty is a multi-dimensional concept, with some of its determinants not quantifiable. To meet the purpose of this thesis, which quantitatively assessed the long run impact of trade liberalisation with alternative fiscal measures on poverty, we limit ourselves to only one quantitative measure of poverty, that is, consumption poverty. The poor then are seen as households that are not able to meet a certain minimum level of consumption, called the poverty line. The poverty line was estimated using the cost of basic needs method. The poverty line is set at an amount necessary to pay for a food basket providing 2900 kilocalories per adult equivalent, while also covering the cost of basic non-food needs.

The discussion will be in two parts: The first part will dwell on poverty at the national level under the four policy simulations, Trade Lib, VAT, Corp Tax, and Income Tax, while the second part will consider poverty at the household level under the same policies.

Poverty at the national level

This section presents a global analysis of the impact of complete removal of import tariff on poverty. Table 25 reports the poverty outcome of complete import tariff removal (Trade Lib) at the national and location level.

Table 25: Trade Liberalisation and national Poverty

	Base			Trade Liberalisation		
	P0	P1	P2	P0	P1	P2
National	27.0	9.0	4.3	26.4	8.7	4.1
Urban	10.4	2.9	1.2	10.0	2.7	1.1
Rural	37.1	12.7	6.2	36.3	12.3	5.9

Source: Simulation Results

The Table shows that all the poverty measures fall at the national level for the policy shock. Under trade liberalisation, the incidence of poverty falls from the base value of 27.0 percent to 26.4 percent in 2015. The depth of poverty, which measures how far the poor are from the poverty line, also decreases from 9.0 percent in the base to 8.7 percent in 2015. Equally, the severity of poverty declines from 4.3 percent in the base to 4.1 percent in 2015. In relative terms, the incidence of poverty reduces by 2.2 percent, the depth falls by 3.3 percent and the severity of poverty declines by about 4.7 percent. The outcome clearly suggests that trade liberalisation has the potential to better the circumstances of the poor in Ghana in the long-run. This finding confirms the findings of Nahar and Siriwardana (2009) that trade liberalisation has a positive impact on poverty in Bangladesh in the long-run.

Across all locations, all poverty indicators also decline. For urban areas, the headcount poverty decreases from 10.4 percent in the base scenario to 10.0 percent in 2015, while the poverty gap falls from 2.9 percent in the base to 2.7 percent in 2015. Finally, the severity of poverty falls from 1.2 percent in the base to 1.1 percent in 2015. The extent of decrease in the

poverty measures under trade liberalisation is 3.9 percent for the incidence of poverty, 6.9 percent for the depth of poverty and 8.3 percent for the severity of poverty. In the rural areas, on the other hand, the percentage of people living below the poverty line goes down from 37.1 percent in the base scenario to 36.3 percent in 2015. The poverty gap decreases from 12.7 percent in the base scenario to 12.3 percent in 2015, while the severity of poverty falls from 6.2 percent in the base to 5.9 percent in 2015. In effect therefore, the incidence of poverty decreases by 2.2 percent, the depth of poverty falls by 3.2 percent and the severity of poverty declines by 4.8 percent.

In terms of the change in poverty indicators, the fall in the incidence of poverty, the depth of poverty and severity of poverty is higher in the urban area than in the rural area. For instance, while the incidence of poverty falls by a margin of 3.9 percent in the urban area, it falls by 2.2% in the rural area. The depth of poverty for urban area falls by 6.9 percent, while it declines by 3.2 percent in the rural area. Finally, the severity of poverty also changes by a higher percentage in the urban area than in the rural. Specifically, while the severity of poverty falls by 8.3 percent in the urban areas, it decreases by 4.8 percent in the rural areas.

The analysis done above shows that trade liberalisation favours urban households more than it does to rural households. The results confirm the findings of Annabi et al (2005) for Senegal, Siddique et al (2008) for Pakistan, Adjovi et al (2008) for Benin, but contradict the result of Aredo et al (2007) who found that a complete elimination of tariff increases poverty at the national level in Ethiopia.

It is clear from the analysis done so far show that income changes from trade liberalisation favour rural areas, but the poverty impact favours urban areas. The income changes turn to favour rural areas because the expanding sectors are mainly agricultural sectors producing export goods. These are rural-based productive activities and they are more labour intensive. Poverty alleviation is, however, more than mere income changes. It involves consumption of goods and services. The results of the study show that goods whose prices have fallen most are those consumed by the urban areas. It therefore stands to reason that the urban areas benefit more from poverty than the rural areas that consume less of these goods.

Another plausible reason why rural areas benefit less from poverty reduction even though the rural areas enjoy higher income changes from trade liberalisation is that the levels of poverty in the rural areas are so high that the positive change in income is not enough to take many people out of poverty. In other words, the poor in the rural areas are so far away from the poverty line such that the positive change in income is not enough to reduce poverty significantly. Contrary, the poor in the urban areas are very close to the poverty line such that the slightest increase in income makes a significant impact on urban poverty.

Household level analysis

Analyzing poverty at the national level conceals details at the household level. This section is, therefore, devoted to examining how

households fare under the policy shock of complete elimination of import tariffs.

There are nine households chosen by location as shown in Table (26).

Table 26: Households

Household Type	Composition
Accra	Greater Accra Metropolitan area Urban areas in Ga East, Ga West and Tema
Urban Coastal	Urban Western, Urban Eastern, Urban Central and Urban Greater Accra
Urban Forest	Urban Western, Urban Central, Urban Volta, Urban Eastern, Urban Ashanti, and Urban Brong Ahafo
Urban North	Urban Northern, Urban Upper East, and Urban Upper West
Urban South	Urban Volta, Urban Eastern, and Urban Brong Ahafo
Rural Coastal	Rural Western, Rural Central, Rural Greater Accra, Rural Volta, and Rural Eastern
Rural Forest	Rural forest Western, Central, Volta, Eastern, Ashanti and Brong Ahafo
Rural North	Rural Northern, Rural Upper East, and Rural Upper West
Rural South	Rural Volta, Rural Eastern and Rural Brong Ahafo

Source: Author's own construction from GLSS 5

Table 27 reports on the factorial shares of household income. The household level data were obtained from the GLSS 5 for the year 2005. In Table 27, labor is the important contributor in the earning of incomes of all categories of households. Remittances constitute the next major source of income to the households, but it accrues mainly to urban households, followed by capital income, which because it includes land accrues mainly to rural households, with the exception of Accra and Urban South. The least source of income to households is transfer income.

Table 27: Factorial source of household income

Household	labour Income	Capital Income	Remittances Income	Transfer Income	Total
Accra	83.5	3.1	10.4	3.4	100.0
Urban Coastal	86.4	1.1	9.9	2.6	100.0
Urban Forest	83.9	1.1	14.5	0.5	100.0
Urban South	91.2	3.6	4.6	0.6	100.0
Urban North	89.1	1.5	8.9	0.5	100.0
Rural Coastal	90.7	1.8	7.1	0.4	100.0
Rural Forest	90.5	1.7	6.7	1.1	100.0
Rural South	93.6	1.6	4.7	0.06	99.96
Rural North	92.7	3.4	3.4	0.5	100.0

Source: Author's own computation from GLSS 5

Table 28 presents the results of all the policy shocks on household poverty. Compared with the benchmark values, poverty levels decrease for all households for the complete removal of import tariffs. Removing imports taxes makes the economy of Ghana more efficient, the production structure changes from the production of import-competing goods to the production of agricultural-based exports, which use labour more intensively. Factors of production relocate to the expanding sectors and factor earnings increase, which translates into increase in household incomes. The reduction in the domestic price of imports and import-competing substitutes increases household consumption and poverty decreases for all households. It is for these reasons that all household poverty indicators decrease under the scenario of complete removal of import taxes.

Generally, poverty is prevalent in rural households than in urban households. Again, poverty is higher in the northern households than any other households. Northern households have the highest incidence of poverty in both urban and rural areas. For northern rural households, poverty levels have been very high so that even though poverty generally reduces with trade liberalisation, the level of poverty in the northern rural households still remains high. For example, the poverty headcount decreases from 67.2 percent in the benchmark to 67 percent in 2015 for the policy shock and the depth of poverty falls from 30.4 percent in the benchmark to 29.8 percent in 2015 for all northern households. Finally, the severity of poverty declines from 17.0 percent in the benchmark to 16.6 percent in 2015. It is also worthy of note that the highest reduction in the incidence of poverty occurs in the rural coast

household. Here, the poverty headcount decreases from 20.9 percent in the benchmark to 19.3 percent in 2015 under the policy scenario.

Table 28: Trade liberalisation and household poverty

Household	Base			Trade Liberalisation		
	Po	P1	P2	Po	P1	P2
Accra	10.2	2.7	1.0	9.9	2.5	0.9
Urban Coastal	5.5	0.8	0.2	5.1	0.7	0.2
Urban Forest	6.7	1.7	0.7	6.1	1.5	0.6
Urban South	20.9	7.4	3.9	20.1	7.0	3.7
Urban North	30.1	10.5	4.7	29.6	0.1	4.4
Rural Coastal	20.9	4.7	1.5	19.3	4.2	1.4
Rural Forest	25.4	6.1	2.1	24.6	5.8	2.0
Rural South	34.6	7.6	2.5	33.4	7.1	2.3
Rural North	67.2	30.4	17.0	67.0	29.8	16.6

Source: Simulation Results

The analysis so far shows that there are significant differences in the incidence of poverty, depth of poverty and severity of poverty even though poverty rates generally decrease for each household (Siddiqui et al, 2008; Cororaton, 2008; Akapaiboon, 2007). For instance, poverty rates are much higher in the Northern households compared to households in the other locations. The Urban North households record the highest poverty headcount

among the urban households and the Rural North households also experience the highest incidence of poverty among rural households.

One major reason why trade liberalisation has the lowest impact on poverty in the Northern region is that two of the major commodities of the region, rice and poultry, actually contracted. Other reasons cited for the region's poor poverty record are its geographical disadvantages, including relatively low and variable rainfall, savannah vegetation, and the inaccessibility of large parts of the region which has less well-developed rural road networks compared to those in the rest of the country (ODI & CEPA, 2005; Breisinger et al, 2008) and a deliberate colonial government policy to under-develop the region so, it could serve as a source of cheap labour for the south (Shepherd & Gyimah-Boadi, 2004 as cited in AL-Hassan & Diao, 2007). The stark inequality between the north and the south of Ghana needs to be addressed in order to make a significant progress in poverty alleviation.

Another result of the simulation exercise is that even though changes in income favour rural areas more than urban areas, poverty reduction favours urban areas more than it does for rural areas. The reasoning is that the sectors that expand as a result of trade liberalisation are mainly agricultural export sectors. These sectors are rural-based and labour-intensive, thus employing majority of the rural folk. However, the goods whose prices decreased are consumed by the urban households and not the rural households. Consequently, the poverty levels in the urban areas reduce more than the poverty level in the rural areas. Another plausible explanation is that rural areas have higher poverty gap than urban areas, so while the change in income

in the rural areas was not enough to bring many people out of poverty, it was more than enough to lift many more people out of poverty in the urban areas. And yet another possible explanation is that government spending is skewed towards the urban centres where households are relatively better off than rural households. This fact is clearly seen in Table 27 where urban households that have lower poverty rate receive more transfers than rural households that are relatively poorer.

The finding that urban households benefit more from import tariff liberalisation than rural households corroborates the results of Nwafor et al (2007), Bibi and Chatti (2006), Siddique et al (2008), Siddique (2009), Cororation et al (2005) and Adjovi et al (2008), but contradicts the findings of Nahar and Siriwardana (2009), Chitiga and Mabugu (2005) and Bautista and Thomas (1997), Pradhan and Sahoo (2008) and Decaluwe et al (1999).

In conclusion, import tariff liberalisation reduces poverty at the household level in the long run. In particular, trade liberalisation reduces the incidence, depth and severity of poverty. However, urban households benefit more than their rural counterparts.

CHAPTER SIX

TRADE LIBERALISATION AND INCREASE IN VALUE ADDED TAX

Introduction

The chapter focuses on the simulated results of trade liberalisation with a 31 percent upward adjustment in VAT. Government revenue fell from Gh¢ 39853.87 billion to Gh¢38140.15 billion in the short run after trade liberalisation. To compensate for the loss in government revenue, various percentages of the prevailing VAT rate of 15 percent were tried and 31 percent was found to restore government revenue to the value before trade liberalisation.

The rest of the presentation in this chapter is done in two stages. At stage one, the macroeconomic and sectoral effects of the policy will be examined. The second stage will concentrate on the effect of trade liberalisation combined with 31 percent increase in VAT on poverty in Ghana.

Macroeconomic effects

Complete removal of imports tariffs accompanied with a 31 percent upward adjustment in VAT to keep government revenue neutral leads to improvements in GDP of about 2.71 percent as shown in Table 29.

Table 29: Trade liberalisation, 31 percent increase in value added tax and macroeconomic indicators

GDP items	Base	Value added tax (%)
Absorption	24659.64	3.23
Private consumption	134436.88	6.45
Government consumption	25644.83	4.92
Fixed investment	444529.55	8.58
Stock change	48.13	1.86
Export	51425.96	18.77
Imports	91159.57	12.93
GDP(Value Added)	164925.76	2.71
Government revenue	39853.87	-4.30

Source: Simulation Results

The expansion in GDP is driven by increases in absorption of about 3.23 percent over the initial and private consumption of about 6.45. Equally significant are the 4.92 percent increase in government consumption, and 8.58 percent rise in investment. There is also an 18.77 percent rise in exports and a 12 .93 percent increase in imports. The increase in output is an indication that import tariff elimination (trade liberalisation) with 31 percent upward adjustment in VAT has a positive effect on overall welfare of the people of Ghana for the study period of 2005 - 2015. The finding confirms what Rutherford, et al (1997) obtained for Morocco, but contradicts the results of Feraboli (2007) for Jordan and Emini et al (2005) for Cameroon.

Import tariff removal is expected to reduce domestic import prices and also the price of imported intermediate inputs. However, VAT on selected locally-produced goods and services and imports increase the prices of these products (Ajakaiye, 1999). The quantity demanded of the locally-produced VATable good will fall if its demand is elastic. The profits of firms producing this good will decrease and the firms will not be encouraged to invest more so employment will also fall. If the firms happen to be major employers of labour, then household incomes could decline and poverty may increase.

Increasing VAT on imported intermediate inputs will increase domestic costs of production and reduce the profitability of investment. Domestic firms will reduce their demand for the imported intermediate input and where cheaper domestic substitutes are not readily available, the firm will reduce output and hence employment, all other things being equal. In the case where the good is a finished one, and assuming prices rise because of the VAT increase, then real incomes will fall and household consumption will fall, with negative effect on employment and incomes. On the contrary, if the price of the finished good falls because the fall in import price exceeds that of the rise in the VAT rate, real incomes will rise and household consumption will increase.

The government of Ghana introduced a value added tax of 10% in 1999 to replace sales tax. The VAT rate is currently 15.5%. The tax is on imports as well as domestically produced goods and services, and it forms part of the final price the consumer pays for goods and services. There is also a flat

rate VAT scheme that applies a marginal tax rate of 3%, on the value of taxable goods supplied by retailers.

Some goods and services (both imported and domestically produced goods and services) are exempt from VAT. Among the products are medical and pharmaceutical products, basic food, farming transportation equipment; water supply excluding packaged and distilled water; domestic use of electricity, crude oil and hydrocarbon products such as petrol, diesel, liquefied petroleum gas, kerosene and residual fuel oil. Other exempted services are medical and health services; financial services; educational items and services; and transportation by bus, train, boat and air (Ajakaiye, 1999; Ghana VAT Service -Website). The exemption is intended to make VAT pro-poor.

The simulation results indicate that the policy shock results in decrease in import prices (Table 31) which makes imports cheaper than domestic import-competing substitutes. Consumers therefore, shift from the domestic import-competing substitutes to demand more of imported goods and services. The import-competing sectors which were initially heavily protected will see a decline in output and employment. The heavily protected sectors are rice, chicken, dairy products, textiles, leather and footwear, paper products, publishing and printing, fertilizer and clothing.

The local currency depreciates under the high import demand in order to the keep the current account constant. The competitiveness of the export sector improves because of the reduction in costs of production and the depreciation of the local currency. Profitability of the export sector encourages expansion of the export industry, investment increases, production of

exportables increase, export of goods and services rise, employment in the export sector rises, incomes increase; this creates a multiplier effect of incomes and expenditures leading to further increases in GDP. As seen in the first simulation (Trade liberalisation) expanding exports sectors include non-traditional exports such as fruit, tree nuts, vegetable and industrial crops, and traditional exports like cocoa, forestry products, fish products and wood products (see Table 30).

Table 30: Trade liberalisation, 31 percent increase in value added tax and value added

Commodity	Base	Value added tax (%)
Maize	831.54	-1.74
Rice	365.64	-58.38
Sorghum/Millet	1070.68	-0.21
Cassava	707.14	5.00
Yams	132.30	0.84
Cowpea	294.23	0.70
Soyabean	65.01	3.68
Groundnuts	732.68	-3.66
Tree nuts	226.79	10.69
Fruit domestic	500.99	4.31
Vegetable domestic	1572.36	-5.87
Plantains	129.57	4.15
Fruit export	55.81	27.89
Vegetable export	122.82	6.92

Table 30 (Continued)

Palmoil	207.30	4.42
Cocoa beans	1896.40	5.07
Other crop	129.20	27.03
Export Industrial crop	548.43	7.33
Chicken	8.88	-21.72
Eggs	28.60	12.21
Beef	539.18	-7.66
Goat	346.17	7.79
Other meat	434.77	3.25
Forestry	4963.44	1.05
Fishery	2197.22	11.40
Mining	6592.86	1.11
Other formal Food processing	573.64	5.62
Cocoa processing	728.95	3.68
Dairy	655.34	-23.99
Meat and fish processing	2171.27	2.83
Other manufacturing		
Textile	328.63	-73.91
Clothing	1274	-6.21
Leather and footwear	600.97	-54.35
Wood production	1695.08	14.11
Paper products, publishing and printing	324.62	-4.18

Table 30 (Continued)

Petroleum	519.98	7.99
Diesel	436.47	7.09
Other fuels	12.82	1.74
Other chemicals	1430.29	26.92
Metal production	1679.38	5.11
Acapt	1459.64	10.65
Construction	15749.79	-8.37
Water	268.62	3.78
Electricity	4748.71	7.88
Trade services	7582.82	9.42
Other services	1025.24	6.27
Transport services	4575.34	7.09
Communication	2829.49	8.95
Business	2389.17	19.95
Real Estate	3752.11	7.96
Community and other services	3045.86	4.41
Administration	18902.66	0.09
Education	4018.46	0.08
Health	1167.06	0.36

Source: Simulation Results

The extent of expansion in these specific export sectors under trade liberalisation with upward adjustment is VAT is higher than the case under

trade liberalisation without any tax adjustment. These are the sectors in which Ghana has comparative advantage and, more importantly, are also labour intensive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income for majority of households in the country, household incomes will rise and poverty rate may decrease. Other expanding sectors include non-tradable sectors of the economy of Ghana, some of which include administration, health, water, education, trade, transport and communication, real estate, mining, trading, other services, etc. Most of these sectors have expanded to provide supporting services to the export sector. Examples of these services include road transport, business services including telecommunication, public sector services, water and electricity, health and education. The service sector which is a major employer of labour in Ghana also expands. However, construction which must have benefited from the tariff protection contracts by a bigger margin under trade liberalisation with VAT upward adjustment than the case under trade liberalisation with any tax adjustment.

