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No. 01/07

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Adam Blake, Andrew McKay and Oliver Morrissey

Centre for Research in Economic Development and International Trade, University of Nottingham

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Abstract
This paper evaluates the impact on Uganda of the liberalisation of world trade, especially in agricultural commodities, as proposed in the Uruguay Round. We can draw three broad conclusions. First, the impact of multilateral liberalisation on a low-income country such as Uganda appears to be quite slight, albeit positive, largely because there is only a slight impact on the world prices of the agricultural commodities it exports. Second, the principal gains actually arise from reforms that are essentially unilateral trade liberalisation. Third, the impact is likely to be pro-poor. Although the largest proportional gains are to the urban self-employed, there are significant gains in agriculture that benefit almost all categories of rural household.

Outline

1. Introduction

Uganda is, in many respects, a typical sub-Saharan African country; it is low-income, dependent on aid, tends to have a persistent trade deficit, is dominated by agricultural production and processing with a small manufacturing sector, and merchandise exports are principally of a few primary commodities (notably, in this case, coffee). Furthermore, it suffers internal security problems and is caught up in regional conflicts, therefore faces the threat of political instability. It is untypical in that it has exhibited high growth rates throughout most of the 1990s, is self-sufficient in food, has attained a relatively stable macroeconomy, has made considerable progress in liberalising its trade regime and is eligible for debt relief (under the HIPC initiative). From the context of evaluating the likely impact of multilateral trade liberalisation, Uganda is a valid case to represent the most salient features of better performing sub-Saharan African economies.

In the context of the potential impact on a low-income country such as Uganda, the major Uruguay Round (UR) proposals, as embodied in GATT 1994, were those for liberalisation of trade in agricultural commodities. In practice, little real agricultural liberalisation has been implemented to date. We estimate the impact on Uganda assuming UR commitments are implemented by 2002, using a base model for 1997 (projected from a 1992 data base). The reforms incorporated in the simulations are changes in world prices, as a result of implementing the UR, and unilateral liberalisation (Uganda reduces its tariffs).

Section 2 discusses the commodity composition of Ugandan trade and outlines the potential effects of multilateral trade liberalisation (MTL) using a simple partial analysis. We outline the structure of the computable general equilibrium (CGE) model in Section 3 and present the results of using this to estimate the impact of MTL on Uganda. The conclusions are in Section 4.

2 Commodity Composition of Trade and Effects of Liberalisation

To insulate the economy from adverse terms of trade and instability in export earnings associated with commodity concentration, there has been an effort since 1987 to diversify Uganda's exports. The aim has been to move away from traditional (coffee, tea, cotton and tobacco) towards non-traditional exports, mainly composed of agricultural

commodities such as sesame seeds, maize, beans, horticulture and fish. There has been a significant rise in export revenue from non-traditional exports, from $71 million in 1993, representing 35 per cent of total export earnings, to $151 million in 1995, although then only 27 per cent of total export earnings (Sharer *et al*, 1995). Traditional exports, especially coffee, still constitute the largest share of foreign exchange earnings (and are likely to remain so for the foreseeable future), accounting for over 70 per cent of commodity exports for most of the period between 1989 and 1995. Consequently, export earnings are very sensitive to trends in world prices for these traditional commodities (Morrissey and Rudaheranwa, 1998).

Significant unilateral trade liberalisation has been implemented in Uganda since 1992. This was designed, amongst other things, to reverse and even eliminate the trade deficit through increasing export earnings. Incentives geared towards export-oriented sectors combined with market-determined exchange rate policies are expected to encourage both traditional and non-traditional exports. Although merchandise exports continued to decline whilst imports remained steady throughout the period from 1988 to 1992, thereafter the value of exports improved markedly (Morrissey and Rudaheranwa, 1998). Nevertheless, exports remained at around ten per cent of GDP in the 1990 whereas imports were 20% or more. The persistent trade deficit reflects the composition of Uganda's export basket (primarily coffee and other cash crops) and import basket (manufactures, equipment and machinery) and the impact of deteriorating terms of trade.

