THE IMPACT OF EAST AFRICA COMMUNITY CUSTOMS UNION ON UGANDA ECONOMY: A COMPUTABLE GENERAL EQUILIBRIUM (CGE) ANALYSIS

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1. Introduction

In 2005, Uganda, Kenya and Tanzania signed a treaty forming the East Africa Community (EAC) customs union which has now been expanded to include Rwanda and Burundi. The purpose of the customs union is to promote trade and other elements of regional development. The dominant feature of the customs union is that member states agreed to reduce tariffs. The Heads of State reached an agreement to implement a common external tariff with three bands, 0 percent for meritorious goods, 10 percent for intermediate goods and 25 percent for consumer goods (Obwona:2005:15). Uganda and the rest of the members of EAC have imposed a common external tariff of 25 percent on goods from non-members of EAC (Obwona: 2005:15).

However, the EAC customs union presents uncertain economic impacts on member countries and has generated a great deal of public discussion and debate in Uganda (Obwona: 2002:15). For instance, there is concern that Ugandan industries would be adversely affected under the customs union by import competitition especially from Kenya which has a relatively advanced industrial sector.[2] But, to date, there is limited analysis of the economic impact of the new EAC customs union on member countries. Therefore, a concise analysis of the impact of the EAC customs union is important to guide policy intended for development of trade to benefit the Ugandan economy. The purpose of this paper is to quantify the impacts of the EAC customs union on Uganda's economy using general equilibrium analysis (CGE). This methodology captures fully the chain of interactions in the Ugandan economy that were triggered by the customs union (Dorosh: 2000:11; Mbabazi: 2002:14). The rest of the paper is organized as follows. Section 2 describes the data and the modeling approach of Uganda's economy. Section 3 discusses the simulation results for EAC customs union on macroeconomic variables, manufacturing sector, welfare and factor income. Finally, section 4 provides the concluding remarks.

2. The Social Accounting Matrix and the Ugandan CGE modeling

2.1 The data: A Social Accounting Matrix for Uganda (SAM)

A SAM is a particular representation of macro and meso economic accounts of socio-economic system, which captures the transactions and transfers between all economic agents in the system (Pyatt and Round:1985:16). The accounts are presented in a square matrix, where the incomings and outgoings for each account are shown as corresponding row and column of a matrix. The transactions are shown in the cells, so the matrix displays the interconnections between agents in an explicit way. It is comprehensive in the sense that it portrays all economic activities of the system (consumption, production, accumulation and distribution), although not necessarily in equivalent detail. A SAM is flexible in that disaggregation is possible and emphasis can be placed on different parts on the economic system. Such transactions are carried out by different economic agents either through market or identifiable transfers.

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[2] See Morris Obwona *et al* (2005) "The new EAC customs union: Implications for Ugandan trade, industry competitiveness, and economic welfare". Final Report, prepared for Ministry of Finance, Planning and Economic Development, p.2.

The concepts and principles of SAM are fairly standard (for details see Pyatt and Round: 1985:16). In CGE modeling we need to construct a SAM or use the existing one. The latest available SAM for Uganda was constructed in 2002.[3] The Uganda SAM contains the block of activities, factors of production, households, government, stocks and the rest of the world (ROW). It is a 193 by 193 matrix, which has 62 activities, 62 commodities, 32 household types, and 16 labour categories, showing GDP at factor cost amounting to 3,389,424 million Uganda shillings at 2002 prices. The various commodities (domestic production) supplied are purchased and used largely by households (40 percent) for final consumption, but also a considerable percentage (35 percent) is demanded and used by producers as intermediate inputs. Although only 7 percent of the domestic production is exported, a considerable amount (11 percent) is used for investment and stocks, while the remaining 8 percent is used by government for final consumption.

Households are shown to derive 68 percent of their income from factor income payments while the rest accrues from government, inter-household transfers, corporations and the ROW. The government account earns a hefty 33 percent income from import tariffs, a characteristic typical of developing countries. It derives 42 percent from the ROW which includes international aid and interest. Domestic producers pay 14 percent in taxes on products, while only 6 percent is income taxes paid by households and only 5 percent is corporate taxes paid by corporations.