Sectoral impact

As previously, the removal of import tariffs results in a decline in import prices (Table 31) with the most affected products being rice, chicken, dairy products, textiles, clothing, leather and footwear, paper products, publishing and printing and fertilizer.

Trade 31: Trade liberalisation, 31 percent increase in value added tax and import prices

Commodity	Base	Value added tax (%)
Maize	1.55	5.36
Rice	3.76	-12.83
Other cereals	1.00	5.36
Other crops	2.66	5.35
Chicken	1.00	-11.79
Beef	1.00	5.35
Sheep and Goat	1.00	2.34
Other meat	1.00	2.33
Other formal food processing	1.00	2.35
Dairy products	1.00	-18.26
Meat and fish processing	1.00	-1.62
Textiles	1.00	-20.16
Clothing	1.00	-2.52
Leather and footwear	1.00	-22.01
Paper product, publishing and printing	1.00	-24.27
Crude and other oils	1.00	2.36
Other fuels	1.00	4.27
Fertilizer	1.00	-5.17
Other chemicals	0.88	-0.54
Metal products	0.48	1.85
Electricity	1.00	4.50

Source: Simulation Results

A comparison with the first simulation results (Trade lib) shows that the extent of fall in import prices is higher under trade liberalisation with a 31 percent increase in the VAT rate. The decline in the prices of imported goods stimulates demand for imported goods, which is detrimental to domestically produced goods.

As indicated earlier on, reduction in import prices leads to an expansion in the imports of rice, dairy products, chicken, processed food, textiles, clothing, and paper products (see Table 32). Other products that have seen improvement in their imports are crude oil and related products and fertilizer.

Table 32: Trade liberalisation, 31 percent increase in value added tax and imports

Commodity	Base	Value added tax (%)
Maize	118.71	-11.89
Rice	1054.42	46.59
Other cereals	136.74	4.03
Other crops	64.49	-19.10
Chicken	1782.82	23.87
Beef	740.93	9.49
Sheep/ Goat	175.44	11.37
Other meats	374.20	5.20
Other formal food processing	8352.54	5.82
Dairy products	144.19	22.93
Meat and fish processing	2396.95	24.52

Table 32 (Continued)

Textiles	1689.67	5.16
Clothing	4358.93	6.53
Leather and footwear	1069.50	7.28
Paper product, publishing and printing	503.28	7.98
Crude and other oils	10104.97	8.19
Other fuels	4787.27	5.60
Fertilizer	2879.73	0.13
Other chemicals	7356.46	1.77
Metal products	6335.89	-6.86
Electricity	86.36	-7.14

Source: Simulation Results

Clearly the percentage increase in the import of these goods is higher under this policy shock than the case under trade liberalisation. The production of substitutes for the imported products declines because of lack of demand compelling profits to fall, and earnings of factors of production to nosedive under the circumstance. Affected factors relocate to the expanding sectors of the economy.

The sectors that have seen some expansion in terms of output can be grouped under general agricultural, industrial and export subsectors. The expanding agriculture sectors include maize, other crops, other cereals, vegetable farming, goat and sheep rearing and cocoa farming. Other food

processing, other chemicals, electricity, water, mining and metal sectors constitute the expanding industrial sectors. For the export sector, the growing sectors include non-traditional exports such as fruit exports, tree nuts, vegetable exports and export industry crops, and the traditional exports like cocoa, forestry products, fish products and wood products (Table 33). The expansion in, particularly, agriculture is significant in that the sector employs over 50 percent of the labour force and by extension provides income to many households in Ghana.

Table 33: Trade liberalisation, 31 percent increase in value added tax and exports

Commodity	Base	Value added tax (%)
Cocoyam	92.31	-3.65
Palm oil	163.02	-1.25
Groundnuts	46.58	-0.21
Tree nuts	473.63	1.37
Fruit export	660.77	30.10
Vegetable export	47.78	6.99
Cocoa beans	874.65	6.39
Export of industrial crops	79.43	7.58
Forestry	7726.40	1.92
Fishing	1679.71	18.99
Mining	11292.39	01.31
Cocoa processing	1927.72	0.37
Meat and fish processing	1927.72	18.58

Table 33 (Continued)

Textiles	118.52	-6.60
Wood products	3246	17.18
Other chemicals	119.45	8.60
Repairing, hotel and restaurant	8203.77	8.24

Source: Simulation Results

The growth in the agricultural and export-oriented sectors impacts positively on employment as most of them are labour-intensive productive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income to majority of households in Ghana, household incomes will increase and many people will come out of poverty. The rise in incomes in the agricultural and export sectors leads to increased demand for non-tradable goods and services.

Other ancillary activities, particularly, commerce, transport and communication, real estates, business services, banking and finance, insurance, administration, education and health are rejuvenated to support the expansion in the agricultural, industrial and export sectors. For instance, improvement in the transportation industry such as road transport is necessary to deal with the increasing volumes of cocoa, wood products and the transportation of all the agricultural products from the farm gate to the marketing centres.

Factor earnings

The expansion of certain sectors of the economy and contraction of others in response to the policy shock promotes varying degrees of demand for factors of production in the economy, which then affects the returns to these factors. Sectors that expand offer attractive remuneration to factors they use intensively, while the contracting sectors offer lower rewards. The increase in the competitiveness of exports has led to expansion in non-traditional exports which are predominantly labour intensive activities. As output in these sectors expand, the demand for labour increases, returns to labour rises, and labour from the contracting sectors, i.e. import-competing sectors (for example rice, poultry, etc) of the economy, relocate to the expanding sectors. This development has implications for factor employment, factor earnings and sectoral allocation of productive resources. The impact of trade liberalisation combined with 31 percent increase in VAT rate on the returns to factors is captured in Table 34.

As indicated Table 34, the returns to all categories of labour in all ecological zones improve while returns to capital decreases. In particular, there is a positive change in return to self-employed labour (agriculture), and land in all the ecological zones as a result of the policy shock. This finding is not surprising as most of the expanding sectors are agricultural activities with high labour intensities. It is pertinent, however, to note that the change in returns to self-employed agricultural labour is more than that of skilled labour non-agriculture and unskilled labour non-agriculture. Similarly, the change in returns to land exceeds change in returns to skilled labour non-agriculture and

unskilled labour non-agriculture. This pattern in the change of factor returns is because trade liberalisation allows Ghana to realize its comparative advantage in producing labour-intensive commodities that use agriculture labour and land intensively. Hence, the demand for self-employed agricultural labour and land increase relatively more than for other factors, pushing up their relative returns.

Table 34: Trade liberalisation, 31 percent increase in value added tax and factor returns

Factor	Base level	Value added tax (%)
Self-employed agricultural labour	8.76	9.52
Skill labour (non-agricultural)	26.26	6.89
Unskilled labour (non-agricultural)	12.49	6.37
Capital	0.21	-1.06
Land (coast)	3.26	10.20
Land (forest)	2.39	8.53
Land (south)	3.90	8.36
Land (north)	2.17	7.47

Source: Simulation Results

As in the first simulation (Trade liberalisation), there is an increase in the returns to skilled labour (non-agriculture) and unskilled labour (non-agriculture). The increase in returns to non-agriculture skilled and unskilled labour derives from the expansion in some sectors in the industrial sector as well as the service sector. There is, however, a decline in the returns to capital.

It is worth noting that the increase in the returns to labour and land in this exercise are more than the previous exercise. Similarly, the decline in the returns to capital in this simulation is smaller than the previous simulation. This is probably because production increases more in this simulation than in the first one. While the finding confirms the results of Cattaneo, Hinojosa-Ojeda and Robinson (1999) for Costa Rica, it contradicts that of Siddiqui et al (2008) for Pakistan.

Household incomes

Trade liberalisation combined with a 31 percent increase in VAT rate has a positive impact on household incomes. As shown in Table 35, income increases for all categories of households.

Table 35: Trade liberalisation, 31 percent increase in value added tax and household income

Household	Base Level	Value added tax (%)
Accra	31410.95	6.00
Urban coastal	9781.06	5.73
Urban Forest	16148.56	5.93
Urban south	15545.99	5.73
Urban North	3370.75	6.38
Rural Coastal	8940.74	8.93
Rural Forest	23154.69	6.89
Rural South	22835.35	7.69
Rural North	13595.84	8.98

Source: Simulation Results

The rise in household income is due to the fact that returns to labour, which is the main source of income to households, increases for the policy shock. Overall, rural households enjoy a higher increase in their incomes than urban households. This finding is the direct opposite of what Siddiqui et al (2008) found for Pakistan, Cororaton (2008) found for the Philippines, and Wong, Arguello and Rivera (2008) found for Ecuador. A plausible explanation for the more favourable income effect of trade liberalisation with VAT for rural households is that rural households rely more on labour income than their urban counterparts whose incomes are more dependent on capital income and so rural households benefit more from the export push. The increase in income for this simulation exercise exceeds that for the previous simulation exercise.

Household consumption

There is a general improvement in household consumption, with rural households benefiting more than urban households (see Table 36). Specifically, among the rural households, rural coast has the highest consumption change of 8.22 percent, followed by rural forest with 6.82 percent and rural south with 6.62 percent. For the urban households, urban forest has the highest consumption change of 6.31 percent, followed by Accra with 6.13 percent and Urban Coast with 5.91 percent. A comparison of the consumption effect of trade liberalisation with VAT with the consumption effect of trade liberalisation shows that the consumption effect of the former simulation exercise is higher than that of the latter.

Table 36: Trade liberalisation, 31 percent increase in value added tax and household consumption

Household	Base Level	Value added tax (%)
Accra	28159.92	6.13
Urban coastal	9539.28	5.91
Urban Forest	14985.44	6.31
Urban South	14870.72	5.34
Urban North	3391.31	5.23
Rural Coastal	8746.83	8.22
Rural Forest	20229.58	6.86
Rural South	21958.29	6.62
Rural North	12555.50	5.97

Source: Simulation Results

The difference in the change in the consumption levels for urban and rural households is due to the fact that rural households benefit most from the export push resulting from trade liberalisation and in addition, most of the goods consumed by rural household are VAT exempt. On the contrary, urban household are disadvantaged so far as the export push of trade liberalisation is concerned and they have to pay VAT. The increased consumption is for both imported goods and local import-competing substitutes whose prices have been forced down by the increased inflow of cheap imports. Consequently, trade liberalisation combined with 31 percent increase in VAT rate is welfare-enhancing for all household groups. This result validates the findings of

Konan and Maskus (2000) for Egypt, Bhasin and Annim (2005) for Ghana and Rutherford, Rutstrom and Tarr (1997) for Morocco.

Poverty at the national level

Complete removal of import tariffs combined with 31 percent increase in VAT rate reduces all poverty measures at the national level as shown in Table 37. This result is partially confirmed by the findings of Emini et al (2005) for Cameroon , Cororation et al (2005) for the Philippines, and Adjovi et al (2008) for Benin who found out that trade liberalisation combined with indirect tax (VAT) reduced the incidence of poverty, but increased the poverty gap and severity of poverty.

Table 37: Trade liberalisation combined with 31 percent increase in value added tax and national poverty

	Base			Value added tax		
	P0	P1	P2	P0	P1	P2
National	27.0	9.0	4.3	25.6	8.4	4.0
Urban	10.4	2.9	1.2	9.6	2.7	1.1
Rural	37.1	12.7	6.2	35.3	11.9	5.8

Source: Simulation Results

The poverty measures under consideration are the incidence of poverty (Po), the depth of poverty (P1) and the severity of poverty (P2). Table 37 shows a decline of all poverty measures for the simulation exercise relative to the base scenario. For instance, the incidence of poverty falls from the base

value of 27.0 percent to 25.6 percent in 2015. The depth of poverty decreases from 9.0 percent in the base scenario to 8.4 percent in 2015. Furthermore, the severity of poverty declines from 4.3 percent in the base scenario to 4.0 percent in 2015.

The poverty outcomes under trade liberalisation with 31 percent increase in VAT rate are slightly better than the poverty effects of trade liberalisation. For example, while the incidence of poverty reduces from 27 percent for base scenario to 26.4 percent for trade liberalisation, it declines from 27 percent for the base scenario to 25.6 percent for trade liberalisation with 31 percent increase in VAT. Similarly, the depth of poverty reduces from 9.0 percent for the base to 8.7 percent for trade liberalisation, and 8.4 percent for trade liberalisation combined with 31 percent increase in VAT. For the severity of poverty, while it falls from 4.3 percent for the base to 4.1 percent for trade liberalisation, it declines to 4.0 percent for trade liberalisation combined with 31 percent increase in VAT. In relative terms, the incidence of poverty reduces by 5.2 percent, the depth falls by 6.7 percent and the severity of poverty declines by about 7.0 percent. The finding portend that trade liberalisation combined with 31 percent increase in VAT has a favourable impact on poverty at the national level in the long-run in Ghana.

All poverty indicators also decline for all locations. The headcount poverty for urban areas decreases from 10.4 percent in the base scenario to 9.6 percent for trade liberalisation combined with 31 percent increase in VAT in 2015, while the poverty gap falls from 2.9 percent in the base to 2.7 percent in for trade liberalisation with VAT in 2015. Finally, the severity of poverty falls

from 1.2 percent in the base to 1.1 percent for trade liberalisation combined with VAT in 2015. The extent of decrease in the poverty measures under trade liberalisation combined with 31 percent increase in VAT is 7.7 percent for the incidence of poverty, 6.9 percent for the depth of poverty and 8.3 percent for the severity of poverty.

For rural areas the incidence of poverty reduces from 37.1 percent in the base scenario to 35.3 percent, the poverty gap decreases from 12.7 percent in the base scenario to 11.9 percent in 2015, while the severity of poverty falls from 6.2 percent in the base to 5.8 percent for trade liberalisation with 31 percent rise in VAT in 2015. Comparatively, the incidence of poverty falls from 37.1 percent for the base scenario to 36.3 percent for trade liberalisation and 35.3 percent for trade liberalisation combined with 31 percent rise in VAT, the depth of poverty declines from 12.7 percent for the base to 12.3 percent for trade liberalisation and 11.9 percent for trade liberalisation with 31 percent increase in VAT and finally, the severity of poverty falls from 6.2 percent for the base scenario to 5.9 percent for trade liberalisation and 5.8 percent for trade liberalisation combined with 10 percent rise in VAT. Relatively, the incidence of poverty decreases by 4.9 percent, the depth of poverty falls by 6.3 percent and the severity of poverty declines by 6.5 percent.

A comparison of the poverty effects of trade liberalisation combined with 31 percent rise in VAT rate for urban and rural areas shows that the fall in the incidence of poverty, the depth of poverty and severity of poverty is higher in the urban area than in the rural area. For instance, while the

incidence of poverty falls by a margin of 7.7 percent in the urban area, it falls by 4.9 percent in the rural area. The depth of poverty for urban area falls by 6.9 percent, while it declines by 6.3 percent in the rural area. Finally, the severity of poverty also changes by a higher percentage in the urban area than in the rural. Specifically, while the severity of poverty falls by 8.3 percent in the urban areas, it decreases by 6.5 percent in the rural areas. Clearly, even though poverty reduces for both urban and rural areas, it reduces more for urban areas than rural areas for the same reasons as indicated under trade liberalisation.

Household level analysis

Trade liberalisation with 31 percent rise in VAT reduces poverty for all household categories as confirmed under VAT in Table 38. This finding corroborates the finding of Bhasin and Annim (2005), but contradicts those of Wong et al (2008) and Emini et al (2005).

A critical examination of poverty levels at the household level shows that urban households benefit more than rural households. This finding reflects the regional analysis made earlier. Broadly, while the incidence of poverty ranges between 4 percent and 28 percent for urban areas, it ranges between 18 percent and 66 percent for rural areas.

Equally worth noting is the fact that poverty is higher in the northern households than rural households. Northern households have the highest incidence of poverty in both urban and rural areas. For northern rural households, poverty levels have been very high so that even though poverty

generally reduces for trade liberalisation with 31 percent increase in VAT, the level of poverty in the northern rural households still remains high. For example, the poverty headcount decreases from 67.2 percent in the benchmark scenario to 66.5 percent in 2015 for the policy shock and the depth of poverty falls from 30.4 percent in the benchmark to 29.3 percent in 2015 for all northern households. Finally, the severity of poverty declines from 17.0 percent in the benchmark to 16.2 percent in 2015. It is also worthy of note that the highest reduction in the incidence of poverty occurs in the rural coast household. Here, the poverty headcount decreases from 20.9 percent in the benchmark to 18.1 percent in 2015 under the policy scenario.

Table 38: Trade liberalisation combined with 31percent increase in value added tax and household poverty

Household	Base			Value added tax		
	Po	P1	P2	Po	P1	P2
Accra	10.2	2.7	1.0	9.8	2.4	0.9
Urban Coastal	5.5	0.8	0.2	4.2	0.7	0.2
Urban Forest	6.7	1.7	0.7	5.9	1.4	0.6
Urban South	20.9	7.4	3.9	20.0	7.0	3.6
Urban North	30.1	10.5	4.7	28.5	9.9	4.3
Rural Coastal	20.9	4.7	1.5	18.1	4.0	1.3
Rural Forest	25.4	6.1	2.1	23.4	5.5	1.8
Rural South	34.6	7.6	2.5	32.4	6.7	2.2
Rural North	67.2	30.4	17.0	66.5	29.3	16.2

Source: Simulation Results

In short, trade liberalisation combined with 31 percent increase in VAT rate reduces the incidence of poverty, depth of poverty and severity of poverty of all households. But trade liberalisation combined with an increase in VAT favours urban households more than rural households.

CHAPTER SEVEN

TRADE LIBERALISATION AND INCREASE IN CORPORATE TAX

Introduction

The chapter presents the simulated results of trade liberalisation combined with a 50 percent rise in the corporate tax rate. Trade liberalisation led to a fall in government revenue from Gh¢ 39853.87 billion to Gh¢38140.15 billion in the short run. Various percentages of the prevailing average corporate tax rate of 25 percent were tried and 50 percent was found to restore government revenue to the level before trade liberalisation.

