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POLICY RESPONSE TO A COMMODITY PRICE BOOM UNDER STRUCTURAL CONSTRAINTS. THE CASE OF TANZANIA

by

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Abstract. This paper explores the impact of possible responses to the recent soar in world commodity prices on economic activity and household welfare in Tanzania, on the basis of a single country computable general equilibrium model that includes considerable factor market and household details. The focus is on the impact of different types of trade policies, as well as of the large marketing margins between producers, consumers and the foreign markets existing in the country. Scenario results are computed under a number of different assumptions in terms of the degree of substitutability of domestic products with imported goods, and flexibility in the allocation between exports and the domestic market. Results indicate that the Tanzanian economy may fail to benefit from the opportunities arising from the increase in world agricultural prices, and that trade policy does not appear to be capable of counteracting this risk. Rather, even a partial removal of a key structural bottleneck, such as the reduction of marketing margins, generates desirable results in terms of both production and distribution.

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1. Introduction

The recent boom of world prices for basic food commodities, as well as of petroleum prices, has raised the spectrum of a potential "double squeeze" in many low-income food deficit countries (LIFDCs), which are large importers of both food and oil. On the other hand increases in prices of exportable commodities could alleviate or counteract this effect. Understanding the effect of possible responses to such shocks is of primary importance; particularly it is useful to consider the potential role that trade policy could play in this context, if any. In fact, over the last year many LIFDCs have reduced their import tariffs, in view of mitigating the impact of the soaring world food prices on their consumers. However, the effectiveness and the consequences of such measures is not obvious, as it depends on a number of structural features of the economy, which ultimately affect the degree of price transmission of international prices in the domestic markets, as well as the substitutability between imports and domestically-produced goods.

The purpose of this paper is to explore a number of adjustment policies, including trade policies, which are meant to address the recent world commodity boom in low income agriculture dependent economies. In most developing countries, major policy changes would necessarily take place against a background characterized by significant structural constraints, which affect the functioning of markets and their degree of completeness and competitiveness. Common characteristics of such contexts are backward technologies and poor infrastructural endowments, resulting in large market weaknesses, such as large marketing margins, that render many domestic products in fact non-tradable.

This is especially the case of agricultural production, and of the more traditional parts of the food chain. Where subsistence farming is widespread, a significant portion of households' consumption flows directly from production into self-consumption, bypassing the specialized processing and distribution systems. Food processing and marketing usually show high transaction costs arising from poor infrastructures, such as inadequate physical transport facilities, and by institutional and physical gaps in the organization of activities.

Any policy change aimed at responding to a large external shock, if taking place in such a structural context, is likely to bring about considerable economy-wide effects which are complex in nature, and spread across sectors and institutions. A major concern in this study is the existence of large marketing margins for agricultural products and the degree of tradability of agricultural products. The more policy analysis allows for such potential effects to be taken into account and analyzed, the more policy design can be effective: as it was widely shown, policy analysis results are deeply affected by assumptions concerning the structure of the economy (Ackerman, 2005; Taylor and von Arnim, 2006).

In fact, inadequate infrastructures, such as transport and transaction costs can contribute to rural poverty, especially in Africa. For instance, a recent analysis in Madagascar suggests that high transport margins between remote and central regions, together with lower input use, reduced yields and increases the incidence of poverty (Stifel *et al.*, 2003). Minot (2005) came to similar conclusions for Tanzania. Similarly, Delgado *et al.* (2003) and Kilima (2006) independently found that international and local markets in Tanzania are not well connected, rendering many staple food products essentially non-tradable. This suggests that there are large and non stationary marketing margins affecting policy changes, and therefore it would be misleading to assume full price transmission between world and domestic prices.

Recent studies have included marketing margins in analyses of economy-wide impacts of trade liberalization and other policies. Arndt et. al. (2000) found in their analysis of Mozambique that not only the macroeconomic effects of reducing marketing margins are

significant, but also that there are synergies between simultaneously increasing agricultural productivity and reducing marketing margins. They did not, however, analyze impacts of trade policies. Wobst (2003) explicitly included marketing costs in his analysis of the impact of trade liberalization in five Southern Africa Countries, and found that reductions in marketing costs improve considerably the export performance.

This paper discusses trade policy changes as a response to the commodity boom with reference to one specific Eastern African country, Tanzania, and examines the effects of this policy in connection with a number of structural features of the economy, such as the size of the marketing margins and the degree of substitutability between domestically-produced good and foreign goods, both on the import side and the export side. The analysis is based on a 2001 Social Accounting Matrix (SAM) for Tanzania, built from the data provided by IFPRI (Thurlow and Wobst, 2003), which includes considerable factor, household, and sectoral detail. The simulations presented are run with a single-country computable general equilibrium (CGE) model.

The paper proceeds in the next section to discuss the Tanzanian context, and the structural features of the economy. Section 3 illustrates the main features of the model, of the closure rule adopted, and of the data set and its adaptation. Section 4 reports the results of the simulations, whereas Section 5 discusses their sensitivity to some structural assumptions embedded in key parameters. Finally, the last section concludes.

2. The Tanzanian context

With a per capita income of about US$280, Tanzania is among the world's poorest countries. During most of its post-independence history, the country pursued socialist policies which resulted in extended periods of below-potential economic performance. The reforms undertaken from the mid-1980s were not sustained, and by the early 1990s the economy was back into macro-economic disequilibrium and poor growth rates. Efforts were resumed few years later, with more effective commitments towards macro-economic stability and sound fiscal and monetary policies. Stabilization was accompanied by structural reforms, including privatization of state-owned enterprises, liberalization of the agricultural markets, efforts to improve the business environment and to strengthen public expenditure management. This second cycle of reforms has resulted in sustained growth, which in the last few years was reported above five percent per year.

Agriculture plays a dominant role in the economy, accounting for nearly 45 percent of GDP, for about three quarters of merchandise exports, employing around 70 percent of the labour force, and constituting a source of livelihood for about 80 percent of the population, particularly for the poorer and more vulnerable groups in rural areas. The average farm size varies between less than 1 and 3 hectares, and the vast majority of the crop area is cultivated by hand. Activities are still to a large extent dependent upon unpaid family labour, particularly of women and children, who account for at least 70 percent of total agricultural labour.

The main food crops are maize, rice, wheat, sorghum/millet, cassava and beans, occupying nearly 85 percent of the arable land. Bananas are grown mainly in the Kagera and Kilimanjaro areas, and like cassava, have a low value-to-bulk ratio; therefore they are generally retained for home consumption. Export crops represent 12 percent of the value of total crop production.

