East African Community and Poverty Alleviation in Uganda: Micro Simulations in a CGE Model

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1. Background

Introduction

Globalization and regional integration have become some of the most popular topics of the 1990's (Vamvakidis,1997). This proposed study focuses on one aspect of globalization, namely, regional integration by focusing on the well being of one particular group, namely the poor. Understanding the impacts of regional integration on income distribution and poverty is important because of the vulnerability of the poor as a group in developing countries. Gains and losses from regional integration are often unevenly distributed inside the country. A complex phenomenon in itself, regional integration poses new questions relating to the prospects of the poor.

Poverty is caused by both microeconomic, macroeconomic and social cultural factors. We primarily aim to assess the possible role of macroeconomic factor with emphasis on regional integration in poverty dynamics. Joining the East African Community regional

integration involves removal of tariffs in the community and maintaining a common external tariff with the rest of the world has poverty implication. Regional integration is likely to bring in the short-run, shocks to Ugandan imports and exports prices. Thus the impact of regional integration on income distribution and poverty is not very clear and is a subject of intense debate.

Trade Liberalization Policies in Uganda

Morrisey and Rudaheranwa(1998) provide a discussion of the major trade policy reforms in Uganda in the period 1987 to 1997.The liberalization of foreign exchange in 1990, and abolition of marketing boards particularly coffee in 1992, greatly improved the farm gate prices for coffee and boosted production, as farmers were able to receive a greater proportion of the world coffee prices. Given that small holder poor farmers grow coffee, the progress with liberalization of coffee had a direct positive effect on poverty(Appeleton,2001).Recent trade liberalization in Uganda brought about considerable reductions in the top tariff rates and the differences between tariff rates compared to other partner states as shown in Table one below. There was also rationalization of structures of tariffs regimes as shown in Table one below.

Table One: EAC Countries: Evolution of Tariff Regimes

	1997	1999	2002
Uganda			

Tariff band	4.0	3.0	3.0
Maximum rate	20.0	15.0	15.0
Simple Average	13.2	9.0	9.0
Kenya			
Tariff band	5.0	5.0	5.0
Maximum rate	35.0	35.0	35.0
Simple Average	18.4	16.3	16.6
Tanzania			
Tariff band	9.0	5.0	4.0
Maximum rate	50.0	25.0	25.0
Simple Average	21.8	16.1	14.3

Source: WTO and United Nations Conference on Trade and Statistics

The removal of internal tariffs and imposition of a common external tariff by East Africa Community member countries will have an impact on income distribution and poverty levels with respect to the composition, and volume of imports and exports to the East African Community member states and the rest of the world.

East African Community(EAC) and Poverty Alleviation

EAC is a preferential trading area consisting of Uganda, Kenya and Tanzania. It aims at achieving deeper regional integration among the three member states with the establishment of a customs union, then a common market, a monetary union and eventually a political federation. All the member countries view regional integration as

an essential element of their development strategy and an important ingredient in stimulating increased trade, investment and competition.

On June 23, 2003, the presidents of the three member countries reached an agreement which fully implemented in the year 2005 on the Common External Tariff(CET) for the planned customs union that has three bands; 0 percent for meritorious goods, 10% for intermediate goods and 25% for consumer goods. Due to the fact that the three member states are at different levels of development, under the EAC Common External Tariff, Tanzania and Uganda will maintain internal tariffs on select Kenyan imports. In Uganda, there are 426 items on selected imports from Kenya that will initially attract a 10 percent tariff but will eventually be reduced to zero within a period of five years.

In the past two decades, intraregional trade has grown with a share of intraregional exports increasing from about 6% in 1991 to 16% in 2001 and imports rising from 2.7% in 1991 to 10.5% in 2001. Although Kenya sends a significant share of its exports to EAC, it takes only 1.4% of total imports from the sub-region. Tanzania sends 9.9% of her total exports to the sub-region and receives from it 7.2% of total imports. However, while Uganda's exports to EAC are similarly low at two percent, it receives a substantial 48.8 percent of total imports from the EAC. With complete removal of tariff barriers these shares are expected to increase significantly and will have poverty alleviation implications.