The first part of the presentation in this chapter will focus on the macroeconomic and sectoral effects of the policy experiment and the second part will deal with the effect of trade liberalisation combined with 50 percent increase in corporate tax on poverty in Ghana.

As indicated in the previous simulations, complete import tariff removal leads to a fall in the price of imports relative to local import-competing substitutes. The reduction in import prices will cause quantity demanded of imports to increase. The exchange rate depreciates because the increase in the amount of imported goods requires a real depreciation to increase exports in order to maintain the initial fixed trade balance. The depreciation of the local currency makes exports profitable and export volumes rise assuming that there are no supply constraints and Ghana is a

small country, by which we mean exports from the country do not affect international market prices.

Assuming that the firms paying the corporate tax are exporters, then how much investment that they will make will depend on the profitability of the investment. Since an increase in corporate tax reduces the profitability of investment, not much investment will be undertaken, employment will not expand as expected or there could be layoffs. If the affected firms are major employers of labour, then the layoffs could cause household incomes and consumption to fall and hence increase poverty. On the contrary, if the firms are not key employers of labour, then the impact of the policy shock on household income and consumption will be minimal. Another channel through which corporate tax could affect poverty is household consumption. Because an increase in corporate tax reduces corporate income, incomes households receive from enterprises also decrease, thereby leading to a decline in consumption. Reduced consumption will lead to output cuts, reduction in employment and hence lead to rise in poverty. Thus, the effect of the policy shock on poverty will be based on which of the forces identified above dominates.

Macroeconomic effects

The macroeconomic effects of trade liberalisation combined with 50 percent increase in corporate tax are presented in this section. As in the previous simulations, GDP increases by about 3.01 percent as shown in Table 39.

Table 39: Trade liberalisation, 50 percent increase in corporate tax and macroeconomic indicators

GDP items	Base	Corporate Tax (%)
Absorption	24659.64	3.63
Private consumption	134436.88	7.94
Government consumption	25644.83	5.85
Fixed investment	444529.55	10.58
Stock change	48.13	2.20
Export	51425.96	21.87
Imports	91159.57	15.04
GDP(Value Added)	164925.76	3.01
Government revenue	39853.87	-4.30

Source: Simulation Results

There is also improvement in the components of GDP as exemplified by increases in absorption of about 3.63 percent and private consumption of about 7.94. Government consumption increases by 5.85 percent, investment rises by 10.58 percent, exports increase by 21.87 percent and imports improve by 15.04 percent. The rise in GDP means that complete removal of import tariff (trade liberalisation) combined with 50 percent increase in corporate tax improves economic welfare (Wang & Zhai, 1998).

The policy shock also causes reduction in the prices of imports relative to the heavily protected domestic import-competing substitutes such as rice, chicken, Dairy products, textiles, leather and footwear, paper products, publishing and printing, fertilizer and clothing as shown in Table 41.

Consumer demand switches from the relatively expensive domestic import-competing substitutes to the relatively less expensive imported goods and services leading a decline in output and hence employment in the domestic import-competing sectors.

High import demand leads to depreciation of the local currency, which is necessary to keep the current account fixed. Availability of cheap imported inputs reduces costs of production and hence improves the competitiveness of the export sector. Exports increase because of the profitability of the sector, leading to expansion in investment, employment, output and incomes. Similar to the first and second simulations, expansion in the exports sectors is confined to non-traditional exports such as fruit, tree nuts, vegetable and industrial crops, and traditional exports like cocoa, forestry products, fish products and wood products (See Table 40). Compared with the first two simulation results, the increase in the aforementioned export sectors under trade liberalisation with 50 percent rise in corporate tax rate is the highest. The implication is that the positive impact of import tariff removal offsets the negative effects of increase in the corporate tax rate.

Table 40: Trade liberalisation, 50 percent increase in corporate tax and value added

Commodity	Base	Corporate tax (%)
Maize	831.54	-1.68
Rice	365.64	-65.14
Sorghum/Millet	1070.68	-1.17
Cassava	707.14	5.88

Table 40 (Continued)

Yams	132.30	1.28
Cowpea	294.23	0.89
Soyabean	65.01	24.74
Groundnuts	732.68	-3.80
Tree nuts	226.79	8.51
Fruit domestic	500.99	4.00
Vegetable domestic	1572.36	-7.23
Plantains	129.57	4.87
Fruit export	55.81	31.69
Vegetable export	122.82	7.81
Palmoil	207.30	4.81
Cocoa beans	1896.40	5.96
Other crop	129.20	30.01
Export Industrial crop	548.43	8.99
Chicken	8.88	-25.84
Eggs	28.60	13.72
Beef	539.18	-6.73
Goat	346.17	6.46
Other meat	434.77	0.64
Fishery	2197.22	12.97
Mining	6592.86	1.26
Other formal Food processing	573.64	5.57
Cassava	728.95	3.74

Table 40 (Continued)

Dairy	655.34	-32.89
Meat and fish processing	2171.27	1.80
Textile	328.63	-81.25
Clothing	1274	-6.21
Leather and footwear	600.97	-63.87
Wood production	1695.08	15.62
Paper products, publishing and printing	324.62	-5.18
Petroleum	519.98	9.24
Diesel	436.47	8.13
Other fuels	12.82	1.12
Other chemicals	1430.29	29.60
Metal production	1679.38	3.01
Acapt	1459.64	10.59
Construction	15749.79	-10.41
Water	268.62	7.80
Electricity	4748.71	8.89
Trade services	7582.82	10.77
Other services	1025.24	7.41
Transport services	4575.34	8.21
Communication	2829.49	10.20
Business	2389.17	23.05
Cassava	3752.11	9.04

Table 40 (Continued)

Community and other services	3045.86	4.90
Administration	18902.66	0.11
Education	4018.46	0.10
Health	1167.06	1.53

Source: Simulation Results

The expansion in these export sectors engenders significant increase in employment of unskilled and semi-skilled labour. Household incomes rise because of the increase in labour income which is the main source of income. Consequently, poverty rate may decrease. Other non-tradable sectors whose expansion can be attributed to the policy shock include administration, health, water, education, trade, transport and communication, real estate, mining, trading, other services, etc. Most of these sectors provide support to the export sector. Examples of the supporting sectors include road transport, business services including telecommunication, public sector services, water and electricity, health and education. The service sector which is a major employer of labour in Ghana also expands. However, construction which must have benefited from the tariff protection contracts by a bigger margin under this policy shock than for the first two simulations.

Sectoral impact

The policy shock produces differential impact on import prices (See Table 41) with the most affected products being rice, chicken, dairy products,

textiles, clothing, leather and footwear, paper products, publishing and printing and fertilizer.

Table 41: Trade liberalisation, 50 percent increase in corporate tax and import prices

Commodity	Base	Corporate tax (%)
Maize	1.55	6.18
Rice	3.76	-12.83
Other cereals	1.00	3.32
Other crops	2.66	3.31
Chicken	1.00	-11.79
Beef	1.00	6.18
Sheep and Goat	1.00	3.30
Other meat	1.00	3.29
Other formal food processing	1.00	3.31
Dairy products	1.00	-18.26
Meat and fish processing	1.00	-1.62
Textiles	1.00	-20.16
Clothing	1.00	-2.52
Leather and footwear	1.00	-22.01
Paper product, publishing and printing	1.00	-24.27
Crude and other oils	1.00	6.18
Other fuels	1.00	4.91
Fertilizer	1.00	-5.17
Cassava	0.88	-0.54

Table 41 (Continued)

Metal products	0.48	2.12
Electricity	1.00	6.22

Source: Simulation Results

A comparison with the first two simulation results indicates that the extent of fall in import prices is highest for this policy simulation exercise. Also, demand for imports increases the most for this simulation than the earlier two simulation experiments.

Imports of rice, dairy products, chicken, processed food, textiles, clothing, and paper products (Table 42) increase. Similarly, imports of crude oil and related products and fertilizer rise. The extent of increase in the import of these products is highest for this policy shock compared with trade liberalisation and trade liberalisation combined with 31 percent increase in VAT rate. Lack of demand causes decline in the production of domestic substitutes for the imported products. Therefore, profits of the contracting domestic substitutes fall, causing earnings of factors of production to decline. Factors whose earnings are adversely affected relocate to the expanding sectors.

Table 42: Trade liberalisation, 50 percent increase in corporate tax and imports

Commodity	Base Level	Corporate tax (%)
Maize	118.71	-13.78
Rice	1054.42	50.15
Other cereals	136.74	4.53
Other crops	64.49	-20.83
Chicken	1782.82	28.38
Beef	740.93	11.11
Sheep/ Goat	175.44	13.51
Other meats	374.20	5.44
Other formal food processing	8352.54	6.93
Dairy products	144.19	30.40
Meat and fish processing	2396.95	29.98
Textiles	1689.67	5.95
Clothing	4358.93	7.90
Leather and footwear	1069.50	8.85
Paper product, publishing and printing	503.28	9.98
Crude and other oils	10104.97	9.40
Other fuels	4787.27	6.36
Fertilizer	2879.73	0.47
Other chemicals	7356.46	2.59
Metal products	6335.89	-7.71
Electricity	86.36	-18.82

Source: Simulation Results

Output expansion occurs in general agricultural, industrial and export subsectors. The expanding agriculture sectors include other crops, other cereals, vegetable farming, goat and sheep rearing and cocoa farming. Other food processing, other chemicals, electricity, water, mining and metal sectors constitute the expanding industrial sectors. For the export sector, the growing sectors include non-traditional exports such as fruit exports, tree nuts, vegetable exports and export industry crops, and the traditional exports like cocoa, forestry products, fish products and wood products (See Tables 43). The expansion in, particularly, agriculture is significant in that the sector employs over 50 percent of the labour force and by extension provides income to many households in Ghana.

Table 43: Trade liberalisation, 50 percent increase in corporate tax and exports

Commodity	Base	Corporate tax (%)
Cocoyam	92.31	-4.24
Palm oil	163.02	-1.83
Groundnuts	46.58	-0.51
Tree nuts	473.63	1.37
Fruit export	660.77	34.75
Vegetable export	47.78	7.97
Cocoa beans	874.65	7.34
Export of industrial crops	79.43	8.41
Forestry	7726.40	2.03
Fishing	1679.71	21.33

Table 43 (Continued)

Mining	11292.39	1.53
Cocoa processing	1927.72	-1.18
Meat and fish processing	1927.72	18.99
Textiles	118.52	-7.40
Wood products	3246	18.75
Other chemicals	119.45	9.27
Repairing, hotel and restaurant	8203.77	9.74

Source: Simulation Results

Improvement in the agricultural and export-oriented sectors is of particular importance because it impacts positively on employment as most of the activities are labour-intensive in nature. Employment of unskilled and semi-skilled labour increases substantially. With labour income as the main source of income to majority of households in Ghana, household incomes increase and many people come out of poverty. The rise in incomes in the agricultural and export sectors simulates demand for other products such as non-tradable goods and services.

Expansion in the agricultural and industrial sectors engender improvement in other supporting sectors, particularly, commerce, transport and communication, real estates, business services, banking and finance, insurance, administration, education and health are rejuvenated to support the expansion in the agricultural, industrial and export sectors. Particularly, improvement in the transportation industry such as road transport is necessary to deal with the increasing volumes of cocoa, wood products and the

transportation of all the agricultural products from the farm gate to the marketing centres.

Factor earnings

As has been pointed out in the earlier simulation exercises, different sectors of the economy response differently to the policy shock in the form of trade liberalisation combined with 50 percent increase in corporate tax rate. Thus, while some sectors of the economy expand, other sectors contract creating varying degree of demand for factors of production in the economy. Expanding sectors offer attractive returns to factors they use intensively, while the contracting sectors offer lower rewards.

The policy shock has caused expansion in non-traditional exports, which are predominantly labour intensive activities. Expansion in the output of these sectors create demand for labour, returns to labour rises, and labour from the contracting sectors, that is, import-competing sectors (for example rice, poultry, etc) of the economy, relocate to these expanding sectors. Factor employment, factor earnings and sectoral allocation of productive resources are accordingly affected.

The simulation results of the policy experiment, trade liberalisation combined with 50 percent increase in corporate tax rate, on the returns to factors are presented in Table 44.

Table 44: Trade liberalisation, 50 percent increase in corporate tax and factor returns

Factor	Base	Corporate tax
Self-employed agricultural labour	8.76	11.13
Skill labour (non-agricultural)	26.26	7.96
Unskilled labour (non-agricultural)	12.49	7.24
Capital	0.21	-0.13
Land (coast)	3.26	11.69
Land (forest)	2.39	9.71
Land (south)	3.90	9.58
Land (north)	2.17	8.55

Source: Simulation Results

It is clear from Table 44 that returns to all categories of labour in all ecological zones improve while returns to capital decreases. Particular mention can be made of the positive change in return to self-employed labour (agriculture), and land in all the ecological zones as a result of the policy shock. The finding is attributed to the factor that most of the expanding sectors are agricultural activities with high labour intensities. It is pertinent, however, to note that the change in returns to self-employed agricultural labour is more than that of skilled labour non-agriculture and unskilled labour non-agriculture. Similarly, the change in returns to land exceeds change in returns to skilled labour non-agriculture and unskilled labour non-agriculture. This pattern in the change of factor returns is because trade liberalisation favours the production of labour-intensive commodities that use agriculture labour and

land intensively. Hence, the demand for self-employed agricultural labour and land increase relatively more than for other factors, pushing up their relative returns.

Compared with in the first two simulation results, the increase in the returns to skilled labour (non-agriculture) and unskilled labour (non-agriculture) and land is highest for this simulation exercise. Similarly, the decline in the returns to capital in this simulation is smaller than that of the previous two simulations.

Household income

Household incomes increase in response to complete import tariff removal combined with 50 percent rise in corporate tax rate (See Table 45). Household incomes increase in response to the rise in the returns to labour, a primary source of income to households.

Generally, rural households benefit more from the increase in incomes than urban households. The result supports Chitiga and Mabugu (2005) for Zimbabwe but contradicts the results of Siddiqui et al (2008) for Pakistan, Cororaton (2008) for the Philippines, and Wong, Arguello and Rivera (2008) for Ecuador.

Trade liberalisation combined with 50 percent increase in corporate tax rate favours rural incomes more than urban incomes because rural households rely more on labour income which increases as a result of the policy shock than their urban counterparts. In effect, rural households benefit more from the export push than their urban counterparts.

Table 45: Trade liberalisation, 50 percent increase in corporate tax and household income

Household	Base	Corporate tax (%)
Accra	31410.95	6.88
Urban coastal	9781.06	6.61
Urban Forest	16148.56	6.86
Urban south	15545.99	6.61
Urban North	3370.75	7.33
Rural Coastal	8940.74	10.97
Rural Forest	23154.69	8.03
Rural South	22835.35	8.84
Rural North	13595.84	10.46

Source: Simulation Results

Household Consumption

Trade liberalisation combined with 50 percent rise in corporate tax rate has a favourable effect on household consumption, with rural households benefiting more than urban households (refer to Table 46). It is important to note that the benefits of the policy shock are not evenly distributed within either rural households or urban households. Of the rural households, rural coast enjoys the highest consumption change of 10.14 percent among the rural household group. This is followed by rural forest with 8.04 percent and rural south with 7.62 percent. Among the urban households, urban forest has the

highest consumption change of 7.29 percent, followed by Accra with 6.99 percent and Urban Coast with 6.81 percent.

Changes in household consumption favour rural households more than urban households because rural households benefit more from the expansion in exports resulting from trade liberalisation combined with 50 percent increase in corporate tax rate. The increased consumption is for both imported goods and local import-competing substitutes whose prices have been forced down by the increased inflow of cheap imports.

Table 46: Trade liberalisation, 50 percent increase in corporate tax and household consumption

Household	Base	Corporate Tax (%)
Accra	28159.92	6.99
Urban coastal	9539.28	6.81
Urban Forest	14985.44	7.29
Urban South	14870.72	6.18
Urban North	3391.31	6.02
Rural Coastal	8746.83	10.14
Rural Forest	20229.58	8.04
Rural South	21958.29	7.62
Rural North	12555.50	6.99

Source: Simulation Results

As shown in Table 46, changes in household consumption for this policy simulation exercise is highest compared with that for trade liberalisation and for trade liberalisation combined with 50 percent increase in

corporate tax rate. Accordingly, trade liberalisation combined with 50 percent increase in corporate tax rate is welfare-enhancing for all household groups. This finding confirms the results of Chan and Dung (2008) for Vietnam.

Poverty at the national level

The incidence of poverty, the depth of poverty and the severity of poverty at the national and regional levels reduce in response to the policy shock of complete removal of import tariffs combined with 50 percent increase in corporate tax rate. The results of the policy shock on poverty measures are shown under Corp Tax in Table 47.

Table 47: Trade liberalisation, 50 percent increase in corporate tax and national poverty

	Base			Corporate Tax		
	P0	P1	P2	P0	P1	P2
National	27.0	9.0	4.3	25.1	8.3	3.9
Urban	10.4	2.9	1.2	9.5	2.6	1.1
Rural	37.1	12.7	6.2	34.5	11.7	5.6

Source: Simulation Results

As shown in Table 47, the incidence of poverty falls from the base value of 27.0 percent to 25.1 percent in 2015. The depth of poverty decreases from 9.0 percent in the base scenario to 8.3 percent in 2015. Furthermore, the severity of poverty declines from 4.3 percent in the base scenario to 3.9 percent in 2015. A comparison of the poverty outcomes for trade liberalisation

with 50 percent increase in corporate tax rate with the results for the previous two simulation experiments indicate that the former's results are the lowest. For example, while the incidence of poverty reduces from 27 percent for base scenario to 26.4 percent for trade liberalisation and 25.6 percent for trade liberalisation with 31 percent increase in VAT, it reduces to 25.1 percent for trade liberalisation with 50 percent increase in the corporate tax rate. In a Similar vein, the depth of poverty reduces from 9.0 percent for the base to 8.7 percent for trade liberalisation, and 8.4 percent for trade liberalisation combined with 31 percent increase in VAT, but it reduces to 8.1 percent for trade liberalisation with 50 percent increase in corporate tax rate. In the case of the severity of poverty, while it falls from 4.3 percent for the base to 4.1 percent for trade liberalisation, it declines to 4.0 percent for trade liberalisation combined with 31 percent increase in VAT and to 3.9 percent for trade liberalisation combined with 50 percent rise in corporate tax rate.

Comparatively, the incidence of poverty reduces by 7.04 percent, the depth falls by 7.78 percent and the severity of poverty declines by about 9.30 percent. Clearly, trade liberalisation combined with 50 percent increase in corporate tax rate has a positive effect on poverty at the national level in the long-run Ghana.