The Ugandan economy is dominated by agricultural activities, as is the commodity composition of exports. The share of agricultural products declined from about 90 per cent of exports in the late 1980s to about 70 per cent in 1992 but recovered to over 75 per cent in the mid-90s; this is largely a reflection of the variability in coffee production and earnings. With the increase in coffee prices and growth of non-traditional exports since the mid-90s, the trade balance has improved (although the composition of exports is still dominated by agriculture). The composition of imports has remained remarkably stable, and the volume has only increased markedly since 1994 (for data, see Morrissey and Rudaheranwa, 1998). We can note from this broad picture that the anticipated world price effects of MTL will have little impact on the prices of Ugandan imports (the exceptions being agricultural products, which are less than ten per cent of total imports, and textiles which are less than five per cent).

The real problem facing Ugandan attempts to increase export earnings is the severe lack of export diversification and the fact that it is a price taker on world markets. Uganda can do nothing to influence world prices for primary commodities. Uganda can take measures to encourage export diversification, both in terms of quality and niche markets for traditional commodities (such as organic coffee) and in terms of encouraging non-traditional exports. Trade policy reforms are part of such a strategy, and Uganda has gone far down that road. Increasing exports of agricultural crops is not simply a trade policy issue. It is also an issue of agricultural policy, such as providing education and extension services to small, dispersed farmers, and encouraging adoption of the most appropriate technology to ensure high quality output. Trade policy contributes to improving price incentives, but other policy interventions are necessary to relax constraints and ensure supply response (McKay *et al*, 1997). Some of these will be agricultural policy, including improved provision of inputs. Improved infrastructure and institutional support, such as for coffee transport and marketing, are also important components of export promotion.

Impact of Changes in World Prices

The easiest way of judging the possible impact of MTL on Uganda is to consider how MTL might affect the price of exports and imports, and evaluate the potential response. This is a simple partial equilibrium approach, but at least provides guidance. There are three stages. First, we identify the products likely to be affected (i.e. to experience changes in world prices due to MTL) and select a figure for the volume of trade in those products for a base year, in our case 1995. We use the average volume traded for the four principal export commodities over 1994-96 (to smooth the series) as our base year estimate. Such data are not available for textiles or cereals (the only import commodities likely to be affected). However, for an average over 1994-96, we do know that cereal and cereal preparations imports were worth $42.2m and textile imports were worth $31.6m; average total imports were $1009.5m, so these products represent 4.2 per cent and 3.2 per cent respectively (*Uganda Statistical Abstract 1998*, p. 77).

Second, we require an estimate of the price change; where available we use the range from estimates reported in other studies, otherwise we use our own estimates. Third, we require an estimate of potential supply response. There are no available estimates for Uganda. Relevant information is provided in McKay *et al* (1999) who estimated aggregate

agricultural supply response for Tanzania, distinguishing export and food crops. They found that food crop production was responsive to changes in the relative price of food to export crops, with a short-run elasticity of 0.39 and a long-run elasticity of 0.92. However, they were unable to estimate supply response for aggregate export crops: the (downward) trend in output was almost entirely explained (statistically) by a time trend. As the time trend captured a secular decline in world prices, this does not imply that producers of export crops are not responsive (rather, the data do not permit one to estimate the response). Nevertheless, the results demonstrated that farmers are, in principle, quite responsive to prices, and the aggregate agricultural output response was 0.35. We adopt this as our estimate of agricultural supply response for Ugandan producers.

Combining all of these we can estimate the overall impact of MTL on the principal products affected for Uganda. The results are summarised in Table 1 for the principal export commodities. Perhaps the most important point to note is the very wide range of estimates of the impact of MTL on coffee prices (although estimates were not available, a similar wide range should be expected to apply to the other commodities). Obviously, the actual impact on Uganda will depend on how world prices change, and MTL is only one (and not the most important) factor affecting world commodity prices, but also on the ability of Ugandan producers to respond. As coffee is such a dominant crop for Uganda, and there is a tenfold difference in the estimated effects of MTL on coffee prices, the overall impact depends heavily on what happens to coffee prices (the impact associated with other crops is relatively small). As a result of MTL, Ugandan coffee exports could increase by between $0.5m and $3m, relative to a 1995 base. Total exports (of the four commodities) could increase by between $0.6m and $3.2m. Even at the maximum this is no more than 0.5 per cent of total exports. This effect is quite small, albeit positive.

