The Potential Implications of the EU-CAP Reforms on the Botswana Beef Industry

Botswiri Oupa Tsheko

Abstract

Food processing (beef) has been a major beneficiary of preferential trade between the EU and the ACP countries, which allows free access into the EU market. But the renegotiation of the Convention to comply with the WTO free trade agreement, under the Cotonuo Agreement, is likely to see the removal of this preferential treatment for Botswana beef, and thus opening it to stiff international competition. This is likely to result in a fall in beef prices, which will impact, adversely, on the rural population.

To explore the impact of a food processing export price fall of 24% (in foreign currency), policy simulations using CGE were conducted. At the micro level, this shock initially reduced export and producer prices for food processing (beef), giving rise to disequilibrium on the production side. In response, the variable factors (different labour types) move from the beef sector to other sectors, especially to the textile sector. At the macro level, a deficit appears in the current account, signalling that the economy, in order to maintain external balance, has to increase exports and/or reduce imports. This imbalance gives rise to exchange rate depreciation, i.e., raising the prices and encouraging production of traded output relative to non-traded commodities.

These results show that it is very risky for a developing country to depend highly on exports of a few commodities. In order for Botswana to reduce such a risk, it is necessary to diversify its trade structure and build up production and export capacity in other manufactures to meet the long-term economic aspirations of the country.

1: Introduction

Food processing (beef) has been a major beneficiary of preferential trade between the European Union (EU) and the African Carribean and Pacific (ACP) countries, which allows free access into the EU market. But the renegotiation of the Convention to comply with the World Trade Organisation (WTO) free trade agreement, under the Cotonuo Agreement, is likely to see the removal of this preferential treatment for Botswana beef, and thus opening it to international competition. This is likely to result in a fall in beef prices, which will impact, adversely, on the rural population.

To explore the impact of a food processing (beef) export price fall of 24% (in foreign currency), as a result of the European Union Common Agricultural Policy (CAP) reforms, policy simulations using Computable General Equilibrium(CGE) model were conducted. At the micro level, the results will show that the shocks initially reduced export and producer prices for food processing (beef), giving rise to disequilibrium on the production side. In response, the variable factors (different labour types) move from the beef sector to other sectors, especially to the textile sector. At the macro level, a deficit is expected to appear in the current account, signalling that the economy, in order to maintain external balance, has to increase exports and/or reduce imports. This imbalance is expected to give rise to exchange rate depreciation, i.e., to raise the prices and encourage production of traded output relative to non-traded commodities.

2: The Structure of the Botswana Economy

Botswana was one of the poorest countries when she attained political independence in 1966 with a per capita income of about US$400 in 2000 prices. The poverty situation was accentuated by several years of drought, which coincided with the achievement of independence. One third of the national cattle herd died, while one fifth of the population received famine relief from the international community (Botswana National Development Plan 7).

At independence in 1966, Botswana, typical of a poor developing country, relied heavily on agriculture. Beef products were the most important export commodities. Apart from the railway line, communication and infrastructure were poorly developed, and prospects for rapid development of the economy were bleak.

However the diamond industry transformed Botswana from an agricultural-based economy to one in which diamonds account for 80 percent of exports and 50 percent of Government revenues. The remaining part of exports came from beef, copper nickel and manufactured products, though the manufacturing sector's contribution was not that significant in terms of foreign earnings until fairly recently.

Mineral revenues have enabled the government to build up large foreign exchange reserves, which amounted to around $5.5 billion in 2002. Thus the economy of Botswana is highly dependent on minerals this dependency being indicated by the strong linkages between the minerals sector and the other sectors of the economy, through the 'fiscal' linkages.
In this paper the influence of the mineral sector is isolated so as to allow the capture of any effect of any other sector on the rest of the economy. This is done through the closure conditions (see section 4).

3: The CGE Model for Botswana

To capture the sectoral and welfare effects of trade liberalization on the economy of Botswana we developed a computable general equilibrium (CGE) model for Botswana; for this we used the 1996/97 social accounting matrix (SAM) as a database, calibrated the CGE to the base year values, and used it to run simulations of external shocks on the economy.

A CGE model is an appropriate instrument to analyse external shocks and domestic policies in which multisectoral linkages are important. It casts light on distributional and allocative efficiency aspects of different sectors of the economy. The model is Walrasian. This means that in CGE modelling, the study of the behaviour of economic variables takes full account of the interaction between endogenous variables and their relationships with the exogenous variables (Robinson; 1989). To explain this interaction we start by giving a brief discussion of the behavioural relationships in the model, which are captured by non-linear first optimality conditions for production and consumption decisions.

In this model, domestic production uses a two-stage production process wheras households' consumption expenditure in this model are allocated across different commodities according to Linear Expenditure System (LES) demand functions. For a developing country such as Botswana, a Stone-Geary utility function is preferred because it allows for subsistence consumption expenditures which are likely to exist, especially for poor households.