In terms of location, poverty measures follow the national trend for this simulation experiment. The incidence of poverty for urban areas decreases from 10.4 percent in the base scenario to 9.5 percent for trade liberalisation combined with 15 percent increase in corporate tax rate in 2015, while the poverty gap falls from 2.9 percent in the base scenario to 2.6 percent in for

trade liberalisation with corporate tax in 2015. Finally, the severity of poverty falls from 1.2 percent in the base scenario to 1.1 percent for trade liberalisation combined with corporate tax rate increase of 50 percent in 2015.

Relatively, the extent of decrease in the poverty measures for this policy shock is 8.65 percent for the incidence of poverty, 10.34 percent for the depth of poverty and 8.3 percent for the severity of poverty. It is instructive to note that the extent of decrease in the severity of poverty from the base scenario is the same for trade liberalisation with 31 percent increase in VAT and trade liberalisation with 50 percent increase in the corporate tax rate. However, the extent of decrease in the incidence of poverty and depth of poverty for trade liberalisation combined with 50 percent increase in corporate tax rate exceeds that for trade liberalisation with 31 percent increase in VAT.

In the case of rural areas the incidence of poverty reduces from 37.1 percent in the base scenario to 34.5 percent, the poverty gap decreases from 12.7 percent in the base scenario to 11.7 percent in 2015, while the severity of poverty falls from 6.2 percent in the base to 5.6 percent for trade liberalisation with 15 percent rise in corporate tax rate in 2015. In relative terms these poverty measures decline by 7.0 percent for incidence of poverty, 7.8 percent for the depth of poverty and 9.7 percent for the severity of poverty.

Comparison of the results of the three simulation exercises indicates that the incidence of poverty falls from 37.1 percent for the base scenario to 36.3 percent for trade liberalisation, to 35.3 percent for trade liberalisation combined with 31 percent rise in VAT and to 34.5 percent for trade liberalisation combined with 50 percent increase in corporate tax rate. The

depth of poverty declines from 12.7 percent for the base to 12.3 percent for trade liberalisation, to 11.9 percent for trade liberalisation with 31 percent increase in VAT and to 11.7 for trade liberalisation combined with 50 percent increase in corporate tax rate. Finally, the severity of poverty falls from 6.2 percent for the base scenario to 5.9 percent for trade liberalisation, to 5.8 percent for trade liberalisation combined with 31 percent rise in VAT and 5.6 percent for trade liberalisation with 50 percent increase in corporate tax rate.

Even though poverty levels fall for both urban and rural areas, urban areas record lower levels of poverty than rural areas for this policy shock of trade liberalisation combined with 50 percent increase in corporate tax rate increase. In particular, the rate of decrease in the incidence of poverty, the depth of poverty and severity of poverty is higher in the urban area than in the rural area. For instance, while the incidence of poverty falls by a margin of 8.7 percent in the urban area, it falls by 7.0 percent in the rural area. The depth of poverty for urban area falls by 10.3 percent, while it declines by 7.8 percent in the rural area. However, the severity of poverty changes by a lower percentage in the urban area than in the rural area. Specifically, while the severity of poverty falls by 8.3 percent in the urban areas, it decreases by 9.7 percent in the rural areas. This can be explained to mean that even though the number of poor reduces by a higher percentage in the urban area compared with the rural area, inequality among the poor is lower in rural areas than in urban areas. On the whole, even though poverty reduces for both urban and rural areas, it is still higher in rural areas than in urban areas.

Household level analysis

All poverty measures reduce following the policy experiment of trade liberalisation combined with 50 percent increase in corporate tax. The results are captured in Table 48.

As shown in Table 48, all households experience reduction in poverty levels relative to the base scenario, but urban households benefit more than rural households. This finding is in line with the national analysis made earlier. Generally, while the incidence of poverty ranges between 4 percent and 28 percent for urban areas, it ranges between 17 percent and 66 percent for rural areas. For the poverty gap, the range is between 0.6 percent and 10 percent for urban areas while it is between 4 percent and 30 percent for rural areas. Similarly, the severity of poverty ranges 0.1 percent and 4 percent for urban areas and 1.0 percent and 16 percent for rural areas.

Table 48: Trade liberalisation, 50 percent in corporate tax and household poverty

Household	Base			Corporate tax		
	Po	P1	P2	Po	P1	P2
Accra	10.2	2.7	1.0	9.7	2.3	0.9
Urban Coastal	5.5	0.8	0.2	4.2	0.6	0.1
Urban Forest	6.7	1.7	0.7	5.9	1.4	0.6
Urban South	20.9	7.4	3.9	20.0	6.8	3.6
Urban North	30.1	10.5	4.7	28.1	9.7	4.2
Rural Coastal	20.9	4.7	1.5	16.9	3.8	1.2

Table 48 (Continued)

Rural Forest	25.4	6.1	2.1	22.7	5.3	1.8
Rural South	34.6	7.6	2.5	31.4	6.4	2.1
Rural North	67.2	30.4	17.0	66.0	28.9	16.0

Source: Simulation Results

Equally worth noting is the fact that poverty is higher in the northern households than rural households. Northern households have the highest incidence of poverty in both urban and rural areas. For northern rural households, poverty levels have been very high so that even though poverty generally reduces for trade liberalisation with 50 percent increase in corporate tax rate, the level of poverty in the northern rural households still remains high. For example, the poverty headcount decreases from 67.2 percent in the benchmark scenario to 66.0 percent in 2015 for the policy shock and the depth of poverty falls from 30.4 percent in the benchmark to 28.9 percent in 2015 for all northern households. Finally, the severity of poverty declines from 17.0 percent in the benchmark to 16.0 percent in 2015. It is also worthy of note that the highest reduction in the incidence of poverty occurs in the rural coast household. Here, the poverty headcount decreases from 20.9 percent in the benchmark to 16.9 percent in 2015 under the policy scenario.

In conclusion, trade liberalisation combined with 50 percent increase in corporate tax rate reduces the incidence of poverty, depth of poverty and severity of poverty of all households. However, trade liberalisation combined

with an increase in corporate tax rate favours urban households more than rural households.

CHAPTER EIGHT

TRADE LIBERALISATION AND INCREASE IN INCOME TAX

Introduction

In this chapter the results of the policy experiment, trade liberalisation combined with 40 percent rise in income tax rate, are presented. The 40 percent rise in the income tax rate was found to be the extent to which income tax must rise to keep government revenue, which reduced from Gh¢ 39853.87 billion to Gh¢38140.15 billion after trade liberalisation, neutral.

The rest of the chapter is organised as follows: The first section of the chapter concerntrates on the macroeconomic and sectoral effects of the policy experiment, and the second part dwells on the effect of the policy shock on poverty in Ghana.

In this simulation exercise, the fall in revenue resulting from the complete removal of trade tariffs is covered up by 40 percent upward adjustment in income tax rate so as to keep government revenue intact. Trade tax reduction makes imports cheaper and hence lead to increase in imports, all other things being equal, to the detriment of the production of local import-substitutes. Relative demand for the domestic import-competing substitutes decreases, output falls and employment also decreases. Factors of production from the contracting import-competing sectors relocate to the expanding export sector. For factors of production that are successful in relocating to

expanding sectors, their incomes could remain the same or even be higher. However, for those that are not able to relocate, their incomes fall and poverty worsens.

Again, cheaper imported inputs reduce domestic costs of production and make firms competitive. Also, the increase in relative demand for imports causes the exchange rate to depreciate for exports to increase in order to maintain the trade balance. The depreciation of the exchange rate increases the domestic price of exports and so exporters are motivated to export more, assuming there are no export supply constraints in Ghana, and secondly, the country's exports do not affect international prices of exports. Investment in the export sector increases, factor employment expands and factor earnings rise. Consequently, household incomes increase, but disposable incomes fall with the increase in the income tax rate.

The decline in disposable income has direct and indirect effects on poverty. Directly, poverty will rise because consumption levels may fall. The indirect effect is that the decline in disposable income leads to a fall in demand, which discourages investment and hence employment. Income of those who lose their jobs fall and poverty worsens for them. Alternatively, the fall in demand leads to a fall in prices, causes real incomes to rise for those who have jobs. Again, households can deplete their savings to make up for any welfare loss and so poverty may not rise. In effect therefore, the outcome of this policy experiment depends on which of these effects plays out stronger.

Macroeconomic effects

The policy shock of complete elimination of import tariff (trade liberalisation) with 88 percent upward adjustment in income tax produces favourable macroeconomic effects as captured in Table 49.

Table 49: Trade liberalisation, 40 percent increase in income tax and macroeconomic indicators

GDP items	Base	Income Tax (%)
Absorption	24659.64	8.14
Private consumption	134436.88	10.93
Government consumption	25644.83	8.86
Fixed investment	444529.55	15.00
Stock change	48.13	3.01
Export	51425.96	25.54
Imports	91159.57	16.24
GDP(Value Added)	164925.76	3.58
Government revenue	39853.87	-4.30

Source: Simulation Results

As displayed in Table 49, GDP increases by 3.58 percent over the base value. Other macroeconomic variables that have benefited from the positive influence of the policy shock include absorption, which increases by 8.14 percent, private consumption which rises by 10.93 percent and government consumption which increases by 8.86 percent. Others include investment, which rises by 15.00 percent, exports which, increases by 25.54 percent and imports, which improve by 16.24 percent. The expansion in GDP can be

explained to mean that total elimination of import tariff (trade liberalisation) combined with 40 percent increase in income tax enhances economic welfare in Ghana. Thus, trade liberalisation improves economic efficiency. Wang and Zhai (1998) make a similar observation for China.

Trade liberalisation combined with 40 percent increase in income tax causes reduction in the prices of imports relative to the heavily protected domestic import-competing substitutes such as rice, chicken, dairy products, textiles, leather and footwear paper products, publishing and printing, fertilizer and clothing. Consumer demand switches from the relatively expensive domestic import-competing substitutes to the relatively less expensive imported goods and services leading to a decline in the output and hence employment in the domestic import-competing sectors.

Under pressure from high import demand, the local currency depreciates, a necessary condition to the keep the current account fixed. With cheap imported inputs readily available, costs of production reduce which improves the competitiveness of the export sector. Exports increase because of the profitability of the sector, leading to expansion in investment, employment, output and incomes. In line with the first three simulation exercises, expansion in the export sectors is confined mostly to non-traditional exports such as fruit, tree nuts, vegetable and industrial crops, and traditional exports like cocoa, forestry products, fish products and wood products .

Table 50: Trade liberalisation, 40 percent increase in income tax and value added

Commodity	Base	Income Tax (%)
Maize	831.54	-1.46
Rice	365.64	-74.07
Sorghum/Millet	1070.68	-1.45
Cassava	707.14	6.14
Yams	132.30	1.19
Cowpea	294.23	1.22
Soyabean	65.01	5.46
Groundnuts	732.68	2.92
Tree nuts	226.79	4.94
Fruit domestic	500.99	3.14
Vegetable domestic	1572.36	-7.58
Plantains	129.57	5.90
Fruit export	55.81	37.63
Vegetable export	122.82	8.89
Palmoil	207.30	5.00
Cocoa beans	1896.40	4.80
Other crop	129.20	31.87
Export Industrial crop	548.43	9.22
Chicken	8.88	-36.65
Eggs	28.60	-15.65
Beef	539.18	-2.16
Goat	346.17	2.22

Table 50 (Continued)

Other meat	434.77	1.62
Forestry	4963.44	2.23
Fishery	2197.22	14.77
Mining	6592.86	1.19
Other formal food processing	573.64	5.84
Cocoa processing	728.95	0.30
Dairy	655.34	-51.93
Meat and fish processing	2171.27	-2.25
Textile	328.63	-86.72
Clothing	1274	-1.16
Leather and footwear	600.97	-72.84
Wood production	1695.08	2.75
Paper products, publishing and printing	324.62	-6.18
Petroleum	519.98	10.05
Diesel	436.47	9.93
Other fuels	12.82	0.14
Other chemicals	1430.29	25.85
Metal production	1679.38	8.03
Acapt	1459.64	4.08
Construction	15749.79	-10.50
Water	268.62	8.51
Electricity	4748.71	9.17

Table 50 (Continued)

Trade services	7582.82	12.82
Other services	1025.24	9.33
Transport services	4575.34	11.93
Communication	2829.49	12.35
Business	2389.17	24.48
Real Estate	3752.11	12.10
Community and other services	3045.86	6.27
Administration	18902.66	0.22
Education	4018.46	0.11
Health	1167.06	2.28

Source: Simulation Results

Other non-tradable sectors whose expansion can be attributed to the policy shock include administration, health, water, education, trade, transport and communication, real estate, mining, trading, other services, etc. Most of these sectors provide support to the export sector. Examples of the supporting sectors include road transport, business services including telecommunication, public sector services, water and electricity, health and education. The service sector which is a major employer of labour in Ghana also expands. However, construction which must have benefited from the tariff protection contracts by a bigger margin under this policy shock than for the first three simulations (see Table 50).

Sectoral impact

The policy shock manifests itself in the form of decrease in domestic import prices, which influence other prices, thereby resulting in reallocation of resources, changes in household incomes and variations in consumption expenditure. The impact of the trade liberalisation accompanied by 40 percent increase in income on domestic import prices is captured in Table 51.

As expected, domestic import prices decline in response to the policy shock of trade liberalisation combined with 40 percent increase in income tax (Khondker, et al 2008), with the protected products experiencing the highest decline in prices. The most affected products, which are also the protected products in the country, include rice, chicken, dairy products, textiles, clothing, leather and footwear, paper products, publishing and printing and fertilizer.

Table 51: Trade liberalisation, 40 percent increase in income tax and import Prices

Commodity	Base	Income Tax (%)
Maize	1.55	7.82
Rice	3.76	-12.83
Other cereals	1.00	7.82
Other crops	2.66	3.76
Chicken	1.00	-11.79
Beef	1.00	7.82
Sheep and Goat	1.00	7.81
Other meat	1.00	3.73

Table 51 (Continued)

Other formal food processing	1.00	3.75
Dairy products	1.00	-18.26
Meat and fish processing	1.00	-1.62
Textiles	1.00	-20.16
Clothing	1.00	-2.52
Leather and footwear	1.00	-22.01
Paper product, publishing and printing	1.00	-24.27
Crude and other oils	1.00	7.82
Other fuels	1.00	6.21
Fertilizer	1.00	-5.17
Other chemicals	0.88	-0.54
Metal products	0.48	2.65
Electricity	1.00	7.86

Source: Simulation Results

In response to the fall in import prices, imports of rice, dairy products, chicken, processed food, textiles, clothing, and paper products (see Table 52) increase. Similarly, imports of crude oil and related products and fertilizer rise.

Table 52: Trade liberalisation, 40 percent increase in income tax and imports

Commodity	Base	Income Tax (%)
Maize	118.71	27.01
Rice	1054.42	67.35
Other cereals	136.74	10.31
Other crops	64.49	-22.55
Chicken	1782.82	37.17
Beef	740.93	15.22
Sheep/ Goat	175.44	19.75
Other meats	374.20	8.10
Other formal food processing	8352.54	8.41
Dairy products	144.19	31.00
Meat and fish processing	2396.95	32.29
Textiles	1689.67	6.88
Clothing	4358.93	8.56
Leather and footwear	1069.50	9.31
Paper product, publishing and printing	503.28	10.27
Crude and other oils	10104.97	12.17
Other fuels	4787.27	7.96
Fertilizer	2879.73	1.26
Other chemicals	7356.46	4.39
Metal products	6335.89	-9.40
Electricity	86.36	-19.02

Source: Simulation Results

The rise in the volume of imports could be explained to mean that the decrease in the domestic price of imports exceeds the decline in the price of domestic import-competing substitutes. The extent of increase in the import of these products is highest for this policy shock (Khondker, et al 2008) compared with trade liberalisation, trade liberalisation combined with 31 percent increase in VAT rate and trade liberalisation accompanied by 50 percent increase in corporate tax rate. This result differs from that of Khondker, et al (2008), probably because the increase in income tax, in this case, is not high enough to discourage the demand for imported products.

Slackened demand causes decline in the production of domestic substitutes for the imported products. Therefore, profits of the contracting domestic substitutes fall, causing earnings of factors of production to decline under the circumstance. Factors whose earnings are adversely affected relocate to the expanding sectors.

Other sectors of the economy (refer to Table 50) in general agriculture, industry and export subsectors expand as a result of the policy shock. The expanding agriculture sectors include other crops, other cereals, vegetable farming, goat and sheep rearing and cocoa farming. Other food processing, other chemicals, electricity, water, mining and metal sectors constitute the expanding industrial sectors. For the export sector, the growing sectors include non-traditional exports such as fruit exports, tree nuts, vegetable exports and export industry crops, and the traditional exports like cocoa, forestry products, fish products and wood products (Table 53). The growth in certain agricultural

subsectors is noteworthy as the sector employs over 50 percent of the labour force and by extension provides income to many households in Ghana.

Table 53: Trade liberalisation, 40 percent increase in income tax and exports

Commodity	Base	Income Tax (%)
Cocoyam	92.31	-3.58
Palm oil	163.02	-3.60
Groundnuts	46.58	-1.50
Tree nuts	473.63	6.85
Fruit export	660.77	7.25
Vegetable export	47.78	10.06
Cocoa beans	874.65	3.34
Export of industrial crops	79.43	5.42
Forestry	7726.40	9.31
Fishing	1679.71	7.21
Mining	11292.39	2.67
Cocoa processing	1927.72	-3.04
Meat and fish processing	1927.72	9.56
Textiles	118.52	-5.33
Wood products	3246	6.15
Other chemicals	119.45	8.86
Repairing, hotel and restaurant	8203.77	8.80

Source: Simulation Results

Expansion in the agricultural, export-oriented and the industrial sectors influence employment of unskilled and semi-skilled labour, which constitute the main source of income to many of households in Ghana. In addition, growth in these sectors serves as a catalyst for other supporting sectors, particularly, commerce, transport and communication, real estates, business services, banking and finance, insurance, administration, education and health to be invigorated to support the expansion in the agricultural, industrial and export sectors.

Factor Earnings

Trade liberalisation combined with 88 percent increase in income tax results in contraction of the protected sectors like rice cultivation, poultry farming, and textile manufacturing and growth in the unprotected sectors such as vegetable cultivation, cereal cultivation, and non-traditional export crop cultivation which are mostly labour-intensive activities. In response to the sectoral growth dynamics, labour and capital resources move from the contracting sectors to the expanding as the growing sectors offer attractive returns to factors they use intensively, while the contracting sectors offer lower rewards. The impact of the policy simulation on factor returns is as shown in Table 54.