We have insufficient data to estimate the corresponding effect of MTL on imports using the above approach for exports. However, estimates show that if agricultural liberalisation in developed countries is implemented, the price effects on grain and cereals could be quite significant. The lowest estimated increase is two per cent (under partial liberalisation) ranging up to 26 per cent for full liberalisation (a very long-run scenario). On the not unreasonable assumption that Ugandan farmers are as responsive as Tanzanian farmers, the increased price of cereal imports should encourage increased production in Uganda (there is potential to expand production of millet, maize and sorghum). This is

especially true as food crop prices are likely to increase by more than export crop prices. If appropriate agricultural policies are in place to provide incentives to local farmers and facilitate increased production, an increase in world cereal prices need not disadvantage Uganda as it has the potential to displace more expensive imports with increased domestic production. Although Uganda may experience some terms of trade losses, there is unlikely to be a net adverse effect from MTL. In fact, given that the impact is likely to be beneficial to agriculture, and that is the core of the Ugandan economy, MTL could be expected to benefit Uganda.

Table 1 Partial Impact of World Price Changes on Uganda

Export Crop		**Coffee**	**Tea**	**Cotton**	**Tobacco**
Base volume (tonnes)		213965	12088	6331	3225
Base price ($/Kg)		1.82	1.02	1.01	2.12
Price change (%):	Max	4.00	2.90	2.33	-0.88
	Min	0.41	2.34		
Volume change(%):	Max	1.40	1.02	0.82	-0.31
	Min	0.14	0.82		
Impact ($m)	Max	3.00	0.13	0.12	-0.06
	Min	0.55	0.10		
% exports (average)	Max	0.77	1.06	1.88	0.88
	Min	0.14	0.81		

Notes: Base volume is 1994-96 average.
Price change – max and min estimates from Zietz and Valdes (1986, 1990) and UNCTAD (1990); the estimate for cotton is from Brandao and Martin (1993); estimate for tobacco from Blake *et al* (1998).
Volume change - assumes supply response elasticity of 0.35 for all crops, calculated as 0.35 times the price change.
Impact – the value of the volume change at the new price, i.e. (base volume times volume change) times (base price times price change).
% Exports – impact expressed as a percentage of base year exports of the commodity.

3 CGE Estimates for Uganda

A CGE model of Uganda was constructed, taking existing data from the 1992 input-output table of Uganda and household data from the 1992-93 Ugandan Integrated Household Survey. The IO table gives data at a 50-sector level of aggregation, and includes separate IO matrices for both domestic and imported goods. While the household expenditure survey contains data at a more detailed level, it has been aggregated to match the 50-sector IO table. In doing this, ten household groupings have been identified, with six categories of labour.

Table 2 lists the factors of production, giving the percentage of factor returns contributed by each of five broad sector classifications. Labour is defined according to literacy levels (low, medium and high) and according to wage and non-wage income. Overall, factor returns are principally from "other primary" (mainly food crops) and services. Wage labour is predominantly in services, although a significant share of returns are from processing and manufacturing. There are two predominant means of non-wage employment in Uganda: subsistence agriculture, which leads to a concentration of non-wage, low and medium literacy labour in "other primary", and informal sector or self-employment (mostly in services). Wage income, particularly of labour with high literacy, is concentrated in the services sector.

Table 2. Factors of production identified in the model

	Percentage of factor returns from:				
	Cash crops	Other primary	Processing of agricultural products	Manufacturing	Services
1. Wage earning, low literacy	9%	25%	13%	2%	51%
2. Wage earning, medium literacy	4%	10%	7%	8%	71%
3. Wage earning, high literacy	0%	1%	3%	5%	91%
4. Non-wage, low literacy	5%	87%	3%	1%	4%
5. Non-wage, medium literacy	4%	81%	2%	2%	11%
6. Non-wage, high literacy	2%	44%	2%	2%	49%
7. Capital (includes land)	2%	36%	5%	3%	55%
All Factors	3%	47%	3%	3%	44%

Table 3 shows the definitions for the ten household groups defined in the model. The total income of each group as a proportion of total household income (column 1) is

disaggregated into the proportion of household income earned from wage labour (column 2) and from highly literate labour (column 3). As a greater proportion of the population live in rural than in urban areas, more rural/agricultural households are defined than urban ones. The first two household groups are defined as wage earners, from urban and rural areas. For these groups wage income accounts for 89% and 69% respectively of income, and this is predominantly from highly literate labour. Agricultural households are classified for each of the four regions. The Northern region is the poorest; this region is semi-arid, is the main area for cotton production (which performed poorly until the late 1990s), and is unstable (subject to rebel activities). Non-working households are a miscellaneous category; this may include some of the poorest (such as households headed by widows or the old), but also includes households living on remittances and those that do not 'need' to work (i.e. they have non-earned income).