The commodity composition of intraregional trade reveals that unlike trade with the rest of the world, food products and manufacturing products play an important role. Table Two indicates that for Uganda, 64.5% and 34.6% of her exports to Kenya and Tanzania respectively are agricultural products and imports of 33.3% and 7.1% from Tanzania and Kenya respectively are manufactured goods in the year 2001.

Table Two: Uganda Exports and Imports by Commodity from EAC Countries, 2001 (Percent of total)

	Imports from		Exports to	
	Kenya	Tanzania	Kenya	Tanzania
Uganda				
Food products	3.6	18.3	64.5	34
Agricultural products	6.3	8.6	11.7	0.5
Textile fibres	0.1	0.2	4.7	0.4
Ore, minerals and metals	3.5	03	2.8	0
Energy	52.7	1.4	12.9	26.4
Petroleum products	52.4	41.4	0.1	0
Gas, natural and manufactured	0.3	0	0	0
Electric current	0	0	12.8	26.4
Manufacturing	33.8	7.3	3.3	38.2

Source: United Nations Trade statistics Database, 2003

Regional integration may affect poverty through its impacts on government revenue, the prices of products and the income of households. Reduction in government revenue may negatively affect transfers and social expenditure. Imported products may become cheaper and hence more attractive than domestic goods. The other channel through which the poor may be affected is through changes in prices. Households that obtain income from domestic production of protected products a fall in income is expected. At the same time the reduction in the prices of imported goods makes more consumption possible for the household. At the same time, households producing products that were previously protected by importing countries may be expected to have a rise in their incomes. The net effect thus depends on whether the household is a net producer or consumer of the products in question.

Uganda has made good strides towards economic growth at an average of 6% per annum and reduced the number of households below the poverty line from 56% in 1992 to 35% in 1999. Current literature indicates that this success was not equally distributed among regions or between rural and urban areas. The incidence of poverty in rural areas was 39% while it was only 10 percent in urban areas in 1999. As a result, 95% of the poor in Uganda are concentrated in rural areas with agriculture as their primary source of livelihood.

There is growing evidence showing that openness is beneficial to growth. However, it is unknown if tariff reductions in a regional integration context will lead to lower or higher

poverty levels in Uganda. It is also unknown what the relative effects of the increases will be in the different socioeconomic groups of Uganda. This proposed study aims at using a CGE micro simulation model to run simulations that will indicate if there will be changes in the overall incidence levels of poverty and impact on household income distribution and poverty incidence in different socioeconomic groups of Uganda.

2. Main Research Questions

- Will regional integration be favorable or harmful to the poor?

- How will the exogenous shocks be transimited to the poor and non poor households?

- Will the effects differ between different types of the poor?

- What alternative or accompanying policies could be used to ensure a more equitable distribution of the gains from regional integration?

3. Statement of the Problem

The pattern and trends in poverty are central in policy making and regional integration efforts. Regional integration efforts to increase economic growth require an understanding of the impact of regional integration on poverty and income distribution. Regional integration presents both risks and opportunities for participating countries in general and the poor in particular. However we know little about the impact of East Africa Community regional integration on poverty alleviation in Uganda.

Many studies have shown that trade openness is on aggregate beneficial to an economy. However at a more detailed level, there are likely to be winners and losers from trade policy changes. We shall analyze the impact of the removal of tariffs for goods originating from the EAC member countries and while maintaining a common external tariffs on the rest of the world and also the effect of terms of trade changes due to EAC regional integration. This will provide a deeper insight into the relationship between poverty alleviation and regional integration.

4. Core Research Objective

The overall objective of this proposed study is to estimate the impact of EAC regional integration on poor households in Uganda.

5. Policy Relevance

The findings from this proposed study will act as a guide to policy makers about the consequences of regional integration on poor households. The specific policies to be addressed in this proposed study are tariff reforms and terms of trade changes. Isolating the impacts of these trade policies effects has the advantage of enabling policy makers to know the actual impact of tariffs and terms of trade changes has on poverty and thus facilitate informed policy making. The ability to distinguish winners and losers from these trade policies is very crucial. Picking the right policy intervention to help the losers depends on accurately understanding the impact of tariff and terms of trade change as a result of formation of EAC regional integration. This information is currently missing and urgently required.