The second stage of the model involves the identification of the components of the transactions recorded in the SAM. Commodities are supplied by domestic production activities and by imports. Imperfect substitutability is assumed for commodities from domestic activities and imports. That is households choose their consumption bundles from a set of 'composite' commodities that are aggregates of domestically produced and imported commodities. These 'composite' commodities are formed as Constant Elasticity of Substitution (CES) aggregates that make the presumption that domestically produced and imported commodities are imperfect substitutes.

Imperfect substitution between imports and domestic supply sold domestically is captured by the CES aggregation function in which the composite commodity that is supplied in the domestic market is an aggregate domestic supplies and imports.

Similarly on the export side it may be assumed that there is imperfect transformation in production between varieties produced for the domestic market and those for foreign markets, which allows divergence between the domestic price of exportable goods and their world prices.

Finally there is a discussion of features intended to capture economic conditions in Botswana and these features are called the closure rules. These closure rules are those constraints that have to be satisfied by the economic system, but which are not considered in the decisions of any micro agents (Robinson; 1989, pp. 907-908).

4 : Model Closure Rules

A major closure condition for this group of experiments is holding minerals production in Botswana fixed. Since Botswana minerals (diamonds) are exported through the Central Selling Organisation (CSO), which is a cartel that controls the international price for diamonds (under De Beers), to capture the influence of any international trade shock on different sectors of the economy it is necessary to hold minerals (diamonds) production fixed. Restricting factor use by mining accomplishes this purpose.

Other closure conditions are with respect to the following: the foreign exchange market, the capital (investment-savings) market and the government's account.

For the savings-investment balance, the model treats the investment decision as given: the economy allocates fixed quantities of a set of commodities for investment purposes. This is to reflect the fact that as a result of the accumulations of foreign reserves over number of years, Botswana does not face savings constraints. Given this closure, the value of savings has to adjust to assure that it equals the investment value. The basic approach is to let the marginal propensity to save vary for the domestic non-government institutions. Thus, this is a case of an investment-driven model. The model assumes that the proportions of each commodity purchased for investment purposes are fixed exogenously in volume terms, and hence the amount of each commodity purchased adjusts equally proportionately so that the total value of savings equals the total value of investment as prices change. This is achieved by fixing the investment-scaling factor and making the household savings rate variable.

For the external balance (which is expressed in foreign currency), the closure is that the real exchange rate is flexible while foreign savings (the current account deficit) are fixed. If, *ceteris paribus*, foreign savings are below the exogenous level, a depreciation of the real exchange rate would correct the situation by simultaneously (i) reducing spending on imports (a fall in import quantities at fixed world prices); and (ii) increasing earnings from exports (an increase in export quantities at fixed world prices).

The specification of the closure for the government account in the base model presumes that all tax rates are fixed at their initial rates and that government expenditure volumes are fixed, and therefore that government savings, the internal balance, is a residual.

The closure rule in the enterprise account is to fix the enterprise quantities of commodities used by enterprises, which is achieved by fixing expenditure-scaling factor. This means that consumption decisions by enterprises are exogenously determined. This implies that in order to

bring the account to equilibrium the value of enterprise savings must vary. If the value of the adjuster is changed, but left fixed, this imposes equiproportionate changes on the volumes of commodities demanded.

The model implements the factor closure rules in three stages. The first stage sets up a basic specification whereby all factors are deemed perfectly mobile; the second stage introduces a more general specification whereby factors can be made activity specific and allowance can be made for unemployed factors, while the third stage introduces the idea that factor market restrictions may arise from activity specific characteristics, rather than the factor inspired restrictions considered in the second stage. For these simulations, the model assumes that labour is mobile across all sectors in the short-run and that capital is fixed. The model further assumes that there is unemployed unskilled labour. That is, the model assumes that the supply of the unskilled labour is perfectly elastic, so that activities can employ any amount of unskilled labour at a fixed price. This applies for both the short and long runs. Thus in the long run all factors are mobile between sectors but there is still unemployment of unskilled labour.

Finally, the model specifies the price normalisation equation, the consumer price index (CPI). This numeraire is needed to serve as a base since the model is homogenous of degree zero in prices and hence only defines relative prices. But in cases where we need to fix the real exchange rate in the economy, ER is fixed and also the producer price index (PPI) and is unfixed.

5: CGE Simulation Results

It bears emphasising that a CGE model simulations serve to disentangle the policy effects from other possible influences on economic performance (such as external market development). The various policy experiements- involving trade liberalisation, the Cotonuo agreement, changes in government expenditure and tax and subsidies policies and labour market analysis.

SIMULATION 1: Trade liberalisation-WTO

The first policy simulations are conducted for the purpose of demonstrating the impact of international trade liberalisation on Botswana's macroeconomic performance, intersectoral shifts and households. The results are expected to indicate that international trade shocks have a decisive effect on the overall performance and the sectoral structure of Botswana economy.