Table 3. Households identified in the model

	Share of household type in total household incomes	Wage income as a proportion of household income	Income from highly literate labour as a proportion of household income
1. Urban wage earners	12%	89%	79%
2. Rural wage earners	10%	69%	57%
3. Agricultural, central	14%	4%	14%
4. Agricultural, eastern	14%	4%	16%
5. Agricultural, western	15%	3%	11%
6. Agricultural, northern	9%	3%	20%
7. Urban non-farm self employed	12%	1%	49%
8. Rural non-farm self employed	9%	0%	39%
9. Urban non-working	1%	0%	4%
10. Rural non-working	3%	0%	5%
All households	100%	20%	33%

The representation of production in the model follows fairly standard structures in the CGE modelling literature (see Blake *et al*, 1998; Goldin and Knudsen, 1990; Martin and Winters, 1996). We assume constant returns to scale technology and perfect competition. Output is modelled as a Leontief combination of intermediate inputs and aggregate value added, and aggregate value added as a CES combination of different factors. The Armington assumption is invoked to differentiate imports from domestically produced goods, and also to differentiate exports from goods for domestic use. In both import and export markets, Uganda is modelled as a small country that cannot influence world prices.

Factor markets are modelled as displaying imperfect mobility. Capital is considered to be specific to the sector it is used in, while the six categories of labour are each characterised by a transformation frontier between sectors of use[1]. The government collects tax revenue from production taxes, import tariffs and income taxes and uses this revenue on public expenditure, to finance the trade deficit[2] and to provide transfers to households.

Each of the ten household groups receives income from the seven factors of production (of which three are wage labour, three non-wage labour and one is capital), transfers from other household groups and transfers from the government. Each household group pays income tax, and exhausts its remaining income on either savings, transfers to other households and expenditure on goods and services. This consumption is represented by a LES function, calibrated to income elasticities. The Armington assumption again differentiates imports from domestically produced goods.

Table 4 Sector data and average growth rates 1992-1997

	--------from 1992 Data--------			--------from 1997 Data--------			Baseline simulation result
	Exports % total exports	Imports % total imports	Value added % GDP	GDP growth 92-97 (1)	GDP pc growth 92-97 (2)	Export price 92-97 (3)	TFP growth 92-97 (4)
Coffee	34.7%	0.0%	1.7%	10.7%	7.6%	6.6%	1.0%
Other cash crops	9.7%	1.1%	2.1%	13.8%	10.7%	3.4%	6.6%
Food	14.1%	4.7%	48.4%	3.3%	0.1%	0.0%	-1.0%
Other primary	5.5%	1.3%	3.9%	6.2%	3.1%	0.0%	-0.2%
Manufacturing	0.9%	77.8%	6.0%	15.7%	12.6%	0.0%	8.6%
Services	35.2%	15.2%	37.9%	9.8%	6.7%	0.0%	3.1%
Total	100%	100%	100%	7.0%	3.9%	2.6%	1.4%

Notes:
1 Average annual real GDP growth rate between 1992 and 1997.
2 Average annual real GDP per capita growth rate 1992-1997.
3 Average annual real export price growth rate 1992-1997.

1 In fact, this is a constant elasticity of transformation (CET) frontier. The elasticities of transformation vary according to level of literacy and wage/non wage. The elasticities that we use are: 0.25, 0.5 and 0.75 for low, medium and high literacy non-wage labour, and 0.5, 1 and 1.5 for the corresponding wage labour categories. These values imply significant rigidity in the non-wage and low-literacy wage labour markets.

2 A common way of explaining the trade deficit in CGE models is that the trade deficit equals net foreign savings (X-M = S-I). Normally, the 'representative' household would finance this. As we have 10 households, and as most foreign savings in Uganda are through the government, we model the public sector as financing this deficit. Furthermore, the deficit is a constant, implying that exports can only change if matched by imports.

