



Trade Reforms and Horizontal Inequalities: A Case of Uganda

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Trade Reforms and Horizontal Inequalities: A Case of Uganda

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1. Introduction

During the 1970s and 1980s, Uganda's economy exhibited severe trade-related distortions including quantitative restrictions on imports and exports; high and dispersed tariffs; taxes on exports; controls on prices and foreign exchange allocations; and considerable state involvement in commercially viable economic activities. As recognition that the private sector and expanded trade as the engine of growth, Uganda has undertaken trade policy reforms over the last 15 years. Both the size and dispersion of tariffs have substantially reduced in Uganda; export taxes have been abolished (with the exception of those on hides and skins); quantitative trade restrictions and non-tariff barriers to trade (such as trade licensing, prohibitions/bans, quotas, administrative pricing, and foreign exchange rate controls) have substantially reduced particularly when the monopoly of produce and marketing boards was abolished in the 1990s. Most of trade transactions currently rely more on market forces rather than administrative controls.

The trade literature (Amjadi and Yeats, 1995; Soludo, Ogbu and Chang, 2004:11-12) suggests that trade liberalization reduce production and transaction related inefficiencies arising from misallocation of resources; increased spillovers and learning effects from the development of new products, technologies, and information sources. Additionally, it increases the country's ability to cope with adverse external shocks and generates strong linkages between export and other sectors of the economy. Trade liberalization weakens monopoly elements that may affect trade and results in favorable import and export prices, and it reduces the reliance on a limited and often unstable export of primary commodities to more diversified export products. With reduced controls on import trade, producers have better accessibility to imported inputs; consumers have increased variety and better quality products while exporting producers receive an increased share of the world price of their export products.

Increased market opportunities and easy accessibility to imported inputs is also conducive for more investments, employment of more resources including land and labour all of which increase incomes of the population. Trade liberalization is likely to lead to increase prices of imports and impact negatively on the welfare of consumers. The exposure of formerly protected and subsidised domestic producers to import competition following trade liberalisation is likely to reduce production and investment among those producers that are unable to

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3 adjust to new trade environment. In brief, trade liberalisation leads to winners
4 and losers. The effect of the price change, as a result of trade liberalisation,
5 depends on whether a household is net supplier or net consumer of the
6 liberalized good or service. Effects of trade liberalization impacts on the welfare
7 of the population through its effects on enterprises (investment, employment,
8 profits); households (prices, wages, endowments, private and official transfers);
9 and government revenue and expenditures on social services and public
10 infrastructure.
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17 While these benefits of trade liberalization are well acknowledged, it's not very
18 clear the extent to which trade reforms could have impacted on the welfare and
19 distribution of income in Uganda. This paper attempts to address the extent to
20 which trade reforms would affect horizontal inequalities across regions. All
21 regional, bilateral and multilateral trade initiatives have implications on
22 production, consumption, trade, employment and income (levels and
23 distribution) since they differently affect prices and incentives of producers and
24 owners of factors of production. A study is essential to estimate the welfare
25 effects of these initiatives particularly the anticipated tariff liberalisation and Free
26 Trade Area (FTA) between the EU and Uganda under ESA-ACP grouping both
27 under a full liberalization scenario and in case of partial exclusions in agriculture.
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34 To address this question, we employ a dynamic general equilibrium model
35 which is linked to households survey data. The key findings suggest that the
36 overall reduction of tariffs would indeed be beneficial to all regions but more
37 importantly in the Northern and Eastern regions where poverty is highest. The
38 joining of the East African Community would also benefit all regions as a result
39 of access to cheaper imports. Lastly, the Uruguay round whose focus was on the
40 reduction of tariffs on agricultural commodities would benefit all regions
41 especially the North and East.
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2. Economic Reforms and Developments during the period 1990-2008

The period 1990-2008 has seen tremendous economic transformation fuelled mainly by sound macroeconomic policies involving careful sequencing and determined implementation of what the World Bank calls “the most far-reaching stabilization and structural reform program in Africa, and one of the most comprehensive reform efforts in the world”, (World Bank, 2007). The first reform was under the Economic Recovery Program (ERP) originally introduced in 1987 supported by World Bank and IMF, with the initial focus on price stabilization and liberalization. Some of the policies under this programme were currency reform, devaluations, liberalization of domestic prices, and the conversion to floating exchange rate regime in 1993. The next set of reforms involved the adoption of the structural adjustment programme that was meant to free up markets and create price incentives, stimulate private investment, and encourage competition. Reforms under this programme included the abolition of marketing boards, privatization and abolition of parastatals and the establishment of the Uganda Investment Authority.

This period was also characterized by sustained macro-economic stabilization, adjustment and structural reform efforts that affected almost all sectors of the economy. These mainly involved macro-economic stabilization process, price liberalization, public enterprises reform, financial sector liberalization and reform and civil service reform. Macro-economic stabilisation and re-orientation of the pricing and marketing policies, and strengthening institutional framework constituted the major cornerstones of the program in addition to stabilising and changing the structure of the economy. It is this reason that the ERP focused on macroeconomic stability, liberalisation of the foreign exchange system, trade, price, and marketing systems, improving the incentive structure and business climate to promote savings mobilisation and investment, and rehabilitating the country’s economic, social and institutional infrastructure.

(i) Background to Trade Reforms

(i) *Multilateral trade system and trade reforms*

The most comprehensive round of multilateral trade negotiations, launched in Punta del Este, Uruguay in 1986, concluded in 1994 and the World Trade Organization (WTO) came into being on 1st January 1995. The WTO Agreement

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3 entails an extensive programme of work with respect to implementation, reviews
4 and further negotiations as mandated in the Agreement, all requiring
5 commitment of human and material resources by WTO Members. However,
6 most developing countries like Uganda have not been able to participate in WTO
7 matters in a way that effectively serves their interests, due to their limited
8 knowledge, financial and human resources and coordination. Finger (1999:11
9 and 2000:433) shows that only 65 developing countries were members of
10 GATT/WTO when the Uruguay Round began in 1987, 20 of which did not have
11 delegations in Geneva; 15 developing countries were represented from
12 Embassies in other European cities while 5 developing countries by delegation
13 based in their national capitals. As a result, Uganda never participated regularly
14 in the negotiations, and thus her current problems of implementing WTO
15 requirements may partly be stemming from implementing Agreements in whose
16 negotiations she never meaningfully participated. The current WTO negotiations
17 under Doha Round are expected to induce further trade liberalisation and ensure
18 a rule-based trading system.
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28 In addition to WTO multilateral trade system, there are other trade arrangements
29 that impact on Uganda's import and export trade which have implications to
30 Uganda's welfare. They include, the Generalised System of Preferences (GSP),
31 African Growth Opportunity Act (AGOA), Everything But Arms (EBA) and the
32 Cotonou Agreement.
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37 The *Generalised System of Preferences* is based on the 1979 Enabling Clause that
38 created a permanent waiver to the most-favoured-nation provision in the
39 General Agreement on Tariffs and Trade. Under GSP, selected products
40 originating in developing countries are granted non-reciprocal preferences in the
41 form of reduced or zero tariff rates. Least developed countries receive
42 preferential treatment for a wider coverage of products and deeper tariff cuts.
43 GSP schemes represent unilateral preferences that differ in their design and
44 duration across preference granting countries. The following WTO members
45 currently operate GSP schemes: Australia, Belarus, Bulgaria, Canada, the
46 European Community, Japan, New Zealand, Norway, the Russian Federation,
47 Switzerland, Turkey and the United States of America.
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54 The EU's *Everything But Arms* initiative of 2001 grants duty-free access to imports
55 of all products from least developed countries, except to arms and munitions.
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3 Only imports of bananas, rice and sugar were not fully liberalised immediately.
4 In the meantime, there are duty free tariff quotas for rice and sugar. The EBA
5 provisions have been incorporated into the EU's GSP scheme. The rules of origin
6 of the latter allow for "diagonal cumulation" in only four regions: in the
7 Caribbean, East Asia, Latin America, and South Asia, intermediate inputs from
8 regional partners are counted as local value-added if the degree of prior
9 transformation of the inputs would have conferred origin in the regional partner
10 country. Outside these regions, only imported inputs from the EU can be
11 counted towards local value-added ("bilateral cumulation"). The regulation on
12 EBA foresees that the special arrangements for LDC's are to be maintained for an
13 unlimited period of time.
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21 The *African Growth and Opportunities Act* of 2000 extends the GSP scheme of the
22 United States to additional products, notably garments, from African countries
23 that satisfy certain economic, social and political criteria. A special program for
24 countries with a gross national product per capita of less than 1500 US\$ relaxes
25 the otherwise strict rules of origin for apparel and allows qualifying countries to
26 count yarn and fabric from anywhere in the world as local content in apparel
27 assembled in their countries. AGOA is a time-bound program that requires
28 periodic renewal by the US Congress. The special textile benefits expire in
29 September 2007, while the overall program is scheduled to run until 2015.
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36 (ii) *Economic Partnerships Agreements*
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38 Relations between 77 African, Caribbean and Pacific (ACP) countries and the
39 European Union (EU) go back more than 50 years. For most of the time, trade
40 relations have been characterized by non-reciprocal duty-free access to the EU
41 market for most ACP exports with the exception of certain agricultural products
42 facing positive tariffs and quotas. Before the Cotonou Agreement was signed in
43 2000, the EU-ACP relationship was governed by successive agreements under
44 the Lomé Convention. Lomé preferences, with few exceptions, seemed to have
45 done little to help expand and diversify ACP exports.
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51 The *Cotonou Agreement* of 2000 between the EU and ACP provides preferential
52 access to the EU market in addition to and beyond GSP. The Cotonou
53 Agreement redefines the relationship between the EU and the ACP with major
54 changes: preferential market access commitments are to be made on the basis of
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3 reciprocity, with terms and conditions to be negotiated in the context of the
4 Economic Partnership Agreement (EPAs) between the EU and different country
5 groupings within the ACP. The negotiations began in September 2002 and are
6 expected to be concluded by the end of 2007 and come into force on 1 January
7 2008, until which date non-reciprocal preferences under the Cotonou Agreement
8 will be preserved. The progressive removal of trade barriers after 2008 is to lead
9 to Free Trade Agreements (FTAs) between the EU and ACP regional groupings¹
10 in conformity with WTO rules.
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16 The EU is a very important trading partner for Uganda both for import and
17 export trade, particularly in agricultural products. Agriculture is an important
18 source of foreign exchange for most ACP countries, and the majority of the
19 population (about 80%) depends on agriculture for employment, food and
20 livelihood security, and rural development. Agriculture is a major source of
21 inputs into food and agro-processing manufacturing activities and it forms a
22 considerable market for the output of the industrial sector.
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28 EU exports to the EPA regions are more diversified and comprise more
29 processed products, equipment and other essential inputs. The ACP countries
30 are concerned that the EU agricultural exports – where almost all the leading
31 products are supported by export subsidies and trade-distorting domestic
32 support -will have negative effects on the EPA regions' domestic production of
33 the same or like products when tariffs are reduced or removed altogether. At
34 present, the ACP countries can, at least in theory, apply fairly high tariffs to
35 protect themselves from EU exports. However, this opportunity may be severely
36 restricted in the EPAs. This may have an effect on domestic production, even
37 though the ACP countries are to get some flexibility to exclude a certain part of
38 total trade from tariff reductions (perhaps 20 per cent of all trade) and/or to
39 implement the tariff reductions over a longer period (perhaps ten years).
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49 ¹ The EU is negotiating with ACP grouped into six regional clusters: *West Africa group*:
50 Economic Community of Western African States (ECOWAS) and Mauritania; *Central Africa group*:
51 Communauté Economique et Monétaire de l'Afrique Centrale (CEMAC) and São Tomé and Príncipe;
52 *Eastern and Southern Africa (ESA) group*: Eligible members of the Common Market for Eastern and
53 Southern Africa (COMESA), with the exception of certain Southern African Development Community
54 (SADC) members; *SADC group*: Angola, Mozambique, Tanzania as well as Botswana, Lesotho, Namibia,
55 Swaziland (BLNS) that together with South Africa (observer to the SADC negotiating group) belong to the
56 Southern African Customs Union (SACU); other SADC members form part of the ESA group;
57 *Caribbean*: 14 ACP members of the Caribbean Community (CARICOM) and the Dominican Republic;
58 and *Pacific*: Pacific ACP members; negotiations not yet underway.
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(iii) *Uganda in the regional economic integration*