In general, five factors contribute to low agricultural productivity: *(i)* low input use; *(ii)* low output prices compared to production costs; *(iii)* unfavourable weather conditions; *(iv)* pests

and diseases; *(v)* poor knowledge of agronomic practices; *(vi)* low levels of capital, especially for small scale farmers. Moreover, agriculture is mostly rain fed, and both crops and livestock are adversely affected by periodical droughts.

Earlier studies (Government of the United Republic of Tanzania, World Bank and IFPRI, 2000) indicated that the country enjoys comparative advantage in all its major export crops, and in several food crops, despite the low level of technology. These studies also highlighted the presence of significant linkages between the production of exportable agricultural goods, rural incomes and growth; agricultural development and increased productivity are therefore crucial for both economic growth and poverty alleviation.

Poverty levels are high in Tanzania. During the past decade, a reduction has occurred mainly in urban poverty, while rural areas have seen relatively little change. The aggregate poverty level in 2000-01 was 36 percent compared to 39 percent in 1991-92, but in rural areas about 40 percent of households were reported below the basic needs line, accounting for about 81 percent of all the poor population[2]. In 1991-92, the poverty level of this same type of households – depending on agriculture for their livelihood – was 42 percent.

Within agriculture, poverty levels are highest among households depending on livestock (59 percent), while is 41 percent for those depending on food crops, 39 percent for those depending on cash crops, and 33 percent for those depending on livestock products[3]. These figures are not surprising, given that the agricultural sector only expanded at 3.5 percent per year over the past decade, corresponding to less than 1 percent in per capita terms; they suggest that agricultural development and better farm-gate prices can potentially result in significant poverty reductions.

A recent study by Levin and Mbamba (2004) showed that an expansion of agricultural production in Tanzania has the strongest potential effects in terms of employment and income generation, which would however benefit mostly the non-poor households, both in rural and urban areas. Despite such asymmetry, the growth of agricultural production still seems to imply the largest potential impact on poverty reduction. Furthermore, through selective increases in agricultural total factor productivity (TFP), the study shows that the best growth prospects were offered by exportable crops, as these could lead to larger exportable surpluses. On the contrary, TFP increases in food crops would depress income, as food crops are mostly non tradable, and hence a production expansion, combined with a slow down of domestic demand, would reduce prices, negatively affecting the poor rural households.

3. The model and the data

The simulations presented in this paper are run with a single country computable general equilibrium model, built as a modified version of the one presented in Lofgren *et al.* (2002). The framework is comparative static, and assumes profit maximization on the supply side, and utility maximization on the demand side.

Production is modeled as a constant elasticity of substitution (CES) function, determining the level of each activity from aggregate value added and aggregate intermediate inputs. Individual intermediates are derived through fixed coefficients from the aggregate intermediates. Value added for each activity is defined as a CES function of factor inputs.

[2] Data are derived from the 2000-01 National Household Budget Survey (HBS, National Bureau of Statistics, 2002).

[3] In Tanzania the terms "cash crops" normally refers to exportable crops grown by farmers for cash, such as coffee, cotton, cashew nuts, tobacco, tea, etc.

Activities produce outputs of individual commodities, which are allocated to domestic and export uses via a constant elasticity of transformation (CET) function. Imports are assumed to be imperfect substitutes for domestic output, following the approach proposed by Armington (1969). Therefore, commodities available in the domestic market are modeled as composite goods, resulting from domestic and imported differentiated products. Non-land capital is assumed to be fixed in each sector at the base year level. Total arable land is also assumed to be fixed, but substitution is allowed among agricultural activities, based on relative price changes.

Demand is modeled separately for household self consumption – flowing directly from activities to the households without including marketing margins – and marketed consumption, in which household purchase composite commodities which do include margins and indirect taxes. Two separate demand systems account for home and marketed goods, both modeled as Linear Expenditure Systems. Investment demand is defined as an adjustment coefficient multiplying an amount fixed in the base period, akin to capital coefficients times the volume of total real investment.

The model includes explicitly a trade activity which collects the marketing margins associated with all activities, and distinguishes three margins, namely those involved in exporting goods, in importing goods, and those required for selling into the domestic market. Margins enter the price formation equations as exogenous transaction cost coefficients.

The public sector is included in the model, with revenues accruing from value added, income, import and export taxes balanced against public demand for government consumption – produced by an activity called public administration – and investment.

Welfare is measured as "money metric utility"(MMU) (Deaton, 1980), that is by comparing the expenditure of a household under a simulated scenario, where the household has expenditure Y, and pays prices p, with the expenditure that would have been incurred to obtain the same level of welfare as in the base period but at current prices p.

As mentioned, the model is comparative static, and therefore does not allow one to take into account the adjustment path implied by each scenario, nor the associated costs. However, as a proxy for such costs, we computed a Structural Change Index (Clark et al, 1996). This provides a comparative measure of the amount of resources that moves from one activity to another under each scenario, that can be interpreted as an indication of the adjustment costs implied by each scenario. The Structural Change Index (SCI) was computed as follows:

$$SCI = \frac{1}{2}\sum_i \left| a_{is} - a_{i0} \right|$$

where $a_{i(t)}$ and $a_{i(t-1)}$ are the percentage shares in value added in the base run and the scenario respectively. SCI is bounded between zero and 100, with 100 indicating a total change in the economic structure, and zero indicating no change.

As any economy-wide model, the one employed in this work can be solved by following different closure rules, defining endogenous and exogenous variables, and hence the way in which the equilibrium is achieved. This notoriously contentious matter is well beyond the scope of this paper, but cannot be avoided in fact, as any simulation implies crucial assumptions on the adjustment mechanisms in the economy[4].

The balancing of the goods and factor markets can be achieved either through the standard neoclassical flex price assumption, which implies that demand equals supply so that the price

[4] See Rattso (1982), Robinson (1991) and Taylor (1990) for extensive reviews on this topic.

adjusts to clear the market; or through the fix-price assumption, implying that either demand or supply adjust to clear the market under fixed prices, given an initial condition of under or over utilization. In the real world, commodity and factor markets most likely behave in an intermediate way, and the extent to which one or the other assumption is more appropriate depends on the specific case, over which views can legitimately differ.

On the government account, a key behavioural notion embedded in the closure is whether the government is or is not assumed to keep surpluses or deficits fixed. This implies, respectively, either an endogenous adjustment of taxes and expenditure, or fixed taxes rates with endogenous adjustment of surpluses and deficits. On the current account, the closure determines whether the exchange rate adjusts to a given stock of foreign exchange, or is assumed to be fixed with the current account adjusting endogenously by additional foreign borrowing or reserves accumulation. On the saving-investment side, the closure defines whether the savings determine the level of investment, following the classical approach, or investment is determined exogenously by private agents and by the government, with savings adjusting endogenously.