4 Average annual total factor productivity growth rate 1992-1997. These are calculated in the 1997 baseline scenario.

1997 Baseline Simulation

The IO table and SAM are based on 1992 data so our first step is to project this forward to represent the Ugandan economy in 1997. To do this, we take data on a limited number of indicators for 1992 and 1997 and apply movements in these indicators to the model. These indicators are essentially output growth, export, import and GDP shares (by value added) of the principal sectors, as indicated in Table 4. As productivity rates are unavailable, they are made endogenous[3] and are produced by the simulated projection so that the representation meets the 1997 level of GDP with the same structure of production as is evident in the economy in 1997. An aggregated version of the growth rates that this entails is given in Table 4. Population figures are taken for urban and rural areas[4], and the households' factor endowments and population are expanded in these proportions. In addition, an extra 1% per annum increase in factor supply is assumed for all factors, over and above that implied by population growth. This additional growth in factor endowments is to account for skill and quality improvements over time. World price changes for Uganda's major export goods (coffee, tea, cotton and tobacco) are incorporated; in the model these only affect coffee and other cash crops. The implied total factor productivity (TFP) growth rates are consistent with an economy that was performing well during this period of analysis.

Historical Decomposition

The results from the 1997 baseline simulation are decomposed according to the different "shocks" that we apply in the baseline simulation. We perform four simulations for the historical decomposition: (i) a productivity simulation, where the productivity rates derived in the 1997 baseline simulation are applied (at exogenous rates) with no other changes from the 1992 base. (ii) a world price simulation, where the only change from the 1992 base is to introduce 1997 world prices, (iii) a population simulation, where population (and proportionately, factor endowments) is scaled up to the 1997 level, at

3 While other simulations that we perform use some of the same exogenous shocks introduced here, this is the only simulation where productivity is endogenous.

4 These show that rural population grew by an annual average of 2.6% between 1992-1997, while urban population grew by 7.0% pa.

different rates for rural and urban households, (iv) a factor simulation, where the additional factor endowment growth of one per cent per annum is introduced.

Table 5 shows the results for these simulations, and the 1997 baseline simulation, in terms of equivalent variations (EVs) as a percentage of 1992 income, for each household group and for a welfare function that is a Cobb-Douglas function of the households' utility. The baseline simulation has total welfare growing by 3.9% per annum, which has differential impacts on households. Productivity growth and factor growth have the largest effects on welfare and household EVs, with export prices having small positive effects for all households except urban and rural non-working, and population growth having purely redistributive effects. As population growth is here accompanied by proportionate growth in factor endowments, the overall effect must be zero on per capita welfare. The exogenous population trend is that urban households grow at a higher rate than rural households, so factors supplied by urban households (particularly medium and high literacy wage labour), are oversupplied relative to other factors of production. Relative returns to these factors therefore fall, leaving urban households, and particularly urban wage earners, significantly worse off. Rural wage earners also have a negative EV as they are also supplying the same types of labour as the urban wage earners.

Table 5: Equivalent variations for households and sector output, under the 1997 baseline simulation and historical decomposition. Annualised percentages of 1992 income.

	Baseline Simulation	**Productivity growth**	**Export prices**	**Population growth**	**Factor growth**
Equivalent Variation	(per capita)			(per capita)	
1. Urban wage earners	2.2%	2.1%	0.1%	-2.3%	1.7%
2. Rural wage earners	2.2%	1.5%	0.1%	-1.6%	1.8%
3. Agricultural, central	3.5%	1.2%	0.2%	0.1%	1.7%
4. Agricultural, eastern	3.6%	1.2%	0.2%	0.1%	1.7%
5. Agricultural, western	3.4%	1.0%	0.2%	0.2%	1.7%
6. Agricultural, northern	3.4%	1.2%	0.2%	0.0%	1.7%
7. Urban non-farm self employed	5.0%	2.9%	0.4%	-0.7%	1.6%
8. Rural non-farm self employed	4.2%	2.1%	0.4%	-0.4%	1.6%
9. Urban non-working	4.3%	2.2%	0.0%	-0.5%	2.0%
10. Rural non-working	3.1%	1.0%	-0.1%	-0.5%	2.3%
Total (Cobb-Douglas composite)	3.9%	1.6%	0.2%	0.0%	1.4%
Output					
Coffee	7.5%	2.5%	1.8%	1.1%	2.6%
Other cash crops	11.3%	7.2%	0.6%	1.4%	2.2%
Food	0.7%	-1.0%	-0.1%	-0.1%	1.9%
Other primary	2.2%	0.2%	-0.1%	0.4%	1.7%
Manufacturing	10.5%	7.2%	-0.3%	1.5%	2.1%
Services	6.0%	3.1%	0.0%	1.0%	1.9%