Uganda is involved into a number of trade initiatives particularly regional economic integration specifically the East African Community (EAC) and the Common Market for East and Southern Africa (COMESA). The East African Community (EAC) is composed of five Partner States; Burundi, Kenya, Tanzania, Uganda and Rwanda. The Treaty for the establishment of the EAC was signed on 30th November 1999 and came into force on 7th July 2000. The EAC Customs Union Protocol was signed on 2nd March 2004 and came into force on 1st January 2005. In accordance with the provisions of Article 75 of the Treaty, the Protocol, inter alia, provides a number elements including (i) elimination of internal tariffs and other charges of equivalent effect (ii) elimination of non-tariff barriers; (iii) establishment of a Common External Tariff (CET); (iv) duty drawback, refund and remission of duties and taxes, etc. The CET of the EAC Customs Union has three tariff bands of 0% 10% and 25% on basic raw materials, semi-processed goods and finished goods respectively.

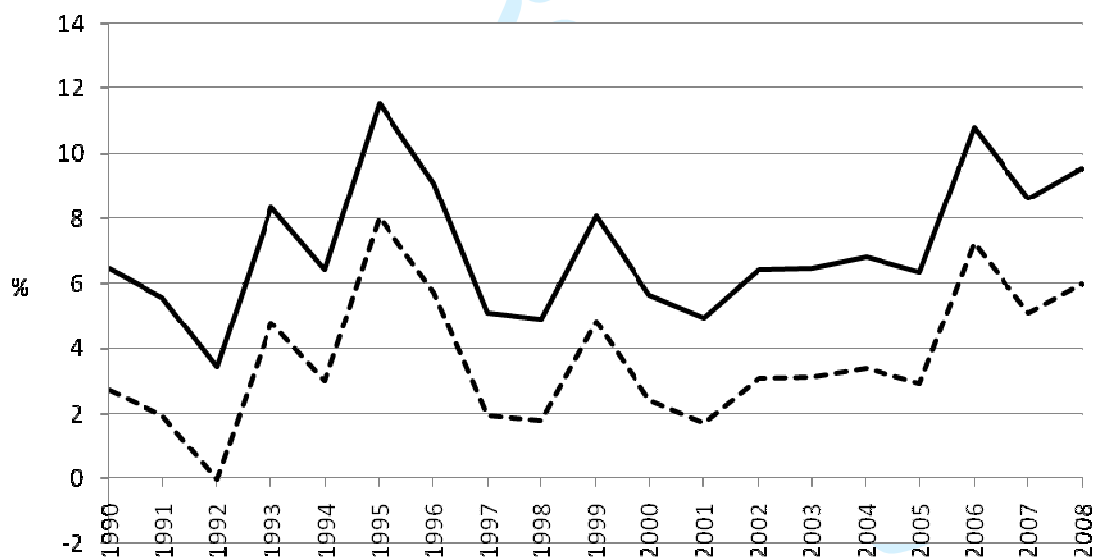
A process is also under way to move to the East African Common Market. Considerable progress has also been made in the case of COMESA towards the establishment of the COMESA Customs Union and 11 of the 18 COMESA member countries are already in Free Trade Area arrangements.

3. Performance of the Economy During the Period 1990-2008

The period 1990-2008 can be characterized in two phases of growth; the first phase was 1990-1999 and the other was 2000-2008. The 1990 to 1999 phase was characterized by sustained positive growth rates far above the Sub-Saharan average. At an average of 3.6 per cent, Uganda's per capita income (measured in 1985 international prices) recovered from the low of US \$ 504 of 1986 and had reached US \$ 697 by 1997. The Uganda Bureau of Statistics estimates trend growth over this period at about 6.8 percent per year with all sectors of the economy growing relatively fast during the period 1990-1999.

Similarly, the period 2000-2008 was characterized by very high growth rates. Estimates by the Uganda Bureau of Statistics show that average GDP growth rate (at factor prices) for the five years (2003/04-2007/2008) was as high as 7.9 per cent, with the economy posting a growth rate of 8.9 per cent for the year 2007/2008. But the economy grew only at 6.5 per cent in 2008 due to the turmoil in the world economy and regional instability. Growth slowed in 2009 to about 5.8 per cent mainly due to internal and external shocks arising from the global recession. The global recession impacted the economy through (i) reduction in foreign financial inflows including aid, grants, foreign direct investment and remittances; (ii) depreciation of the exchange rate (as a result of (i)); (iii) changes in exports to the region, and; (iv) changes in exports of goods that are exported beyond the region. (i) reduction in foreign financial inflows including aid, grants, foreign direct investment and remittances; (ii) depreciation of the exchange rate (as a result of (i)); (iii) changes in exports to the region, and; (iv) changes in exports of goods that are exported beyond the region.

Figure 1: Uganda Annual GDP and GDP Per Capita percentage growth, 1990-2008



Source: World Development Indicators, World Bank, 2008

(i) Key Growth Drivers

Uganda's strong economic growth since 1992 has been driven mainly by the services, manufacturing and construction sectors. In 2008/09, the share of value added contributed by the services sector was almost half of GDP from about 32 per cent in 1990 and that of agriculture diminished steadily from 50.3 per cent to about 15.2 per cent in the same period. The recent decline in agriculture partly reflected the effects of floods in Eastern Uganda and the persistent decline in the stock of fish due to chronic over-fishing, especially Nile Perch in Lake Victoria, resulting in a decline in fishing output of 5.9 per cent in 2007. But other structural problems, including the use of inferior inputs and lack of value addition that have limited productivity and profitability of the sector, are also to blame.

The industry sector (manufacturing, construction and mining) share in GDP increased from about 1 per cent in 1990 to about 24.2 per cent in 2008/9. However, its growth was slowed down in 2008/09 by the effect of the global economic crisis, growing only by 3.8 per cent compared to 9.1 per cent the previous fiscal year (MFPED, 2009). This was mainly due to the slowdown in the construction sector due to the drop in remittances that has hitherto fuelled a construction boom in the country. This slowdown was also due to the increase in imported inputs arising from the depreciation of the Uganda shilling.

Growth in 2008, as in most of the past was mainly due to private consumption, with more than 80 per cent share of GDP. Investment growth however, has continued to be strong, with private and public investment rising by an estimated 17 per cent and 15 per cent respectively in 2008. Private investment growth has recently been led by construction (AfDB, 2009). Moreover, economic growth has been export-led with the share of exports to GDP rising steadily through the last two decades. This has been partly due to the expanding regional market for Uganda's exports for both food and manufactured products.

Figure 2: Sectoral Contribution to GDP (percent):2000/01 - 2008/09, at market prices.

Source: Uganda Bureau of Statistics database

Between 2000/01 and 2008/09, the share of agriculture to GDP fell rapidly while that of industry registered notable growth between 2004/05 and 2007/08 before converging with the share of agriculture in 2008/09 at about 23 per cent.

While there have been changes in the sectoral composition of GDP, there has not been a commensurate change in the distribution pattern of the labour force. The GDP share of the emerging modern sectors is increasing but their share of the labour force is falling. The share of the labour force employed in manufacturing and services sectors decreased from 6.9 and 22.2 per cent to 5.2 and 19.5 per cent respectively despite the rise in the GDP shares of these sectors for the period 2002/03 and 2005/06. However, the share of labour force engaged in the agriculture sector increased from 70.9 per cent in 2002/03 to 75.2 per cent in 2005/06 while the share of agriculture GDP declined over the same period.

Table 1: Percentage share of labour force per sector

	1992/93	1999/00	2002/03	2005/06
Agriculture	81.5	82.3	70.9	75.2
Industry	4.6	4.2	6.9	5.2
Services	13.9	13.5	22.2	19.5