The closure rule adopted in this exercise was based on a combination of available evidence and knowledge of the Tanzanian context. Commodity markets are assumed to clear with flex prices, as there are no major output price controls in the economy. In factor markets, however, the likely presence of excess unskilled labour and shortage of skilled labour led us to assume that the wages of all unskilled labour classes are fixed in real terms, while those of the skilled labour classes are flexible, and respond to supply and demand. On total investment, we side with the classical view that it is determined by available savings, as the availability of private savings constitutes in fact a significant constraint in Tanzania, as microeconomic evidence suggests. In the same vein, on the current account we assume a flexible exchange rate with a fixed availability of foreign savings. Finally, we assume that the government budget is endogenously determined, so that the tax rates and other fiscal instruments are fixed. The sensitivity of the results to such assumptions was widely tested in a previous paper (Conforti and Sarris, 2007), showing how the modeling of the labour market and the public budget can significantly affect key results, such as GDP and welfare.

Parameters are calibrated, using as a starting point those reported by Thurlow and Wobst (2003), and the CES and CET elasticities adopted in that same work for product groups similar to those employed here. On the demand side, the calibration is based on a procedure that enforces the symmetry, homogeneity and negativity properties of the linear expenditure systems.

In terms of data, the simulations are based on the more recently available Social Accounting Matrix for Tanzania, which was computed by Thurlow and Wobst (2003), and refers to year 2001. This original SAM was aggregated to include 24 different activities and commodities, of which nine are crops, two are primary livestock activities, four are processed food and beverages, four are secondary sector activities, and five are services, including trade and administration[5].

[5] The complete list of activities/commodities includes: maize, other cereals, beans, other cash crops, cassava and roots, coffee, cashew, other fruits and vegetables, other crops, livestock, fishing and hunting, mining, meats, processed grains, other processed foods, beverages, other secondary activities, construction activities, utilities, trade, hotels, transportation, other services, and public administration.

In the factor market, the SAM utilized includes six labour types, four of which can be classified as unskilled[6], plus agricultural and non-agricultural capital, and land, which is only employed in agriculture. Concerning institutions, the private sector is represented by an aggregate enterprise entity, and by six types of households, three urban and three rural[7], plus a government sector. The SAM reports direct taxes, various types of indirect taxes, such as those on value added, on factor use, as well as imports tariffs and export subsidies.

A comparison with microeconomic evidence from independent surveys conducted in Tanzania (Sarris *et al*., 2006) showed that the original SAM provided by Thurlow and Wobst (2003) includes a low level of marketing margins for the domestic market, as well as for exports and imports, particularly for agricultural and food products. This arises from the types of margins considered in that base SAM, which are only those between the wholesale and the retail level, while those between the farm gate and the wholesale are absent. However, the latter are both the largest, and those causing more concerns, given that they can more directly affect farmers' incentives[8].

For this reason, the original SAM from Thurlow and Wobst (2003) was modified. Given the absence of systematic information on marketing margins , it was decided to re-compute them as percentages of the values of the marketed as well as of the exported and imported commodities. The difference in the resulting income in the SAM was subtracted from the income of the respective producers, with the result that the whole SAM had to be rebalanced. For exported commodities it was assumed that the margin associated with marketing transaction costs would amount to 50 percent of the marketed values. For imports the same margin was set at 20 percent of import values, and for domestic sales to households at 30 percent of purchased values.

To minimize information losses, the rebalancing was run by maintaining at their original level the data which was considered to be more reliable, particularly those on foreign trade and on the public sector. The rebalancing was implemented with different methods, and the results were ranked in terms of percentage changes in the original figures. The smaller and more widespread changes were achieved by minimizing the sum of the squared residuals of the changes in the SAM elements.

Table 1 reports a summary of the structural characteristics of the Tanzanian economy as inferred from the rebalanced 2001 SAM. Maize and other cereals appear as dominant activities in terms of GDP but less so in terms of exports, which are dominated by coffee and cashew; large shares of most agricultural products that are not marketed. The most important sector on the export side is transport, and on the import side the other secondary products. Despite their small importance in total trade, maize and cereals imports constitute a significant share of consumption.

[6] The complete list of labour types includes: subsistence labour, child labour, non-educated male labour, non-educated female labour – which altogether form the unskilled group – plus educated male labour and educated female labour.

[7] The complete list of households includes, for both the rural and the urban sectors, poor, non-poor-non-educated, and non-poor-educated, distinguished on the basis of the status of the reference person in the household.

[8] For instance, if the average price of coffee received by farmers as inferred from micro surveys is compared to the average (wholesale export) market price obtained in the Moshi auction the margin is larger than 50 percent in Kilimanjaro, a region close to Moshi, and even higher for Ruvuma a region much further away from Moshi than Kilimanjaro.

Table 1. Production and trade structure of the Tanzanian economy in 2001

	Share in total value added (percentage)	Share in total exports (percentage)	Share in total imports (percentage)	Shar of exports in production (percantage)	Share of marketed production in total production (percentage)	Share of imports in total domestic consumption (percentage)	Ratio of domestic margin to marketed production (percentage)
maize	9.9	0.1	0.8	0.2	48.2	3.6	13.3
other cereals	5.6	0.2	2	0.5	76.7	7.7	4.2
beans	2.3	0.1	0	0.6	73.6	0	25.6
other cash crops	4.6	10.2	2.5	22.1	93.3	8.8	7.3
cassava and roots	3.6	0	0	0	40.2	0	31.4
coffee	0.8	7.3	0	92.7	96	0	1.1
cashew	1	7.2	0	98.6	100	0	0
other fruits and vegetables	6.6	2.1	0.4	6.9	65.9	2	31.8
other crops	0.8	0.3	0	9.5	58.6	0.3	25.8
livestock	3.3	0.5	0.1	2.4	83.7	1.1	13.7
fishing and hunting	7.7	5.4	0	13.3	77.5	0.1	28.6
mining	1.5	1.5	0.7	12.7	100	9	4.2
meats	2.3	0	0.2	0.2	75.1	1.5	40.8
processed grains	0.7	0.5	0.8	1	100	2.3	33.1
other processed foods	2	0.5	3.7	1.3	97.3	14.8	44
beverages	0.9	0.1	0.8	0.5	95.9	8.2	38.6
other secondary	6.2	3.3	62.7	1.6	100	52.9	3
utilities	1.7	0	0	0	100	0	0
construction	4.5	0	0.1	0	100	0.3	0
trade	10.5	0	0	0	100	0	0
hotels	2.6	0	0	0	100	0	0
transportation	5.8	44.3	19.5	53.7	100	36.4	0
other services	9	10.9	4.7	7.4	74.9	4.9	0
administration	6.2	5.5	0.9	4.4	100	1.1	0

Source: author's calculations

4. The effect of an increase in world commodity prices and the related policy responses

The generalised increase that has recently occurred in world prices of agricultural commodities, as well as in the oil price, is generating a wide debate about the impact on developing countries. If fact, a typical price dilemma may arise: increased commodity prices can generate additional income, which can be beneficial in countries where agriculture is a large share of the economy; but at the same time, the increased commodity prices can also reduce real incomes of both urban and rural net food buyers households. The relative importance of these two opposite effects, together with the degree of substitutability between domestic and foreign goods, and the ability of the economy to adjust to changed relative prices will determine the overall impact; the degree of households' participation in agricultural markets, the balance between tradables and non-tradables in both the factor and the output markets will also contribute to determine the results.