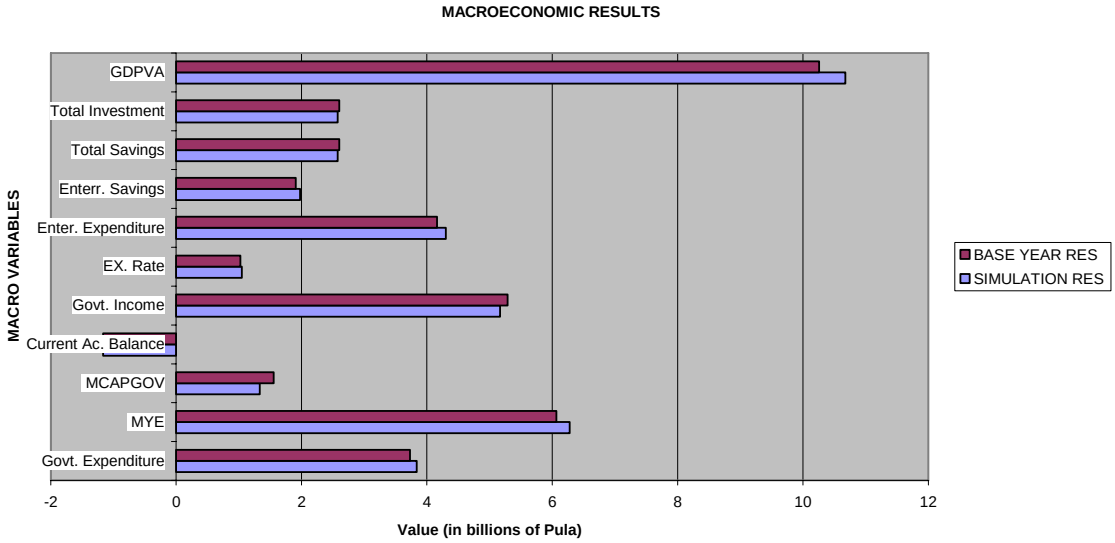
To capture the impact of trade liberalisation on Botswana's macroeconomic performance, intersectoral shifts, fiscal policy shifts, and household welfare, policy simulations were conducted to explore the impact of reductions in import tariffs of 24%. Note that these are the MFN rates.

The analyses are comparative static; hence the analyses do not address potentially important questions relating to the sequencing of reforms an potential dynamic benefits from trade liberalisation.

Results: Macroeconomic results

Government interventions in foreign trade affect relative prices and sectoral production through their effects on the domestic prices of tradable goods (imports and exports) and changes in the real exchange rate. The exchange rate in turn will affect the domestic prices of tradable goods relative to domestic goods.

Since the exchange rate is a macro variable, it is important to start the discussion of the results with macroeconomic analyses because they give macro results that provide a useful starting point. That is the results help indicate how the whole economy reacts to the exogenous shock. Thus, if the reduction in tariffs moves the macro variables in a particular direction, that would be a clear indication that the economy is moving in that direction.



These macroeconomic results are discussed in the context of the macro closures for the model. As stated in section 4, for the government account, the model closure is that government savings is a flexible residual while all tax rates are fixed. For the external balance, the closure is that the real exchange rate is flexible while foreign savings (the current account deficit) are fixed.

The macroeconomic results are reported in Figure 1; there is a general increase in the macroeconomic variables with the reduction in import duties by 24%. GDPVA increases by 4.1%, from a base value of P10.09b.In general the GDPVA gains reflect an increase in the labour supply as well as allocative efficiency.

There is nominal exchange rate depreciation by 2.4%, which signals a relative fall in import prices and that for the economy, in order to maintain external balance. The real exchange rate

depreciation will occur if the fall in import prices result in a more than proportionate increase in imports; that is in the case here the elasticity of substitution between imports and domestic supply is greater than 1. Given that substitution elasticities are greater 1 for most of the commodities, there is real exchange rate depreciation. With real exchange rate depreciation the economy responds by expanding exports and producing less of the domestic substitutes.

SIMULATION 2: Beef Export Price Shocks

The beef industry has one of the strongest linkages with the rural economy in Botswana, and any negative shock that affects this industry is likely to impact adversely on the a number of households in the country, especially the rural population. This industry accounted for 57% of total manufacturing exports in 2003 and was the second largest source of foreign earnings after mineral exports.

The trade arrangement between Botswana and the European Union allows free access without reciprocity to the European market for beef exported from ACP members such as Botswana. Botswana beef has been a major beneficiary of this agreement through free access into the EU market. The negotiation of a post-Lome' relationship ACP countries and the EU (Economic Partnership Agreement) is important for the rural economy in Botswana. The export price for food processing is likely to fall as a result. This is because with the current trade arrangement, Botswana food processing is sold above world prices in the EU market.

A study by Malzbender (2003) has shown that as a result of the reforms, beef prices in the EU have on average experienced a 25% decline since 1999; and that the study projects a further 7% decline in beef prices as a result of the enlargement of the EU to 25 member states. The declining EU prices have already reduced the returns of Botswana beef exports and an ongoing price decline will lead to further reduced returns.