Source: UNHS 2005/06

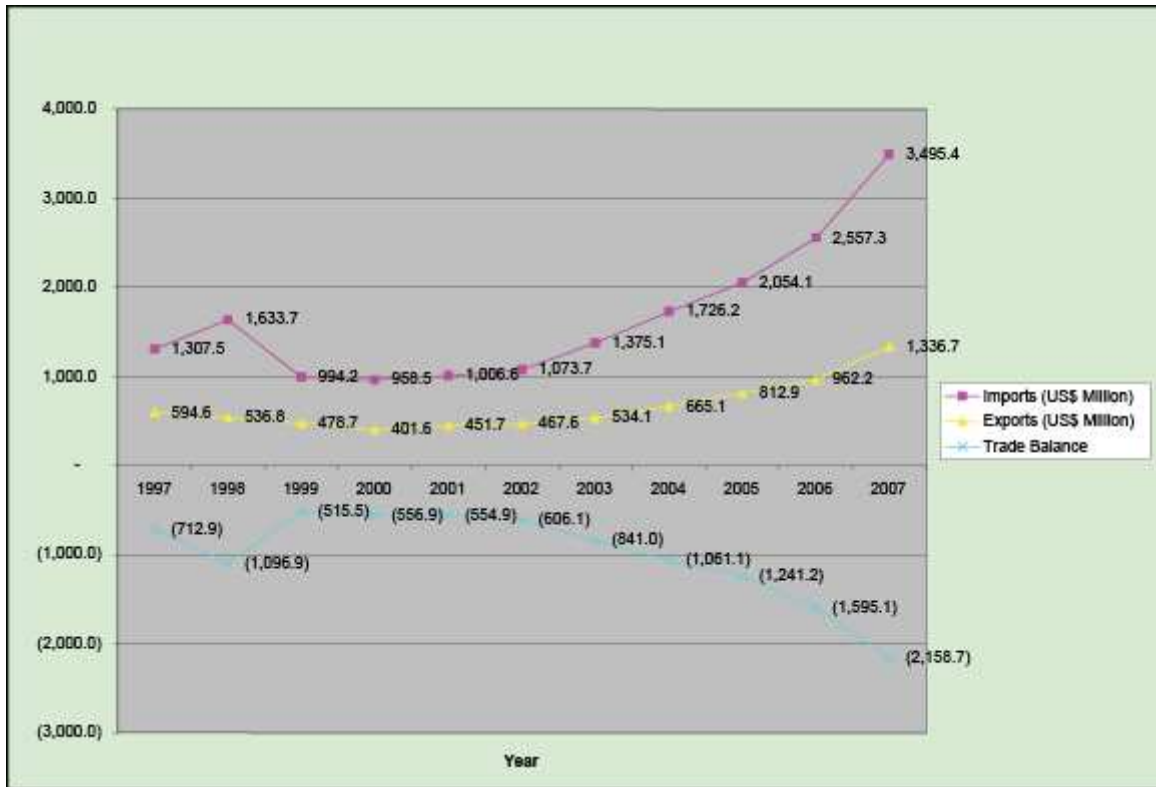
(ii) Trade Performance

Uganda's trade with the rest of the world has been increasing for the last two decades in the wake of liberalization of the economy. The trade sector is characterized by growth in both exports and imports, with the latter growing faster. However, exports substantially increased from 2.5 per cent in 2001 to 24.1 per cent in 2005, though they dropped to 18.4 per cent in 2006. In 2008/09, Uganda's merchandise exports peaked at USD 2.8 billion, having increased from USD 2.6 billion in the 2007/08 financial year, compared to a meager USD 372 million in 1986².

Overall imports have been increasing faster than exports resulting into a wider trade balance. Figure 6.1 reveals that the economy has been experiencing a growing balance of trade deficit since 2001.

² UBOS, 2008

Figure 3: Value of Exports, Imports and Trade Balance (1997 to 2007)



Source: UBOS, Statistical Abstracts (various years)

4. Regional administrative and tribal classifications

Uganda is divided into four administrative regions: Central, Eastern, Western and Northern. These regions also form the basis of ethnic distinctions which, to a greater extent, explain the horizontal inequalities in Uganda. These ethnic distinctions have roots in societies that were antagonistic to each other in the pre-colonial era. This antagonism was exploited by the forces of British colonialism to ease their military political conquest in Uganda. According to Mamdani (1983), the form through which power was organized in the colony underpinned the process of construction of ethnicity. Ethnicity was used as an instrument of divide and rule by the colonial powers. This generated the basis of long-term ethnic consciousness in Uganda.

The major ethnic groups in Uganda are:- the Bantu-speaking group who live in the Central, Southern and Western parts of the country. The central group comprises of the Baganda; the Eastern group is made up of the Basoga, Bagisu, Bagwele, Basamia, Japadhola, Sabiny and other small tribes. The Western Bantu-speaking group includes the Banyoro, Batoro and Banyakore of Western Uganda.

The other major ethnic group is the Non-Bantu speaking group are sub-divided into the Nilotic and Central Sudanic peoples. These groups occupy the Eastern, Northern and North-western positions of the country. They are further divided into the Iteso, Langi, Acholi, Alur, Karamojong, Jie, Madi and the Lugbara in the North.

Table 2: Percentage Regional Distribution of Population

Region	Distribution of Population		
	1999	2002	2005
Central	29.0	29.6	29.2
Eastern	26.6	27.4	25.2
Northern	19.0	18.2	19.7
Western	25.4	24.7	25.9
Urban	13.1	13.8	15.4
Rural	86.9	86.2	84.6

Source: UNHS- 1999/00, 2002/03 and 2005/06

Agriculture (mainly small-scale farming) employs 70.3% of Uganda's population. The other sources of livelihood include employment income (13.3%), property income (8.0%) and trading (6.0%). On a regional basis, the Northern region is predominantly dependent on farming as a main source of economic livelihood (80%), followed by Western region (77.6%), Eastern region (76.3%) and Central region (54.3%). Employment income, which ranks as the second most important source of economic livelihood, is more predominant in Central region (22.8%), followed by Eastern region (10.1%), Western region (9.0%) and Northern region (7.2%). This pattern of relative importance of employment income may partly be explained by the fact that the administrative capital city and most industrial establishments that offer good employment opportunities are located in the Central region. Property income as a source of household livelihood is also most significant in Central region (10.2%), followed by Northern region (7.5%), Eastern

region (6.9%) and Western region (6.7%). Trading and other income also rank as significant sources of income in Central region compared with other regions (Table 3).

Table 3: Percentage distribution of households by economic activities by region

Region	Farming	Trading	Employment income	Property income	Cottage industry	Other
Central	54.3	9.3	22.8	10.2	1.0	2.4
Eastern	76.3	5.3	10.1	6.9	0.5	0.8
Western	77.6	4.6	9.0	6.7	0.6	1.5
Northern	80.0	3.0	7.2	7.5	1.1	1.2
Total	70.3	6.0	13.3	8.0	0.8	1.5

Source: MoFPED, 1991

5. Commodity Price Fluctuations and Impact on Uganda

The Ugandan economy is dominated by agricultural activities, and so is the commodity composition of exports. Prior to the liberalization of the economy and the emphasis on import substitution and export diversification in the 1990s, Uganda depended mainly on coffee as the main export. This was a major constraint to the country's terms of trade especially when the world coffee prices dropped as was the case in the mid 1990's. The commodity composition of Uganda's exports has significantly changed. Before the year 2000, the traditional exports were the main foreign exchange earner. However, in the past 10 years, the non-traditional exports surpassed the traditional exports in foreign exchange earnings.

(i) Commodity Prices

The drive for export diversification and reduced commodity prices in the world market for traditional exports increased further the share for non-traditional exports. As shown in the figures 4-6, the uncertain fluctuation of traditional commodity prices led the authorities to emphasize the importance of diversifying the export base.

Figure 4: Tea monthly prices (cents/kg)

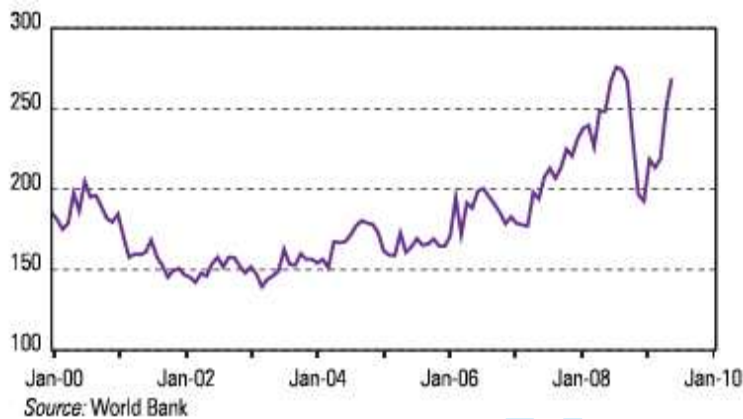


Figure 5: Coffee monthly prices (\$/kg)

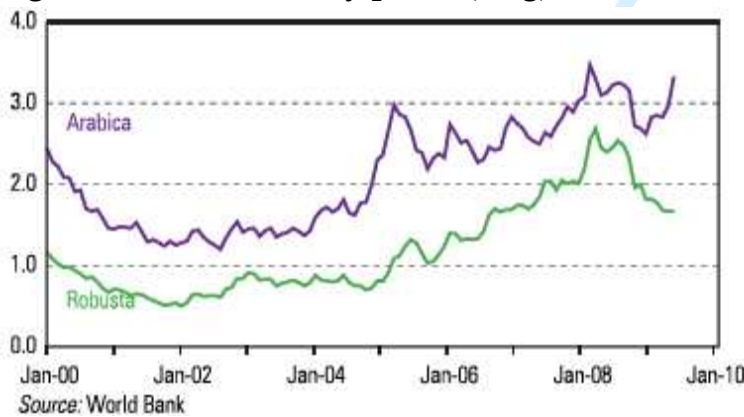


Figure 6: Cotton monthly prices (\$/kg)

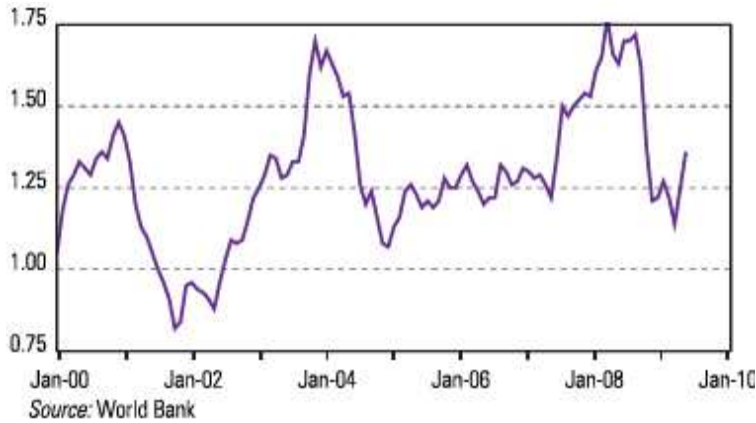


Figure 7: Petroleum monthly prices (\$/barrel)



The export commodities comprise mainly of agricultural raw materials that are subject to climatic changes and price volatility in the world market. The export of raw materials undermines their competitiveness in the region and world markets. On the other hand, the import sector is dominated by highly valued capital and consumer goods leading to unfavorable trade balance for most of the years. The expansion of the export products base coupled with strict quality control measures would greatly improve on the export earnings thereby narrowing the trade deficit.

(ii) Exports Performance

The contribution of **Traditional Exports** (TEs) (namely; coffee, tea, cotton and tobacco) to the overall export value continued to decline over the years from 52.6 per cent in 2000 to about 30 per cent in 2008, as shown in the Table 4.

Table 4: Exports of selected commodities by percent value

Year	Coffee	Cotton	Tea	Tobacco	Fish	Flowers	Vanilla	Traditional Exports	Non-traditional Exports
2000	31.2	5.5	9.2	6.7	7.7	2.5	0.2	52.6	47.4
2001	21.6	3	6.6	7.1	17.3	3.3	0.5	38.3	61.7
2002	20.7	2	6.7	9.7	18.8	3.8	1.5	39.1	60.9
2003	18.8	3.3	7.2	8.1	16.5	4.1	2.5	37.3	62.7
2004	18.7	6.4	5.6	6.1	15.5	4	0.9	36.8	63.2
2005	21.3	3.5	4.2	3.9	17.6	3	0.8	32.9	67.1
2006	19.7	2.1	5.3	2.8	15.2	2.2	0.5	29.9	70.1
2007	19.9	1.5	3.6	5	9.3	1.7	0.5	29.9	70.1
2008	23.4	0.8	2.7	3.9	7.2	1.7	0.2	30.7	69.3

Source: Statistical Abstract (2005 and 2009)

The coffee share to total export revenue consistently continued to drop although it maintained the lead as the main foreign exchange earner (Table 5). Total earnings from tea and tobacco have been fluctuating, but their share in total export consistently declined over the period. Cotton share to total exports on the other hand increased steadily while the quantity of exported cotton increased by 60.6 per cent in 2004 but started declining in subsequent years.