Government is the main source of investment finance (28 percent) followed by domestic producers (27 percent), households (26 percent) and lastly the corporations that provide only 20 percent. Imports of goods and services account for 87 percent of total expenditure to the ROW. The rest is paid to ROW by domestic household sectors in form of remittances; wage labour from domestic production activity; domestic corporations payments of dividends and insurance claims; income transfers paid by government; and net lending and external debt related payments. It is important to note that net lending and external debt related payment is negative fourteen of total expenditure to ROW indicating a possibility of a negative trade balance and hence inability to cope with external debt servicing.

The extent of household disaggregation is very important for policy reform analyses involving representative household groups as opposed to individual households.[4] Pyatt and Round (1985:16) argue persuasively for a household disaggregation that minimises within-group heterogeneity. This is achieved in the Uganda SAM through the disaggregating of households by quartiles within regional, rural and urban classifications. These criteria generated 32household groups; namely, rural Q1, Q2, Q3, Q4 and urban Q1, Q2, Q3, Q4; distinguished by region (Central, Eastern, Northern and Western).

The Uganda SAM identifies four labour categories disaggregated by gender and skill; namely, male and female, distinguished by unskilled, semi-skilled, skilled and highly skilled. These are further classified according to rural and urban as well as by geographic regions. This criterion yields 16categories of labour classifications. Land and capital are distributed accordingly to the various household groups.[5]

2.2 CGE modeling of Uganda economy

[3] Work is in progress to update the 2002 SAM to 2007.

[4] An overriding feature of a SAM is that households and household groups are at the heart of the framework. This helps to bring data from disparate sources. These households are often classified according to characteristics of either the household head or the principal income earners (gender, employment status), often by location (rural/urban, etc) and sometimes other characteristics including asset or main income source (farm/non farm, etc).

[5] Labour account is usually disaggregated by gender, skill, educational level, location etc. The main focus is on labour market segmentation that may have structural consequences, especially determining impacts on different groups of households.

CGE technique can capture the interdependence among the various markets and sectors of an economy. The theoretical foundation is the equilibrium theory formalized by Arrow and Debreu.[6] When combined with social accounting matrix or input-output data it is a standard tool for policy analysis (Shoven:1984:18; Stifel and Thorbecke:2003:19; Reed:1996:17; Dixon, Parmenter, Sutton and Vincent 1982:9; Francois and Reinert:1996:12).

The model of the Uganda economy developed here is a static one of a small open economy. The general structure of this computable general equilibrium model is a familiar one which has been used frequently in numerous studies based on a standard CGE model developed by (Lofgren, Harris, and Robinson:2002:13). The CGE model is calibrated to the 2002 SAM database and GAMS software is used to calibrate the model and perform the simulations.[7] It is assumed that the economy is at equilibrium at the benchmark (2002).

A policy simulation is implemented as a *counterfactual* scenario, which consists of an exogenous set of shocks to the system (Decluwe, Patry, Savad, and Thorbecke: 1999:6; Dervis, de Melo and Robinson:1982:7). Counterfactual shows the state of the economy after all markets have reached a new equilibrium; that is, comparative static analysis. The various components of the CGE model of Uganda are described here..

2.2.1 Productions and commodities

In our model production makes use of five factors: capital, skilled labour, unskilled labour, land and natural resources. Factor endowments are assumed to be fully employed and their growth rates are exogenous (zero for land and natural resources), except for labour which is based on demographic forecast of United Nations. Installed capital and natural resources are sector-specific, so that their rate of returns may vary across sectors. The three remaining factors are perfectly mobile across sectors.

The production technology process is represented by a nested production function.[8] At the bottom level, primary inputs are combined to produce value-added using a CES (constant elasticity of substitution) function. At the top level, aggregated value added is then combined with intermediate inputs within a fixed coefficient (Leontief) function to give the output. The profit maximisation gives the demand for intermediate goods, labor and capital demand. A firm can choose the quantity of the commodities it can produce. For all activities, producers maximize profits given their technology and the prices of inputs and output (Lofgren: 20001:13).

2.2.2 International trade

The allocation of domestic output between exports and domestic sales is determined using the assumption that domestic producers maximise profits subject to imperfect transformability between these two alternatives. The production possibility frontier of the economy is defined by a constant elasticity of transformation (CET) function between domestic supply and export.