Beef exports from Botswana in 2003 earned P246m, of which P168.14m came from the export of fresh and chilled boneless beef exported to the EU, i.e., from the preferential trading agreement. If the preferential EU market were closed the revenue from beef exports would fall appreciably. Assuming markets as lucrative as those on which frozen beef has been sold could replace the lost EU export market, the trade data for 2003 suggest a reduction in average export price of 25 percent. However, if the lost markets can only be replaced by sales of fresh and chilled beef on the South African market, which in 2003 imported P44.4m, this suggests a reduction in average export price of 30 percent. Thus the scenario looks at the potential effect of a fall in preferential export prices for Botswana beef in the EU, and what effect the alternative markets will have on the export of beef. Here we chose to look at only two alternative market, South Africa and the

Rest of the World. South Africa is the second largest importer of Botswana beef after the EU, and the balance is taken by the rest of the world.

Selected results are reported in Table 1. The overall effects on the economy appear to be relatively small with a minor reduction in GDPVA and slight deterioration in the exchange rate. The rest of the results show that the preferential access to the EU market is of substantive importance to the Botswana economy and that even with the erosion of the preference, the EU remains the preferred market for Botswana beef. However the other results indicate this may not be the case. In particular the fairly pronounced commodity and activity price changes are suggestive of substantial forces for structural change.

Table 1 Selected Results

Variable	Change in Export Price of Meat	
	25 percent	**30 percent**
GDPVA	-0.2	-0.2
Total Exports	-6.13	-9.8
Total Imports	-4.2	-7.5
Exchange Rate	1.25	1.34
1.1 COMMODITY PRICES FOR DOMESTIC PRODUCTION AND SALES		
Cattle	-12.47	-15.88
Other Livestock	-15.67	-18.86
Vegetables	5.26	5.67
Grains	2.68	2.79
Meat & Products	-5.56	-6.02
Textiles & Clothes	-1.24	-1.32
1.2 ACTIVITY PRICES		
Trad Agric Cattle	-7.16	-8.7
Trad Agric Other	-4.9	-5.28
Freehold Farms	-4.05	-4.36
Meat Processing	-3.5	-5.41
1.3 ACTIVITY OUTPUT		
Trad Agric Cattle	-22.06	-23.92
Trad Agric Other	-0.78	-0.55
Freehold Farms	-24.37	-26.26
Meat Processing	-21.83	-23.61
Textiles	35.88	38.91
1.4 FACTOR DEMANDS		
1.4.3 Farm-workers		
Trad Agric Cattle	-16.75	-18.35
Trad Agric Other	3.73	4.29
1.5 FACTOR PRICES		
Farm-workers	-11.04	-11.86
Min of Other Labour (unskilled)	-0.9	-0.97
1.6 DISPOSABLE INCOMES		
Urban Households Wage Income	0.55	0.6

Urban Households Self-employed	-2.2 1.34	-2.37 1.44
Urban Households Transfers	0.09	0.1
Rural Households Wage Income	-4.4	-4.73
Rural Households Self-employed	2.18	2.35
Rural Households Transfers	0.61	0.66
Non-Citizen Households		

The changes in commodity prices are concentrated on the agricultural commodities. Cattle, other livestock and meat products all experience pronounced declines in the price for domestically produced and consumed commodities. The increases in other agricultural commodity prices indicate incentives for switching production from livestock to other agricultural commodities, although any move to produce more vegetables will come up against water availability constraints. For most other commodities a nominal increase in prices, except for some service commodities. A very similar pattern emerges for composite good prices. Pronounced reductions in livestock and related prices offset by small increases in prices for most other commodities.

The reported activity price changes indicate substantial incentives to switch out of agricultural and meat processing activities, indeed for nearly all the other activities there are small increases in activity prices.

The increase in output by the Textiles activity is of interest. This appears to be driven by two forces, the increased value of foreign exchange and the skill composition of labour force relative to shrinking activities. The expected result was that the tourist related activities would experience most expansion, and while they do expand the proportionate and absolute expansions are less than for the textile activity. There has been some effort to promote the textiles sector in Botswana and it seems to be working, especially as a result of the AGOA arrangement.

Labour adjustment Policy Analysis

The shifts in factor demands and prices are in line with the movements of commodity and activity prices. Demand for farm workers in cattle production declines appreciably but is slightly offset by increase demand for other agricultural production. While many of the changes in labour demand are relatively small the cumulative changes in the patterns of employment predicted by the model are appreciable. This suggests large structural changes in employment. The price of land is expected to drop.

The impacts on disposable household incomes is interesting. Households whose main income sources are from self-employment experience noticeable reductions in disposable income, whereas all other household groups see increases in nominal disposable incomes. The fact that

both urban and rural based self-employed households experience income reductions is consistent with the continuing close links between urban and rural households. The other effects are reflective of the structural changes in labour markets.

SIMULATION 3 : ADD TO SIMULATION 2, Government Consumption Expenditure: reduce Govt Savings:

As the largest sector in the economy in terms of employment, savings and expenditure, any external shocks on the Government sector is likely to affect other sectors of the economy significantly. Thus a shock on Government expenditure as a result of changes in the beef industry will affect the economy adversely. The Government shock in this model will be looked at as follows : a rise in government expenditure as a result of the SPS requirement by th EU on beef. This rise in Government expenditure is most likely to have effects on all other sectors. For instance such a rise in Government expenditure would most likely results in the reduction in expenditure on other sectors especially Government transfers to households and provision of public goods.