Table 5: Exports by Value ('000 US\$), 2002-2008

Year	Coffee	Cotton	Tea	Tobacco	Fish	Flowers	Vanilla
2002	96,626	9,519	31,293	45,262	87,945	17,828	6,898
2003	100,233	17,755	38,314	43,042	88,113	22,080	13,546
2004	124,237	42,758	37,258	40,702	103,309	26,424	6,120
2005	172,942	28,821	34,274	31,486	142,691	24,128	6,135
2006	189,830	20,474	50,873	26,964	145,837	20,987	4,808
2007	265,853	19,571	47,629	66,301	124,711	22,782	6,262
2008	403,179	13,214	47,222	66,448	124,436	28,790	3,039

Source: Statistical Abstract (2007 and 2009)

The continuous decline in share of traditional exports may partly be attributed to the deteriorating terms of trade for coffee, the main foreign exchange earner. Coffee export prices fell by almost 70 per cent in dollar terms between 1998/99 and 2001/02 alone leading to a US\$ 222 million decline in coffee export earnings (The Republic of Uganda 2003a). Although coffee prices began to pick up in the first half of financial year 2002/2003 (about US\$ 0.59 per kg), they were still

much lower than the 1994/95 price (about US\$2.48 per kg) (Rudaheranwa, 2004). While there was a reduction in volume of coffee exported in 2005, coffee earnings have been increasing from US\$ 124.2 million in 2004 to US\$ 403.2 million in 2008 (Statistical Abstract, 2009). This can be attributed to improvement in the international coffee prices. There have also been increases in export volumes of Tea and Tobacco. However, Cotton has earned less foreign exchange than expected due to the decline in its world market price.

Table 6: Exports by quantity (Tonnes), 2002-2008

Year	Coffee	Cotton	Tea	Tobacco	Fish	Flowers	Vanilla
2002	201,591	12,322	30,400	23,266	25,525	4,504	63
2003	146,299	16,762	36,669	24,669	26,422	5,636	91
2004	159,983	29,293	36,874	27,843	31,808	6,092	71
2005	142,513	30,403	36,532	23,730	39,201	6,162	234
2006	126,887	18,480	30,584	15,794	36,461	4,989	195
2007	164,540	16,230	44,015	26,384	31,681	5,267	422
2008	200,640	7,960	46,022	29,042	24,965	5,349	192

Source: Statistical Abstract (2007 and 2009)

The **Non-Traditional Exports** (Ugandan exports other than Coffee, Tea, Tobacco and Cotton), which include fish and fish products, flowers, Vanilla, maize among others, have maintained a steady increase in their contribution to total export earnings (Table 6). Of these, fish has performed exceptionally well emerging second after coffee in foreign exchange earnings. The high performance share of non-traditional exports is attributed to the export diversification policy drive initiated in the country in the early 1990s. There have been deliberate and increased efforts by government to boost non-traditional exports leading to increases in the various non-traditional export products such as Vanilla, Roses and Cut flowers, and Fish and Fish products.

Table 7: Exports value by region and country of destination (% share)

Year	ASIA	EUROPEAN UNION	OTHER EUROPE	COMESA REGION	OTHER AFRICA	USA
2000	2.3	24.9	25.6	23.3	8	2.1
2001	0.7	28.4	16.7	27	7.4	1.5
2002	0.5	33.4	15.7	23	11.8	2
2003	1.8	26.3	14.8	27.7	8.6	2.4
2004	1.4	27.7	16.7	26.8	5.7	2.4
2005	7.5	31.1	10.1	30.7	4.8	2

2006	7.8	27.4	5.1	29.5	3.9	1.5
2007	5.4	24.3	6.8	37.9	6.6	1.5
2008	5.7	26.7	9.2	42.1	4.2	0.9

Source: Statistical Abstract (2005 and 2009)

The European Union (EU) countries and COMESA member states are Uganda's major export destinations. The dominant role of regional trade has recently been increased by the global financial crisis that has reduced the exports of traditional cash crops that are normally destined for the crisis hit developed countries. For example the export performance of the coffee sector, which contributes nearly 20 per cent of the total export earnings and with its market mainly in Europe, has gone down. The value of coffee exports fell by 35 per cent in March 2009 compared to a year earlier. On the other hand, regional trade especially in non-traditional exports such as maize, beans, cement etc has continued to increase in spite of the global economic crisis. For example, growth of exports of maize and beans increased by about 60 percent between the year 2007 and 2009 even as the economic crisis became more severe.

(iii) Imports Performance

The value of imports has continued to increase at a higher rate than export values implying that the trade balance is ever growing. Over the years the import bill has grown relatively higher than export earnings, which partly explains the worsening trade imbalance for Uganda. The persistent trade imbalance is mainly attributed to export of un-processed items (Statistical Abstract, 2006).

Table 8: Imports by origin from selected regions and countries (% share)

Year	ASIA	EUROPEAN UNION	OTHER EUROPE	COMESA REGION	OTHER AFRICA	USA
2000	23.4	19.4	2.9	32.6	8	3.2
2001	25.8	19.7	3.4	29.4	8.2	2.8
2002	27.3	17.1	2.6	31.5	7.9	3.3
2003	27.8	17.7	1.8	28.3	7.3	5.7
2004	29	18.2	0.9	25.2	9.3	6
2005	26.3	40.4	1.1	27.5	8.7	3.8
2006	29.3	18.8	2.7	17.6	7.4	3.5
2007	33.6	20.5	1.9	16	6.9	2.9
2008	34.8	19.4	3.4	13.2	8.3	2.6

Source: Statistical Abstract (2005 and 2009)

In 2008, imports rose by 35 per cent primarily due to increasing global oil prices. Consequently, Uganda's trade deficit as a percentage of GDP rose from 6.3 per cent in 2007 to 11.9 per cent in 2008 and similar patterns were observed in 2009 and 2010 on the backdrop of increasing oil prices and food prices.

6. Analysis of social and economic horizontal inequalities

Regional inequality in Uganda has historical roots in the colonial period and the ensuing civil war. Some of the inequalities that matter most for poverty reduction are attributed to differences between the four main regions. The following tables and graphs show some dimensions of regional disparities in endowments and opportunities. As demonstrated in Table 9, the central region has the lowest percentage of poor households while on average poverty has been increasing in the Northern region. The persistent poverty in the Northern region is partly explained by the civil conflict which took place for more than two decades.

Table 9: Poverty by Geographic regions

Region	Poverty Headcount Rate			Distribution of the Poor		
	1999	2002	2005	1999	2002	2005
Central	19.7	22.3	16.4	16.9	17.0	15.4
Eastern	35.0	46.0	35.9	27.5	32.5	29.0
Northern	63.6	63.0	60.7	35.9	29.6	38.5
Western	26.2	32.9	20.5	19.7	21.0	17.0
Urban	9.6	14.4	13.7	3.7	5.1	6.8
Rural	37.5	42.7	34.2	96.3	94.9	93.2
Total	33.8	38.8	31.1	100.0	100.0	100.0

Source: UNHS- 1999/00, 2002/03 and 2005/06

Table 10: Population Shares and Urbanization by Region, 2005/06

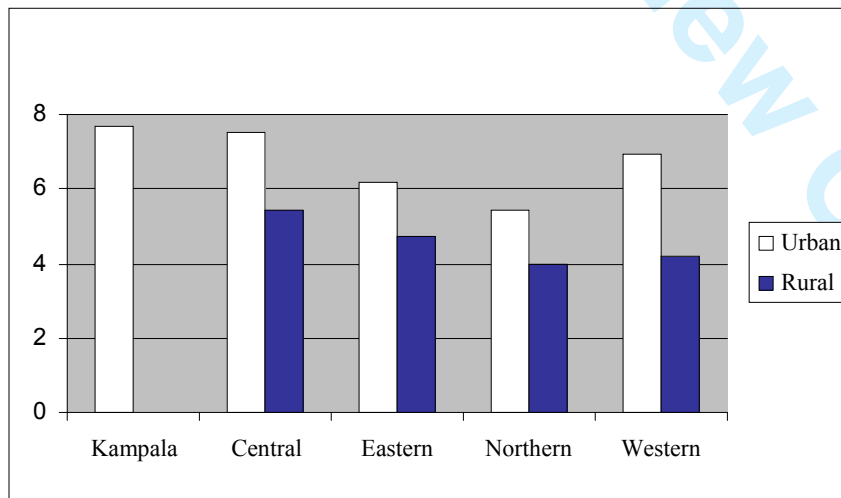
	Central	Eastern	Northern	Western	Total
Share of total population	29.2	25.2	19.7	25.9	100.0
Percent of population urban	29.4	7.8	14.3	7.6	15.4

Source: UNHS 2005/6.

Table 10 shows the Central region is much more urbanized than other regions, owing to the presence of the capital city

(i) Average education of labour force by region

Education is important in determining earnings, and there exists high inequality of earnings by education level in Uganda. Figure 9 shows the Central urban households and their labor force have the highest level of education – on average 7.7 years. Next is the Western region, with an average education level of 6.9, followed by the East at 6.2 and the North at 5.4. Low education attainment has also been attributed to the chronic persistent poverty especially in the Northern region (Ssewanyana 2010).

Figure 8: Average Years of Education of Labour Force, 2005/06

Source: UNHS 2005/06

(ii) Access to services

Access to primary education (Figure 11, Table 11) (measured by enrollment ratios and distance), and to water (Figure 9) is roughly the same in the four regions. However, access to electricity, the urban Center stands way ahead of other areas, while the East and West occupy the middle, and in sanitation, the Center and West stand above the others (Figure 9). The urban North is behind on many counts - particularly with respect to secondary education infrastructure and enrollment (Table 11, Figure 10), health clinics (Table 11), and electricity (Figure 9). Distance to government secondary schools can be as high as 12 kms in rural areas.