To accommodate the possibility that imported commodities are exported, the Armington assumption is applied in combining domestic production and imports, using a CES function.[9] The resulting homogenous 'Armington commodities are either sold in Uganda or exported'. A CET function determines the scope for the choice between domestic demand and export. The Armington assumption is used here to distinguish between domestically produced goods and imports (Armington:1969:1). For each good, the model assumes imperfect substitutability (CES function) between imports and the

6The approach is covered in some of the literature in microeconomics. Arrow and Debreu assumed that all market choices are made at once. See David M. Kreps, 1990, *A Course in Microeconomics Theory*, Prentice Hall of India, pp.217-20.

[7] GAMS stands for General Algebraic Modeling System, a software used in CGE analysis.

[8] It is a two-layer structure of intermediate inputs and value added.

[9]The Armington assumption is that imported and domestically produced commodities are substitutes for each other, but not perfect substitutes. This solves the problem that the same kind of goods are found to be both exported in actual trade data which is inconsistent with the Heckscher-Ohlin under perfect competition.

corresponding composite domestic goods. The parameters for CET and CES elasticity used to calibrate the functions in the CGE model were borrowed (Devarajan: 1990:5).[10] Exports are traded for foreign exchange which is used to pay for imports. Balance of payments equals net import.

2.2.3 Factor of production

There are 18 primary inputs: 16 labour types, capital and land. Wages and returns to capital are assumed to adjust so as to clear all the factor markets. Both types of labor are mobile across sectors while capital is assumed to be sector-specific. Economic agents own all these factors of production.

2.2.4 Consumption

Household consumption is modeled using the Cobb-Douglass utility function subject to the budget constraint (Lofgren: 2001:13). Therefore, economic agents respond to price incentives but keep the share of their budget spent on each commodity fixed. The agents demand consumption goods and save the remainder as disposable income. Households receive their income from primary factor payments. They also receive transfers from government and the rest of the world. Households pay income taxes and these are proportional to their incomes. Savings and total consumption are assumed to be a fixed proportion of household's disposable income (income after income taxes). Consumption demand is determined by a Linear Expenditure System (LES) function.[11] Firms received their income from remuneration of capital; transfers from government and the rest of the world; and net capital transfers from households. Firms pay corporate tax to government and these are proportional to their incomes.

2.2.5 Government

Government is an important institution in the model. Government revenue is composed of direct taxes collected from households and firms, indirect taxes on domestic activities, domestic value added tax, tariff revenue on imports, factor income to the government, and transfers from the rest of the world. The government also saves and consumes.

2.2.6 Market clearing conditions

Supply in any commodity market must be equal to its demand at equilibrium price. Domestic demand equals demand for intermediate inputs to production, public sector use, final consumer demand plus domestic investment and stock change. The model includes supply-demand conditions for the Armington composite goods. On the supply side, Armington composite goods equal the aggregation of imports and domestic production, whereas the demand side includes domestic and export components. Primary factor endowment equals primary factor demand. Any commodity which commands a positive price has a balance between aggregate supply and demand, and any commodity in excess supply has an equilibrium price of zero.

2.2.7 Macro closure and welfare measurement

Equilibrium in a CGE model is captured by a set of macro closures in a model (Dewatripont and Michael: 1987:8; Blake, McKay and Morrissey: 2001:3). Aside from the supply-demand balances in product and factor markets, three macroeconomic balances are specified in the model: (i) fiscal balance, (ii) external trade balance, and (iii) savings-investment balance. For fiscal balance, government savings are assumed to adjust to equate the different between government revenue and spending. For external balance, foreign

[10] One of the most debated issues in CGE literature concerns the validity of the key behavioural parameters. In fact, CGE models prefer to borrow from the handful of estimates available from the literature. Lack of data is often cited as the major reason for the compromise. We use 0.50 for capital-labour substitution; 2.0 for substitution between domestic and imported goods and 5.0 between domestic output and export.

[11] The study also borrowed LES parameters.

savings are fixed with exchange rate adjustment to clear foreign exchange markets. For savings-investment balance, the model assumes that savings are investment driven and adjust through flexible saving rate for firms. Alternative closures, described later, are used in a subset of the model simulations.

The consumer price index (CPI) was chosen as the *numeraire*, the price relative to which all prices are evaluated.[12] The price being fixed at one, means the total quantity of consumption equals total value of consumption at all times. In our model we measure welfare focusing solely on private household consumption while the government purchases are fixed. A change in total household consumption therefore equates a welfare change as measured by the Hicksian equivalent variation (EV).