In order to account for the increase in world commodity prices occurred over the last months, an *ad hoc* baseline scenario was built, named BASEPR. This includes the increases in both import and export prices reported in Table 2 for the period 2001 to 2007. Wheat, rice, sugar, oilseed and oil are the goods whose world prices have been soaring more rapidly over the recent months. Price changes in other sectors were not considered, in order to focus the effect of a change in the relative prices of the above mentioned goods; in this respect, it is worth highlighting that the scenario BASEPR, despite being employed as a basis for other scenarios, should not be confused with an update of the database to the current year, which

would imply a change in all prices, and a re-balancing of the SAM based on new available information. Rather, the scenario BASEPR serves the purpose of indicating, *ceteris paribus*, the effect of a change in a number of key world prices on the Tanzania economy. The subsequent policy scenarios are run on top of BASPR in order to assess the effect of some trade and domestic policy options aimed at counteracting the increases in world prices.

In terms of data, real price changes were sourced mostly from the medium term projection exercise, jointly run by FAO and OECD (2007); other observed nominal price changes were deflated with the US GDP deflator (Table 2).

Table 2. Price changes in scenario BASEPR

	percentage real price increase from 2001-07
maize	47.8
other cereals	49.6
other cash crops	25.7
coffee	25.8
processed grains	48.7
oil and other secondary goods	26.1
transportation	26.1

Source: adapted from Fao and OECD (2007) and ICO

The change in the maize price was derived directly from the FAO-OECD (2007) Outlook; that of the "other cereals" is an average of the change in the wheat and the rice world prices; that of "processed grains" is an average of all cereal prices, while that of the "other cash crops" is an average of the sugar and the oilseed prices; the oil price change is also derived from the same source, while changes in coffee prices were derived from the International Coffee Organization (ICO). No changes were introduced for livestock products, since on average, the real price for these products have not changed significantly over the last years, if meats and dairy prices are considered together, as they are in the SAM. The sector named "other secondary goods" includes petroleum as well as other manufactured goods. The world price corresponding to this item was shocked based on the share of petroleum in it. The transportation sector was shocked by the same amount, based on the assumption that the rise in the oil price would affect the same a share of costs in this activity, as in the secondary sector.

Given these changes in the world prices, and their effects in the Tanzanian economy, the subsequent scenarios are aimed at analyzing some trade and domestic policy options that could be considered as a response (Table 3).

The first four scenarios describe trade policy choices. As a first move, given the increase in prices, the Government may consider reducing existing tariffs, mainly to reduce prices for consumers. This option is studied through the scenario named TARCUT, which implies a 20 percent reduction in all import tariffs. Otherwise the Government may consider to maintain some protection in the economy, especially for some of the activities which are considered to be strategic, while reducing tariffs selectively, only on those goods whose price has increased most. This option is studied in scenario TARSELECT, in which tariffs are reduced only for the goods listed in Table 2. A third trade policy option available to the Government would be the introduction of export taxes, aimed at re-distributing part of the additional income accruing to exporters from the increase in world prices; this is analyzed in scenario EXPT.

Also in this case, however, the Government may be willing to take a selective action, and to introduce export taxes only for those goods whose price has increased most, that is, those listed in Table 2: this option is analyzed in scenario EXPTSELECT.

Table 3. The scenarios simulated

name of the scenario	description
BASEPR	increased world prices as in Table 2
TARCUT	20 percent cut in import tariffs
TARSELECT	20 percent decrease in import tariffs of goods whose price increased in BASEPR
EXPT	20 percent export tax
EXPTSELECT	20 percent export tax of goods whose price increased in BASEPR
TRANSPDW	20 percent decrease in marketing margins
FSAVBL	foreign savings increased to compensate half of the increased net import bill in BASEPR
FSAVHBL	foreign savings increased to compensate the total increased net import bill in BASEPR

The following scenario, instead, considers a different problem which could be also considered a medium term possible response to the world price rises, namely that some kind of domestic strategy has been in place aimed at reducing the marketing margins. This is analyzed through scenario TRANSPDW. This policy would most probably consist of improvements in transport infrastructures, which are today among the major reasons for the high marketing margins. They would require an additional stock of investment. However, the dynamic relation between the additional investment flow and the reduced margins cannot be modeled. Therefore TRANSPDW only compares the present economy with another one, in which margins are lower, while the additional stock of investment required to achieve the reduction is not included, but just assumed to have become available beforehand.

Finally, the last two scenarios assume that the Government manages to obtain an additional aid inflow, that increases the available foreign savings by a measure corresponding to the additional initial import bill generated by the increased world prices, computed on the SAM (FSAVBL); or to half of it (FSAVHBL).

Looking at the aggregated results (Table 4), it is evident that the increase in world prices (scenario BASEPR) has a negative impact on GDP. The reason is that for Tanzania the world price boom entails a negative terms of trade shock. This is because the large share of oil and transport on the import side, is the major negative impact on the terms of trade (TOT). Calculation of the percent change in the terms of trade, based on the statistics of tables 1 and 2, implies that the TOT deteriorates by 18 percent. This deterioration implies considerable price increases at the domestic level, which affects negatively consumption of households, but positively the production of the exportable sectors whose prices increase. The initial external income effect is negative, in the sense that the balance of payments initially would deteriorate. Under full employment, the external correction would be an exchange rate depreciation. However, here we notice that the exchange rate appreciates. The reason is that the decrease in consumption implies a considerable drop in domestic economic activity, and hence employment of unskilled and consequently GDP. The negative income effect, counteracts the price effect, and implies lower exports but mainly much lower imports than

what would be the case under full employment. To counteract these two effects along with the initial shock, the exchange rate ends up appreciating.