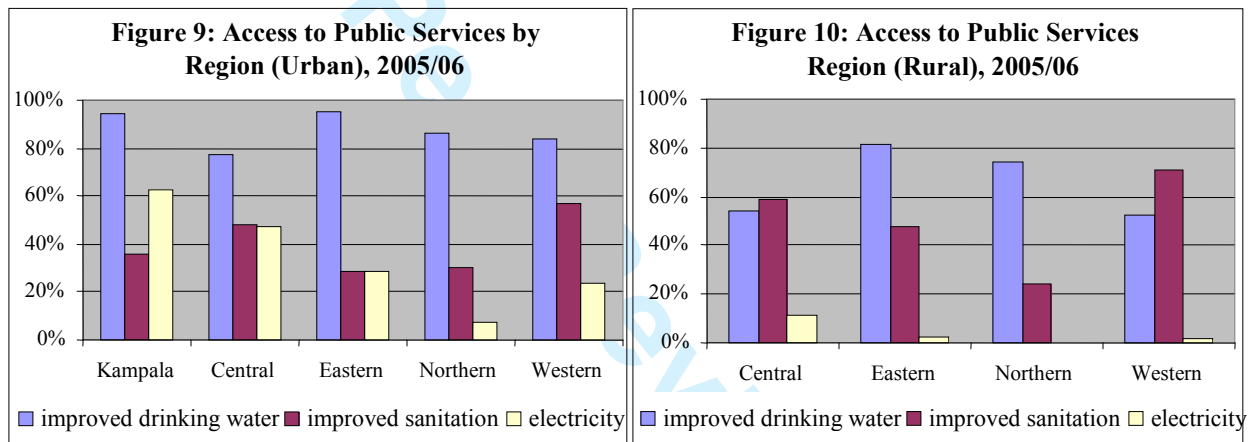
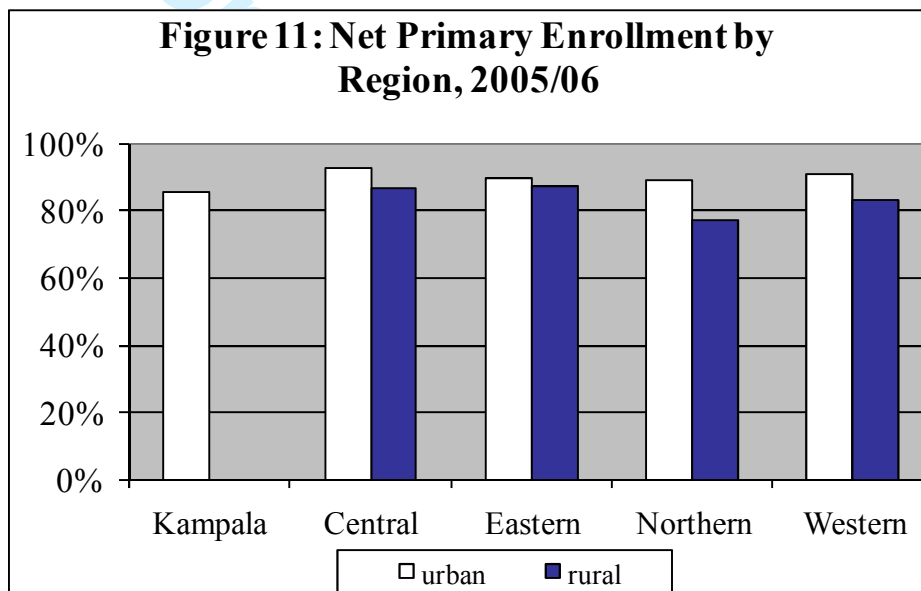


Table 11: Distance to Public Facilities by Region, 2005/06

	Rural			Urban		
	Distance to government primary school	Distance to government secondary school	Distance to government health unit	Distance to government primary school	Distance to government secondary school	Distance to government health unit
Central	1.6	7.8	5.4	0.8	2.4	2.7
Eastern	1.3	6.7	4.6	0.5	2.3	1.3
Northern	1.3	12.4	4.9	0.6	5.3	4.2
Western	1.4	8.4	4.9	0.4	2.0	2.3
Total	1.4	8.6	4.9	0.7	2.9	2.7



Source: UNHS 2005/06

Based on the Uganda National Household Survey of 2005/06, the Central region excluding Kampala had the highest literacy rate (80 percent), while the Northern had the lowest (59 percent). Kampala had a total literacy rate of 91 percent, bearing in mind its special characteristics of being largely composed of all tribes. The literacy rates also were higher for urban dwellers (86 percent) than their rural counter parts (66 percent).

Table 12: Literacy rates for population aged 10 years and above

Region	Literacy Rates		
	1999	2002	2005

Central excluding Kampala	77	79	80
Eastern	62	63	64
Northern	47	56	59
Western	67	74	67
Kampala	-	92	91
Urban	86	87	86
Rural	62	67	66
National	65	70	69

Source: UNHS- 1999/00, 2002/03 and 2005/06

(iii) Employment Opportunities

In general, three types of employment are found in Uganda: agricultural wage employment, non-agricultural wage and salary employment (public and private), farming (e.g. self employment, owner, or unpaid family worker in agricultural household enterprise), and self-employment owner, or unpaid family worker in a non-agricultural enterprise (Table 13). The Central region dominates the private wage and salary jobs although all regions report a large share of the labor force has their primary occupation in non-agricultural jobs. Empirical studies have found that earnings are higher on average for those whose primary employment is non-agricultural wage and salary employment (especially in public service), followed by non-agricultural household enterprises, and followed by agriculture (World Bank, 2006b).

Table 13: Employment Status by Region, 2005/06

Column Percentages	Rural					Urban					Total Uganda	
	Central	Eastern	Northern	Western	Total	Kampala	Central	Eastern	Northern	Western		Total
Wage earners - private agriculture	7	1.5	4.1	6.7	4.9	1.3	2.1	1.5	2.4	3.3	2	4.4
Wage earners - private non-agriculture	9.3	3.1	2.4	4.7	5	41.3	30	19.8	18	19.9	29.6	8.8
Wage earners - government Employer/own account/ unpaid family workers - agriculture	2.2	3	2.5	2.2	2.5	4.4	4.9	7.6	5.7	8	5.6	3
Employer/own account/unpaid family workers - non-agriculture	66.8	84.7	79.8	78.5	77.5	13.1	25.1	35.1	44.6	37.2	26.7	69.5
Unemployed	13.6	7.2	10.3	7.5	9.4	35.6	35.1	34.2	26.7	30.1	33.1	13.2
Total	1.1	0.5	0.9	0.5	0.7	4.4	2.8	1.8	2.6	1.5	3.1	1.1
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: UNHS 2005/06

Table 14: Change in Employment by sector, 2002-2006 (% change)

Sector	Central	Eastern	Northern	Western	Total
Agriculture	2.9	3.1	6.2	12.7	6.3
Mining	-10.8	-14.6	-100	-21.3	-26.3
Manufacturing	-2.5	-19.5	0	-10.5	-6.7
Public utilities	-0.2	-33.5	--	-15.5	-0.2
Construction	7.4	7.6	14.3	-10.8	4
Sales, maintenance and repair of motor vehicles and parts	12.1	-4.5	-4.2	-7.7	4.9
Wholesale	9.4	-8.9	1	22.2	5.5
Retail	-5	-10	5	-19.6	-8.4
Hotels and restaurant	-2.6	-8.3	10.2	-23.7	-7.6
Transport communication	10.9	-2.9	23.5	-1.2	6.2
Financial and other services	0.2	0.3	0.3	0	0.1
Public admin./Education	9.4	9.9	0.8	-2.7	4.7
Health and social work	12.6	-7.6	38.2	9	10.8
Total	2.9	1.2	6.5	6.8	4.2

Source: UNHS, 2002/03 and UNHS, 2005/06

Note: Other services include employees in private households and categories that were not well defined.

(iv) Regional prevalence and trends in malnutrition in children under five

The prevalence of malnutrition among children under five varies significantly by region in Uganda. Table 15 shows the regional distribution in the prevalence of stunting, underweight, and wasting (using WHO 2006 growth standards) in the UDHS 2006³. The prevalence of stunting was highest in Karamoja, in the Southwest and in the North. Underweight was highest in the East-central and the North; wasting was highest in Karamoja, East-Central, South-west and West Nile regions.

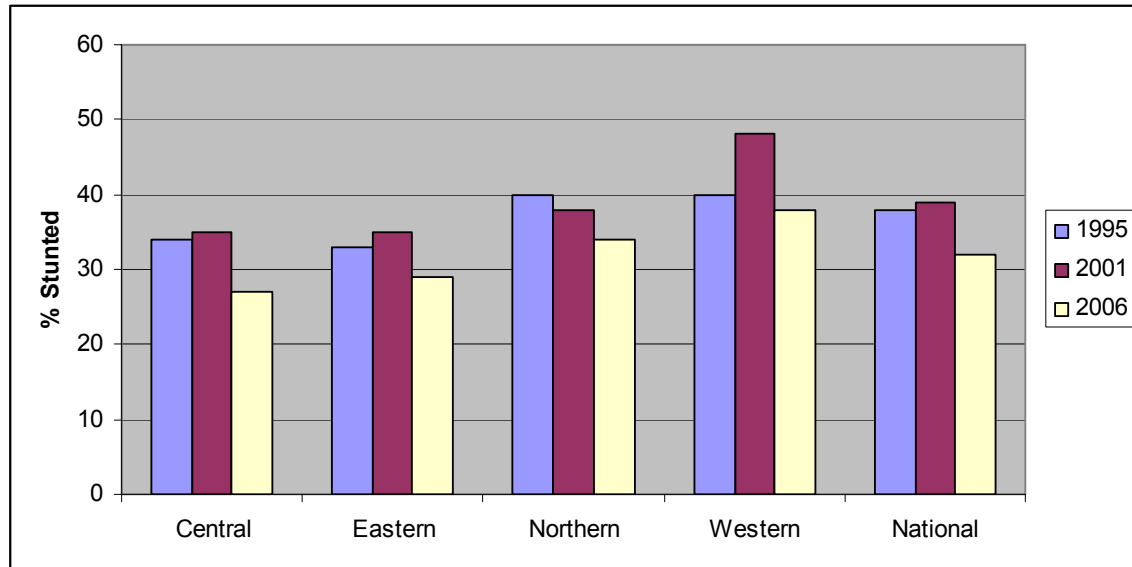
Table 15: Regional distribution in prevalence of severe (-3 z-score) and moderate (-2 z-score) stunting, underweight, and wasting (WHO growth standards)

Region	Stunting		Underweight		Wasting	
	Severe	Severe and Moderate	Severe	Severe and Moderate	Severe	Severe and Moderate
Central 1	15	39	4	13	3	5
Central 2	8	30	2	8	1	3
Kampala	8	22	3	10	4	7
East Central	11	38	6	23	5	10
Eastern	13	36	2	11	1	3
North	17	40	7	22	2	7
West Nile	15	38	5	17	2	8
Western	18	38	3	15	0	5
South West	23	50	5	19	3	9
IDP	14	37	5	20	2	6
Karamoja	25	54	14	14	4	4
National	15	38	4	16	2	6

³ To compare trends in malnutrition over time the data are presented for the four main administrative regions, Northern, Central, Eastern, and Western Uganda instead of the 11 used in the 2006 UDHS. The UDHS 2006 survey was the first survey for Uganda that includes the entire country in the sample. Previous surveys could not achieve this because of the security situation in the north.