Botswana cattle producers are faced with the increased investment costs to meet the EU's strict Sanitary and phyto-sanitary (SPS) standards for beef exports. SPS measures imposed on Botswana's beef as a result of the mad cow disease in Europe require that all beef meat on sale in Europe comes from animals covered by an identification/labelling system. This system ensures traceability of the animals' origin from its birth until it is slaughtered and marketed. Providing traceability is very costly as most animals are raised in communal areas compared to fenced European farms. This is made worse by the fact that unlike their European counterparts, Botswana farmers do not get many subsidies. Given these additional SPS costs on Botswana's beef producers, it is clear that the EU disease control regulations are a serious financial burden to a developing country like Botswana. To capture the effect of these costs we will conduct a policy simulation where, as a result of the SPS demands, the cost of livestock production rises by a certain percentage. Although it is generally assumed that SPS requirements, will increase livestock production costs no has been conducted to quantify the costs. Thus whatever shock we introduce in this case will be hypothetical. To conduct this simulation effectively, the cost on Government will have to be isolated as, given its magnitude, it will oveshadow the producer costs.

Table 2 Selected Results

Variable	A 25% fall in Government Savings and Export beef prices
GDPVA	-1.28
Total Exports	-0.66 (excluding textile)
Total Imports	-0.75
Exchange Rate	1.24
1.7 ACTIVITY PRICES	
Trad Agric Cattle	-3.8
Trad Agric Other	-1.9
Meat Processing	-2.1
1.8 ACTIVITY OUTPUT	
Trad Agric Cattle	-9.2
Trad Agric Other	-4.9
Meat Processing	-20.56
Textiles	69.38
1.9 FACTOR DEMANDS	
1.9.3 Farm-workers	
Trad Agric Cattle	-3.2
Trad Agric Other	3.73
1.10 FACTOR PRICES	
Farm-workers	-6.33
Min of Other Labour (unskilled)	-1.18
1.11 DISPOSABLE INCOMES	
Urban Households Wage Income	-2.58
Urban Households Self-employed	-0.91
Urban Households Transfers	1.34
Rural Households Wage Income	0.03
Rural Households Self-employed	-1.2
Rural Households Transfers	-0.97
Non-Citizen Households	0.61

Here the overall effects on the economy appear to be relatively small with a minor reduction in GDPVA by 1.28%, and again slight deterioration in the exchange rate. While exports fall marginally as a result of the shock, beef exports fall by 15% (compared to a fall of 6.13% in simulation 2). This is a clear indication that the SPS measures are costly to the idnustry and this a decline in beef exports. On the other hand, total imports fall marginally by 0.75%.

The activity price changes again indicate an incentive to switch out of agricultural and meat processing activities to other agriculturl activities such as arable farming. Textile continues to absorb much of the shock resulting from the decline in beef activity. The demand for textile exports increases, to meet the short fall in foreign earnings created by the fall in food processing

export prices.Note that the model assumes mobility of factors of production (Labour) between sectors; thus a decline in the beef activity release part of its labour which goes into the textile industry.

The labour demand (FD) simulation results show that the demand for labour in the beef industry declines as aresult of the shock; however as stated above, textile sector demands more of every type of inputs. This again is an indication that textile is the only sector which grows substantially to meet the demand for imports payments.

Income Distribution Implications

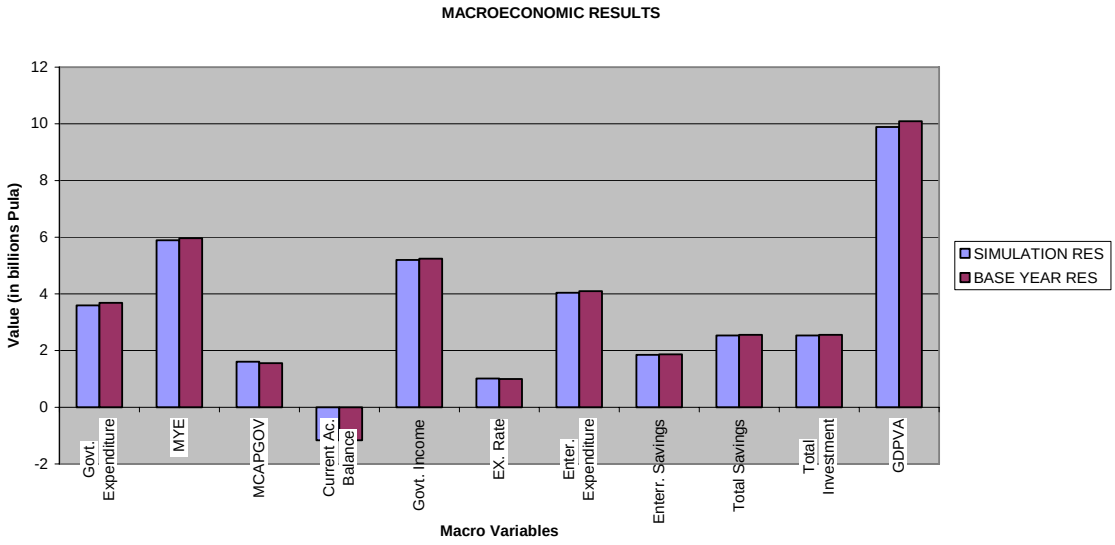
A major concern with the decline in the international beef market as a result of the SPS requirements is to do with the welfare implications of such a shock. This is mainly because the beef industry in Botswana has strong linkages with a number of industries, most of which are labour intensive. Thus a fall in the international price of beef, with a rise in the cost of production (due to SPS measures) result in the contraction of the economy as shown through the macroeconomic results and sectoral results. Without agricultural growth and rural development that can raise the incomes of most of the people residing in rural areas, it is difficult to see how rapid growth of the national economy can be sustained and whether equitable growth can be achieved in the country. As seen, in table 2, all the different households experience a decline in their income as a result of the shock.