The shock has the expected effect on the trade balance. Imports decrease while exports increase, and the size of the percentage change in volume is considerable for agricultural products. Within agriculture the production of the exportables such as coffee increases considerably, and also production of other cereals, whose prices increase as shown in table 2. However, the fixity of land, as well as the decline in domestic demand for the other products due to the income effect, implies that some other crops will suffer land declines, and one among them is maize, despite the increase in its international price. The reason is that maize is basically a non-traded product, as from table 1 it can be seen that only 0.2 percent of production is exported, while only 3.6 percent of domestic consumption is made up of imports. Hence, as it turns out the relative price of maize declines by a small amount and this implies a decrease in its production. On the other hand, the increased cost of the oil imports leads to output decreases in most other sectors, which involve decreases in the employment of unskilled labor, so that unemployment increases. In turn, this drives down GDP and investment. An increase is observed, instead, in Government savings, arising from the increased revenues generate by export and import taxes.

As mentioned, the scenario TARCUT assumes that the Government would respond to the price soar by reducing tariffs on all imported products. Table 4 shows that, compared to the previous scenario in which the Government would not take action, this type of trade policy change would dampen the effect on the trade balance - so that imports would decrease a bit less while exports would increase a bit more . Similarly the decline in GDP and employment is smaller than in the BASEPR scenario, but basically of the same direction and not much smaller. The overall impact on economic activity is still negative. Moreover, reducing tariffs would affect a key public revenue source, so that Government savings would be reduced. This in turn, amplifies the negative effect on investment, given that public resources are a key component of overall savings, and hence investment.

Cutting tariffs selectively - as in scenario TARSELECT in which the Government intervenes only on the tariffs of those imports whose prices have increased - doesn't seem to make a great difference: results are close to those obtained under the BASEPR scenario with the added implication that the impact on GDP is more negative, and the policy change appear to be virtually ineffective.

Rather, a different perspective is offered by the scenario in which the Government would impose a tax on all exported goods (EXPT). One may think of such a scenario as an attempt by the government to capture a share of the trade shock windfall. Taxing all exports in the model cuts considerably the impact of increased export prices, and exports rise by considerably less than under BASEPR, as would be expected. This increase in exports now is not enough to pay for the increased import bill, and hence a deficit in the current account appears, that is corrected by a depreciation of the exchange rate under the fixed foreign savings assumption. This, however, does not make up for the smaller increase in exports. Notwithstanding the decrease in imports, this produces a large increase in unemployment, arising from reduced trade and related services activities, which drives down GDP. Even if the Government would be more cautious in taxing exports (scenario EXPTSELECT) the results would not be much different. The point that can be made is that is the government taxes part of the windfall, and returns the proceeds back to the economy via increase overall investment demand, this will have a negative impact on GDP, as the structure of sectoral final demand from investment is quite different thatn that of the final demand that obtains when

the windfall accrues to households directly. Hence it appears that it may not be a good policy response to tax away the windfall foreign shock.

Table 4. Aggregated results

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

scenarios	GPD	agricultural import	total imports	agricultural export	total exports	investment	government savings	unskilled labour	exchange rate
BASE	7.8	24.8	209.3	22.6	107.8	1.0	92.5	2.5	1.0000
BASEPR	-1.3	-29.3	-8.4	33.9	6.9	-9.6	12.2	-3.2	0.9415
TARCUT	-1.2	-27.0	-8.3	33.9	7.1	-10.6	-10.1	-3.0	0.9448
TARINC	-1.4	-31.5	-8.5	34.0	6.7	-8.6	34.2	-3.4	0.9383
TARSELECT	-1.2	-27.6	-8.4	33.6	7.0	-10.4	-7.4	-3.0	0.9435
EXPT	-3.8	-52.2	-8.4	43.5	5.4	6.8	389.7	-8.4	1.1127
EXPTSELECT	-2.0	-40.6	-9.0	34.1	7.8	-5.3	126.2	-5.1	1.0297
TRANSPDW	2.8	-19.1	1.1	85.6	14.8	-8.9	-17.2	11.5	0.9743
FSAVBL	-1.2	-23.2	-1.2	16.3	0.0	10.4	12.5	-3.1	0.8982
FSAVHBL	-1.2	-26.4	-4.8	25.2	3.5	0.5	12.7	-3.2	0.9202

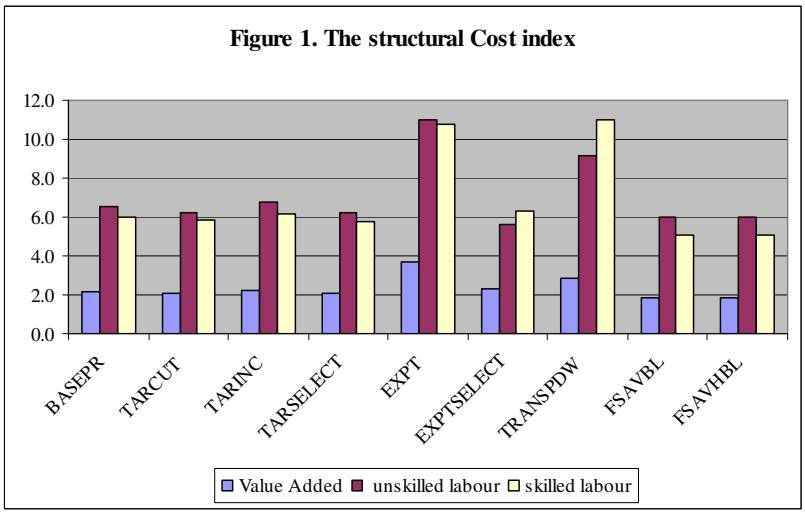
Source: author's calculations

The results for scenario TRANSPDW provides much more more encouraging results. Comparing the scenario BASEPR with this one, indicates that under this scenario GDP and employment would rise significantly. Smaller marketing margins would allow the positive trade shock to influence much more domestic producer prices, and hence would affect very positively exports, especially the exports of agricultural goods; in turn, this would have strong positive effects on the level of employment in the unskilled labour force groups. This would bring about an increase in the imports of a number of staples, which in the scenario BASEPR are produced and consumed within rural households. The increased employment would also drive up the GDP, and this is the only scenario in which this happens. Therefore, even a partial removal of a structural bottleneck would allow domestic producers to benefit significantly from the increased world prices, and urban consumers to pay less for purchasing marketed goods.

Finally, the two scenarios in which the additional expenditure is matched with inflows of foreign savings appear to counteract, at least to some extent, the consequences of the world price increases, given that the reduction of imports and the increase in exports are smaller in size (Table 4). However, the inflows of resource do not produce additional employment, but only additional Government savings, that in turn generate more investment.

So far, the discussion of the policy scenarios has neglected any consideration in terms of the costs associated with the implementation of each of them. To introduce this element into the picture, we have computed the Structural Change Index, that, as mentioned, can be interpreted as a proxy for the adjustment costs implied by each scenario (Figure 1).

In general, the index is higher when we compute it with reference to labour compared to value added. Across scenarios, comparatively more adjustment is implied by those simulating export taxes (EXPT, EXPSELECT), and the reduction of marketing markings (TRANSPDW).