Source: Uganda Demographic Health Survey, 2006

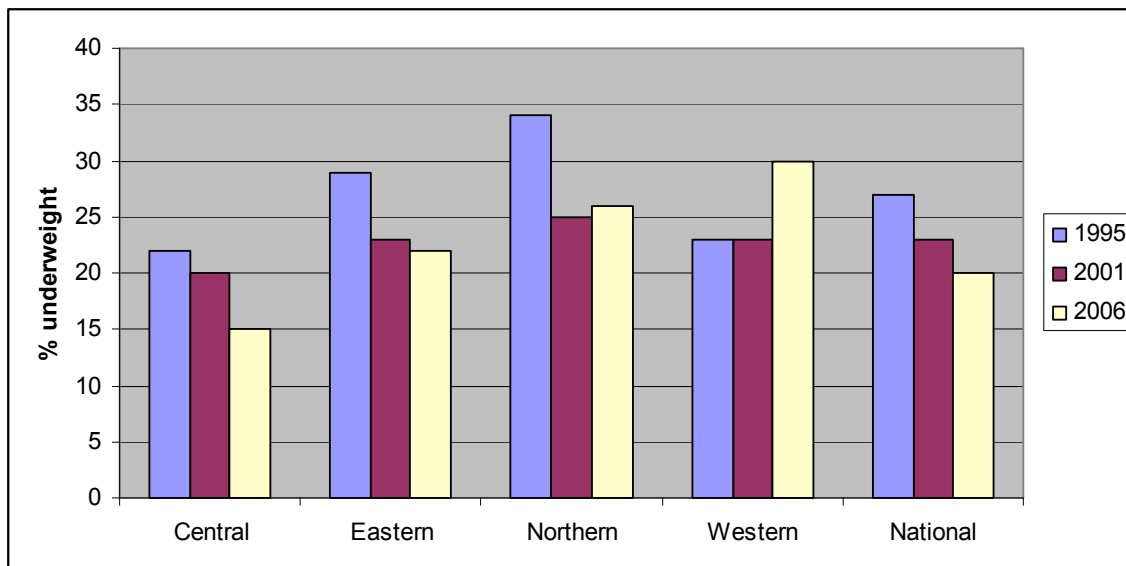
Figure 12: Regional trends in prevalence of stunting 1995-2006



Source: UDHS 1995, 2001, 2006 (using NCHS growth references)

Using the NCHS (National Council for Health Statistics) standards to compare rates over time, the prevalence of stunting has been declining steadily. The prevalence of stunting dropped from 38 percent in 1995 to 32 percent in 2006 (based on the NCHS standards and for children born in the three years prior to the survey for each survey).prevalence of stunting was highest in the western region, and overall the prevalence declined more rapidly compared to other regions (Figure 12).

Figure 13: Regional trends in underweight



Source: UDHS 1995, 2001, 2006 (using NCHS growth references)

While the prevalence of underweight has declined on average in Uganda, the decline has been fastest in the central region, followed by the eastern region. In the northern region of Uganda, the prevalence of underweight rose gradually.

Table 16: Regional Infant Mortality Rates

Region	Infant mortality/1000 live births	Child mortality/1000 live births	Under-five mortality/1000 live births
Central 1	102	63	159
Central 2	67	66	129
Kampala	54	42	94
East Central	74	58	128
Eastern	70	50	116
North	106	80	177
West Nile	98	96	185
Western	76	75	145
South West	109	81	181
IDP	123	88	200
Karamoja	105	78	174
National	76	67	137

Source: Uganda Demographic Health Survey 2006

The under-five mortality rate for kampala is 94 deaths per 1,000 live births, and the IMR is 54 deaths per 1,000 live birth. Both of these estimates are well below the national averages. Among the other regions, under-five mortality ranges from 116 deaths per 1,000 live births in Eastern region to 181 deaths per 1,000 live births in Southwest region and 185 deaths per 1,000 live births in West Nile region.

7. Welfare Implications of Trade Reforms and regional inequalities in Uganda

Using a recursive dynamic general equilibrium model, we consider various simulations of trade reforms that have been implemented or about to be implemented in Uganda. The first set of simulations focused on the partial and complete removal of tariffs. In both cases we assumed that the fiscal deficit was flexible. We also assume that factors of production are mobile across sectors. The second set of simulation focuses on the Uruguay round. In this case we mainly focus on a general reduction on import prices of agricultural commodities,

increase in export prices of agricultural commodities. The third set of simulations assesses the impact of the East African customs union. In this simulation we assume that tariffs on Kenyan imports will be reduced gradually while imports from Tanzania would be zero rated. Finally we assess the implications or benefits of AGOA.

(i) General Liberalization

Here we considered a 50% Tariff cut (Partial Liberalization) and 100% Tariff cut (Complete Liberalization) for all imports into Uganda irrespective of their origin.

As shown in Table 17, the mean incomes for all regions improve under the various simulations of trade liberalization. Trade liberalization would reduce poverty both in the short and long term. Part of the reason why we observe significant gains in poverty reduction is due to the fact that the gains are mainly observed in the agricultural sector. Agriculture in Uganda employs 80 percent of the total population. Therefore, with increased production in this sector due to trade liberalization, households would receive higher incomes and also their subsequent savings for future investment would be much higher. The reduction in poverty would even be more pronounced for households in the Eastern region.

Table 17: Mean Incomes, Poverty and Inequality Under Various Trade Reforms.

Table Mean Incomes by Regions						
	BASE	TarrFull	TarrPart	TarrEAC	Uruguay	AGOA
Central	82,720	82,972	82,865	83,096	83,700	82,945
Eastern	52,133	52,377	52,266	52,427	52,912	52,281
Western	34,383	34,614	34,495	34,618	34,872	34,479
Northern	66,015	66,360	66,197	66,411	66,951	66,204

 Population Below Poverty Line Under Various Trade Reform Scenarios

	Baseline	Tarrful	Tarrpar	TarrEac	Uruguay	Agoa
Central	0.17871	0.17732	0.17871	0.17732	0.17247	0.17801
Eastern	0.37034	0.36563	0.36657	0.36460	0.35612	0.36657
Northern	0.60241	0.60065	0.60171	0.59879	0.59189	0.60019
Western	0.22262	0.21938	0.22089	0.22078	0.20998	0.22089

 Marginal Impact

	Tarrful	Tarrpar	TarrEac	Uruguay	Agoa
Central	-0.00139	0.00000	-0.00139	-0.00623	-0.00069
Eastern	-0.00471	-0.00377	-0.00574	-0.01422	-0.00377
Northern	-0.00175	-0.00070	-0.00362	-0.01052	-0.00222
Western	-0.00324	-0.00173	-0.00184	-0.01264	-0.00173

 Inequality Under Various Trade Reform Scenarios

	Baseline	Tarrful	Tarrpar	TarrEac	Uruguay	Agoa
Central	0.41453	0.41364	0.41416	0.41402	0.41289	0.41453
Eastern	0.38506	0.38504	0.38507	0.38511	0.38379	0.38509
Northern	0.35072	0.35052	0.35064	0.35066	0.35008	0.35077
Western	0.37875	0.37873	0.37876	0.37880	0.37758	0.37877

 Marginal Impact

	Tarrful	Tarrpar	TarrEac	Uruguay	Agoa
Central	-0.00089	-0.00037	-0.00051	-0.00164	0.00000
Eastern	-0.00003	0.00000	0.00005	-0.00127	0.00002
Northern	-0.00020	-0.00007	-0.00006	-0.00064	0.00005
Western	-0.00002	0.00000	0.00005	-0.00118	0.00002

(ii) The Uruguay Round

In order to examine the effects of multilateral liberalisation under the Uruguay Round, we assume full implementation of UR commitments will have been completed by then. As this was mainly for agricultural based commodities, we increase export prices for all agriculture commodities by 20 percent (assuming that this would have been the overall impact on prices), while at the same time reduce the import prices on agricultural commodities from other countries. The

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3 impact of this simulation could be two faced where Uganda's agricultural sector
4 could have faced competition from abroad.
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8 The impact of adopting the Uruguay round would have resulted into significant
9 gains in the fight against poverty especially for the east and northern region
10 where poverty is much higher compared to the central or western. Part of the
11 reason why the impact would be much less in the central is because its much
12 more difficult to reduce poverty especially where its already very low. For the
13 inequality, we observe that all regions would have some reduction in inequality
14 as incomes of especially the population involved in agriculture increase.
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20 (iii) East African Customs Union
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22 In this simulation we considered the implications of Uganda joining the EAC.
23 We looked at effects reducing tariff on major imports to Uganda from within the
24 EAC. We assumed gradual tariff reduction on these imports as we move towards
25 the EA Customs Union. The imports were classified according to their origin.
26 Most of the imports are assumed to originate from Kenya relative to Tanzania
27 given the dismal trade between Uganda and Tanzania.
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29
30

31
32 The impact of this simulation on poverty is similar to the previous experiments.
33 Overall, there would be some reduction in poverty for all regions owing to access
34 to cheaper imports from abroad.
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39 (vi) AGOA
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41 AGOA provides duty-free and quota-free treatment for eligible apparel articles
42 made in qualifying Sub-Saharan African countries through 2015. Uganda being
43 an eligible country, we assumed an increase in the export price (30%) of cotton
44 and cotton products resulting from the participation in AGOA approved
45 activities. In this case we assume that by reducing the tariffs on textile products
46 from Uganda would result into a higher price for all cotton related activities
47 domestically.
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51 Cotton is largely grown in the Northern region and therefore it would be expected
52 that AGOA would largely benefit this region. The results show that poverty in
53 both the east and northern region would be reduced albeit the marginal increase
54 in inequality.
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8. Conclusion and Policy Implications

This paper attempts to address the extent to which trade reforms would affect horizontal inequalities across regions. All regional, bilateral and multilateral trade initiatives have implications on production, consumption, trade, employment and income (levels and distribution) since they differently affect prices and incentives of producers and owners of factors of production.

To address this question, we undertake some descriptive analysis on the extent of inequality across various social indicators. The paper reveals that there is substantial inequality across regions in regard to the various social indicators. In addition access to social services is highly skewed with the Northern region being with the least access to social services. This is also reflected in the outcomes for instance the lower literacy rates exhibited in the Northern region.

The paper also attempts to link the trade policies that have been undertaken to the inequalities portrayed in the descriptive analysis. We employ a dynamic general equilibrium model which is linked to households survey data. The key findings suggest that thrall reduction of tariffs would indeed be beneficial to all regions but more importantly in the Northern and Eastern regions where poverty is highest. The joining of the East African Community would also benefit all regions as a result of access to cheaper imports. Lastly, the Uruguay round whose focus was on the reduction of tariffs on agricultural commodities would benefit all regions especially the North and East. However, the impact of all these various trade initiatives on inequality is very marginal. This suggests that inequality would have to be addressed through other redistributive tools like expenditure programs targeted to the poorest lagging behind.