Productivity growth has the largest effect on sectors where GDP growth has been highest between 1992 and 1997. The 'other cash crops' and manufacturing sectors have experienced high growth rates, so have high productivity rates in order to reach these GDP targets in the baseline simulation. Export prices alone have substantial effects only on the coffee and 'other cash crops' sectors, with small output reductions in other sectors that are competing with cash crop sectors for factor inputs. This pattern is reflected in household EVs, where those households (rural and urban self-employed) with factors (medium and high literacy non-wage labour) employed in cash crop production have the largest EVs.

Impact of the Uruguay Round

In order to examine the effects of multilateral liberalisation under the Uruguay Round, we first project the model forward in time to 2002, and assume full implementation of UR commitments will have been completed by then. We include projections of population growth to 2002, with factor endowments increasing by the rate of population growth plus 1% (to account for skill and quality improvements). We also model productivity changes between 1997 and 2002 at the same growth rates as occurred in the projection from 1992 to 1997. From this projected base for 2002, we introduce changes to world prices for Uganda's imports and exports. In addition, we introduce reductions of 24% in Ugandan tariffs (the UR commitment), and decompose the effects of (i) import price changes, (ii) export price changes, and (iii) Ugandan tariff reductions. The results are shown in Tables 6 and 7.

Table 6 Percentage change in EV per capita, Uruguay Round and components.

	Uruguay Round export price changes	Uruguay Round import price changes	Uruguay Round Ugandan tariff changes	Uruguay Round (all factors)
1. Urban wage earners	0.000%	0.158%	-0.079%	0.079%
2. Rural wage earners	0.000%	0.079%	0.079%	0.236%
3. Agricultural, central	0.000%	0.000%	0.358%	0.502%
4. Agricultural, eastern	0.000%	0.000%	0.286%	0.357%
5. Agricultural, western	0.073%	0.073%	0.436%	0.509%
6. Agricultural, northern	0.000%	0.073%	0.218%	0.291%
7. Urban non-farm self employed	0.126%	0.252%	0.882%	1.197%
8. Rural non-farm self employed	0.067%	0.201%	0.669%	0.870%
9. Urban non-working	-0.067%	-0.067%	-0.467%	-0.534%
10. Rural non-working	-0.074%	-0.074%	-0.445%	-0.593%
Total (Cobb-Douglas composite)	0.000%	0.104%	0.259%	0.415%

Considering first the overall impact, we estimate that GDP would increase by 0.4 per cent in real terms (measured as EV per capita). Although this may appear very slight, it should be interpreted in the context of relatively minor impacts on prices of principal exports and imports, which in turn are relatively low shares of GDP. In particular, exports represent about ten per cent of GDP. Most of this gain arises from unilateral liberalisation (reduction in tariffs across the board), a 0.26% increase in EV, followed by the gain from lower import prices, 0.10%. This is consistent with the fact that imports are over 20% of GDP. In these estimates we assumed coffee prices increased by only 0.4%, hence it is not too surprising that there was no welfare gain from export price changes (although there was a gain in the 'agriculture, western' households, the principal producers of coffee).

Table 7 Exogenous price changes due to the Uruguay Round, and percentage changes in output for the Uruguay Round and components.