However contrary to the expectation that the rural household- which has the strongest linkages with the beef industry through the agricultural sector- would experience the biggest fall in income, it is not the case here. One explanation may be the factor closure condition, which allows for transfer of factors across sectors, resulting in the agricultural sector moving part of the resources to, mainly, the textile sector. But these income distribution results indicate that the reduction in the international price of food processing would shrink the economy.

SIMULATION 4 : ADD TO SIMULATION 3; Land Reform Measures (Land tax) and infrastructural development (Cattle fences). This policy experiment looks at the simultaneous change in trade, fiscal, and land policy on the beef sector. As part of the land reform package, land taxes are levied on farming households. Here we impose a 25% land tax.

Besides trade taxes, marketing margins are the most important component (wedge) between border prices and domestic prices of exports and imports. Botswana's agricultural sector is characterized by poor infrastructure, lack of transportation capacity and the fact that it is land locked and sparsely population To demonstrate the positive effects of the improvements of the

domestic infrastructure (such as cattle fencing) on national production and foreign trade, we simulate a 25% cut on marketing margins.



There is a slight increase macroeconomic variables as a result of the improvement in infrastructure together with a tax on land. Real GDP value added declines by 0.7%. The shock results in a rise in nominal exchange rate of 14%, and incication that there is a rise in economic activity in the country as a result of the improvement in agricultural productivity. Government revenues increase by 6%. And the Government savings increase by 10% in the same period to keep the Government expenditure at the base level.

Table 3 Selected Results

Variable	A 25% increase in Land Tax, and improvement of infrastructure by 25%
1.12 ACTIVITY OUTPUT	
Trad Agric Cattle	1.83
Meat Processing	-3.09
Textiles	26.6
1.13 FACTOR DEMANDS	
1.13.3 Farm-workers	
Trad Agric Cattle	-3.2
Trad Agric Other	3.73
1.14 DISPOSABLE INCOMES	
Urban Households	-1.34
Rural Households	-1.17
Non-Citizen Households	-1.67

The domestic production results indicate a shift in resources as a result of the shock. With an increase in land tax and improvement in infrastructure, the livestock and textile sectors production increase by 1.83% and 27% respectively' whilst beef production declines by 3.09%. This may be an indication that the incentive for producers to shift resources from the production of beef increases as producers experience a rise in their cost of production due to imposition of land tax.
The incomes of households decrease as demand for labour declines. Urban household experience a 1.34% decline in income with the shock. The rural household too experiences a decline of 1.17% The non-citizen income declined more at 1.67%. This indicates that mainly non-citizen household either owns much of the labour demanded by the economy, or the most highly trained, requiring higher incomes.

Generally, the results indicate that an improvement in infrastructure and an imposition of the land tax will iomprove productivity in the agricultural sector. In fact as a result of these changes, the result shows a rise in output of the livestock sector. The reason why the beef sector is experiencing a decline despite infrastructural improvements could be attributed mainly to the fact that the policy simulation included scenarios 2 and 3 which have negative impact on the industry. Thus any improvement that could result from the imposition of a land tax and improvement in infrastructure would be partially offset by the negative shock through simulations 2 and 3. It was important, however, to carry out simulation 4 under these conditions, because the objective is to see how the negative effects of simulations 2 and 3 could be addressed by making changes to the agricultural sector.

SIMUATION 5: ADD TO SIMULATION 4, transfer of resources from livestock to Ecotourism. The tourism industry has strong backward and forward linkages with other sectors of the economy. The tourism sector has economic linkages with the agriculture sector through demand for agricultural products and services; with the manufacturing sector through demand for furniture fittings, linens, kitchen utensils, crafts, etc.; and with the services sector, for banking and insurance services, air and road transport, etc. The major conflicting area in the tourism sector whether it is wild life or eco tourism is over land use between humans and wild life.
Thus this simulation looks at a situation where, as aresult of the decline in the beef indsutry due to the shocks stated in simulations 1 to 4, is to capture the potential effect on the economy of transferring more land to the tourism sector. In this scenario, this transfer is captured through the Hotel and Restaurant account. That we make the assumption that the imporvement in ecotourism will be reflected in a rise in Hotel and Restaurant activities in Botswana. The simulation assumes that as a result of resource transfers, the Hotel and Restaurant activities increase by 25%.