Appendix:

(i) Methodology and data

For the purposes of the analysis we are using a new CGE model for Uganda based on the 2007 Social Accounting Matrix. We draw on a number of strengths from the CGE modeling framework in our analysis as earlier used in the trade literature. Firstly, the model simulates the functioning of the economy as a whole and track how changes in economic conditions are transmitted through price and quantity adjustments on a range of markets. Secondly, the structural nature of the CGE model allows us to analyse separately the impacts of multiple trade reforms. Thirdly, since the basis of the CGE model is a Social Accounting Matrix we are able to discern the effects of the changes in economic conditions on individual sectors of the economy. Fourthly, the link of the model to household survey data enables an assessment of the impacts on the welfare of households, which is particularly interesting since this is where the most important policy implications are likely to be found for issues relating to horizontal inequality. Finally, the recursive dynamic nature of our model, implies that the behaviour of its agents is based on adaptive expectations, rather than on the forward looking expectations that underlie inter-temporal optimisation models. Since a recursive model is solved one period at a time, it is possible to separate the *within-period* component from the *between-period* component, where the latter governs the dynamics of the model.

The CGE model used in the present study is based on a standard CGE model developed by Lofgren, Harris, and Robinson (2002). This is a real model without the financial or banking system (See Table A1). The CGE model is calibrated to the 2007 Social Accounting Matrix. GAMS software is used to calibrate the model and perform the simulations.

A Social Accounting Matrix (SAM) is a table which summarizes the economic activities of all agents in the economy. These agents typically include households, enterprises, government, and the rest of the world (ROW). The relationships included in the SAM include purchase of inputs (goods and services, imports, labour, land, capital etc.); production of commodities; payment of wages, interest rent and taxes; and savings and investment. Like other conventional SAMs, the Uganda SAM is based on a block of production activities, involving factors of production, households, government, stocks and the rest of the world.

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3 The Uganda SAM is a 120 by 120 matrix. The various commodities (domestic
4 production) supplied are purchased and used by households for final
5 consumption (42 per cent of the total), but also a considerable proportion (34 per
6 cent) is demanded and used by producers as intermediate inputs. Only 7 percent
7 of domestic production is exported, while 11 per cent is used for investment and
8 stocks and the remaining 7 percent is used by government for final consumption.
9 Households derive 64 per cent of their income from factor income payments,
10 while the rest accrues from government, inter-household transfers, corporations
11 and the rest of the world. The government earns 32 percent of its income from
12 import tariffs - a relatively high proportion, but a characteristic typical of
13 developing countries. It derives 42 percent of its income from the ROW, which
14 includes international aid and interest. The remainder of government's income is
15 derived from taxes on products (14 percent), income taxes paid by households (6
16 percent) and corporate taxes (5 percent).
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25 Investment finance is sourced more or less equally from government (26 per
26 cent), domestic producers (27 per cent) and households (26 per cent), with
27 enterprises providing only 21 per cent. Imports of goods and services account
28 for 87 percent of total expenditure to the ROW. The rest is paid to ROW by
29 domestic household sectors in form of remittances; wage labour from domestic
30 production activity; domestic corporations payments of dividends; income
31 transfers paid by government; and net lending and external debt related
32 payments.
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38 The extent of household dis-aggregation is very important for policy analysis,
39 and involves representative household groups as opposed to individual
40 households. Pyatt and Thorbecke (1976) argue for a household dis-aggregation
41 that minimizes within-group heterogeneity. This is achieved in the Uganda SAM
42 through the disaggregating of households by rural and urban, and whether
43 households are involved in farming or non farming activities. Moreover, the
44 Uganda SAM identifies three labour categories disaggregated by skilled,
45 unskilled and self employed. Land and capital are distributed accordingly to the
46 various household groups.
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52 *Productions and commodities*

53 For all activities, producers maximize profits given their technology and the
54 prices of inputs and output. The production technology is a two-step nested
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3 structure. At the bottom level, primary inputs are combined to produce value-
4 added using a CES (constant elasticity of substitution) function. At the top level,
5 aggregated value added is then combined with intermediate input within a fixed
6 coefficient (Leontief) function to give the output. The profit maximization gives
7 the demand for intermediate goods, labour and capital demand. The detailed
8 disaggregation of production activities captures the changing structure of growth
9 due to the crisis.
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15 The allocation of domestic output between exports and domestic sales is
16 determined using the assumption that domestic producers maximize profits
17 subject to imperfect transformability between these two alternatives. The
18 production possibility frontier of the economy is defined by a constant elasticity
19 of transformation (CET) function between domestic supply and export.
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24 On the demand side, a composite commodity is made up of domestic demand
25 and final imports and it is consumed by households, enterprises, and
26 government. The Armington assumption is used here to distinguish between
27 domestically produced goods and imports. For each good, the model assumes
28 imperfect substitutability (CES function) between imports and the corresponding
29 composite domestic goods. The parameter for CET and CES elasticity used to
30 calibrate the functions used in the CGE model are exogenously determined.
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36 *Factor of production*

37 There are 6 primary inputs: 3 labour types, capital, cattle and land. Wages and
38 returns to capital are assumed to adjust so as to clear all the factor markets.
39 Unskilled and self-employed labor is mobile across sectors while capital is
40 assumed to be sector-specific. Unskilled labour is not substitutable for skilled
41 labour. Within the model, producers instantly adjust to changes in rates of
42 returns for factors of production for each sector. The model does not take into
43 account adjustment costs of switching resources between sectors.
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49 *Institutions*

50 There are three institutions in the model: households, enterprises and
51 government. Households receive their income from primary factor payments.
52 They also receive transfers from government and the rest of the world.
53 Households pay income taxes and these are proportional to their incomes.
54 Savings and total consumption are assumed to be a fixed proportion of
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3 household's disposable income (income after income taxes). Consumption
4 demand is determined by a Linear Expenditure System (LES) function. Firms
5 receive their income from remuneration of capital; transfers from government
6 and the rest of the world; and net capital transfers from households. Firms pay
7 corporate tax to government and these are proportional to their incomes.
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12 Government revenue is composed of direct taxes collected from households and
13 firms, indirect taxes on domestic activities, domestic value added tax, tariff
14 revenue on imports, factor income to the government, and transfers from the rest
15 of the world. The government also saves and consumes.
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18 19 *Macro closure*

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21 Equilibrium in a CGE model is captured by a set of macro closures in a model.
22 Aside from the supply-demand balances in product and factor markets, three
23 macroeconomic balances are specified in the model: (i) fiscal balance, (ii) the
24 external trade balance, and (iii) savings-investment balance. For fiscal balance,
25 government savings is assumed to adjust to equate the different between
26 government revenue and spending. For external balance, foreign savings are
27 fixed with exchange rate adjustment to clear foreign exchange markets. For
28 savings-investment balance, the model assumes that savings are investment
29 driven and adjust through flexible saving rate for firms.
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35 36 *Recursive dynamics*

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38 To appropriately capture the dynamic aspects of aid on the economy, this model
39 is extended by building some recursive dynamics by adopting the methodology
40 used in previous studies on Botswana and South Africa (Thurlow, 2007). The
41 dynamics is captured by assuming that investments in the current period are
42 used to build on the new capital stock for the next period. The new capital is
43 allocated across sectors according to the profitability of the various sectors. The
44 labour supply path under different policy scenarios is exogenously provided
45 from a demographic model. Population growth rates overtime are assumed to be
46 3.2 percent annually. The model is initially solved to replicate the SAM of 2007.
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(ii) Model Equations

Table A1. CGE model sets, parameters, and variables

Symbol	Explanation	Symbol	Explanation
Sets			
$a \in A$	Activities	$c \in CMN(\subset C)$	Commodities not in CM
$a \in ALEO(\subset A)$	Activities with a Leontief function at the top of the technology nest	$c \in CT(\subset C)$	Transaction service commodities
$c \in C$	Commodities	$c \in CX(\subset C)$	Commodities with domestic production
$c \in CD(\subset C)$	Commodities with domestic sales of domestic output	$f \in F$	Factors
$c \in CDN(\subset C)$	Commodities not in CD	$i \in INS$	Institutions (domestic and rest of world)
$c \in CE(\subset C)$	Exported commodities	$i \in INSD(\subset INS)$	Domestic institutions
$c \in CEN(\subset C)$	Commodities not in CE	$i \in INSDNG(\subset INSD)$	Domestic non-government institutions
$c \in CM(\subset C)$	Aggregate imported commodities	$h \in H(\subset INSDNG)$	Households
Parameters			
$cwts_c$	Weight of commodity c in the CPI	$qdst_c$	Quantity of stock change
$dwts_c$	Weight of commodity c in the producer price index	qg_c	Base-year quantity of government demand
ica_{ca}	Quantity of c as intermediate input per unit of activity a	$qinv_c$	Base-year quantity of private investment demand
$icd_{cc'}$	Quantity of commodity c as trade input per unit of c' produced and sold domestically	$shif_{if}$	Share for domestic institution i in income of factor f
$ice_{cc'}$	Quantity of commodity c as trade input per exported unit of c'	$shii_{i'}$	Share of net income of i' to i ($i' \in INSDNG$; $i \in INSDNG$)
$icm_{cc'}$	Quantity of commodity c as trade input per imported unit of c'	ta_a	Tax rate for activity a
$inta_a$	Quantity of aggregate intermediate input per activity unit	$tins_i$	Exogenous direct tax rate for domestic institution i
iva_a	Quantity of aggregate intermediate input per activity unit	$tins0I_i$	0-1 parameter with 1 for institutions with potentially flexed direct tax rates
mps_i	Base savings rate for domestic institution i	tm_c	Import tariff rate
$mps0I_i$	0-1 parameter with 1 for institutions with potentially flexed direct tax rates	tq_c	Rate of sales tax
pwe_c	Export price (foreign currency)	$trnsfr_{if}$	Transfer from factor f to institution i
pwm_c	Import price (foreign currency)		