3. Simulation and discussion of results

3.1 Discussion of results

Every simulation results generated by a detailed CGE model such as ours depend potentially on thousands of data items, elasticity values and behavioural assumptions. Nevertheless, as demonstrated in this paper, it is possible to explain the results to policy makers in terms of elementary mechanism, starting from the bigger picture (macro variables) down to the smaller units (micro variables). The approach used to explain results here makes it possible for policy advisors or politicians to understand CGE results without requiring time-consuming absorption of voluminous technical documentation. We performed simulations under three policy scenarios under the assumptions of fixed/ varying fiscal deficit and mobile labour (see Table 1). Tariffs were reduced by 25, 33 and 100 percent respectively.

Table 1: Summary scenario for the impact of customs union

Simulation	Code	Fiscal Deficit	Mobility of labour
Scenario 1: Partial tariff reduction			
1. EAC tariff cut 25%	(EAC1)	flexible	mobile
2. EAC tariff cut 25%	(EAC2)	fixed	mobile
Scenario 2: Partial tariff reduction			
3. EAC tariff cut 33%	(EAC3)	flexible	mobile
4. EAC tariff cut 33%	(EAC4)	fixed	mobile
Scenario 3: Complete tariff removal			
5. EAC tariff cut 100%	(EAC5)	flexible	mobile
6. EAC tariff cut 100%	(EAC6)	fixed	mobile

3.1.1 Impact on macroeconomic variables

Table 2 summarises the impact of the customs unions on the macroeconomic variables.

Table 2: Effects of EAC customs union on Uganda's macroeconomic variables (percentage change from 2002—the baseline of the model)

	2002 LEVEL	**EAC1**	**EAC2**	**EAC3**	**EAC4**	**EAC5**	**EAC6**
	(MILLION SHS) *	**%**	**%**	**%**	**%**	**%**	**%**
Absorption	10,213,837	0.0	0.0	0.2	0.2	0.2	

[12]Absolute price levels are undermined in the model and only relative prices can be assessed. Fixing the consumer price index to one implies that inflation cannot occur.

Private Consumption				8,636,159				0.1	0.1	0.1
0.3	0.3	0.3								
Exports				446,538					0.6	0.8
0.3	2.9	2.9	2.9							
Imports				1,192,472			0.4	0.5	0.5	0.5
1.9	1.9									
GDP at Market Prices				10,859,871				0.0	0.1	0.1
0.2	0.2	0.2								
Net Income Tax				1,436,146			0.2	0.3	2.9	1.9
0.2	2.1									

Source: Bank of Uganda
Note: * Figures obtained from Bank of Uganda, Quarterly Economic Report, June 2004.

Real GDP

Real GDP increases by a small percentage of not more than 0.2 percent when all tariffs have been removed under scenario 3, whether the budget deficit is fixed or flexible[13]. With gradual removal of tariffs (scenarios 1 and 2), there was virtually no growth in real GDP. In Uganda investment is scarce (investment equation in the model) and therefore GDP is generally consumption-driven (consumption equation in the model). Promotion of foreign direct investment (FDI) would be a viable policy for the government to pursue.

Exports and Imports

Tariff cuts increased exports more than imports. Both import and export volumes have increased by 3 and 2 percent respectively under scenario 3. Under gradual removal of tariffs (scenarios 1 and 2) exports and imports growth were less than one percent. The increase in exports is partly as a result of increased availability of capital goods and re-exportation to other countries in the region such as Democratic Republic of Congo (DRC) and Southern Sudan.

This low percentage growth rate in export depicts a weak intra-regional trade.[14] Since increase in government spending primarily affects production of domestic goods, real depreciation of the exchange rate is required to stimulate exports and reduce imports. Since exports increased, the trade balance and balance of payments improved as well, reducing the budget deficit.

3.1.2 Impact on industrial sector

Table 3 indicates that the impact on Uganda's industrial sector ismixed. Economic literature has often emphasized the favorable impact of tariff reduction on industries. Some manufacturing industries (food, drink and tobacco, coffee and tea, chemical, apparels) declined as a result of competition from imports and high production cost since intermediate imports are high. Other industries like pulp and paper products, dairy, sugar, leather, metal and cement have positive percentage change of less than one percent.

[13] Uganda has a budget deficit of 12 percent of GDP.
[14] There is very limited intra-trade in the customs union due to complementarities in production and non trade barriers like customs clearance delays.