6. Scientific Contribution of the Research

No study has carried out a comprehensive assessment of the impact of regional integration on the poor food producing household's levels in Uganda. The poverty effects of regional integration in a country will depend on such country specific factors as the initial size of import tariffs, sectoral distribution of the poor, regional distribution of the poor and the wage and employment effects of regional integration (see Cockburn, 2001, Winters, 2000). This study aims at quantifying the possible poverty impacts of regional integration to obtain knowledge on how it can be made pro-poor.

It is expected that the study may be used to prompt greater attention in compensatory or socially protective policy designs to socio economic groups whose incomes will be greatly reduced. The study will prompt attention in policy design to efforts to enable the poor take advantage of regional integration and stimulate debate on regional integration impacts on poverty reduction so that this can be factored amongst the factors that may cause changes in the poverty levels. The study will also provide a recent database (SAM) for the analysis of other poverty related issues and encourage research into the different ways regional integration can be used as a tool for poverty reduction in Uganda.

This study proposes to do a CGE micro simulation analysis of regional integration on poverty in Uganda. To our knowledge, this will be the first study of its kind in Uganda. This study will thus contribute to the debate on the impact of regional integration on poverty in developing countries using CGE analysis. It is also hoped that this proposed

study will lead us to understand better the relationship between regional integration and poverty alleviation.

7. Literature Review

Recent surveys on the literature about the link between trade and poverty show that there are various methods of analysis that can be grouped into partial equilibrium models and general equilibrium models, models on trade, growth and poverty(see Winters, et al,2004; Hertel, et al ,2004). The empirical evidence from these surveys indicates that there can be no simple general conclusion about the relationship between trade liberalization and poverty alleviation. According to economic literature, the effects of regional integration on poverty is best analyzed through a computable general equilibrium model where it is possible to include certain provisions that may affect the volume, price and poverty focus of trade. This proposed study falls under the general equilibrium method, in particular in the CGE poverty literature. This proposed study will trace the impact of changes in food crops prices and manufactured products prices on household incomes.

Viner (1950) investigated the welfare gains from regional trading agreements and found that the welfare impact of an RTA is ambiguous. Gains will occur if higher cost domestic production is replaced by cheaper imports from a partner country, i.e., trade creation. But if partner country production replaces lower cost imports from the rest of the world trade diversion, there will be losses.

A study by Dirk Willem et al (2004) examines the effects of regional integration on poverty and discusses the routes from regional integration to poverty on the basis of a simple mapping of a set of links describing how poverty in the country is affected by regional process. The first set of links between regional integration is through trade. Regional trade agreements include certain provisions that may affect volume, price and poverty focus of trade. The second set of links is through foreign direct investment. Regional trade agreements include provisions that may affect the volume and poverty focus of foreign direct investment but this effect is usually in the long run. The third set of links can be termed as other links and relate to non trade and non FDI issues in regional trade agreements that may affect poverty. Finally these links in general may in turn affect different characteristics of poverty intermediated through complimentary conditions including public policies. These sets of links will depend on the structure and the labor and goods markets. Our proposed study focuses on the short run effects of regional integration by focusing on changes in the relative prices of goods produced and consumed by poor households.

Many attempts have been made to adapt CGE models to the analysis of trade liberalization and poverty issues. A popular approach is to assume a lognormal distribution of income within each category where the variance is estimated with the base year data (De Janvry, et al, 1991). The CGE model in this approach is used to estimate the change in the average income for each household category, while the variance of income is assumed fixed. It is argued that a beta distribution is preferable to other

distributions because it can be skewed left or right and thus may better represent the types of intra category income distributions commonly observed (Decaluwe et al, 2000).