Table A1 continued. CGE model sets, parameters, and variables

Symbol	Explanation	Symbol	Explanation
Greek Symbols			
α_a^a	Efficiency parameter in the CES activity function	δ_{cr}^t	CET function share parameter
α_a^{va}	Efficiency parameter in the CES value-added function	δ_{fa}^{va}	CES value-added function share parameter for factor f in activity a
α_c^{ac}	Shift parameter for domestic commodity aggregation function	γ_{ch}^m	Subsistence consumption of marketed commodity c for household h
α_c^q	Armington function shift parameter	θ_{ac}	Yield of output c per unit of activity a
α_c^t	CET function shift parameter	ρ_a^a	CES production function exponent
β^a	Capital sectoral mobility factor	ρ_a^{va}	CES value-added function exponent
β_{ch}^m	Marginal share of consumption spending on marketed commodity c for household h	ρ_c^{ac}	Domestic commodity aggregation function exponent
δ_a^a	CES activity function share parameter	ρ_c^q	Armington function exponent
δ_{ac}^{ac}	Share parameter for domestic commodity aggregation function	ρ_c^t	CET function exponent
δ_{cr}^q	Armington function share parameter	η_{fat}^a	Sector share of new capital
ν_f	Capital depreciation rate		
Exogenous Variables			
\overline{CPI}	Consumer price index	\overline{MPSADJ}	Savings rate scaling factor (= 0 for base)
\overline{DTINS}	Change in domestic institution tax share (= 0 for base; exogenous variable)	\overline{QFS}_f	Quantity supplied of factor
\overline{FSAV}	Foreign savings (FCU)	$\overline{TINSADJ}$	Direct tax scaling factor (= 0 for base; exogenous variable)
\overline{GADJ}	Government consumption adjustment factor	\overline{WFDIST}_{fa}	Wage distortion factor for factor f in activity a
\overline{IADJ}	Investment adjustment factor		
Endogenous Variables			
AWF_{ft}^a	Average capital rental rate in time period t	QG_c	Government consumption demand for commodity
$DMPS$	Change in domestic institution savings rates (= 0 for base; exogenous variable)	QH_{ch}	Quantity consumed of commodity c by household h
DPI	Producer price index for domestically marketed output	QHA_{ach}	Quantity of household home consumption of commodity c from activity a for household h
EG	Government expenditures	$QINTA_a$	Quantity of aggregate intermediate input
EH_h	Consumption spending for household	$QINT_{ca}$	Quantity of commodity c as intermediate input to activity a
EXR	Exchange rate (LCU per unit of FCU)	$QINV_c$	Quantity of investment demand for commodity
$GSAV$	Government savings	QM_{cr}	Quantity of imports of commodity c
QF_{fa}	Quantity demanded of factor f from activity a		

Table A1 continued. CGE model sets, parameters, and variables

Symbol	Explanation	Symbol	Explanation
Endogenous Variables Continued			
MPS_i	Marginal propensity to save for domestic non-government institution (exogenous variable)	QQ_c	Quantity of goods supplied to domestic market (composite supply)
PA_a	Activity price (unit gross revenue)	QT_c	Quantity of commodity demanded as trade input
PDD_c	Demand price for commodity produced and sold domestically	QVA_a	Quantity of (aggregate) value-added
PDS_c	Supply price for commodity produced and sold domestically	QX_c	Aggregated quantity of domestic output of commodity
PE_{cr}	Export price (domestic currency)	$QXAC_{ac}$	Quantity of output of commodity c from activity a
$PINTA_a$	Aggregate intermediate input price for activity a	RWF_f	Real average factor price
PK_{ft}	Unit price of capital in time period t	$TABS$	Total nominal absorption
PM_{cr}	Import price (domestic currency)	$TINS_i$	Direct tax rate for institution i ($i \in INSDNG$)
PQ_c	Composite commodity price	$TRII_{i'}$	Transfers from institution i' to i (both in the set INSDNG)
PVA_a	Value-added price (factor income per unit of activity)	WF_f	Average price of factor
PX_c	Aggregate producer price for commodity	YF_f	Income of factor f
$PXAC_{ac}$	Producer price of commodity c for activity a	YG	Government revenue
QA_a	Quantity (level) of activity	YI_i	Income of domestic non-government institution
QD_c	Quantity sold domestically of domestic output	YIF_{if}	Income to domestic institution i from factor f
QE_{cr}	Quantity of exports	ΔK_{fat}^a	Quantity of new capital by activity a for time period t

Table A2. CGE model equations

Production and Price Equations

$$QINT_{ca} = ica_{ca} \cdot QINTA_a \quad (1)$$

$$PINTA_a = \sum_{c \in C} PQ_c \cdot ica_{ca} \quad (2)$$

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

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

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

$$W_{f'} \cdot WFDIST_{f'a} = W_f \cdot WFDIST_{fa} \cdot QF_{fa} \cdot \left(\sum_{f'' \in F} \delta_{ff''a}^{van} \cdot QF_{f''a}^{-\rho_{fa}^{van}} \right)^{-1} \cdot \delta_{ff'a}^{van} \cdot QF_{f'a}^{-\rho_{fa}^{van}-1} \quad (6)$$

$$QVA_a = iva_a \cdot QA_a \quad (7)$$

$$QINTA_a = inta_a \cdot QA_a \quad (8)$$

$$PA_a \cdot (1 - ta_a) \cdot QA_a = PVA_a \cdot QVA_a + PINTA_a \cdot QINTA_a \quad (9)$$

$$QXAC_{ac} = \theta_{ac} \cdot QA_a \quad (10)$$

$$PA_a = \sum_{c \in C} PXAC_{ac} \cdot \theta_{ac} \quad (11)$$

$$QX_c = \alpha_c^{ac} \cdot \left(\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_c^{ac}} \right)^{\frac{1}{\rho_c^{ac}-1}} \quad (12)$$

$$PXAC_{ac} = PX_c \cdot QX_c \cdot \left(\sum_{a \in A'} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_c^{ac}} \right)^{-1} \cdot \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_c^{ac}-1} \quad (13)$$

$$PE_{cr} = pwe_{cr} \cdot EXR - \sum_{c' \in CT} PQ_{c'} \cdot ice_{c'c} \quad (14)$$

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

$$\frac{QE_{cr}}{QD_c} = \left(\frac{PE_{cr}}{PDS_c} \cdot \frac{1 - \sum_r \delta_{cr}^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t-1}} \quad (16)$$

Table A3. CGE model equations (continued)

$$QX_c = QD_c + \sum_r QE_{cr} \quad (17)$$

$$PX_c \cdot QX_c = PDS_c \cdot QD_c + \sum_r PE_{cr} \cdot QE_{cr} \quad (18)$$

$$PDD_c = PDS_c + \sum_{c' \in CT} PQ_{c'} \cdot icd_{c',c} \quad (19)$$

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

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

$$\frac{QM_{cr}}{QD_c} = \left(\frac{PDD_c}{PM_{cr}} \cdot \frac{\delta_c^q}{1 - \sum_r \delta_{cr}^q} \right)^{\frac{1}{1 + \rho_c^q}} \quad (22)$$

$$QQ_c = QD_c + \sum_r QM_{cr} \quad (23)$$

$$PQ_c \cdot (1 - tq_c) \cdot QQ_c = PDD_c \cdot QD_c + \sum_r PM_{cr} \cdot QM_{cr} \quad (24)$$

$$QT_c = \sum_{c' \in C'} (icm_{c,c'} \cdot QM_{c'} + ice_{c,c'} \cdot QE_{c'} + icd_{c,c'} \cdot QD_{c'}) \quad (25)$$

$$\overline{CPI} = \sum_{c \in C} PQ_c \cdot cwts_c \quad (26)$$

$$DPI = \sum_{c \in C} PDS_c \cdot dwts_c \quad (27)$$

Institutional Incomes and Domestic Demand Equations

$$YF_f = \sum_{a \in A} WF_f \cdot \overline{WFDIST}_{fa} \cdot QF_{fa} \quad (28)$$

$$YF_{if} = shif_{if} \cdot [YF_f - trnsfr_{rowf} \cdot EXR] \quad (29)$$

$$YI_i = \sum_{f \in F} YF_{if} + \sum_{i' \in INSDNG'} TRII_{i'} + trnsfr_{i'gov} \cdot \overline{CPI} + trnsfr_{i'row} \cdot EXR \quad (30)$$

$$TRII_{i'} = shii_{i'} \cdot (1 - MPS_{i'}) \cdot (1 - \overline{tins}_{i'}) \cdot YI_{i'} \quad (31)$$

$$EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih} \right) \cdot (1 - MPS_h) \cdot (1 - \overline{tins}_h) \cdot YI_h \quad (32)$$

$$PQ_c \cdot QH_{ch} = PQ_c \cdot \gamma_{ch}^m + \beta_{ch}^m \cdot \left(EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m \right) \quad (33)$$

$$QINV_c = IADJ \cdot \overline{qinv}_c \quad (34)$$

$$QG_c = \overline{GADJ} \cdot \overline{qg}_c \quad (35)$$

Table A3. CGE Model Equations (continued)

$$EG = \sum_{c \in C} PQ_c \cdot QG_c + \sum_{i \in INSDNG} \overline{trnsfr}_{i \text{ gov}} \cdot \overline{CPI} \quad (36)$$

System Constraints and Macroeconomic Closures

$$YG = \sum_{i \in INSDNG} \overline{tins}_i \cdot YI_i + \sum_{c \in CMNR} tm_c \cdot pwm_c \cdot QM_c \cdot EXR + \sum_{c \in C} tq_c \cdot PQ_c \cdot QQ_c + \sum_{f \in F} YF_{\text{gov } f} + \overline{trnsfr}_{\text{gov row}} \cdot EXR \quad (37)$$

$$QQ_c = \sum_{a \in A} QINT_{ca} + \sum_{h \in H} QH_{ch} + QG_c + QINV_c + qdst_c + QT_c \quad (38)$$

$$\sum_{a \in A} QF_{fa} = QFS_f \quad (39)$$

$$YG = EG + GSAV \quad (40)$$

$$\sum_{r \in CMNR} pwm_{cr} \cdot QM_{cr} + \sum_{f \in F} \overline{trnsfr}_{\text{row } f} = \sum_{r \in CENR} pwe_{cr} \cdot QE_{cr} + \sum_{i \in INSD} \overline{trnsfr}_{i \text{ row}} + FSAV \quad (41)$$

$$\sum_{i \in INSDNG} MPS_i \cdot (1 - \overline{tins}_i) \cdot YI_i + GSAV + EXR \cdot FSAV = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c \quad (42)$$

$$MPS_i = \overline{mps}_i \cdot (1 + MPSADJ) \quad (43)$$

Capital Accumulation and Allocation Equations

$$AWF_{f,t}^a = \sum_a \left[\left(\frac{QF_{f,at}}{\sum_{a'} QF_{f,a't}} \right) \cdot WF_{f,t} \cdot WFDIST_{f,at} \right] \quad (44)$$

$$\eta_{f,at}^a = \left(\frac{QF_{f,at}}{\sum_{a'} QF_{f,a't}} \right) \cdot \left(\beta^a \cdot \left(\frac{WF_{f,t} \cdot WFDIST_{f,at}}{AWF_{f,t}^a} - 1 \right) + 1 \right) \quad (45)$$

$$\Delta K_{f,at}^a = \eta_{f,at}^a \cdot \left(\frac{\sum_c PQ_{ct} \cdot QINV_{ct}}{PK_{f,t}} \right) \quad (46)$$

$$PK_{f,t} = \sum_c PQ_{ct} \cdot \frac{QINV_{ct}}{\sum_{c'} QINV_{c't}} \quad (47)$$

$$QF_{f,at+1} = QF_{f,at} \cdot \left(1 + \frac{\Delta K_{f,at}^a}{QF_{f,at}} - \nu_f \right) \quad (48)$$

$$QFS_{f,t+1} = QFS_{f,t} \cdot \left(1 + \frac{\sum \Delta K_{f,at}}{QFS_{f,t}} - \nu_f \right) \quad (49)$$

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