	Exogenous		Percentage change in output per annum			
	Change in export prices due to the UR	Change in import prices due to the UR	Uruguay Round export price changes	Uruguay Round import price changes	Uruguay Round Ugandan tariff changes	Uruguay Round (all factors)
Coffee	0.4%	0.4%	0.05%	-0.07%	0.67%	0.62%
Other cash crops	1.8%	2.7%	0.55%	-0.02%	0.52%	1.03%
Food	0.9%	6.8%	0.01%	0.02%	-0.10%	-0.07%
Other primary	-0.3%	-0.6%	-0.06%	-0.01%	0.12%	0.04%
Manufacturing	-0.2%	-1.0%	-0.12%	-0.24%	0.18%	-0.20%
Services	-0.2%	-0.7%	0.01%	0.07%	-0.16%	-0.08%
Average	0.4%	-0.5%				

In terms of the distributional effects (Table 6), the welfare gains are greatest for urban and rural non-farm self-employed; this is likely to reflect gains to traders and owners of cash crop processing facilities, and significant gains due to cheaper imports. The only groups to suffer a welfare loss are the urban and rural non-working (in the Ugandan context, such households are not necessarily the poorest; non-working should be interpreted as not needing to work rather than being unemployed). The benefits to agriculture are greater in the main food and coffee growing central and western regions, because the factors that benefit are more prevalent in those regions. Table 7 shows that the largest output gains are in cash crops, especially those other than coffee. Food output is estimated to fall slightly, as factors are diverted into cash crops (but note that overall agriculture incomes rise).

Manufacturing output is estimated to fall slightly, as import-competing producers face more competition. Perhaps the single most important conclusion is that the welfare gains arise predominantly from reforms that are essentially unilateral trade liberalisation.

Coffee Price Increases

In the previous simulations we used the Brandao and Martin (1993) estimate for the effect of the UR on world prices for coffee. This is rather low so we simulate the effects of alternative coffee price increases. Table 8 shows the results from these simulations, where equivalent variation (as a percentage of 2002 post-UR income) is given for each household, and output changes from the full Uruguay Round scenario are given. These results indicate a low supply response for coffee (a 10% price increase generates an output increase of 2.32%), and that returns from such price increases go predominantly to the agricultural households, and to non-farm self employed. This is lower than the supply response of 0.35 assumed in Table 1. However, that figure was derived from food crops in Tanzania, whereas this one is generated from the model.

Table 8 The effects of additional coffee export price increases

Additional coffee export price increase	2%	4%	6%	8%	10%
Equivalent Variation					
1. Urban wage earners	0.00%	0.00%	0.00%	0.00%	0.00%
2. Rural wage earners	0.08%	0.08%	0.08%	0.08%	0.08%
3. Agricultural, central	0.14%	0.21%	0.36%	0.43%	0.57%
4. Agricultural, eastern	0.07%	0.21%	0.36%	0.43%	0.57%
5. Agricultural, western	0.14%	0.29%	0.36%	0.51%	0.65%
6. Agricultural, northern	0.14%	0.22%	0.29%	0.43%	0.51%
7. Urban non-farm self employed	0.19%	0.37%	0.56%	0.75%	0.87%
8. Rural non-farm self employed	0.13%	0.33%	0.46%	0.60%	0.80%
9. Urban non-working	0.00%	0.00%	0.00%	0.00%	0.00%
10. Rural non-working	0.00%	0.00%	-0.07%	-0.07%	-0.07%
Total (Cobb-Douglas composite)	0.10%	0.15%	0.26%	0.36%	0.46%
Output					
Coffee	0.50%	0.97%	1.45%	1.90%	2.32%
Other cash crops	-0.17%	-0.32%	-0.48%	-0.63%	-0.77%
Food	-0.01%	-0.06%	-0.06%	-0.07%	-0.12%
Other primary	-0.06%	-0.15%	-0.21%	-0.25%	-0.30%
Manufacturing	-0.15%	-0.32%	-0.48%	-0.66%	-0.81%
Services	0.02%	0.03%	0.05%	0.07%	0.10%

One may feel that coffee supply response in Uganda should be higher than estimated, and indeed it may be greater in the now liberalised market. Our results can be interpreted as conservative estimates, given the assumption that factor mobility is limited (and land is constrained). The quality of the coffee tree stock in Uganda is quite low, and planting new trees is both a slow process and would not be reflected in yields for some five years. The coffee sector in Uganda has been fully liberalised; in the early 1990s coffee production was controlled by the state-owned Coffee Marketing Board whereas by the late 1990s some 90% of trade was in the hands of five multinationals. Coffee production roughly doubled between 1992 and 1997, as did the share of the world price received by producers (Morrissey and Rudaheranwa, 1998). This gives rise to cautious optimism for the future of the sector.