Two CGE analyses have been conducted in Uganda to analyze the effects of trade liberalization in Uganda. One study was by Brake (1998) and another by Mbabazi (2002) which focused mainly on analyzing production efficiency and reallocation effects. The two studies basically investigated tariffs reduction before 2000. Mbabazi study used nominal tariffs and in principle, these under estimates the true protection. In our proposed study we shall use effective tariffs and take into account regional integration which involves complete removal of tariffs within the East African Community member countries while maintaining a common external tariffs on the rest of the world. Our focus will be on the effect of regional integration on poor food producing households in Uganda.

The analysis of tracing down the impact of trade reforms particularly broad reforms of East African Community regional integration to the poor food producing household level in Uganda has not been emphasized or has been completely missed out. Yet the trade structure and patterns between the member states is unique for instance it is dominated by food crops and simple manufactured goods trade (see table one above) that may have a strong impact on poor food producing households in Uganda. From the survey we note that no comprehensive assessment of the impacts of regional integration on poverty has been carried out in Uganda. This proposed study attempts to fill this literature gap within the context of East Africa Community regional integration agenda.

8. Expected Results

The simulation will indicate whether national level poverty level particularly poor food crops producing households will change due to regional integration, which food crops will be affected and consequently which food crops producing households will be affected.

9. Methodology

Modeling Regional Integration and Poverty in Uganda

Researchers have used aggregate indicators such as the levels of wages and employment, or the value added in different sectors to analyze the effects of different trade regimes on distribution of income (Beyer et al, 1999, Harrison and Hansen, 1999). However these approaches have setbacks because they fail to capture the mix of effects on specific households and their response for instance to prices. Other researchers have used more elaborate partial equilibrium models to examine income and welfare distributional effects of changes in trade policies (Ravillion, 1989, Levy et al, 1992). Econometric models have also been used by several researchers to analyze the effects of trade liberalization (Dollar, 1992, Edwards, 1992, Ben David, 1993, Sachs and Warner, 1995).

A more popular way of modeling the impact of policy changes on the economy is CGE modeling pioneered by Bourguignon et al, (1991). These CGE models are well suited to analyze short run and long run trends and structural responses to changes in policy. The

procedure used in these models is a combination of household's surveys which provide the structure of household's consumption and behavioral responses at the moment of the simulation, and of simulated or actual price and income changes following a change in a policy. More recently, Cockburn (2001) has attempted to bridge the gap between CGE models and poverty and distribution analysis of trade liberalization by constructing a CGE model that explicitly models all the households from a nationally representative household survey in Nepal. However, traditional CGE models fail to address income distribution and poverty issues.

Numerical general equilibrium models are the most used tools for simulating the impact of policies or external shocks on various economic variables. The popularity of these models in developing countries is due to the fact that they can be run on the basis of a one year database. There are two main ways to achieve the consistency between the macro framework and microeconomic surveys. There is the fully integrated micro macro framework which was proposed by Cogneau and Robilliard (2000). It is based on a standard CGE model where representative households and workers are replaced by a full sample of households and workers whose behaviors are observed from households and labor force surveys. The other method is the sequential micro macro framework. The macro part of the model is an extended CGE model supposed to describe the functioning of the economy to be analyzed.

To assess the potential effects of regional integration on poverty in Uganda, we follow the integrated micro simulation approach developed recently by Decaluwe et al. (1999),

Cockburn (2001) and Cogneau and Robillard (2001).The CGE model to be used will be based on a prototype developed by Blake (1998) for analysis of trade policies and applied for Uganda. The model is a Walrasian standard neoclassical static model with imperfect substititution between domestic and foreign goods and follows in the tradition of application of CGE models to developing countries(Dervis et al. 1982) and standard CGE modeling structures(Blake et al.1998).

Supply will be modeled using nested constant elasticity of substitution (CES) functions, which describe the substitution and complement relations among the various inputs. A constant return to scale is assumed and producers are assumed to be cost minimizes. Output results from the two composite goods, i.e., intermediate consumption and value added, will be combined in fixed proportions. The intermediate aggregate will obtained by combining all products in fixed proportions. The double Armington assumption is used to distinguish imports and domestically produced goods, implying imperfect substitutability and also to differentiate exports from goods for domestic use. The composite production good is therefore a constant elasticity of substitution (CET) aggregation of sectoral exports and domestically consumed producer goods.