Table 3: Impact on industry output activity (% change from the base case-2002)

Industry	EAC1	EAC2	EAC3	EAC4	EAC5	EAC6
Pulp and Paper products	0.0	0.0	0.0	0.0	0.1	0.1
Food, Drink and Tobacco	0.0	0.0	0.0	0.0	-0.1	-0.1
Dairy	0.2	0.2	0.3	0.3	0.9	0.9
Sugar	0.1	0.1	0.2	0.2	0.5	0.5
Coffee and Tea	-0.2	-0.2	-0.3	-0.2	-0.9	-0.9
Soft drinks	-0.1	-0.1	-0.1	-0.1	-0.5	-0.5
Chemicals	0.0	0.0	-0.1	-0.1	-0.2	-0.2
Textiles	0.0	-0.1	-.0.1	-0.1	-0.2	-0.2
Apperels	-0.2	-0.2	-0.3	-0.3	-0.8	-0.8
Leather	0.1	0.1	0.1	0.1	0.3	0.3
Printing and Publishing	-0.5	-0.5	-0.6	-0.6	-0.2	-0.2
Petroleum	-0.1	-0.1	-0.1	-0.1	-0.3	-0.3
Rubber	-0.7	-0.7	-0.9	-0.9	-2.7	-2.7
Metal	0.0	0.0	0.0	0.0	0.1	0.1
Clay	0.0	0.0	0.0	0.0	0.0	0.0
Cement	0.0	0.0	0.0	0.0	0.2	0.2

3.1.3 Impact on Welfare

Table 4 provides the impact of EAC customs union on welfare. There is reduction in the welfare of the poorest households (1st, 2nd, and 3rd quintiles) while the welfare of the 25 percent of the richest urban and rural households (4th quintile) improved. The poorer members of the society lost because of possible trade diversion. Locally produced goods are relatively more expensive compared to imported products.

However, the welfare of the richest household group increased for a number of reasons. There are two sources of consumption gain.

Table 3: Compensating variation from the base case 2002 (percentage change)

	EAC1	EAC2	EAC3	EAC4	EAC5	EAC6
Central region urban (first quintile)	-0.4	-0.4	-0.5	-0.5	-1.7	-1.8
Central region urban (second quintile)	-0.6	-0.6	-0.7	-0.8	-2.6	-2.8
Central region urban (third quintile)	-0.7	-0.7	-0.9	-0.8	-2.6	-2.8

Central region urban (fourth quintile)	1.2	1.2	1.6	1.6	4.6	4.6
Central region rural (first quintile)	0.1	0.1	0.1	0.1	0.3	0.2
Central region rural (second quintile)	0.2	- 0.2	0.1	0.1	0.4	0.4
Central region rural (third quintile)	3.4	4.0	0.3	0.3	0.8	0.8
Central region rural (fourth quintile)	-0.2	-0.3	4.5	5.3	12.9	15.0
Eastern region urban (first quintile)	-0.2	-0.3	-0.3	-0.4	-1.1	-1.3
Eastern region urban (second quintile)	-0.3	-0.4	-0.5	-0.5	-1.7	-1.9
Eastern region urban (third quintile)	-0.3	-0.4	0.7	0.7	2.1	2.0
Eastern region urban (fourth quintile)	0.6	0.5	0.2	0.3	0.2	0.5
Eastern region rural (first quintile)	0.0	0.0	0.0	0.0	0.1	0.1
Eastern region rural (second quintile)	0.0	0.0	0.1	0.1	0.2	0.1
Eastern region rural (third quintile)	0.1	0.1	0.1	0.1	0.4	0.4
Eastern region rural (fourth quintile)	0.1	0.2	0.2	0.3	0.2	0.5
Northern region urban (first quintile)	-0.3	-0.4	-0.4	-0.5	-1.5	-1.7
Northern region urban (second quintile)	-0.2	-0.3	-0.3	-0.4	-1.1	-1.3
Northern region urban (third quintile)	0.0	0.0	0.0	0.0	-0.2	-0.3
Northern region urban (fourth quintile)	0.1	0.1	0.2	0.2	0.5	0.4
Northern region rural (first quintile)	0.1	0.1	0.1	0.1	0.3	0.2
Northern region rural (second quintile)	0.0	0.0	0.0	0.1	0.2	0.2
Northern region rural (third quintile)	0.0	0.0	0.0	0.0	-0.2	-0.3
Northern region rural (fourth quintile)	0.0	0.1	0.1	0.1	0.0	0.2
Western region urban (first quintile)	0.0	-0.1	0.0	-0.1	0.0	-0.2
Western region urban (second quintile)	-0.3	-0.4	-0.4	-0.5	-1.5	-1.7
Western region urban (third quintile)	-0.1	-0.2	-0.1	-0.2	-0.6	-0.8
Western region urban (fourth quintile)	0.8	0.7	1.0	0.9	2.7	2.4
Western region rural (first quintile)	0.0	0.0	0.1	0.0	0.2	0.1
Western region rural (second quintile)	0.0	0.0	0.0	0.0	0.1	0.1
Western region rural (third quintile)	0.1	0.1	0.1	0.1	0.2	0.2
Western region rural (fourth quintile)	0.4	0.5	0.6	0.6	1.5	1.8
T0tal	**4.1**	**4.1**	**5.5**	**5.3**	**10.7**	**10.7**