It is clear from Table 54 that returns to all categories of labour in all ecological zones increase while returns to capital decreases. Particular mention can be made of the positive change in return to self-employed labour

(agriculture), and land in all the ecological zones as a result of the policy shock.

Table 54: Trade liberalisation, 40 percent increase in income tax and factor returns

Factor	Base	Income Tax (%)
Self-employed agricultural labour	8.76	13.60
Skill labour (non-agricultural)	26.26	10.10
Unskilled labour (non-agricultural)	12.49	8.19
Capital	0.21	-2.89
Land (coast)	3.26	13.94
Land (forest)	2.39	11.05
Land (south)	3.90	10.70
Land (north)	2.17	10.14

Source: Simulation Results

The finding is attributed to the fact that most of the expanding sectors are agricultural activities with high labour intensities and less capital requirements. This assertion is further strengthened by the fact that change in returns to self-employed agricultural labour is more than that of skilled labour non-agriculture and unskilled labour non-agriculture. Similarly, the change in returns to land exceeds change in returns to skilled labour non-agriculture and unskilled labour non-agriculture. This finding is in line with what Wang and Zhai (1998) found for China, and Akapaiboon (2007) discovered for Thailand, but contradicts sharply with the findings of Khondker et al (2008) for

Bangladesh and Pradhan and Sahoo (2008) for India. Wang and Zhai (1998), in particular, justify the increase in returns to labour on the ground that the rise in the profitability of labour-intensive activities necessitates increase in the demand for labour.

Household incomes

Although the complete elimination of imports tariff along with 88 percent increase in income tax harms the sectors that benefited from higher relative protection levels, the total impact on household income is positive (Akapaiboon 2007) , as can be seen in Table 55.

Table 55: Trade liberalisation, 40 percent increase in income tax, and household income

Household	Base	Income Tax (%)
Accra	31410.95	8.75
Urban coastal	9781.06	8.40
Urban Forest	16148.56	8.78
Urban south	15545.99	8.47
Urban North	3370.75	9.36
Rural Coastal	8940.74	14.60
Rural Forest	23154.69	10.29
Rural South	22835.35	11.10
Rural North	13595.84	13.10

Source: Simulation Results

The increase in household incomes derives from the increase in the returns to labour which is the principal source (see Table 26) of income to households. On the whole, rural households benefit more from the increase in incomes than urban households. This confirms the findings of Chitiga and Mabugu (2005), Wang and Zhai (1998), but sharply conflicts with the results of Siddiqui et al (2008), Cororaton (2008), and Wong, Arguello and Rivera (2008).

The disparity between rural incomes and urban incomes is because rural households rely primarily on labour income which increases as a result of the policy shock. Secondly, a uniform income tax increase would affect urban households more significantly, as they are more likely to work in the formal sector of the economy (Cockburn, Decaluwe & Robichaud, 2008).

Household Consumption

The positive income effect of complete import tariff elimination along with 40 percent increase in income tax translates into increased consumption for all household categories. The result suggests that the decrease in disposable income resulting from the increase in income tax rate reduces demand, which causes prices to fall. Real income then rises, which leads to increase in consumption. Secondly, households might have sustained the increased consumption by depleting their savings. This result is at variance with the findings of Sapkota and Cockburn (2008) for Nepal and Siddiqui et al (2008) for Bangladesh. In the case of Siddiqui et al, the rich maintained their

consumption level by depleting their savings. The simulation results are shown in Table 56.

Table 56: Trade liberalisation, 40 percent increase in income tax and household consumption

Household	Base	Income Tax
Accra	28159.92	8.91
Urban coastal	9539.28	8.82
Urban Forest	14985.44	9.54
Urban South	14870.72	8.15
Urban North	3391.31	7.95
Rural Coastal	8746.83	13.69
Rural Forest	20229.58	10.54
Rural South	21958.29	9.79
Rural North	12555.50	9.27

Source: Simulation Results

Clearly, rural households benefit more than urban households, but the gains are not evenly distributed among either rural households or urban households. Among the rural households, rural coast enjoys the highest consumption change of 13.69 percent over the base figure. This is followed by rural forest with 10.54 percent and rural south with 9.79 percent. Among the urban households, urban forest has the highest consumption change of 9.54 percent, followed by Accra with 8.91 percent and Urban Coast with 8.82 percent.

Compared with results for the previous simulation exercises, household consumption changes is highest for this policy shock. This is probably because income tax is less distortionary than the other taxes (Sapkota & Cockburn, 2008) and also possibly because income tax is paid by a very small proportion of the population so that increasing it may not have a significant impact on consumption. Clearly, import tariff liberalisation combined with 40 percent increase in income tax rate improves welfare of all household groups (Wang & Zhai, 1998).

Poverty at the national level

Import tariff elimination along with income tax reforms leads to reduction in the incidence of poverty, the depth of poverty and the severity of poverty across national and all locations. The result partially validates the finding of Siddiqui et al (2008) who found out that trade liberalisation with income tax adjustment increases the incidence of poverty, but reduces the poverty gap and the severity of poverty in Pakistan. The implication of the simulation result is that while the number of poor people reduces, the conditions of those who remain poor improves. This is a confirmation of the positive growth effect on poverty that trade liberalisation brings (Dollar & Kraay, 2002). The results of the policy experiment on poverty measures are shown under Income Tax in Table 57.

Table 57: Trade liberalisation, 40 percent increase in income tax and national Poverty

	Base			Income Tax		
	P0	P1	P2	P0	P1	P2
National	27.0	9.0	4.3	23.9	7.6	3.2
Urban	10.4	2.9	1.2	8.9	2.2	0.9
Rural	37.1	12.7	6.2	32.1	10.1	5.2

Source: Simulation Results

It is evident from Table 57 that the incidence of poverty falls from the base scenario of 27.0 percent to 23.9 percent in 2015. The depth of poverty decreases from 9.0 percent in the base scenario to 7.6 percent in 2015. Furthermore, the severity of poverty declines from 4.3 percent in the base scenario to 3.2 percent in 2015.

The decline in poverty measures is higher for this simulation than the previous simulation experiments. For instance, while the incidence of poverty reduces from 27 percent for base scenario to 26.4 percent for trade liberalisation, 25.6 percent for trade liberalisation with 31 percent increase in VAT, 25.1 percent for trade liberalisation with 50 percent increase in the corporate tax rate, it reduces to 23.9 percent for this policy shock. In a Similar vein, the depth of poverty reduces from 9.0 percent for the base scenario to 8.7 percent for trade liberalisation, 8.4 percent for trade liberalisation combined with 31 percent increase in VAT, 8.1 percent for trade liberalisation with 50 percent increase in corporate tax rate, but it reduces to 7.6 percent for this policy exercise. In the case of the severity of poverty, while it falls from 4.3 percent for the base to 4.1 percent for trade liberalisation, it declines to 4.0 percent for trade liberalisation combined with 31 percent increase in VAT, 3.9

percent for trade liberalisation combined with 50 percent rise in corporate tax rate and 3.2 percent for the current policy experiment. The outcome is due to the fact that import tariff elimination along with 40 percent upward adjustment in income tax is less distortionary than, say, import tariff removal combined with upward adjustment of VAT, or corporate tax (Sapkota & Cockburn, 2008; Wang & Zhai, 1998).

In relative terms, the incidence of poverty reduces by 11.48 percent, the depth falls by 15.56 percent and the severity of poverty declines by about 25.58 percent. These results suggests that some households have been taken out of poverty (as shown by the relative decline in the incidence of poverty), whereas those who were initially poor have in general, become relatively better off as indicated by the relative decline in the depth and severity of poverty.

Poverty measures decrease across all locations for this simulation experiment (Khondker et al, 2008; Akapaiboon, 2007). The incidence of poverty for urban areas decreases from 10.4 percent in the base scenario to 8.9 percent in 2015, while the poverty gap falls from 2.9 percent in the base scenario to 2.2 percent in 2015. Finally, the severity of poverty falls from 1.2 percent in the base scenario to 0.9 percent in 2015. Relatively, the extent of decrease in the poverty measures under import liberalisation combined with 40 percent increase in income tax rate is 14.42 percent for the incidence of poverty, 24.14 percent for the depth of poverty and 25.00 percent for the severity of poverty.

For rural areas, the incidence of poverty reduces from 37.1 percent in the base scenario to 32.1 percent, the poverty gap decreases from 12.7 percent in the base scenario to 10.1 percent in 2015, while the severity of poverty falls from 6.2 percent in the base to 5.2 percent for the current policy shock. In relative terms these poverty measures decline by 13.48 percent for incidence of poverty, 20.47 percent for the depth of poverty and 16.13 percent for the severity of poverty.

Urban areas record lower levels of poverty than rural area for this policy experiment. Specifically, the extent of decrease in the incidence of poverty is higher in the urban area than in the rural area as indicated by 14.42 percent and 13.48, respectively. Similarly, the percentage decrease in the depth of poverty is higher for urban areas than it is for rural areas, which in terms of figures are 24.14 percent and 20.47 percent, respectively. In like manner, the percentage decline in the severity of poverty is higher for urban area than for rural area as exemplified by 25.0 percent and 20.47 percent, respectively

Household level analysis

For this simulation exercise, all poverty indicators reduce for all households as summarized under Income Tax in Table 58. This result validates the finding of Akapaiboon (2007) for Thailand, but conflicts with the result of Siddiqui et al (2008) for Pakistan. Akapaiboon attributed his result to the growth effect of trade liberalisation. In the case of Siddiqui et al, urban

household poverty declined while poverty levels rose for rural households for trade liberalisation combined with income tax upward adjustment.

Generally, while the incidence of poverty ranges between 3 percent and 27 percent for urban areas, it ranges between 15 percent and 63 percent for rural areas. For the poverty gap, the range is between 0.6 percent and 9 percent for urban areas while it is between 3 percent and 28 percent for rural areas. Similarly, the severity of poverty ranges from 0.1 percent and 4 percent for urban areas and 0.9 percent and 15 percent for rural areas.

Table 58: Trade liberalisation, 40 percent increase in income tax and household poverty

Household	Base			Income Tax		
	P0	P1	P2	P0	P1	P2
Accra	10.2	2.7	1.0	9.1	2.1	0.6
Urban Coastal	5.5	0.8	0.2	3.4	0.6	0.1
Urban Forest	6.7	1.7	0.7	5.1	1.2	0.4
Urban South	20.9	7.4	3.9	19.0	6.4	3.2
Urban North	30.1	10.5	4.7	27.0	9.3	4.0
Rural Coastal	20.9	4.7	1.5	15.0	3.0	0.9
Rural Forest	25.4	6.1	2.1	21.0	4.8	1.5
Rural South	34.6	7.6	2.5	30.1	5.9	1.8
Rural North	67.2	30.4	17.0	62.8	27.9	14.9

Source: Simulation Results

As observed in the previous simulation exercises, poverty is higher in the northern households than rural households in this policy experiment.

Northern households have the highest incidence of poverty in both urban areas and rural areas. For northern rural households, poverty levels have been very high so that even though poverty generally reduces for trade liberalisation with 40 percent increase in income tax rate, the level of poverty in the northern rural households still remains high. For example, the poverty headcount decreases from 67.2 percent in the benchmark scenario to 62.8 percent in 2015 for the policy shock and the depth of poverty falls from 30.4 percent in the benchmark to 27.9 percent in 2015 for all northern households. Similarly, the severity of poverty declines from 17.0 percent in the benchmark to 14.9 percent in 2015. Interestingly, the highest reduction in the incidence of poverty occurs in the rural coast household. Here, the poverty headcount decreases from 20.9 percent in the benchmark to 15.0 percent in 2015 for this policy shock.

In conclusion, all these results suggest that not only does the number of the poor decrease, the extent to which their income falls below the poverty line also decreases. From a policymaker's point of view, this is a very positive effect from import tariff liberalisation and income tax reforms since the amount of transfer needed to bring all of the poor just up to the poverty line is less after the shock.

CHAPTER NINE

COMPARISON OF TRADE LIBERALISATION AND TAX REFORMS

Introduction

This chapter compares the impact of trade liberalisation and tax reforms on macroeconomic variables, and poverty level of different household categories. There are three fiscal mechanisms of interest. These are trade liberalisation combined with 31 percent upward adjustment of VAT rate (VAT), Trade liberalisation combined with 50 percent increase in corporate tax rate (Corp Tax) and trade liberalisation combined with 40 percent upward adjustment in personal income tax rate (Income Tax). The presentation will cover a comparison of the macroeconomic and sectoral effects of the alternative fiscal mechanisms to be followed by the poverty impacts of the policy shocks at both the national level and household level.

Macroeconomic effects

The effects of the three policy simulations (VAT, Corp Tax, and Income Tax) described above on key macroeconomic variables such as absorption -private consumption, government consumption, investment and stock change-, exports, imports, and GDP are summarized in Table 59. The figures, which are percentages of base values, are assembled from Tables 29, 39 and 49, respectively.

Table 59: Trade liberalisation, tax policies and macroeconomics indicators

GDP items	Value added tax	Corporate tax	income tax
Absorption	3.23	3.63	8.14
Private consumption	6.45	7.94	10.93
Government consumption	4.92	5.85	8.86
Fixed investment	8.58	10.58	15.00
Stock change	1.86	2.20	3.01
Export	18.77	21.87	25.54
Imports	12.93	15.04	16.24
GDP(Value Added)	2.71	3.01	3.58
Government revenue	-4.30	-4.30	-4.30

Source: Simulation Results

The last row of Table 59 shows that trade liberalisation reduces government revenue by 4.30 percent. Government must, therefore, find other sources of replacing lost revenue from trade liberalisation. All the three tax replacements policies, that is, VAT, Corp Tax, and Income Tax, increase absorption. Change in absorption is highest (8.14 percent) when lost revenue from trade liberalisation is compensated for by adjusting income tax rate upwards. The magnitude of change in absorption, however, decreases when either corporate tax or VAT is used to finance the loss in revenue from trade

liberalisation. For instance, while the change in absorption is 3.63 percent for Corp Tax, it is 3.23 percent for VAT.

Private consumption has also increased for all policy shocks, but the extent of increase depends on which of the lost government revenue replacements tax policies is under consideration. Private consumption rises by 10.93 percent under Income tax, the highest for the policy simulations, followed by 7.94 percent for Corp Tax and 6.45 percent for VAT. Increase in private consumption is sustained by rise in imports. Another component of absorption that has been affected favourably by the policy experiments is government consumption. The highest increase in government consumption of 8.86 percent is recorded under Income Tax, followed closely by Corp Tax with 5.85 percent and VAT with 4.92 percent. The last two components of absorption captured in Table 61 are investment and stock change. The highest increase for these two components of absorption is obtained under Income Tax, while the lowest rise in both investment and stock change are recorded under VAT. The rise in absorption suggests that overall welfare has increased for all policy changes for the study period of 2005 - 2015. These results confirm the findings of Wang and Zhai (1998) for China, Feraboli (2007) for Jordan. In the case of Wang and Zhai, financing lost tariff revenue with income tax had the highest impact on absorption, followed by corporate tax and VAT in that order. For Feraboli, compensating lost government revenue from trade tax cuts with increase in income tax reduces consumption in the short run, but it increases in the long run.

It is also significant to note that exports increase for all the policy simulations. However, the magnitude of change varies depending on which of the proposed lost tariff revenue compensatory measures is under examination. For example, exports increase by 25.54 percent for Income Tax and rise by 21.87 percent for Corp Tax. For VAT, exports increase by 18.77 percent for the period of study. Similarly, all the policy shocks cause expansion in imports, but the degree of increase is linked to the type of compensatory measure. The highest change in imports occurs under Income Tax, followed by Corp Tax. That is not all, imports increase by 12.93 percent under VAT. The increase in absorption, exports and imports has reflected in the change in GDP. The highest change in output occurs under Income Tax, followed by Corp Tax. The lowest change in output is recorded under VAT for period of study, 2005 – 2015.

Income tax is more efficient than say, VAT or corporate tax in increasing macro performance because it is the least distortionary amongst the three taxes (Sapkota & Cockburn, 2008). This suggests that income tax does affect allocation decisions relatively less than the other tax hurdles and so leaves relative prices and cost slightly altered. Income tax is a direct transfer of resources from individuals to the state. Since this transfer does affect the relative prices of goods and services indirectly, it does affect businesses decision on the use of economic resources in the production of goods and services. However, this effect is minimal compared with corporate tax and VAT. In other words, business decision making is efficient and that leads to economic growth. Similarly, personal income tax does not affect cost of

production as corporate tax and VAT do and so does not distort economic decision making so much. On the contrary, VAT and corporate taxes affect relative prices and so affect economic decision making greatly.

The positive macroeconomic outcome can be explained by the fact that tariff removal improves the competiveness of the economy of Ghana. Tariff reduction results in a decrease in import prices thereby making imports cheaper than domestic import-competing substitutes. Consumers therefore, shift from the domestic import-competing substitutes to demand more of imported goods and services. The import-competing sectors which were initially heavily protected will see a decline in output and employment. In this simulation exercise, the sectors that were heavily protected are rice, chicken, dairy products, textiles, leather and footwear, paper products, publishing and printing, fertilizer and clothing.

The increase in imports causes depreciation of the local currency in order to keep the current account constant. Again, the fall in the prices of imported inputs reduces domestic costs of production. These two effects lead to a reduction in the domestic costs of production for the expanding sectors of the economy. Output in these expanding sectors rise, employment grows, and the productive factors from the declining sectors relocate to the growing sectors. The reduction in costs of production and the depreciation of the local currency have led to increase in competiveness of the export sector.

As a result of the increase in the domestic price of exports, the export industry expands, investment increases, production of exportables increase, export of goods and services rise, employment in the export sector rises,

incomes increase; this creates a multiplier effect of incomes and expenditures leading to further increases in GDP. Examples of expanding exports sectors include non-traditional exports such as fruit, tree nuts, vegetable and industrial crops, and traditional exports like cocoa, forestry products, fish products and wood products (see Table 60). These are the sectors in which Ghana has comparative advantage and, more importantly, are also labour intensive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income for majority of households in the country, household incomes will rise and poverty rate may decrease.

It is not only the exports sector that has expanded. Table 60 shows that other non-tradable sectors of the economy of Ghana have equally expanded. Some of the other sectors that have expanded include administration, health, water, education, trade, transport and communication, real estate, mining, trading, other services, etc. Majority of the sectors have expanded to provide supporting services to the export sector (backward linkages). Examples of these services include road transport, business services including telecommunication, public sector services, water and electricity, health and education. The expansion of the service sector which includes retail trade is significant in that it provides employment for many people. Construction contracts possibly because as a non-tradable it had benefited enormously from the tariff protection.