Table 4 Selected Results

Variable	25% Transfer of Land use to Wildlife
1.15 ACTIVITY OUTPUT	
Trad Agric Cattle	-3.7
Meat Processing	0.7
Textiles	-19.8
Hotel and Restaurants	3.6
1.16 FACTOR DEMANDS	
1.16.3 Farm-workers	
Trad Agric Cattle	--0.6
Manufacturing	2.7
Services	5.01
1.17 DISPOSABLE INCOMES	
Urban Households	1.5
Rural Households	1.3
Non-Citizen Households	2.0

The results support the argument that the toursim sector has stronger linkages with the rest of the economy. Looking at the activity output, we find that with a transfer of 25% of land to wildlife, the livestock sector experience a marginal fall in its activity; and the beef outpt increases by 0.7%. This may an indication that with the rise in tourism activity, there is a rise in demand for domestc beef. However textile experiences a decline in output of around 20% and this may be attributed to the fact that labour, especially unskilled labour will be transferred to tourism activity and other manufacturing activities such as furniture fittings, linens, kitchen utensils, crafts, etc.; and with the services sector, for banking and insurance services, air and road transport, etc. With the rise in economic activity, incomes of households improve.

6: Conclusion

The international food processing (beef) price have shown that the shock affects mainly the industries with stronger linkages to the rural economy, which adversely affect the urban and the rural households incomes.

The results show that it is very risky for a developing country to be highly dependent on exports of a single commodity. In order for Botswana to reduce such a risk, it is necessary to diversify its trade structure and build up production and export capacity in other manufacturing sector to meet long-term economic aspirations of the country. This may mean an expansion of the export

capacity of sectors such as textile and tourism. However positive effects of such diversification may take long to be realised; and this may result in the country facing a trade deficit for a long period of time.

Given these results, Botswana is likely to face a serious challenge in its long-term economic development and growth strategies after the end of the Cotonuo Agreement in 2007. As the food processing (beef) exports become less competitive in the international market, there are likely to be serious welfare implications across the households. This is compounded by the fact that Botswana has lost its status as a least developed country (LDCS) under the current agreement. This means the country would not be eligible for the compensatory arrangement that the European Union would have for the ACP least development countries to meet the foreign exchange losses the country would incur as a result of the new trade arrangement.

However it should be noted that much of the outcomes of the shocks were influenced by the choice of macro and factor market closures for this model. Another important factor that influenced modeling results substantially was the choice of elasticity parameters.

References

Akinboade, O.A. 1994. Technical effeciency change in Kenyan agriculture and the poor: A computable general equilibrium analysis. *Canadian Journal of Development Studies 15(1): 55-74.*

Armington, P.S. 1969. A theory of demand for products distinguished by place of production. *International Monetary Fund Stuff Papers, 16, 1 159-177.*

Arndt, C., S. Robinson, and F. Tarp. 1999*. Parameter estimation for a computable general equilibrium model: A maximum entropy approach*. Trade and Macroeconomics Division Discussion Paper No. 40. Washington, D.C.: International Food Policy Research Institute.

Baldwin, R.E. and Murray, T. 1977. MFN tariff reductions and developing country trade benefits under GSP. *Economic Journal, 8: 30-46*.

Bank of Botswana. 1998. *Annual Report*. 1997. Bank of Botswana, Gaborone, Botswana.

Barclays Bank. 1997. Barclay's Business Guide to Botswana. Gaborone: Barclay's Bank of Botswana Ltd.

BIDPA (Botswana Institute for Development and Policy Analysis). 1998. *Economic Impact of the Proposed European Union-South Africa Free Trade Agreement on Botswana, Lesotho, Namibia and Swaziland*. BIDPA study; 1998.

Delacuwe,B., and A. Martens., 1988. CGE modeling and developing economies. A concise empirical survey of 73 applications to 26 countries. *Journal of Policy Modeling 10(4): 529-568.*

Dervis, K., J. de Melo and S. Robinson. 1982. *general Equilibrium Models for Development.* Cambridge University Press, Cambridge.

De Janvry. A. 1994. Farm-nonfarm synergies in Africa: Discussion. *American Journal of Agricultural Economics 76 (December): 1183-1185.*

Defourny, J. and Thorbecke, E. 1984. Structural Path Analysis and Multiplier Decomposition Within a Social Accounting Matrix Framework, *Economic Journal, Vol. 94. Pp 111-136.*

Delacuwe,B., and A. Martens. 1988. CGE modeling and developing economies. A concise empirical survey of 73 applications to 26 countries. *Journal of Policy Modeling 10(4): 529-568.*

Delgado, C.L., P. Hazell, J. Hopkins, and V. Kelly. 1994. Promoting intersectoral growth linkages in rural Africa through agricultural technology and policy reform. *American Journal of Agricultural Economics 76 (December): 1166-1171.*

de Melo, J. and S. Robinson. 1989. Product Differentiation and the Treatment of Foreign Trade in Computable General Equilibrium Models of Small Economies. *Journal of International Economics. Vol. 27, no. 1-2 (August), pp46-67.*

de Melo, J., and D. Tarr. 1992. *A general equlibrium analysis of U.S. foreign trade policy*. Cambridge, Mass., U.S.A. and London: Massachusetts Institute of technology Press.