This is expected, given that these two scenarios imply deeper changes in terms of factor's allocation across products; and in the case of the reduction of marketing margins, the scenario describes more the outcome of a structural change, rather than a simple policy change.

In terms of welfare (Table 5), world price increases (BASEPR) imply negative results in all types of households, mainly due to the fact that total consumption expenditure decreases in all groups of households, given the large GDP decline.

Table 5. Welfare results

(percentage change from BASE)

scenarios	Rural Poor	Rural NP uned	Rural NP Educ	Urban Poor	Urban NP Uned	Urban NP Educ
BASEPR	-2.4	-2.7	-5.3	-5.9	-4.5	-6.3
TARCUT	-2.2	-2.5	-5.0	-5.5	-4.2	-6.0
TARSELECT	-2.3	-2.5	-5.1	-5.6	-4.3	-6.1
EXPT	-8.1	-8.0	-10.1	-11.6	-8.3	-10.2
EXPTSELECT	-4.9	-5.0	-6.7	-7.7	-5.6	-7.2
TRANSPDW	12.7	10.8	0.6	-3.3	-0.7	-0.3
FSAVHBL	-2.9	-3.3	-4.3	-4.5	-4.0	-4.7
FSAVHBL	-2.7	-3.0	-4.8	-5.2	-4.2	-5.5

Source: author's calculations

As expected, however, higher losses appear in urban households, both the poor and non poor, suffering from reduced employment of unskilled labour, and from increased consumption expenditure, respectively. In rural households, instead, the negative welfare effect is dampened by the positive effect of the increased production of export goods, such as coffee, that partially offsets the increase in prices, and by the increased self-consumption within the household, that substitutes from the reduced import of some staples.

Concerning the other scenarios, welfare would change markedly (and negatively) only when export taxes are increased, either on all products or on selected products (Table 5), and with the reduction of the marketing margins (mostly positively). The scenario with the reduction in marketing margins is also the only scenario under which the poor rural households would improve their position.

5. Sensitivity analysis: the impact of commodity shocks and policies under different degrees of tradability

In this section we investigate the extent to which the results obtained so far are sensitive to key assumptions embedded in the elasticities that govern the substitutability between domestically-produced and foreign goods, as well as producers' response to price incentives. This exercise serves a dual purpose: on the one hand, it explores the robustness of the results reported in the previous section to changes in key parameter, on the other, it shows what difference can be had with a higher degree of flexibility in the Tanzanian economy in the scenarios described in the previous section. As mentioned, the three parameters considered are:

1. the Constant Elasticity of Transformation (CET) that allocates production between the domestic market and exports;

2. the Constant Elasticity of Substitution (CES) that regulates consumers' choice between imported and domestically produced goods;

3. the constant elasticity of substitution at the bottom of the technology nest (σ), where activities respond to the changes in the relative price of intermediates and factors of production.

These three parameters where increased by 100 percent for agricultural products only, firstly, and subsequently for all products. Considering the same scenarios described in the previous section, six additional sets of results were generated (Tables 6 to 14), which are interesting to consider in comparison with the previous ones, obtained with the standard set of parameters described in section 2.

The results generated with such modified elasticities are reported in Tables 6 to 14, one table for each policy scenario. Due to space consideration, these will not the reviewed in detail; rather a number of evdent regularities in the behaviour of the results will be highlighted.

Firstly, it is clear that a higher CET amplifies all effects on exports, as expected, given that the model allows for increased substitutability in the allocation of production between export and the domestic market. Secondly, a higher CES amplifies all effects on the import side, as it allows for more substitutability in consumption between imports and domestic production. Given the Armington approach that the model adopts, this corresponds to the assumption that domestic production in somehow more similar to imports, so that consumers substitute one for the other to a greater extent.

Thirdly, a higher degree of substitutability in the bottom nest of the production function tends to amplify all the changes in the economy, both on the export and the import side, as well as in the labour market, given its higher substitutability with other factors.

Fourthly, substitutability between factors of production amplifies the effects on GDP, whereas these tend to be smaller when we allow for higher substitutability on the imports side, that is with a higher Armington elasticity, given that this decrease the degree of reaction of the domestic market. Finally, the SCIs show that adjustment costs tend to increase with the size of the elasticities, given that they drive a wider reaction to all shocks.

6. Concluding remarks

The improvement of the trade balance that is brought about by the increasing world price does not generate results that are favourable for the poorer households, mainly as a consequence of the failure to generate increased employment opportunities for the unskilled labour force. Some benefits in this respect only appear when marketing margins are reduced in the model. The basic mechanism that produces these results is the assumption that the economy has unemployed unskilled labour resources. Hence demand factors are very important in determining the allocation of factors and the increase or decrease in production of various sectors, in response to prices signals and terms of trade shocks. In a full employment model, which is the usual assumption employed in most traditional CGE analyses, these results would not obtain and the adjustment in the economy under full employment would come about largely via the relative price changes. This would produce small changes in GDP, and a n exchange rate depreciation in the BASEPR scenario, as the economy could not vary the total amount of factors employed. We deem that income effects and the attendant closure rule that assumes less than full employment is a more appropriate assumption for low income commodity dependent countries like Tanzania.

In general, therefore, the results indicate that the Tanzanian economy may fail to benefit from the opportunities arising from the improved world agricultural prices due to its structural constraints, that may limit the transmission of price signals from the border to producers; and due to the low degree of adjustments of the domestic economy, arising from the wide presence of non tradables and subsistence activities.

Trade policy appears to be a relatively ineffective remedy in counteracting the worsening of the trade position: tariff reductions and export taxation appear to generate negative results generally. Reducing tariffs seem to counteract to a very small extent the effect of a price increase, while export taxes generate counterintuitive results because they lead to a devaluation of the currency; however unrealistic, this result still highlights how export taxes may end up cutting back on a scarce resource such as foreign exchange. And also selective trade policy interventions – both on imports and exports - do not appear to produce substantially different results.

Rather, when one of the key structural bottlenecks is tackled, as it happens in the scenario that hypothesises a reduction in the marketing margins, the model shows a positive relation between the export markets, employment, and the welfare of poorer household, especially in rural areas. With only a 20 percent reduction in marketing margins, all effects computed by the model turn out to be definitely better compared to those computed under trade policy change scenarios. This also appears to be a far more desirable option compared to an exogenous injection of foreign saving, that may be considered as an measure capable of counteracting part of the increased import bill: the economy would still suffer, and fail to benefit from the improved world agricultural prices.

Structural changes, such as a reduction in marketing margins, is however more costly in terms of adjustment compared to policy changes, as shown by Structural Change Index, with the exception of the export taxes, that seem to imply high cost and poor results. In practice, this stems from the fact that tackling the bottlenecks that produce the high margins is far more difficult than changing the trade policy. Moreover, this would require resources whose generation in not modeled here, given the comparative static nature of the model.