Table 60: Trade liberalisation, tax policies and value added

Commodity	Value added tax	Corporate tax	Income Tax
Maize	-1.74	-1.68	-1.46
Rice	-58.38	-65.14	-74.07
Sorghum/Millet	-0.21	-1.17	-1.45
Cassava	5.00	5.88	6.14
Yams	0.84	1.28	1.19
Cowpea	0.70	0.89	1.22
Soyabean	3.68	24.74	5.46
Groundnuts	-3.66	-3.80	2.92
Tree nuts	10.69	8.51	4.94
Fruit domestic	4.31	4.00	3.14
Vegetable domestic	-5.87	-7.23	-7.58
Plantains	4.15	4.87	5.90
Fruit export	27.89	31.69	37.63
Vegetable export	6.92	7.81	8.89
Palmoil	4.42	4.81	5.00
Cocoa beans	5.07	5.96	4.80
Other crop	27.03	30.01	31.87
Export Industrial crop	7.33	8.99	9.22
Chicken	-21.72	-25.84	-36.65
Eggs	12.21	13.72	-15.65
Beef	-7.66	-6.73	-2.16

Table 60 (Continued)

Goat	7.79	6.46	2.22
Other meat	3.25	0.64	1.62
Forestry	1.05	1.26	2.23
Fishery	11.40	12.97	14.77
Mining	1.11	1.26	1.19
Other formal Food processing	5.62	5.57	5.84
Cocoa processing	3.68	3.74	0.30
Dairy	-23.99	-32.89	-51.93
Meat and fish processing	2.83	1.80	-2.25
Textile	-73.91	-81.25	-86.72
Clothing	-6.21	-6.21	-1.16
Leather and footwear	-54.35	-63.87	-72.84
Wood production	14.11	15.62	2.75
Paper products, publishing and printing	-4.18	-5.18	-6.18
Petroleum	7.99	9.24	10.05
Diesel	7.09	8.13	9.93
Other fuels	1.74	1.12	0.14
Other chemicals	26.92	29.60	25.85
Metal production	5.11	3.01	8.03
Acapt	10.65	10.59	4.08
Construction	-8.37	-10.41	-10.50
Water	3.78	7.80	8.51

Table 60 (Continued)

Electricity	7.88	8.89	9.17
Trade services	9.42	10.77	12.82
Other services	6.27	7.41	9.33
Transport services	7.09	8.21	11.93
Communication	8.95	10.20	12.35
Business	19.95	23.05	24.48
Real Estate	7.96	9.04	12.10
Community and other services	4.41	4.90	6.27
Administration	0.09	0.11	0.22
Education	0.08	0.10	0.11
Health	0.36	1.53	2.28

Source: Simulation Results

A comparison of the results of the three simulations in Table 60 indicates that change in absorption and output is highest for the simulation that has income tax as its lost tax revenue replacement policy (Income Tax). The result means that additional trade liberalisation may bring additional welfare gains to Ghana if budgetary constraints compel government to use other taxes to offset lost revenues. However, the additional welfare gains will depend on the lost revenue compensating measure. For instance, among the three tax replacement policies, the change in absorption and output is highest for Income Tax. This means that income tax is less distortionary than the other tax structures because it does affect relative prices or cost of production less than

the other tax instruments. Another significant observation from Table 60 is that trade expansion under all the policy simulations investigated is higher for Income tax. The findings confirm those of Wang and Zhai (1998) for China.

Sectoral impact

The developments in the aggregate variables mask the sectoral impact of the reduction in trade tariffs. The immediate impact of the reduction in trade tariffs is in the reduction of import prices. As to be expected, the reduction in import prices is highest in sectors with high initial tariff. As mentioned earlier, the protected sectors are rice, chicken, dairy products, textiles, clothing, leather and footwear, paper products, publishing and printing and fertilizer. Table 61 records the effects of trade liberalisation combined with three fiscal policy shocks, VAT, Corp Tax and Income tax, on import prices.

Table 61: Trade Liberalisation, tax policies and import prices

Commodity	Value added tax	Corporate tax	Income tax
Maize	5.36	6.18	7.82
Rice	-12.83	-12.83	-12.83
Other cereals	5.36	3.32	7.82
Other crops	5.35	3.31	3.76
Chicken	-11.79	-11.79	-11.79
Beef	5.35	6.18	7.82
Sheep and Goat	2.34	3.30	7.81

Table 61 (Continued)

Other meat	2.33	3.29	3.73
Other formal food processing	2.35	3.31	3.75
Dairy products	-18.26	-18.26	-18.26
Meat and fish processing	-1.62	-1.62	-1.62
Textiles	-20.16	-20.16	-20.16
Clothing	-2.52	-2.52	-2.52
Leather and footwear	-22.01	-22.01	-22.01
Paper product, publishing and printing	-24.27	-24.27	-24.27
Crude and other oils	2.36	6.18	7.82
Other fuels	4.27	4.91	6.21
Fertilizer	-5.17	-5.17	-5.17
Other chemicals	-0.54	-0.54	-0.54
Metal products	1.85	2.12	2.65
Electricity	4.50	6.22	7.86

Source: Simulation Results

As depicted in Table 61, the prices of rice, chicken, dairy products, textiles, leather and paper products decrease the most for all policy experiments. A comparison of the results of the three simulations reveals that the reduction in import prices is the same for all the tax replacement mechanisms for government revenue.

The decline in the domestic price of imports brought about by tariff removal causes the level of imported goods in the consumer goods sector to rise for all the tax policy simulations. Examples of such imported consumer goods include rice, dairy products, chicken, processed food, textiles, clothing, and paper products. Other imports which have increase are crude oil and related products and fertilizer. The increase in fertilizer import is, particularly, significant because it will boost agriculture production, ceteris paribus. It is instructive to note that the change in imports is not equal for all the policy shocks.

Among VAT, Corp Tax and Income Tax, however, the change in import is highest under Income Tax (See Table 62). Because imported goods are now cheaper relative to domestic import-competing substitutes, demand for imports in Ghana rises. Demand for domestic import-competing substitute falls, profits in that sector falls, and local production decreases. Because the earnings of factors of production fall under these circumstances, factors may relocate to the expanding sectors of the economy.

Table 62: Trade Liberalisation, tax policies and imports

Commodity	Value added tax	Corporate tax	Income Tax
Maize	-11.89	-13.78	27.01
Rice	46.59	50.15	67.35
Other cereals	4.03	4.53	10.31
Other crops	-19.10	-20.83	-22.55
Chicken	23.87	28.38	37.17

Table 62 (Continued)

Beef	9.49	11.11	15.22
Sheep/ Goat	11.37	13.51	19.75
Other meats	5.20	5.44	8.10
Other formal food processing	5.82	6.93	8.41
Dairy products	22.93	30.40	31.00
Meat and fish processing	24.52	29.98	32.29
Textiles	5.16	5.95	6.88
Clothing	6.53	7.90	8.56
Leather and footwear	7.28	8.85	9.31
Paper product, publishing and printing	7.98	9.98	10.27
Crude and other oils	8.19	9.40	12.17
Other fuels	5.60	6.36	7.96
Fertilizer	0.13	0.47	1.26
Other chemicals	1.77	2.59	4.39
Metal products	-6.86	-7.71	-9.40
Electricity	-7.14	-18.82	-19.02

Source: Simulation Results

The expanding sectors are mainly in the agricultural, industrial and export subsectors. The expanding agriculture sectors include maize, other crops, other cereals, vegetable farming, goat and sheep rearing and cocoa

farming. Other food processing, other chemicals, electricity and metal sectors constitute the expanding industrial sectors. For the export sector, the growing sectors include non-traditional exports such as fruit exports, tree nuts, vegetable exports and export industry crops, and the traditional exports like cocoa, forestry products, fish products and wood products, while in industry sectors like electricity, water, and mining, among others have expanded their output (refer to Table 63). The expanding sectors, particularly, agriculture employ over 50 percent of the labour force and by extension provides income to many households in Ghana.

Table 63: Trade liberalisation, tax Policies and exports

Commodity	Value added tax	Corporate tax	Income tax
Cocoyam	-3.65	-4.24	-3.58
Palm oil	-1.25	-1.83	-3.60
Groundnuts	-0.21	-0.51	-1.50
Tree nuts	1.37	1.37	6.85
Fruit export	30.10	34.75	7.25
Vegetable export	6.99	7.97	10.06
Cocoa beans	6.39	7.34	3.34
Export industrial crops	7.58	8.41	5.42
Forestry	1.92	2.03	9.31
Fishing	18.99	21.33	7.21
Mining	01.31	1.53	2.67

Table 63 (Continued)

Cocoa processing	0.37	-1.18	-3.04
Meat and fish processing	18.58	18.99	9.56
Textiles	-6.60	-7.40	-5.33
Wood products	17.18	18.75	6.15
Other chemicals	8.60	9.27	8.86
Repairing, hotel and restaurant	8.24	9.74	8.80

Source: Simulation Results

It is instructive to note that most of the expanding agricultural and export-oriented sectors are labour-intensive productive activities. Consequently, employment of unskilled and semi-skilled labour will be substantial. Since labour income is the main source of income to most households in Ghana, household incomes will increase and many people will come out of poverty. The rise in incomes in the agricultural and export sectors will lead to increased demand for non-tradable goods and services.

The expansion of the agricultural sector, industrial sector and export sector will cause ancillary sectors such as those in the services sector to also grow. In particular, the transportation industry such as road transport will have to expand to deal with the increasing volumes of cocoa, wood products and the transportation of all the agricultural products from the farm gate to the marketing centres. Other service sector activities that are expected to grow to support the expanding sectors in agriculture, industry, and exports, are

telecommunication and business services, banking and finance, insurance and real estate.

Factor earnings

As noted earlier, the decreased cost of imported inputs causes the domestic costs of production to fall and coupled with the depreciation of the local currency will lead to increase in the competitiveness of the economy of Ghana. Because domestic export prices rise under these circumstances, it induces production of more export crops, so export volume increases. As can be seen in Table 65 export volumes of all non-traditional exports such as true nuts, fruits, vegetables, fish, processed meat and fish increase for all policy experiments. These sectors are labour intensive activities and as output in these sectors expand, the demand for labour will increase, wages go up, and labour from the contracting sectors, i. e. import-competing sectors of the economy, will be attracted to these sectors. This development has implications for factor employment, factor earnings and sectoral allocation of productive resources. Returns to labour has accordingly risen as shown in Table 64.

As shown in Table 64, with the exception of change in return to capital, change in return to self-employed labour (agriculture), and land in all the ecological zones have increased as a result of the reduction in import tariff. This finding is not surprising as most of the expanding sectors are agricultural activities with high labour intensities. It is pertinent, however, to note that the change in returns to self-employed agricultural labour is more than that of skilled labour non-agriculture and unskilled labour non-agriculture for the

three revenue replacement policies. Similarly, the change in returns to land exceeds change in returns to skilled labour non-agriculture and unskilled labour non-agriculture. This pattern in the change of factor returns is because trade liberalisation allows Ghana to realize its comparative advantage in producing labour-intensive commodities that use agriculture labour and land intensively. As noted earlier on, most of the expanding sectors of the economy are agriculture-related activities, which use agricultural labour and land intensively. Hence, the demand for self-employed agricultural labour and land increase relatively more than for other factors, pushing up their relative returns.

Table 64: Trade liberalisation, tax policies and factor returns

Factor	Value added tax	Corporate tax	Income Tax
Self-employed agricultural labour	9.52	11.13	13.60
Skill labour (non-agricultural)	6.89	7.96	10.10
Unskilled labour (non-agricultural)	6.37	7.24	8.19
Capital	-1.06	-0.13	-2.89
Land (coast)	10.20	11.69	13.94
Land (forest)	8.53	9.71	11.05
Land (south)	8.36	9.58	10.70
Land (north)	7.47	8.55	10.14

Source: Simulation Results

Equally important, earnings of skilled labour (non-agriculture) and unskilled labour (non-agriculture) have risen under all the policy simulations. The increase in income of non-agriculture skilled and unskilled labour emanates from the expansion in some sectors in the industrial sector such as electricity, water, the service sectors such as retail and wholesale activities, transportation, etc.

The decline in the returns to capital is expected as the capital released by the declining sectors cannot be absorbed in the expanding sector thereby causing the returns to capital to fall. The expanding sectors are not able to absorb the capital released from the contracting sector because of the specificity of capital. Specificity of capital means that the capital equipment is meant to be used for only one particular activity and so the capital cannot be redeployed for use in other productive activities.

An example of the contracting sectors is textile. Capital used in the textile industry will not be suitable for an expanding sector in agriculture, say, vegetable farming. Another reason that account for the decline in the returns to capital is that installed capacity utilization of firms is very low in Ghana. According to Asante, Nixson, & Tsikata (2000) capacity utilization of the manufacturing sector in Ghana was 46 percent in 1993. Among the numerous factors accounting for the low capacity utilization in manufacturing are lack of domestic demand for manufactured products, inadequate supply of raw materials, lack of spare parts and the use of obsolete machinery and plants. Now, with this huge unutilized capacity in the manufacturing sector and with the underlying cause of the problem, i.e. lack of domestic demand for locally

manufactured goods unresolved, there is no way that capital released from a contracting sector will be absorbed by an expanding sector because the expanding sector will just put its idle capacity back to use.

The description of the changes in factor returns appears to be in line with the prediction of the Stolper-Samuelson theorem. The theory states that when a country opens up to trade, returns to factors that are used intensively in its export sector will increase while returns to the factors used intensively in its import-competing sector will decrease. The results of the policy shock indicate expansion in the traditional and non-traditional export sectors of the economy. These are labour-intensive activities and so the returns to all categories of labour have increased. On the other hand, there has been contraction of the import-competing sectors, which use capital intensively. Consequently, returns to capital have declined for the period of study.

Household income

Table 65 compares income change for the different household groups for the three tax replacement policies. The figures are percentages over their respective base values. As noted earlier, labour income constitutes the major source of income to households and within the agricultural sector earnings from land ownership are the second most important source of income to households.

With the expansion of the labour-intensive sectors of the economy, as a result of tariff reduction, demand for factors of production, especially, labour increases and labour earnings also increases. Consequently, income change for

all categories of household has been positive for all the policy shocks (Akapaiboon, 2007). A comparison of the three tax replacement policies, VAT, Corp Tax, and Income Tax, reveals the change income is not the same for all households. Of the three trade liberalisation financing options, households benefit most, in terms of income change, under Income Tax. The observed income change is attributable to the change in production pattern observed earlier. Incomes are higher in the urban areas than the rural areas.

Table 65: Trade liberalisation, tax policies, and household income

Household	Value added tax	Corporate tax	Income tax
Accra	6.00	6.88	8.75
Urban coastal	5.73	6.61	8.40
Urban Forest	5.93	6.86	8.78
Urban south	5.73	6.61	8.47
Urban North	6.38	7.33	9.36
Rural Coastal	8.93	10.97	14.60
Rural Forest	6.89	8.03	10.29
Rural South	7.69	8.84	11.10
Rural North	8.98	10.46	13.10

Source: simulation Results

Household Consumption

The impact of the lost tariff revenue replacement mechanisms on household consumption is captured in Table 66. The Table shows that

consumption change favours all household groups for all the policy shocks. The results confirm the findings of Akapaiboon (2007), but contradict the findings of Sapkota and Cockburn (2008). Sapkota and Cockburn found a reduction in consumption for all household categories, while Akapaiboon found an increase in all household consumption.

The across the board increase in household consumption is expected as income change for all households have been positive too. A comparison of the three government lost tax revenue replacement policies indicates that rural areas benefit more from consumption change. In particular, of the three tax replacement policies, households benefit most under Income Tax. This is due to the fact that compensating revenue lost from trade liberalisation with an upward adjustment in income tax rate distorts production incentives less than other taxes in the economy of Ghana. VAT, however, generates the lowest gains in consumption for all the households because it distorts production incentives (Sapkota & Cockburn, 2008; Wang & Zhai, 1998).

The increased consumption is for both imported goods and local import-competing substitutes whose prices have been forced down by the increased inflow of cheap imports. As noted earlier, lower price imports of products of sectors such as agriculture (for example, rice, dairy products, chicken), and manufacturing (for example, food processing, textiles, clothing, and paper products) have been imported and the prices of their local substitutes have reduced. This implies that trade liberalisation combined with tax revenue replacement mechanisms is welfare-enhancing for all household groups.

Table 66: Trade liberalisation, tax policies and household consumption

Household	Value added tax	Corporate tax	Income tax
Accra	6.13	6.99	8.91
Urban coastal	5.91	6.81	8.82
Urban Forest	6.31	7.29	9.54
Urban South	5.34	6.18	8.15
Urban North	5.23	6.02	7.95
Rural Coastal	8.22	10.14	13.69
Rural Forest	6.86	8.04	10.54
Rural South	6.62	7.62	9.79
Rural North	5.97	6.99	9.27

Source: Simulation results

Poverty Implications

The section discusses the relative impact of the three lost tariff revenue replacement policies on poverty. The presentation is done in two parts: The first part dwells on poverty at the national level under the three policy simulations, VAT, Corp Tax, and Income Tax, while the second part considers poverty at the household level under the same policies.

Poverty at the national level

The poverty measures of interest here are the incidence of poverty (Po), which determines the number of people out of the total population that is classified as poor, the depth of poverty (P1), which measures how far the

income of the poor is from the poverty line, and finally, the severity of poverty, that is, inequality among the poor. A comparison of the effect of each of the tax replacement policies on these poverty measures was carried out to determine which of them was pro-poor.

Table 67 reports the poverty outcomes of the three policy simulations, complete import tariff removal accompanied by 31 percent upward adjustment in the VAT rate (VAT), complete tariff removal with lost tariff revenue compensated by 50 percent upward adjustment in the corporate tax rate (Corp Tax) and finally, complete tariff cut combined with 40 percent upward adjustment in income tax rate (Income Tax). The figures are in absolute terms and the base values are the levels of poverty attained when there is no shock to the economy. The figures under VAT, Corp Tax, and Income Tax are obtained after shocking the economy.

The Table shows that all the poverty measures fall at the national level for all the policy shocks. In the case of VAT, the incidence of poverty decreases from the base value of 27.0 percent to 25.6 percent. The depth of poverty falls from 9.0 percent to 8.4 percent and the severity of poverty decreases from 4.3 percent to 4.0 percent. Comparatively, the incidence of poverty decreases by 5.2 percent, the depth of poverty decreases by 6.7 percent and the severity of poverty is cut by 7.0 percent during the study period. The results for Corp Tax are equally interesting. For instance, the incidence of poverty declines from 27 percent to 25.1 percent, the depth of poverty falls from 9.0 percent to 8.3 percent and the severity of poverty decreases from 4.3 percent to 3.9 percent.