Dervis, K., J. de Melo, and S. Robinson.1982. *General Equilibrium Models for Development Policy*, World Bank Research Publication. Ishington, D.C: World Bank.

Devarajan, S., Lewis, J.D. and Robinson, S. 1990. Policy Lessons from Trade-Focused, Two-Sector Models, *Journal of Policy Modeling, Vol 12, pp 625-657*

_____.*1990. Policy lessons* from trade-focused, two-sector models. *Journal of Policy Modeling 12: 625-657.*

_____.1993. External shocks, purchasing power parity, and the equilibrium real exchange rate. *World Bank Economic Review 7 (1): 45-63.*

Evans, D. 1997a. *The Uruguay Round and the Free Trade Area of the Southern African Develoment Community, SADC. Draft. Mimeo*. Institute of Development Studies, University of Sussex, June.

Evans, D. 1997b. *Impact for the removal of tariffs for the free trade area of the Southern African Development Community*. Occasional paper No. 5, Commonwealth Secretariat.

Government of Botswana. 1997-2001. *Budget Spechees*. Delivered by Minister of Finance and Development Planning.

Harvey, C. 1992. "Botswana: Is the Economic Miracle Over*?", Journal of African Economies, Vol.3, No.1*. Oxford University Press, Oxford.

Leith, J.C. 1992. The Static Welfare Effects of a Small Developing Country's Membership in a Customs Union: Botswana in the Southern African Customs Union, *World Development, Vol. 20, No.7, pp1021-1028*

McDonald, S. 2000. A Disaggregated 1993/94 Social Accounting Matrix for Botswana. University of Sheffield.

McDonald, S. 2000. An evaluation of the Data for Botswana in GTAP 5, TIPS/GTAP Symposium on GTAP 5 Database, Johannesburg, South Africa, September.

McDonald, S., and B.O. Tsheko. 2001. *Scarcity and Abundance: A study of Water and Diamonds in Botswana*. Presented at the Bank of Botswana Seminar, Gaborone, Botswana, September.

McDonald, S., and J. Tlhalefang. 2001. *CGE Models of Energy Use: A review of Production Structures and Data Requirements*. Intermediate Report for the RANESA Project 'Energy Accounts for Botswana'.

McDonald, S., and Wemsley. 2001. The Impact of the EU South Africa Free Trade Agreement on Botswana.

McDonald, S. 2002. *A standard Computable General Equilibrium Model: Technical Documentation*. University of Sheffield.

Pyatt, G. and Roe, C. 1977. Social Accounting Matrices for Development Planning, *Review of Income Wealth, Vol. 23, pp 339-364*

Pyatt, G. and Round, J.I. 1979. Accounting and Fixed Price Multipliers in a Social Accounting Matrix Framework, *The Economic Journal, Vol. 89 (December, 1979), pp 850-873.*

Robinson, S. 1989. *Multisectoral Models: In Handbook of Development Economics* ed. H.B. Chenery and T.N. Srinivasan . Armsterdam: North-Holland.

_____.1990. *Analysing agricultural trade liberalization with single-country computable general equilibrium models*. Department of Agricultural and Resource Economics Working Paper 524. University of California at Berkeley, Berkeley, California., U.S.A.

_____.1991. Macroeconomics, financial variables, and computable general equilibrium models. *World development 19 (11): 1509-1525.*

_____.2000.*Updating and estimating a social accounting matrix using cross entropy methods.* Trade and Macroeconomics Division Discussion Paper No. 58. International Food Policy Research Institute, Washington, D.C.

Sadoulet, E. and Janvry, A. 1995. *Quantitative Development Policy Analysis*, John Hopkins University Press, London.

Stone, J.R. 1978. *The Disaggregation of the household sector in the National Accounts*, Paper presented at World Bank Conference on Social Accounting Methods in Development Planning. Cambridge, U.K.

Theirfielder , R., and S. Robinson. 2002. Trade and Macroeconomics Division Discussion Paper No. 35 Washington, D.C.: International Food Policy Research Institute.

Tsikata, Y. 1999. *Southern Africa: Trade, Liberalization and the Implications for a Free Trade Area*. Discussion Papers on Aspects of the South African Economy, No. 13, Southern Africa Department, World Bank, Washington, D.C.

Unemo, L. 1994. *Environmental Impact of Government Policies and External Shocks in Botswana: A CGE Model Approach*, Beijer Discussion Paper 26. Royal Swedish Academy of Sciences, Stockholm.