The Linear Expenditure System, a modification of the CD and CES production function which introduces a minimum level of demand for each good is assumed to describe household consumer good demand thus eliminating the unitary elasticity of demand.

Income from labor and physical capital accrue to household using fixed shares derived from the SAM, as well as all rents created by specific capital factors. Household total demand is derived from maximizing the utility function, subject to constraints of available consumer price vector. Household utility is a positive function of consumption of the various products and savings, with income elasticity for each product being set to unity. Government and investment demands are disaggregated in sectoral demands once their total value is determined according to fixed coefficients functions.

Export supply is symmetrically modeled as a constant elasticity of transformation. Producers decide to allocate their output to domestic or foreign markets responding to relative prices.

Regional integration impacts will be compared to the situation observed in the base year, in terms of macro economic aggregates, trade volumes, sectoral outputs and poverty levels. The model will be calibrated using information contained in the updated SAM for the year 2004. The updating of the SAM will be done using cross entropy approach. The updated SAM will make distinction between the East African community countries and the rest of the world and will provide the bench mark data for CGE model calibration. We shall use the Harberger convention in which all bench mark prices will be set to unity causing the bench mark values to be treated as quantities. This process will be performed in the software GAMS.

The static model will be calibrated using an updated Macro and Micro SAM for Uganda for the year 2004, with more recent data and surveys from integrated national household's surveys. In using the integrated micro simulation approach we shall be able to take into account household heterogeneity in terms of income sources and consumption pattern.

Main Sectors in the Model

The model will have urban sectors and rural sectors. By introducing a large number of actual households rather than representative into the CGE model we shall carry out a micro simulation exercise which is more reliable as it accounts for within socioeconomic group variations and distribution of income. Following the method by Cockburn (2001), we shall allow for the calculation of the F-G-T poverty indices i.e. poverty head count, depth and severity index and inequality indices after each simulation. With different values of alpha we shall be able to tell how the relationship between individual poverty and the standard of living varies (see Decaluwe et al, 1999). When alpha is equal to zero, the poverty measure yields the proportion of the population within a group below the poverty line. With alpha equal to one, the relative importance accorded to all individuals below the poverty line is proportional to their incomes and we have the income poverty gap. As alpha increases, more importance is given to the shortfalls of the poorest households and the measure becomes more distributionally sensitive, that means, society becomes more averse to poverty(Decaluwe,1999).The poverty income distribution analysis will be done using Stata and DAD software.

Salient Features of the Model

Production

On the production side we assume that in each sector there is a representative firm that generates value added by combining labor and capital. We adopt a nested structure of production. Sectoral output is a leontiff function of value added and total intermediate consumption. Value added is in turn represented by a CES function of labor and capital in the non agricultural sectors (industry and services), and a CES function of land and a composite factor in agriculture. The latter is also represented by a CES function of primary factors: agricultural capital and labor.

The model will have production sectors for agriculture, industry and services, including government service. In the agricultural sector, the model will distinguish capital, land and four types of labor inputs: skilled and unskilled agricultural labor, and skilled and unskilled production workers. Agricultural workers will be employed only in agriculture, while production workers employed in agriculture are mobile between the farm and non farm sectors. Non agricultural sectors except government service use capital as well as skilled and unskilled production worker inputs. Sectoral capital will be assumed to be fixed.

Production of output is to be modeled via multi-level CES Cobb-Douglas(CD) and Leontif functions. Labor and capital are the factors of production and intermediaries are made up of domestic and foreign inputs. Firms are profit maximizers so they hire labor until its marginal revenue product equals the wage.

Production is divided between rural and urban production. Rural output is comprised of tradable and non tradable products. Urban sectors have skilled labor, unskilled labor and capital as factors of production. In the urban sectors skilled and unskilled labor are aggregated using a CES function and then introduced into the production function. Capital is exogenous. CET and CES parameters will be obtained from existing CGE based studies in developing countries.