The first is the efficiency gain in GDP identified above which translate into consumption increase. The second source of consumption gain is the improvement in the terms of trade. This increase in purchasing power of real GDP by increasing prices of commodities produced in Uganda relative to prices of commodities produced outside Uganda. The term of trade effect is the combination of the following. First, there is improvement in the terms of trade from the elimination of import duties which results in reduction of import prices. Second, there is an increase of exports (although of less than 3 percent). Third, the welfare for the higher income groups increases as imported products form a significant part of their consumption basket. Because of the reduction in production in activities on which the poor households depend, for example, crop production, their income and consumption levels are also affected. Tariff cuts also reduce government revenue which is likely to reduce government transfers to the poor households.

3.1.4 Impact on factor income

Table 4 indicates the percentage change in factor income for labour, capital and land. For labour, the incomes of skilled labour both in rural and urban areas have gone up relatively more than the rural unskilled labour in both rural and urban areas. The changes in income of skilled labour could be as a result ofa slight increase in employment in the export sector because they have a high share of employment for the production of these commodities. Unskilled labour suffers smaller factor income change because they have relatively high shares of their employment in the production of commodities for which national production shrinks when tariffs are removed. In addition, this could be as a result of increase in nominal wages.

Factor incomes of land and capital have increased by less than 3 percent. Land supply is fixed but the demand for land has skyrocketed, pushing its price up. Capital supply has increased over time from direct foreign investment and loans/grants offered to the government from foreign sources, reflecting relative abundance of capital in the new equilibrium, compared to other production inputs. Land and capital are scarce factors and are relatively more expensive.

Table 4: Factor income (percentage change from the base case 2002

Factors			**EAC1**		**EAC2**		**EAC3**	**EAC4**
EAC5	**EAC6**							
Labour unskilled (rural male)			0.8	0.8	1.1	1.1	3.7	
3.7								
Labour unskilled (rural female)			0.9	0.9	1.1	1.1	3.8	
3.8								
Labour unskilled (urban male)			0.8	0.8	1.1	1.1	3.3	
3.3								
Labour unskilled (urban female)			1.3	1.3	1.7	1.7	5.5	
5.5								
Labour semi skilled (rural male)			1.4	1.4	1.9	1.9	6.4	
6.4								
Labour semi skilled (rural female)			0.9	0.9	1.2	1.2	3.8	
3.8								
Labour semi skilled (urban male)	0.9	0.9	1.2	1.2	3.8	3.8		
Labour semi-skilled (urban female)			0.8	0.8	1.1	1.1	3.6	
3.6								
Labour skilled (rural male)	0.8	0.8	1.0	1.0	3.1	3.1		
Labour skilled (rural female)			0.7	0.7	0.9	0.9	2.7	
2.7								
Labour skilled (urban male)				0.7	0.7	0.9	0.9	
2.7	2.7							
Labour skilled (urban female)			0.7	0.7	0.9	0.9	2.5	
2.5								
Labour highly skilled (rural male)			0.7	0.7	0.9	0.1	2.8	
2.9								
Labour highly skilled (rural female)	0.8	0.8	1.0	1.0	3.2	3.2		
Labour highly skilled (urban male)			0.7	0.7	0.9	0.9	2.8	
2.8								
Labour highly skilled (urban female)			0.7	0.7	0.9	0.9	2.7	
2.7								
Land			0.7	0.7	0.9	0.9	2.9	
2.9								
Capital			0.7	0.7	0.9	0.9	2.6	
2.7								

3.2 Sources of possible biases in the results

Does this model adequately explain all these results? What are the biases of this model? Although trade liberalization can increase economic efficiency (others have shown that different assumptions on factor mobility and macro closures can cause differences in simulation results Deveranjan, Lewis and Robinson: 1990:5). Other researchers also indicate that different assumptions on economic and social environment may affect the modeling results significantly.