Table 67: Trade liberalization, tax policies and national poverty

Region	Base			Value added tax			Corporate tax			Income Tax		
	P0	P1	P2	P0	P1	P2	P0	P1	P2	P0	P1	P2
National	27.0	9.0	4.3	25.6	8.4	4.0	25.1	8.3	3.9	23.9	7.6	3.2
Urban	10.4	2.9	1.2	9.6	2.7	1.1	9.5	2.6	1.1	8.9	2.2	0.9
Rural	37.1	12.7	6.2	35.3	11.9	5.8	34.5	11.7	5.6	32.1	10.1	5.2

Source: Simulation Results

In effect, the percentage fall for the three measures is 7.0 percent for the incidence, 7.8 percent for the depth and 9.3 percent for the severity of poverty. Finally, for Income Tax, the incidence of poverty falls from 27.0 percent to 23.9 percent, the depth of poverty decreases from 9.0 percent to 7.6 percent and the severity of poverty declines from 4.3 percent to 3.2 percent. This works out to about 11.5 percent fall in the incidence of poverty, 15.6 percent decline in the depth of poverty, and 25.6 percent reduction in the severity of poverty. A comparison of the poverty outcomes for the three tax replacement policy shocks reveals that poverty indices falls the most under Income Tax.

At the regional level, all poverty indicators also decline for all the policy shocks. In the urban area, compensating lost tariff revenue with an upward adjustment in VAT rate causes the incidence of poverty to fall from 10.8 percent in the base to 9.6 percent. The depth of poverty decreases from 2.9 percent in the base to 2.7 percent in 2015, and the severity of poverty declines from 1.2 percent in the base to 1.1 in 2015. In actual fact, the incidence of poverty falls by 7.7 percent, the depth of poverty decreases by 6.9 percent, and the severity of poverty declines by 9.1 percent. For rural areas, the incidence of poverty falls from 37.1 percent to 35.3 percent. The depth of poverty drops from 12.7 percent in the base to 11.9 percent in 2015, and the severity of poverty decreases from 6.2 percent to 5.8 in 2015. Thus, while the incidence of poverty falls by 4.9 percent, the depth of poverty decreases by 6.3 percent, and the severity of poverty declines by 6.5 percent for the study

period. A comparison of the urban and rural poverty outcomes reveals that combining trade liberalisation with VAT favours urban areas.

In the scenario with corporate tax compensating the forgone revenue, the poverty measures for the urban areas are much lower than those reported under VAT. Here, the incidence of poverty falls from 10.4 percent in the base to 9.5 percent in 2015. The depth of poverty decreases from 2.9 percent to 2.6 percent, and the severity of poverty dips from 1.2 percent in the base to 1.1 percent in 2015. For the rural area, the incidence of poverty falls from 37.1 percent to 34.5 percent in 2015, the depth of poverty decreases from 12.7 percent to 11.7 percent, and the severity of poverty declines from 6.2 percent to 5.6 percent. Thus, in this policy shock, while the incidence of poverty falls by 8.7 percent in the urban area, it declines by 7.0 percent in the rural area. The depth of poverty also falls by 10.3 percent in the urban area, but it decreases by a slightly lower margin of 7.7 percent in rural area. Finally, the severity of poverty decreases by 8.3 percent in the urban area, but it declines by 9.7 percent in the rural areas. Generally, this policy shocks benefits urban areas more than it does rural areas.

The final scenario, that is, making-up for lost tariff revenue with an increase in income tax, causes the incidence of poverty in urban areas to fall from 10.4 percent to 8.9 percent, the depth of poverty decreases from 2.9 percent to 2.2 percent and the severity of poverty declines from 1.2 percent to 0.9 percent for the study period. For the rural area, the incidence of poverty reduces from 37.1 percent to 32.1 percent, the depth of poverty falls from 12.7

percent to 10.1 percent and the severity of poverty decreases from 6.2 percent to 5.2 percent.

Comparatively, while the incidence of poverty falls by 14.4 percent for urban areas, it decreases by 13.5 percent for rural areas. Similarly, the depth of poverty drops by 24.1 percent for urban areas, but it declines by 20.5 percent for rural areas. In the case of the severity of poverty, while it falls by 25.0 percent for urban areas, it changes, positively, by a margin of 16.1 percent for rural areas. The results mean that replacing lost revenue from trade liberalisation with an increase in income tax favours urban areas more than it does rural areas. This finding confirms the findings of Wong, Arguello and Rivera (2008) for Ecuador. It however contradicts the results of Siddiqui et al (2008) who found trade liberalisation combined with income tax adjustment increases the incidence of poverty, but reduces the depth of poverty and severity of poverty in Pakistan. Siddiqui et al (2008) attributed their finding to the direct impact of income tax on poverty and income distribution.

The extent to which the poverty measures decrease under the three tax replacement policies is recorded in Table 68. A comparison of the three policy shocks shows that all poverty measures decrease and that the fall in the poverty indices is highest under financing forgone tariff revenue with increase in income tax. These results find partial support in the empirical literature (Wong et al, 2008; Siddiqui et al, 2008; Khondker et al, 2008; and Cororaton et al, 2003). In the case of Wong et al (2008), using VAT to compensate for lost tariff revenue worsened poverty, but poverty reduced when income tax was used to replace lost government revenue resulting from trade liberalisation. Siddique et

al, found income tax to increase the incidence of poverty while the gap and severity of poverty decline.

Table 68: Trade liberalisation, tax policies, and change in poverty measures

	Incidence of Poverty		
	Value added tax	Corporate tax	Income tax
Urban	-7.7	-8.7	-14.4
Rural	-4.9	-7.0	-13.5
National	-5.2	-7.0	-11.5
	Depth of Poverty		
	Value added tax	Corporate tax	Income Tax
Urban	-6.7	-10.3	-24.1
Rural	-6.3	-7.7	-20.5
National	-6.7	-7.8	-15.6
	Severity of Poverty		
	Value added tax	Corporate tax	Income tax
Urban	-9.1	-8.3	-25.0
Rural	-6.5	-9.7	-16.1
National	-7.0	-9.8	-25.6

Source: Author's own computation

Khondker et al (2008) also found out that using income tax to replace lost tariff revenue led to reduction in both rural poverty and urban poverty, but

doing same with production tax increased rural and urban poverty. Finally, Cororaton et al (2003) observed that financing trade liberalisation by upward adjustment in income tax reduced both rural and urban poverty.

The results suggest that while the number of poor people in the population reduces for all the tax replacement mechanisms with the decline in the poverty headcount, the state of the poor also gets better with the fall in the depth of poverty and severity of poverty for all the policy shocks.

Household poverty analysis

This section is devoted to examining how household poverty is affected by the three policy shocks, value added tax, corporate tax and, income tax. Table 69 presents the results of all the policy shocks on household poverty. Compared with the benchmark values, poverty levels decrease for all households under all the policy scenarios. The result does not support that of Wong, Arguello and Rivera (2008) who found out that compensating lost government revenue from trade liberalisation with VAT increases household poverty, but replacing the lost revenue with direct taxes reduce household poverty. Siddiqui et al (2008) found the use of sales tax to replace lost government revenue from trade liberalisation to reduce household poverty, but doing same with income tax rather increased household poverty.

The results suggests that removing trade taxes makes the economy of Ghana more efficient, the production structure changes from the production of import-competing goods to the production of agricultural-based exports, which use labour more intensively. Factors of production relocate to the

expanding sectors and factor earnings increase, which translates into increase in household incomes. The reduction in the domestic price of imports and import-competing substitutes increases household consumption and poverty decreases for all households. It is for these reasons that all household poverty indicators decrease for all the three tax revenue replacement policy shocks.

However, the extent of the decrease depends on which of the forgone tax revenue replacement mechanisms is under consideration. A critical examination of Table 68 reveals that of the three trade liberalisation financing mechanisms, household poverty measures decrease most under Income Tax. A comparison of the household poverty outcomes under Corp Tax with those under VAT also shows that household poverty decreases more under Corp Tax than under VAT. The fact that the magnitude of reduction in poverty is not the same for all the three tax replacement policies means that each of the policy shocks introduces distortions into the economy of Ghana, but the extent of the distortion is lowest under Income Tax (Sapkota and Cockburn, 2008; Wang & Zhai, 1998). The conclusion is that combining trade liberalisation with income tax is the most poverty-friendly of the three trade liberalisation financing mechanisms.

Generally, poverty is prevalent in rural households than in urban households (Akapaiboon, 2007; Nwafor et al, 2007; Lofgren et al, 1999; Adjovi et al, 2008). Nahar and Siriwardana (2009) observed a reduction in both rural and urban poverty. Another significant finding is that poverty is very high in the northern households than any other household. Northern

households have the highest incidence of poverty in both urban and rural areas.

Table 69: Trade liberalisation, tax policies and household poverty

Household	Base			Value added tax		
	Po	P1	P2	Po	P1	P2
Accra	10.2	2.7	1.0	9.8	2.4	0.9
Urban Coastal	5.5	0.8	0.2	4.2	0.7	0.2
Urban Forest	6.7	1.7	0.7	5.9	1.4	0.6
Urban South	20.9	7.4	3.9	20.0	6.9	3.6
Urban North	30.1	10.5	4.7	28.5	9.9	4.3
Rural Coastal	20.9	4.7	1.5	18.1	4 .0	1.3
Rural Forest	25.4	6.1	2.1	23.4	5.5	1.8
Rural South	34.6	7.6	2.5	32.4	6.7	2.2
Rural North	67.2	30.4	17.0	66.5	29.3	16.2
	Corporate tax			Income Tax		
	P0	P1	P2	P0	P1	P2
Accra	9.7	2.3	0.9	9.1	2.1	0.6
Urban Coastal	4.2	0.6	0.1	3.4	0.6	0.1
Urban Forest	5.9	1.4	0.6	5.1	1.2	0.4
Urban South	20.0	6.8	3.6	19.0	6.4	3.2
Urban North	28.1	9.7	4.2	27.0	9.3	4.0
Rural Coastal	16.9	3.8	1.2	15.0	3.0	0.9
Rural Forest	22.7	5.3	1.8	21.0	4.8	1.5
Rural South	31.4	6.4	2.1	30.1	5.9	1.8
Rural North	66.0	28.9	16.0	62.8	27.9	14.9

Source: Simulation Results

For northern rural households, poverty levels have been very high so that even though poverty generally reduces with trade liberalisation combined with tax replacements mechanisms, the level of poverty in the northern rural households still remains high. For example, the poverty headcount decreases from 67.2 percent in the benchmark to over 60 percent in 2015 for all the policy shocks and the depth of poverty falls from 30.4 percent in the benchmark to 20 percent in 2015 for all northern households. Finally, the severity of poverty declines from 17.0 percent for the base scenario to 15 percent in 2015 for all the policy shocks for all northern households. It is also worthy of note that the highest reduction in the incidence of poverty occurs in the rural coast household. Here, the poverty headcount decreases from 20.9 percent in the benchmark to 15.0 percent in 2015 under the policy scenario, which replaces forgone tariff revenue with increase in income tax.

CHAPTER TEN

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

Introduction

The main objective of this final chapter is to summarize the thesis, present the main conclusions of the research and offer policy recommendations. The chapter will be presented in the following order: In the first section of the chapter, attention will be focused on the summary of the work; the second section will deal with the main conclusions and the final section will consider the policy recommendations and limitations of the study.

Summary

This study contributes to the empirical debate on the impact of compensating for lost government revenue resulting trade liberalisation with domestic tax policies on macroeconomic variables and poverty at the national and household levels. The study had five specific objectives. The first specific objective was to find out the effect of trade liberalisation without countervailing revenue generation on government tariff revenue and the incidence, depth and severity of poverty. Secondly, the study sought to investigate the impact of trade liberalisation accompanied by 31 percent upward adjustment in VAT rate on the incidence, depth and severity of poverty. The third specific objective was to examine the effect of trade

liberalisation combined with 50 percent upward adjustment in corporate tax rate on the incidence, depth and severity of poverty in Ghana. The fourth objective was to investigate the impact of trade liberalisation accompanied by 40 percent upward adjustment of income tax rate. Finally, the study sought to compare the results of these policy experiments and make policy recommendations.

In pursuance of these objectives and to be able to capture both the direct and indirect effects of trade liberalisation and fiscal reforms on poverty in Ghana, a recursive dynamic computable general equilibrium (DCGE) model calibrated to a 2005 Social Accounting Matrix (SAM) built with the most recent household survey data, Ghana living Standards survey (GLSS5) was used for the study for the period 2005 to 2015.

Four main policy simulations were carried out in this study to evaluate the poverty impacts of trade liberalisation accompanied by compensating fiscal measures in Ghana. The simulations are: Trade liberalisation, i. e. complete elimination of import taxes (Trade Lib) without compensating for the revenue lost; Trade liberalisation with the lost tariff revenue replaced by 31 percent increase in the value added tax rate (VAT); Trade liberalisation combined with 50 percent upward adjustment of corporate tax rate to keep government revenue neutral (Corp Tax); and finally, Trade liberalisation accompanied by 40 percent upward adjustment in the income tax rate. In the case of simulations two to simulation four, tax rates were increased to keep revenues neutral.

Each of these policy shocks affects growth, employment and poverty. Therefore, the link between growth and poverty was captured endogenously by linking the DCGE with a micro-simulation model. All GLSS5 sample households are included in the microsimulation model and their total expenditures and expenditures on each commodity or commodity group are linked to each of the nine representative households included in the DCGE model according to their locations. The linkages between the DCGE and micro-simulations models allow for the analysis of micro changes in representative households' consumptions induced by changes in their income, market prices, and other factors. The endogenous changes derived from the DCGE model for the nine representative households were used to recalculate the consumption expenditures for their corresponding households in the survey dataset. New levels of total consumption expenditures are recalculated based on individual households' budgets, and the new poverty rates for each region's household group (rural and urban), and the national total are obtained by comparing real expenditure levels to the official poverty line defined for GLSS5.

The macro results of the simulation experiments indicate that all simulations, particularly simulation 4 (removal of trade taxes combined with income tax) result in a positive change in GDP. The results further reveal that the country's export competitiveness improves because of the depreciation of the cedi. There is an increase in imports, but that is not high enough to offset the change in exports. This means that the balance of trade is positive for all simulations. The results also show that absorption and all its components

increase for all the simulations and the increase has been sustained mainly by increase in imports.

It is instructive to note that the cedi depreciates for all simulations. The depreciation of the cedi causes the domestic price of exports to increase. The reduction in the prices of imports reduces the domestic costs of production. Consequently, the economy becomes competitive and exports increase at the sectoral level for all simulations. Specific examples of export expanding sectors include non-traditional exports such as fruits, tree nuts, vegetables and industrial crops and traditional exports like cocoa beans, forestry products, fish products and wood products. Other productive activities that expand include cocoa processing, other food processing and informal food processing.

Services that are related to the expanding sectors such as water, electricity, retail and wholesale services, transport services, communication and business services, real estates, public administration, education and health have all increased. The expanding export sectors are sectors Ghana have comparative advantage and they are mostly labour intensive activities. As a result, employment in these expanding sectors increase, factor earnings rise and household incomes also increase.

Furthermore, the sectoral level results show that domestic import competing sectors contract under all the simulation experiments. These sectors include poultry, dairy products, rice production, textile, clothing, leather and footwear, paper production, publication and printing and construction.

Other findings of the study indicate that changes in income favour rural areas more than urban areas, and yet poverty reduction favours urban

areas more than rural areas. The reasoning is that the sectors that expand as a result of trade liberalisation are mainly agricultural export sectors. These sectors are rural-based and labour-intensive, thus employing majority of the rural folk. However, the goods whose prices decreased are consumed by the urban households and not the rural households. Consequently, the poverty levels in the urban area decrease more than the poverty level in the rural areas. Another plausible explanation is that rural areas have higher poverty gap than urban areas, so while the change in income in the rural areas is not enough to bring many people out of poverty, it is more than enough to lift many more people out of poverty in the urban areas.

The simulation results further indicate that cuts in trade taxes reduce government revenue and how the lost tariff revenue is replaced influences the level of poverty at both the national and household levels. Of the three mechanisms (VAT, Corp Tax and Income Tax) trade liberalisation combined with income tax had the most favourable effect on poverty. Finally, the rural-urban poverty divide and the North-South poverty divide remains under all the policy simulations.

Conclusions

The results of the policy simulations indicate that trade liberalisation causes government tax revenue to fall. This suggests that import tariffs are below the revenue-maximizing level so that any further cut in import tariff is not able to increase imports enough to offset the revenue-reduction effect of the tariff cut.

The results of the study also revealed that trade liberalisation is poverty-reducing in Ghana. The incidence of poverty, depth of poverty and severity of poverty decreases at the national, regional and household levels when all trade taxes are removed. This means that while trade liberalisation reduces the number of poor people in the population, it improves on the conditions of the poor as exemplified by the reduction in the depth of poverty and severity of poverty. However, the north-south divide and the rural-urban dichotomy still persist.

Another conclusion that can be drawn from the study is that all the tax tools used to replace lost revenue from trade liberalisation are less distortionary as poverty reduces further in all cases that any of them was combined with complete import tariff removal. This means that these tax instruments matter for poverty alleviation in Ghana. In this particular study, the findings reveal that when government tax revenue falls as a result of trade liberalisation, and VAT, corporate tax or income tax is used to replace the lost revenue, the incidence of poverty will reduce. However, the extent of decrease in the poverty headcount is highest for the case where income tax is increased to compensate for lost government revenue.

Yet another conclusion of the study is that compensating lost government revenue from trade liberalisation with VAT, corporate tax or income tax reduces the depth of poverty in Ghana. The reduction in the depth of poverty occurs across all locations and for all households. This suggest that the amount of resources required to bring the poor to the poverty line reduces when any of these tax tools is used to compensate for lost government revenue

from import tariff cuts. Again, the degree to which depth of poverty decreases depends on which of the tax instruments is used. In this particular case, the decrease is highest when income tax is used to replace the lost revenue from import tariff liberalisation.

The final conclusion that is drawn from the results of the study is that financing trade liberalisation using VAT, corporate tax, or income tax reduces the severity of poverty in Ghana. The reduction in the severity cuts across all locations and also for all households. The implication is that inequality among the poor reduces when any of the tax instruments mentioned earlier is used to make up the lost government revenue resulting from trade liberalisation.

Policy recommendations

1. Government should use income tax to compensate for shortfall in revenue resulting from trade liberalisation.
2. Sectors such as poultry farming, rice cultivation, and textile manufacturing which contract under trade liberalisation should adopt modern techniques of production to remain competitive. Rice farmers should go into commercial farming and also use high yielding rice varieties, so that they can enjoy economies of scale to enhance their competitiveness.
3. Government should undertake the following complementary policies/ programme to help bridge the poverty gap between the rural areas and the urban areas of Ghana.

i. First, the decentralisation of government business must be given serious attention so as to bring development to the rural areas.

ii. Government must undertake complete human capital development, which include increasing access to health and educational facilities to achieve significant poverty reduction.