Households

Households earn their incomes from production factors: labor, land and capital. They also receive dividends, intra household transfers, government transfers and remittances. They pay indirect taxes to the government. Household savings are a fixed proportion of total disposable income. Household demand is derived from a CD utility function. The model will include all households from the household survey.

Household's income will be made up of wages, profits and transfers and other incomes. Transfers and other incomes are assumed to be exogenous. Using the micro simulated incomes of the households, poverty rates are measured in terms of the F-G-T indices and inequality indices. Regional integration definitely affects the product and factor markets. These in turn cause changes in the sizes of the above components of household income. Thus through household income, the reduction in tariff rate may affect poverty levels. The household survey data will be reaggregated according to three income sources in the model, i.e., wages, profits and transfers plus other incomes.

The poverty line will be based on the poverty line used by the government of Uganda. Household consumption will be modeled with the linear expenditure system (LES). LES parameters will be obtained from previous studies on developing countries.

Firms

There will be one representative firm which earns capital income, pays dividends to households and foreigners and pays direct income taxes to the government.

Labor Market

Unskilled workers are employed only in the rural sector alone and the urban sector employs both skilled and unskilled labor. Workers in the traded agricultural sector usually receive higher wages than workers in the non traded agricultural sectors so the two are modeled separately. Employment of skilled and unskilled labor in the government sector is exogenously determined.

External Trade

The country has two external trading partners: other East African Community members and the rest of the world and two sets of import tariffs in the model, i.e., those from other EAC countries and from the rest of the world. Imports from the EAC countries and the rest of the world will be aggregated using a CES function.

In line with the Armington function, the aggregate domestic good will be made up of domestically produced goods, imported goods from EAC member countries and the rest of the world.

$$QQ = arm\{ \delta\, QM^{-\rho} + (1-\delta)\, QD^{-\rho} \}^{-1/\rho} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..1$$

where

$$QM = QD\{ PDD/PM.\, (1-\delta)\, /\, \delta\, \}^{1/1+\rho}$$

QQ is the quantity of goods in the domestic market, QM represents the weighted average of quantity of imports from East African member countries and the rest of the world and QD is quantity sold domestically of domestic output. PDD is the demand price for commodity produced and sold domestically, PM is import price in domestic currency, δ is the Armington share parameter and ρ is the Armington function exponent. Foreign and domestic goods are assumed to be imperfect substitutes. This differentiation is introduced by the standard Armington assumption with a CES function between imports and domestic goods.

The aggregate quantity of domestic output is given by the following equation

$$QX = cet\{ \sigma\, QE^{-\varphi} + (1-\delta)\, QD^{-\varphi} \}^{-1/\varphi} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..2$$

Where

$$QE = QD\{ PE/PDS. (1-\sigma) / \sigma \}^{1/\varphi -1}$$

Cet is a scale parameter, QE represents the weighted average of quantity of exports to East African member countries and to the rest of the world, QD is quantity sold domestically of domestic output, PDS is the supply price for commodity produced and sold domestically. PE is the weighted export price in domestic currency, σ is the CET share parameter and φ is the CET function exponent.

We also assume that,

$$QE = BQE(PWE/PE)^{\eta}$$

where BQE is the initial level of exports, PWE is the world price of exports and is exogenous and PE is fob price of exported good and is endogenous. The elasticity of demand for exports is given by η. This elasticity strongly determines simulation results of changes in tariffs. We shall estimate elasticity of exports using data bases from UN statistics division (COMTRADE) and the UNCTAD Trade analysis and Information systems (TRAINS) which provide data on trade flows.

Exports are to be modeled using an export supply function. A downward sloping export demand will be assumed. Exports to EAC countries and the rest of the world will also

aggregated using weights to arrive at a composite export good for each sector. On the supply side, producers make an optimal distribution on their production between exports and domestic sales according to a CET function. The small country assumptions hold.

The exchange rate will be exogenously determined to maintain the current account balance. It represents the relative price between imports and domestic goods.