The results obtained with higher values of the three key elasticities served both the purpose of the sensitivity analysis, indicating the extent to which the results are robust to parameter changes, and as a test of the importance of some key structural assumptions on the results. In terms of the first purpose, the results appear robust, given that virtually none of them shows change in its sign. In terms of the structural features, instead, the small differences in the results indicate that especially an increased flexibility in the substitution between the products sold in the domestic markets and those that are exported, would allow the Tanzanian economy to benefit to a greater extent from the favourable agricultural price outlook. This basically indicates that policies designed to improve the tradability of domestic products would be beneficial. This is consistent with the results obtained by Levin and Mbamba (2004).

What foreign aid resources may be employed to reduce the structural constraints that prevent a correct functioning of the economy? The Aid for Trade framework should be useful in the case of Tanzania, given that improved trade infrastructures seem to be able to allow the economy to make better use of its resource for producing internationally competitive goods. At the same time, the highly concentrated nature of the economy, especially on the export side, indicates that room for manoeuvre should be left available to policy makers to promote nascent sectors, by, for instance, allowing them to protect potential infant industries. In this respect, it would probably be desirable for Aid for Trade resources not to be made contingent upon commitments in terms of drastic tariff reductions.

As a final point, and a topic for futre research, it would be useful to consider the extent to which the above results and indications are specific only to the case of Tanzania, and whether they can be generalized for other developing economies

Table 6. Aggregated results for BASEPR under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	BASEPR						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-1.29	-1.26	-1.19	-0.97	-0.92	-1.46	-1.46
agricultural import	24.8	-29.31	-21.84	-21.72	-36.97	-38.05	-23.92	-24.44
total imports	209.3	-8.41	-7.48	-7.57	-9.61	-9.13	-9.24	-8.36
agricultural export	22.6	33.91	35.53	35.14	30.31	31.27	34.16	35.82
total exports	107.8	6.87	6.01	6.16	5.02	5.89	4.05	5.72
investment	1.000	-9.62	-8.83	-8.82	-10.17	-9.64	-9.98	-9.52
government savings	92.5	12.22	12.93	10.56	3.27	4.68	-15.10	-2.44
unskilled labour	2.46	-3.18	-3.13	-2.96	-2.20	-2.07	-3.99	-3.75
exchange rate	1.00	0.94	0.91	0.91	0.93	0.93	0.89	0.90
SCI value added	0.00	2.14	2.40	2.34	2.24	2.20	2.16	2.19
SCI unskillled labour	0.00	6.52	7.44	7.22	7.34	7.23	6.44	6.55
SCI skillled labour	0.00	6.00	6.71	6.52	6.79	6.34	6.88	6.32

Source: author's calculations

Table 7. Aggregated results for TARCUT under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	TARCUT						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-0.08	-0.08	-0.08	-0.06	-0.06	-0.08	-0.07
agricultural import	24.8	-26.96	-19.17	-19.08	-33.68	-34.80	-21.37	-21.91
total imports	209.3	-8.28	-7.28	-7.41	-9.38	-8.90	-9.00	-8.21
agricultural export	22.6	33.86	35.47	35.16	30.60	31.57	34.61	35.87
total exports	107.8	7.08	6.32	6.37	5.34	6.21	4.40	5.95
investment	1.000	-10.62	-9.86	-9.83	-11.12	-10.61	-10.95	-10.49
government savings	92.5	-10.11	-9.07	-11.37	-17.48	-16.29	-35.34	-23.45
unskilled labour	2.46	-2.99	-2.96	-2.79	-2.08	-1.95	-3.75	-3.58
exchange rate	1.000	0.945	0.912	0.911	0.93	0.94	0.90	0.90
SCI value added	0.00	2.08	2.35	2.28	2.19	2.14	2.11	2.13
SCI unskillled labour	0.00	6.23	7.22	7.01	7.08	6.98	6.25	6.35
SCI skillled labour	0.00	5.83	6.70	6.51	6.64	6.21	6.82	6.27

Source: author's calculations

Table 8. Aggregated results for TARINC under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	TARINC						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-1.37	-1.34	-1.26	-1.03	-0.98	-1.54	-1.53
agricultural import	24.8	-31.54	-24.36	-24.21	-40.04	-41.08	-26.32	-26.83
total imports	209.3	-8.53	-7.66	-7.71	-9.82	-9.35	-9.48	-8.50
agricultural export	22.6	33.98	35.60	35.14	30.05	31.01	33.73	35.80
total exports	107.8	6.68	5.71	5.96	4.72	5.59	3.72	5.50
investment	1.000	-8.65	-7.84	-7.85	-9.27	-8.71	-9.04	-8.58
government savings	92.5	34.22	34.56	32.14	23.55	25.20	4.70	18.22
unskilled labour	2.46	-3.37	-3.31	-3.13	-2.33	-2.19	-4.22	-3.92
exchange rate	1.000	0.938	0.906	0.905	0.92	0.93	0.89	0.90
SCI value added	0.00	2.20	2.46	2.39	2.30	2.25	2.21	2.24
SCI unskillled labour	0.00	6.80	7.65	7.45	7.59	7.48	6.66	6.75
SCI skillled labour	0.00	6.19	6.72	6.53	6.94	6.47	6.93	6.38

Source: author's calculations

Table 9. Aggregated results for TARSELECT under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	TARSELECT						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-1.22	-1.20	-1.13	-0.93	-0.87	-1.40	-1.41
agricultural import	24.8	-27.61	-19.89	-19.80	-34.90	-36.01	-22.15	-22.68
total imports	209.3	-8.37	-7.37	-7.50	-9.53	-9.05	-9.09	-8.31
agricultural export	22.6	33.62	35.22	34.90	30.13	31.08	34.32	35.58
total exports	107.8	6.98	6.22	6.28	5.17	6.04	4.29	5.85
investment	1.000	-10.44	-9.67	-9.64	-10.92	-10.41	-10.78	-10.32
government savings	92.49	-7.40	-6.31	-8.61	-14.83	-13.68	-32.74	-20.83
unskilled labour	2.46	-3.04	-3.00	-2.84	-2.11	-1.98	-3.81	-3.62
exchange rate	1.000	0.944	0.911	0.910	0.93	0.93	0.90	0.90
SCI value added	0.00	2.07	2.34	2.28	2.18	2.13	2.10	2.12
SCI unskillled labour	0.00	6.23	7.21	7.00	7.05	6.95	6.23	6.33
SCI skillled labour	0.00	5.80	6.67	6.48	6.60	6.17	6.79	6.24