4. A multifaceted approach to development is required to achieve poverty alleviation in the Northern regions of Ghana. Such an initiative must tackle the environmental as well as the infrastructural constraints characteristic of these areas. A state-private sector partnership is needed to provide the basic infrastructure such as roads, port facilities, airport facilities, electricity, schools, health facilities, dams and irrigation facilities. The availability of these economic and social infrastructure will pave the way for private sector operators to move into the region to create wealth and the much needed jobs to transform the lives of the people of the Northern regions. In this regard, the recent establishment of the Savannah Accelerated Development Authority (SADA) to arrest the deteriorating conditions of the three Northern regions and the northern parts of Brong Ahafo and the Volta regions is timely.

Limitations of the study

The results of the study provide insight into the poverty implications of financing trade liberalisation in Ghana. However, several important limitations

remain, as a result of which the results of the study ought to be used with caution.

First, trade liberalisation was narrowly defined as the complete removal of import tariffs in this study. Since cocoa is a major export crop, future studies should consider the poverty implications of the elimination of export tariffs on cocoa in the long run.

Second, the simulation exercises implemented for this study considered trade liberalisation combined with VAT, corporate tax and income tax separately. Future work could consider implementing trade liberalisation and the tax instruments simultaneously so as to capture the interaction effect of trade reforms and fiscal reforms on poverty in the long run.

Third, the costs of collecting VAT, income tax and corporate tax in Ghana have not been taken care of in this study. Consequently, the results may under or overestimate the real effects of each of the tax replacement policies. As a future direction for research, the real costs of collecting VAT, income tax, and corporate tax in Ghana could be factored into the analysis.

Fourth, the functional form of household demand in the DCGE limits its ability to capture the full extent of demand dynamics. The Linear Expenditure System, which assumes constant budget shares and constant income elasticity, is used to specify household demand in a dynamic model where household incomes change. Even though the Implicit Direct Additive Demand System (AIDADS) by Rimmer and Powell (1996) could have captured better the real dynamics in household demand, the disaggregated demand structure of the model made such an attempt impossible.

Fifth, another major limitation of this study is the under representation of the informal sector. The informal sector in Ghana is substantial, employs many people and as a result is the source of livelihood for many households. Leaving such a major sector out of an important study such as this one could certainly lead to under or over estimation of poverty. However, like the problem with all CGE models, there is very little data on the sector. That explains why it could not be captured as comprehensively as the formal sector where data abounds. As and when more data on the informal sector become readily available, future studies would like to capture the informal sector.

Sixth, the production technologies calibrated to the economic structure remain constant over time. Consequently, technological innovations associated with new investment are not captured by the model simulations. What is more, the model does not capture the benefits linked with increasing returns to scale, technological externalities and spillovers, and so may underestimate the contribution of growth in the economy to employment, incomes and poverty alleviation.

Finally, the construction of the model was based on several assumptions including the following: Capital stock is formed endogenously; both labour and land supply grow by a determined rate; capital is fully employed in all sectors, whereas land is employed only in sub-sectors of agriculture; certain amounts of labour are unemployed; government consumption is determined by fixed share of GDP; and finally, small country, that is, both world export and import prices are fixed. This study did not test

any of these assumptions. Future studies should test the assumptions for the applicability of the model.

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APPENDIX

Mathematical Specification of computable general equilibrium model

Production and price equations

$$QINT_{ca} = ica_{ca} \times QINTA_a \quad (1)$$

$$PINTA_a = \sum_{c \in C} PQ_c \times ica_{ca} \quad (2)$$

$$QVA_a = \alpha_a^{va} \times \left(\sum_{f \in F} \delta_{fa}^{va} \times (\alpha_{fa}^{vaf} \times QF_{fa})^{-\rho_a^{va}} \right)^{-\frac{1}{\rho_a^{va}}} \quad (3)$$

$$W_f \times \overline{WFDIST_f} = PVA_a \times QVA_a \times \left(\sum_{f \in F} \delta_{fa}^{va} \times (\alpha_{fa}^{vaf} \times QF_{fa})^{-\rho_a^{va}} \right)^{-1} \times \delta_{fa}^{va} \times (\alpha_{fa}^{vaf})^{-\rho_a^{va}} \times (QF_{fa})^{-\rho_a^{va}-1} \quad (4)$$

$$QF_{fa} = \alpha_{fa}^{van} \times \left[\sum_{f' \in F} \delta_{ff'a}^{van} \times QF_{f'a}^{-\rho_{fa}^{van}} \right]^{\frac{1}{\rho_{fa}^{van}}} \quad (5)$$

$$W_{f'} \times WFDIST_{f'a} = W_f \times WFDIST_{fa} \times QF_{fa} \times \left[\sum_{f' \in F} \delta_{ff'a}^{va} \times QF_{f'a}^{-\rho_{fa}^{va}} \right]^{-1} \times \delta_{ff'a}^{van} \times QF_{f'a}^{\rho_{fa}^{van}-1} \quad (6)$$

$$QVA_a = iva_a \times QA_a \quad (7)$$

$$QINTA_a = \text{int}a_a \times QA_a \quad (8)$$

$$PA_a \times (1 - ta_a) \times QA_a = PVA_a \times QVA_a + PINTA_a \times QINTA_a \quad (9)$$

$$QXAC_{ac} = \theta_{ac} \times QA_a \quad (10)$$

$$PXAC_{ac} = \sum_{c \in C} \times PXAC_{ac} \times \theta_{ac} \quad (11)$$

$$QX_c = \alpha_c^{ac} \times \left(\sum_{a \in A} \delta_{ac}^{ac} \times QXAC_{ac}^{-\rho_c^{ac}} \right)^{\frac{1}{\rho_c^{ac}-1}} \quad 12$$

$$PXAC_{ac} = PX_c \times QX_c \left(\sum_{a \in A'} \delta_{ac}^{ac} \times QXAC_{ac}^{-\rho_c^{ac}} \right)^{-1} \times \delta_{ac}^{ac} \times QXAC_{ac}^{-\rho_c^{ac}-1} \quad 13$$

$$PE_{cr} = pwe_{cr} \times EXR - \sum_{c' \in CT} \times PQ_c \times ice_{c'c} \quad 14$$

$$QX_c = \alpha_c^t \times \left(\sum_{\tau} \delta_{cr}^t \times QE_{cr}^{\rho_c^t} + (1 - \sum_{\tau} \delta_{cr}^t) \times QD_c^{\rho_c^t} \right)^{\frac{1}{\rho_c^t}} \quad 15$$

$$\frac{QE_{cr}}{QD_c} = \left(\frac{PE_{cr}}{PD_c} \times \frac{1 - \sum_{\tau} \delta_{cr}^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t - 1}} \quad 16$$

$$QX_c = QD_c + \sum_{\tau} QE_{cr} \quad 17$$

$$PX_c \times QX_c = PD_c \times QD_c + \sum_{\tau} PE_{cr} \times QE_{cr} \quad 18$$

$$PDD_c = PDS_c + \sum_{c' \in CT} PQ_{c'} \times icd_{c'c} \quad 19$$

$$PM_{cr} = pwm_{cr} \times (1 + tm_{cr}) \times EXR + \sum_{c' \in CT} PQ_{c'} \times icm_{c'c} \quad 20$$

$$QQ_c = \alpha_c^q \times \left(\sum_{\tau} \delta_{c\tau}^q \times QM_{c\tau}^{-\rho_c^q} (1 - \sum_{\tau} \delta_{cr}^q) \times QD_c^{-\rho_c^q} \right)^{\frac{1}{\rho_c^q}} \quad 21$$

$$\frac{QM_{c\tau}}{QD_c} = \left(\frac{PD_c}{PM_c} \times \frac{\delta_c^q}{1 - \sum_{\tau} \delta_{c\tau}^q} \right)^{\frac{1}{1+\rho_c^q}} \quad 22$$

$$QQ_c = QD_c + \sum_{\tau} QM_{c\tau} \quad 23$$

$$PQ_c \times (1 - tq_c) \times QQ_c = PD_c \times QD_c + \sum_{\tau} PM_{c\tau} \times QM_{c\tau} \quad 24$$

$$cpi = \sum_{c \in C} PQ_c \text{ x } cwts_c \quad 25$$

Institutional incomes and domestic demand equation

$$YF_f = \sum_{a \in A} WF_f \text{ x } wfdist_{fa} \text{ x } QF_{fa} \quad 26$$

$$YIF_{if} = shif_{if} \text{ x } \left[YF_f - trnsfr_{rowf} \times EXR \right] \quad 27$$

$$YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in INSDNG'} TRII_{ii'} + trnsfr_{igov} \text{ x } cpi + trnsfr_{irow} \text{ x } EXR \quad 28$$

$$TRII_{ii'} = shii_{ii'} \text{ x } (1 - mps_{i'}) \text{ x } (1 - tins_h) \text{ x } YI_{i'} \quad 29$$

$$EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih} \right) \text{ x } (1 - mps_h) \text{ x } (1 - tins_h) \text{ x } YI_h \quad 30$$

$$PQ_c \text{ x } QH_{ch} = PQ_c \text{ x } \gamma^m_{ch} + \beta^m_{ch} \text{ x } \left(EH_h - \sum_{c' \in C} PQ_{c'} \text{ x } \gamma^m_{c'h} \right) \quad 31$$

$$QINV_c = IADJ \text{ x } qinv_c \quad 32$$

$$EG = \sum_{c \in C} PQ_c \text{ x } qg_c + \sum_{i \in INSDNG} trnsfr_{igov} \text{ x } cpi \quad 33$$

$$YG = \sum_{i \in INSDNG} tins_i \text{ x } YI_i + \sum_{f \in F} tf_f \text{ x } YF_f$$

$$+ \sum_{a \in A} tva_a \text{ x } PVA_a \text{ x } QVA_a + \sum_{a \in A} ta_a PA_a \text{ x } QA_a + \sum_{c \in CMNR} tm_c \text{ x } pwm_c \text{ x } QM_c \text{ x } EXR$$

$$+ \sum_{c \in CE} te_c \text{ x } pwe_c \text{ x } QE_c \text{ EXR} + \sum_{c \in C} tq_c \text{ x } PQ_c \text{ x } QQ_c + \sum_{f \in F} YF_{govf} + trnsfr_{govrow} \text{ x } EXR \quad 34$$

System constraints and macroeconomic closures

$$QQ_c = \sum_{a \in A} QINT_{ac} + \sum_{h \in H} QH_{ch} + qg_c + QINV_c + qdst_c \quad 35$$

$$\sum_{a \in A} QF_{fa} = QFS_f \quad 36$$

$$YG = EG + GSAV \quad 37$$

$$\sum_{r \in CMNR} pwm_{cr} \times QM_{cr} = \sum_{r \in CENR} pwe_{cr} \times QE_{cr} + \sum_{i \in INSD} trnsfr_{irow} + fsav \quad 38$$

$$\sum_{i \in INSDNG} mps_i \times (1 - \overline{tins_i}) \times YI_i + GSAV + EXR \times fsav = \sum_{c \in C} PQ_c \times QINV_c + \sum_{c \in C} PQ_c \times qdst_c \quad 39$$

Factor accumulation and allocation equations (applies to capital only)

$$AWF_f^a = \sum_a \left[\left(\frac{QF_{fat}}{\sum_{a'} QF_{fa't}} \right) \times WF_{ft} \times wfdist_{fat} \right] \quad 40$$

$$\eta_{fat}^a = \left(\frac{QF_{fat}}{\sum_{a'} QF_{fa't}} \right) \times \left(\beta^a \left[\frac{WF_{ft} \times wfdist_{fat}}{AWF_{ft}^a} - 1 \right] + 1 \right) \quad 41$$

$$\Delta K_{fat}^a = \eta_{fat}^a \times \left(\frac{\sum_c PQ_{ct} \times qinv_{ct}}{PK_{ft}} \right) \quad 42$$

$$PK_{ft} = \sum_c PQ_{ct} \times \frac{qinv_{ct}}{\sum_{c'} qinv_{c't}} \quad 43$$

$$QF_{fat+1} = QF_{fat} \times \left(1 + \frac{\Delta K_{fat}^a}{QF_{fat}} - vf \right) \quad 44$$

$$QFS_{ft+1} = QFS_{ft} \times \left(1 + \frac{\sum_a K_{fat}}{QFS_{ft}} - vf \right) \quad 45$$

Mathematical Presentation of CGE Model – sets, parameters, and variables

Symbol	Explanation
Sets	
$a \in A$	Activities
$\alpha \in AEES(\subset A)$	Activities with a CES function at the top of the technology nest
$a \in ALEO(\subset A)$	Activities with a Leontief function at the top of the technology nest
$c \in C$	Commodities
$c \in CD(\subset C)$	Commodities with domestic sales of domestic output
$c \in CDN(\subset\subset C)$	Commodities not in CD
$c \in CE(\subset C)$	Exported Commodities
$c \in CEN(\subset C)$	Commodities not in CE
$c \in CM(\subset C)$	Aggregate imported commodities
$c \in CX(\subset C)$	Commodities with domestic production
$f \in F$	Factors
$i \in INS$	Institutions (domestic and rest of the world)
$i \in INSDNG(\subset INSD)$	Domestic nongovernmental institutions
$h \in H(\subset INSDNG)$	Households
Equation parameters	
cpi	Consumer price index
$cwts_c$	Weight of commodity c in the CPI
ica_{ca}	Quantity of c as intermediate input per unit of activity a

Mathematical Presentation of DCGE Model – sets, parameters, and variables (Continued)

$icd_{cc'}$	Quantity of commodity c as trade input per unit of ć produced and sold domestically
$ice_{cc'}$	Quantity of commodity c as trade input per exported unit of ć
$icm_{cc'}$	Quantity of commodity c as trade input per imported unit of ć
$\text{int}\,a_a$	Quantity of aggregate intermediate input per activity unit
iva_a	Quantity of value-added per activity per activity unit
mps_i	Base savings rate for domestic institution i
α_a^a	Efficiency parameter in the CES activity function
α_a^{va}	Efficiency parameter in the CES value-added function
α_a^{ac}	Shift parameter for domestic commodity aggregation function
α_c^q	Armington function shift parameter
α_c^t	CET function shift parameter
β^a	Capital sectoral mobility factor
β_{ch}^m	Marginal share of consumption spending on marketed commodity c for household h
δ_a^a	CES activity function share parameter

Mathematical Presentation of DCGE Model – sets, parameters, and variables (Continued)

δ_{ac}^{ac}	Share parameter for domestic commodity aggregation function
δ_{cr}^{q}	Armington function share parameter
v_f	Capital depreciation rate
$mps01_i$	0 -1 parameter with 1 for institutions with potentially fixed direct tax rates
pwe_c	Export price (foreign currency)
$shif_{if}$	Share for domestic institution i in income of factor f
$shii_{ii'}$	Share of net income of i'to i
ta_a	Tax rate for activity a
$tins_i$	Exogenous direct tax rate for domestic institution i

Equation parameters

$tins01_i$	0 -1 parameter with 1 for institutions with potentially flexed direct tax rates
tm_c	Import tariff rate
te_c	Export tariff rate
tq_c	Rate of sales tax
ta_a	Tax rate for activity a
δ_{cr}^{t}	CET function share parameter

Mathematical Presentation of DCGE Model – sets, parameters, and variables (Continued)

δ_{fa}^{va}	CES value-added function share parameter for factor f in activity a
γ_{ch}^{m}	Subsistence consumption of marketed commodity for household h
θ_{ac}	Yield of output c per unit of activity a
ρ_{a}^{a}	CES production function exponent
ρ_{a}^{va}	CES value-added function exponent
ρ_{c}^{ac}	Domestic commodity aggregation function exponent
ρ_{c}^{q}	Armington function exponent
ρ_{c}^{t}	CET function exponent
η_{fat}^{a}	Sector share of new capital

Exogenous variables

$fsav$	Foreign savings (FCU)
mps_{t}	Marginal propensity to save for domestic non-government institution
pwm_{c}	Import price (foreign currency)
pwe_{c}	Export price (foreign currency)
$qdst_{c}$	Quantity of stock change
qfs_{f}	Quantity supplied of factor

Mathematical Presentation of DCGE Model – sets, parameters, and variables

(Continued)

qg_c	Government consumption demand for commodity
$qinv_c$	Base-year quantity of private investment demand
$trnsfr_{if}$	Transfer from factor f to institution i
$wfdist_{fa}$	Wage distortion factor for factor f in activity a

Endogenous variables

AWF_{ft}^{a}	Average capital rental rate in time period t
$IADJ$	Investment adjustment factor
EG	Government expenditure
EH_h	Consumption spending for household
EXR	Exchange rate (LCU per unit of FCU)
$QINTA_a$	Quantity of aggregate intermediate input

Endogenous variables

$QINT_{ca}$	Quantity of commodity c as intermediate input to activity a
$QINV_c$	Quantity of investment demand for commodity
QM_{cr}	Quantity of imports of commodity c
QE_c	Quantity of exports of commodity c
QA_a	Quantity of activity a
PA_a	Activity price (unit gross revenue)

Mathematical Presentation of DCGE Model – sets, parameters, and variables (Continued)

$GSAV$	Government savings
QF_{fa}	Quantity demanded of factor f from activity a
QH_{ch}	Quantity consumed of commodity c by household h
QHA_{ach}	Quantity of household home consumption of commodity c from activity a for household h
PM_{cr}	Unit price of capital in time period t
PQ_c	Import price (domestic currency)
PVA_a	Composite commodity price
PX_c	Value-added price (factor income per unit of activity)
$PXAC_{ac}$	Aggregate producer price for commodity a
QA_a	Producer price of commodity c for activity a
QD_c	Quantity (level) of activity
QE_{ct}	Quantity sold domestically of domestic output
QQ_c	Quantity of goods supplied to domestic market (composite supply)
QVA_a	Quantity of (aggregate) value-added
PD_c	Demand price for commodity produced and sold domestically
PE_{cr}	Supply price for commodity produced and sold domestically
$PINTA_a$	Export price (domestic currency)

Mathematical Presentation of DCGE Model – sets, parameters, and variables (Continued)

PK_{fi}	Aggregate intermediate input price for activity a
QX_c	Aggregate quantity of domestic output of commodity
$QXAC_{ac}$	Quantity of output of commodity c from activity a
$TRII_{ii'}$	Transfers from institution i' to i (both in the set INSDNG)
WF_f	Average price of factors
YF_f	Income of factor f
YG	Government revenue
YI_i	Income of domestic non-government institution
YIF_{if}	Income to domestic institution i from factor f
K^a_{fat}	Quantity of new capital by activity a for the period t