4 Conclusions

The results presented here are simply simulations from a CGE model of Uganda. It is perhaps interesting to note that the low impact estimates of the CGE model are comparable to the simple estimates based on an examination of the composition of trade. We can make three broad conclusions. First, and unsurprisingly, the impact of multilateral trade liberalisation on a low-income country such as Uganda appears to be quite slight, although it is positive. This should not be surprising because although the country is predominantly agriculture-based, the liberalisation of world trade in agricultural commodities has little impact on the world prices of the products Uganda exports. This general result would also apply to other low-income countries, especially those in sub-Saharan Africa but generally those exporting tropical agricultural commodities. Furthermore, low-income countries face constrained supply response and many other domestic policy reforms would be required to allow them avail of the increased opportunities associated with multilateral liberalisation of trade in agricultural commodities.

Second, the greatest share of gains in welfare actually arises from reforms that are essentially unilateral trade liberalisation. Although the model only simulated a potential reduction in tariffs, the results can be interpreted as indicating the potential gains from actual liberalisation. During the period 1992-97 Uganda did simplify and reduce tariffs quite significantly, certainly by more than the 24% reduction simulated here. This liberalisation did improve the relative incentives for agricultural producers, and would

have benefited manufacturers using imported inputs. Given the results of our model, the trade policy reforms implemented by Uganda in the 1990s are likely to have had positive welfare effects.

Third, there are distributional consequences of the impact of trade liberalisation. Although the largest proportional gains are to the urban self-employed, there are significant gains in agriculture. The benefits to agriculture are greater in the main food and coffee growing central and western regions, because the factors that benefit are more prevalent in those regions. This is consistent with the evidence that agricultural growth, and poverty reduction, in Uganda in the 1990s was concentrated in these areas (whereas the Northern region fared least well). Appleton (1998) reports a decline in the poverty headcount index from 56% in 1992 to 46% in 1996, due largely to growth, especially in cash crop production (coffee). However, there is no evidence of a decline in income inequality and the poorest quintile have experienced falling living standards, especially households with a non-working head (AIDS is an important factor here). The Northern regions have benefited least. It is encouraging that our results are consistent with this evidence, even to the extent that we identify non-working households as the major losers (although not all of these households are the poorest).

Our estimates of the effect of the Uruguay Round on Uganda suggest that the overall effect will be small, but on balance positive. As there are major benefits to agriculture/rural households, the impact is likely to be pro-poor. The effect for specific products or sectors depends on how the relevant world prices change, and the flexibility of the Ugandan economy in allowing and encouraging (via the structure of incentives) producers to respond to relative price changes. Uganda is likely to benefit because prices for the cash crops that it exports will rise, and increases in food prices can stimulate domestic farmers to increase production (imports fall, domestic production rises and possibly even exports increase). However, producers respond not so much to the prices they face for individual commodities, but the relative prices faced for substitute commodities. The CGE models address the effects associated with relative price changes. As shown, the outcome depends on the magnitude of relative price changes and the ability of producers to respond (as represented by factor mobility). In general, Uganda will benefit. It will benefit by more the greater the increase in relative prices of the goods it exports. It will benefit even more the greater the degree of factor mobility between sectors

in the economy. Extended analysis based on a refined model is important to evaluate these conclusions and test their robustness.

The model also helps to identify appropriate flanking policies. In the least developed countries, agricultural policy reform is required to increase the incentives facing domestic producers and to remove the constraints (such as access to inputs, credit and technology) that peasant farmers tend to be subject to. Unilateral trade liberalisation, within poor countries, is desirable in that it permits a more efficient allocation of resources and allows world prices to be transmitted to domestic producers. While there will be short-run adjustment costs, as the losses to contracting sectors tend to materialise faster than the gains to expanding sectors, the long-run effect on welfare should be positive. Our results suggest that even the short-run impact will be positive. There are, however, likely to be substantial redistribution effects although, in Uganda, these are likely to be mostly within agriculture as farmers shift from one crop to another. Policies to facilitate internal factor mobility are shown to be important, and more so the greater the increase in relative price incentives. It should not be forgotten that perhaps the most important flanking policies are those in developed countries. Agricultural trade liberalisation in the EU, for example, will have a greater impact on world prices, and even on low-income countries, than policy reforms in low-income countries themselves. The developed country reforms alter the world trade environment; reforms in developing countries can enhance their ability to benefit from a more open global trading environment.

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