First, the key issue which has not been properly captured in the model is productivity and foreign direct investment. Does trade liberalisation affect productivity and foreign direct investment in Uganda? Is the present upsurge in foreign investment in Uganda a result of the EAC customs union? These questions need further investigation.

Second, one of the most debated issues in CGE literature concerns the validity of key behavioural parameters used in the calibration process. CGE results have been shown to be sensitive to the values of these parameters. CGE models seldom estimate these parameters, preferring to borrow from estimates available in the literature. The lack of data prevented us from estimating these elasticities. The results of the sensitivity study are not reported here.

For instance, the Armingtonassumption the degree of substitution between domestic and imported, is a key behavioural parameter that drives the results of interest to policymakers. For instance, trade policy can affect the price of traded goods relative to domestically. Such a price change will affect a country's tradeadvantage, level of income, and employment. The magnitude of these impacts will largely depend on the magnitude of these elasticities, including Armington parameters (Deverajan:1990:5). Thus, it is important to use the true Armington parameters for a study like this one. The estimation of elasticity is a fertile area for future research.

Third, this analysis should have considered other domestic policy reforms like fiscal policy reforms as well as other trade liberalisation initiatives such Doha Development Agenda of World Trade Organisation (WTO) in tandem with the East Africa regional liberalisation process. The inclusion of these policy choices would counterbalance the impact of customs unions.

Finally, the effects of trade policies are not immediate, but spread over a long period of time. Such effects are difficult to take into account in a static framework. Dynamic models may be required to study corresponding adjustment period. Indeed, a number of the effects are dynamic as they are linked to accumulation of capital which has impact on capital and savings (Baldwin:1989:2; 1992:3). This will magnify gains or losses, than static effects as evidenced, for example (Baldwin:1992:3). In this context, a cautious approach is necessary in interpreting our results.

4. Concluding remarks

In this paper we build a single-country multisector CGE model of Uganda to demonstrate the possible outcomes of East Africa customs union. To see the different effect of the East Africa customs union three scenarios were considered, two cases of partial tariff reduction and total tariff removal, allowing for fixed and flexible deficit and mobile labour among sectors. Specifically, our counterfactual analyses adopted three scenarios of progressive tariff reduction of 25, 33, and total removal (100 percent). This arrangement allows us to see the impact of tariff reduction in the medium term on the Ugandan economy. Static CGE models are always medium term, not short-run as is sometimes believed.

The results in this paper indicate that the customs union reduction of tariff rates has only had a small effect on the macroeconomic variable of Uganda of less than 0.2 percent growth in real GDP and less than 3 percent in exports and imports, less than 0.2 of absorption, 2.1 percent of net income tax and 2 and 3 percent for exports and imports respectively. The removal of tariffs has mixed results on the

industrial sector as some industries gained and others lost. There is reduction in the welfare of the poorest households (1st, 2nd, and 3rd quintiles) while the welfare of the 25 percent of the richest rural and urban households (4th quintile) improved.

The main policy implications of the study are as follows. First, intra-regional trade should be promoted. Tariff reduction alone under the customs union would not generate high intra-regional trade without extra measures. While the EAC customs union would generate more trade among the member countries, Kenya's manufacturing sector remains far advanced than other member countries and may spell doom for Uganda in the short and medium terms. Before the complete removal of tariffs on goods from Kenya, Uganda's domestic industries need to be competitive enough if the country is to benefit.

Second, Uganda needs to be cautious in implementing liberalisation policy. In fact, it should be done in a piecemeal manner. Synchronisation of various trade reform programmes is essential. For instance, to consider the removal of tariffs under the Economic Partnership Agreement (EPAs) on goods from the European Union (EU), while at the same time implementing a common external tariff on all goods imported outside the customs union are conflicting goals.

Third, liberalisation should be carried in tandem with fiscal reforms. Uganda needs to identify alternative sources of tax revenues if she is to reduce the level of fiscal deficit.

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