Source: author's calculations

Table 10. Aggregated results for EXPT under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	EXPT						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-3.75	-3.58	-3.46	-1.44	-3.18	-3.66	-3.83
agricultural import	24.8	-52.16	-45.71	-45.27	-55.50	-66.29	-45.57	-46.20
total imports	209.3	-8.37	-8.34	-7.66	-8.14	-9.85	-11.26	-8.60
agricultural export	22.6	43.45	46.05	44.39	19.92	37.91	34.13	44.43
total exports	107.8	5.43	2.64	4.56	0.32	3.71	0.26	3.76
investment	1.000	6.76	7.68	7.47	5.36	6.22	5.72	6.48
government savings	92.5	389.66	373.42	373.42	212.89	364.81	303.02	342.34
unskilled labour	2.46	-8.43	-8.14	-7.89	-3.72	-6.95	-10.03	-9.09
exchange rate	1.000	1.113	1.070	1.065	1.04	1.09	1.03	1.04
SCI value added	0.00	3.67	3.85	3.74	2.30	3.50	3.22	3.56
SCI unskillled labour	0.00	10.97	11.35	11.07	7.67	11.05	10.32	10.21
SCI skillled labour	0.00	10.76	10.07	9.91	7.42	10.49	11.99	10.27

Source: author's calculations

Table 11. Aggregated results for EXPTSELECT under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	BASEPR						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-2.02	-1.86	-1.89	-1.54	-1.54	-2.23	-2.18
agricultural import	24.8	-40.59	-36.07	-36.06	-51.30	-52.80	-36.68	-37.83
total imports	209.3	-9.02	-8.90	-8.64	-10.93	-10.20	-11.08	-9.27
agricultural export	22.6	34.12	35.97	35.96	27.88	29.78	26.05	35.22
total exports	107.8	7.82	6.95	7.42	5.17	6.33	5.07	7.01
investment	1.000	-5.31	-4.69	-4.65	-6.35	-5.53	-6.05	-5.42
government savings	92.5	126.23	120.98	122.85	105.34	111.39	84.29	109.79
unskilled labour	2.46	-5.10	-4.83	-4.90	-3.72	-3.76	-6.53	-5.83
exchange rate	1.000	1.030	0.999	0.999	1.00	1.01	0.99	1.00
SCI value added	0.00	2.32	2.18	2.19	2.36	2.32	2.09	2.27
SCI unskillled labour	0.00	5.59	6.57	6.23	6.39	6.19	5.61	5.51
SCI skillled labour	0.00	6.34	6.58	6.33	6.72	6.55	7.14	6.34

Source: author's calculations

Table 12. Aggregated results for TRANSPDW under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	TRANSPDW						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	2.78	3.11	3.20	2.96	3.02	3.69	3.85
agricultural import	24.8	-19.10	-0.28	0.47	-27.11	-26.83	-8.73	-7.31
total imports	209.3	1.14	3.45	3.87	0.57	0.48	2.76	4.04
agricultural export	22.6	85.57	96.90	95.04	83.16	82.78	98.02	102.68
total exports	107.8	14.78	13.15	14.72	13.86	13.86	13.65	15.41
investment	1.000	-8.89	-6.88	-7.14	-8.92	-8.87	-6.24	-7.04
government savings	92.5	-17.17	-14.52	-19.92	-22.24	-23.31	-4.09	-19.87
unskilled labour	2.46	11.50	11.73	12.01	12.18	12.37	13.83	14.65
exchange rate	1.000	0.974	0.906	0.902	0.97	0.97	0.89	0.88
SCI value added	0.00	2.88	2.90	2.81	3.07	3.03	3.03	2.94
SCI unskillled labour	0.00	9.12	9.37	9.05	9.77	9.63	9.75	10.00
SCI skillled labour	0.00	11.03	10.49	10.23	11.54	11.40	11.70	11.09

Source: author's calculations

Table 13. Aggregated results for FSAVLB under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	FSAVBL						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-1.16	-1.20	-1.09	-0.93	-0.85	-1.33	-1.26
agricultural import	24.8	-23.15	-18.00	-17.45	-29.26	-29.16	-19.55	-19.92
total imports	209.3	-1.16	-0.83	-0.51	-1.50	-1.57	-2.24	-1.14
agricultural export	22.6	16.27	17.95	16.76	14.93	14.67	14.42	16.90
total exports	107.8	0.02	-1.64	-0.52	-0.69	-0.63	-2.60	-0.64
investment	1.000	10.40	11.03	10.74	10.21	10.30	10.66	10.42
government savings	92.5	12.47	14.24	11.13	6.66	6.32	-4.53	4.21
unskilled labour	2.46	#REF!	-3.19	-2.90	-2.36	-2.14	-3.75	-3.41
exchange rate	1.000	0.898	0.880	0.877	0.89	0.89	0.87	0.87
SCI value added	1.00	1.88	2.23	2.10	2.06	2.00	2.01	1.96
SCI unskillled labour	0.00	5.59	6.99	6.72	6.77	6.63	5.93	6.01
SCI skillled labour	0.00	6.34	5.54	5.24	5.82	5.45	5.68	5.08

Source: author's calculations

Table 14. Aggregated results for FSAVHLB under different parameters

(000 Tz shillings in BASE and percentage changes from BASE in other scenarios

	BASE	FSAVHBL						
		standard model	higher CET elasticity, all products	higher CET elasticity, agricultural and food products only	higher CES elasticity, all products	higher CES elasticity, agricultural and food products only	higher supply elasticity in all activities	higher supply elasticity in agriculture and food production only
GPD	7.8	-1.23	-1.23	-1.15	-0.95	-0.89	-1.40	-1.36
agricultural import	24.8	-26.43	-20.07	-19.75	-33.35	-33.90	-21.90	-22.36
total imports	209.3	-4.82	-4.19	-4.08	-5.60	-5.40	-5.80	-4.80
agricultural export	22.6	25.23	26.88	26.08	22.73	23.08	24.30	26.45
total exports	107.8	3.48	2.21	2.86	2.19	2.65	0.74	2.58
investment	1.000	0.55	1.20	1.08	0.11	0.47	0.41	0.55
government savings	92.5	12.70	13.91	11.15	5.28	5.77	-9.79	1.10
unskilled labour	2.46	-3.10	-3.20	-2.97	-2.31	-2.14	-3.90	-3.62
exchange rate	1.000	0.920	0.895	0.893	0.91	0.91	0.88	0.89
SCI value added	1.00	1.85	2.20	2.10	2.00	1.95	1.95	1.95
SCI unskillled labour	0.00	6.03	6.99	6.72	6.77	6.63	5.93	6.01
SCI skillled labour	0.00	5.08	5.54	5.24	5.82	5.45	5.68	5.08

Source: author's calculations

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