Government

Government receives direct tax revenue from households and firms and indirect tax revenue on domestic and imported goods and other sources. The later is exogenous in the model. Government is made up of expenditure on the goods and services in the economy and the transfers to the households. The model accounts for indirect or direct tax compensation in the case of tariff cut.

Equilibrium conditions

General equilibrium is defined by the equality in each period between supply and demand of goods and factors, and the investment saving identity.

The Simulation

We will simulate the effects of a trade liberalization shock in the context of East Africa Community. We shall undertake several simulations the exact way in which the proposed tariff reforms are likely to be implemented. For instance Uganda is supposed to have reduced tariffs from 15% to 10% for most items originating from Kenya and zero rates

for goods originating from Tanzania. After five years, Uganda is expected to reduce tariffs on goods originating from Kenya to zero rates as those from Tanzania. Uganda like all other EAC member states is expected to impose a common external tariff of 25% on goods originating from the rest of the world. This will translate into an increment from 15% to 25% because Uganda had reduced tariff rates during her trade reforms in late 1990s(see Table one). The simulation will be carried in the exact way in which the above proposed tariff reforms are likely to be implemented.

Model Closure

As regards the labor market closure we shall hold real wages fixed, with employment adjusting in each industry. With fixed wage relativities, the share of each occupation in each sector will also be fixed implying that each activity will hire fixed proportions of all model occupations.

Nominal government consumption will be equal to exogenous real government consumption multiplied by its endogenous price. Fixed real government spending neutralizes any possible poverty effects of variations in government spending. Total government income will be held fixed. Any reduction in government income from tariff reduction is compensated endogenously by the introduction of an additional uniform sales tax. Thus the government budget balance or public savings is endogenously determined, although the only variations are due to changes in the nominal price of government consumption.

Total nominal investment will be equal to exogenous total real investment multiplied by its price. Total real investment will be held fixed in order to abstract from intertemporal poverty effects. The price of total real investment is endogenous. The propensities to save of the various households groups in the model adjust proportionately to accommodate the fixed total real investment assumption. This is done through a factor in the household saving function that adjusts endogenously. The trade balance is fixed and nominal exchange rate is the models numeraire. The foreign sector is effectively cleared by changes in the real exchange rate multiplied by the world export prices, divided by the domestic price index.

10. Data Requirements and Source

Data will be obtained from the following sources

- Integrated National Household Survey 2004 from Uganda statistical Bureau.

- Ugandan Trade Summary, Ministry of Finance and Economic Planning.

- Uganda Revenue Authority has information trade flows.

- National accounts and annual reports by the Bank of Uganda.

- The 1992 SAM constructed by Blake (1998).

- UN statistics division (COMTRADE) and the UNCTAD Trade analysis and Information systems (TRAINS) databases will provide data on trade flows which shall use to estimate trade elasticities.

- Other relevant information will be obtained from related studies such as IFPRI which have undertaken various studies in developing countries.

All the data obtained will be used to update the Micro and Macro SAM for Uganda. Data analysis will occur in two stages, the use of acquired data to update a SAM and running the model using the SAM as the database. The two data sets will be reconciled and the software GAMS will be used to balance the new SAM (see Cockburn, 2002). The model will then be solved using the new balanced dataset.

11. Dissemination of Research Results

The study plans to organize three workshops and seminars to disseminate research results to policy makers and other stakeholders. The first workshop would be held to brainstorm over the challenges facing the research into poverty. The second workshop would be to disseminate the results of the study to policy makers with a view to feed into their policy decision making and getting a feedback as to whether the research meets the expectations of policy makers. The last workshop would be to present final results and recommendations to policy makers. We intend also to circulate this proposal to relevant government officials such as those working with Ministry of Finance, Economic Planning and EAC secretariat, to elicit interest in this research project. The study will also produce a scientific paper that will be published in a peered reviewed international journal. In addition, the results will be released to some reputable periodicals that occasionary publish study findings by the World Bank. Working papers and policy briefs emanating from this proposed study will be circulated widely to stakeholders with the aim of influencing public policy as far as strengthening poverty reduction strategies is concerned.

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