Identifying and Measuring Agricultural Policy Bias in Ethiopia

APRIL 2008

Paper to be presented at the GTAP Annual Conference

Helsinki, Finland, June 2008

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1. Introduction:

Ethiopia's long history has witnessed many significant events and far reaching political, economic and social transformations. Throughout these developments, however, the country retained its essential agricultural character, where land tenure and holding as well as farming rights were governed by the feudal system. Feudalism provided the economic basis of political power for much of the modern history of Ethiopia, where land tenure policy had two major characteristics: tributes and tenancy. In the northern part of the country, peasants occupied land based on genealogical decent, but paid tributes to the local elite and the government. The tributes were of a diverse nature, including land-taxes and tithes. In addition to the tributes, the ruling class also appropriated surplus labor from the peasantry, and farming on state and the governor's land were supported by forced labor. This forced labor generally took about a third of the peasant's labor time, Bahru Zewde (1991).

In southern Ethiopia, on the other hand, exploitation took on a more sophisticated and brutal form. A policy which had a profound impact on the system of land tenure in the south was the institution of land measurement instituted at the turn of the twentieth century. Although not new elsewhere in the country, land measurement in the south resulted in the appropriation by the state of large tracts of land. Peasants who had tilled the land under the lineage system of ownership found themselves forced to buy their own land. Failure to do so reduced them to the status of tenancy. Although a major objective of the land measurement policy was to garner large sums of taxes, the registration process that it entailed tended to promote land sale and consolidated private ownership.

The predominant theme of land tenure in post First World War Ethiopia was an acceleration of the process of privatization. Only in the north did the communal kinship system continue. In the south, private tenure increasingly became the norm with the inevitable result of growing concentration of large tracts of land in the hands of the few. The most important consequence of the growth of private tenure was the concomitant spread of tenancy, with 50 - 60% of all holdings were estimated to fall under this category. Absentee landlordism, estimated at about 25% in the 1960's, constituted the other side of the coin Bahru Zewde (1991).

While post Second World War saw an accelerated privatization of land and the refinement of the feudal regime, the period also witnessed widespread rural opposition and the outbreak of rebellion in several parts of the country. Peasants rose in rebellion and, allied with students, waged a sustained struggle for radical land reform. Finally, the army rose against the regime, resulting in the 1974 Ethiopian Revolution.

The military junta that took power after the revolution pursued a socialist strategy. It distributed land to the peasantry, but kept ownership in the hands of the government. Rural Ethiopia was organized in peasant associations, which acted as a political machinery to strengthen the government's hold on power. In line with the Marxist-Leninist ideology that characterized the revolutionary movement, the country followed an economic strategy that directly affected the agricultural sector. An Agricultural Marketing Board with monopoly powers was set up, to whom farmers were obliged to sell their produce. Producer and consumer prices were centrally set, while attempts were made to subsidize inputs. Moreover, like much of Sub-Sahara Africa at

the time, the country pursued an import substitution industrialization strategy that necessarily led to high import tariffs across several manufacturing sectors, quantitative import controls, and artificially overvalued exchange rates.

In 1991, a new government, Ethiopia's People's Democratic Revolutionary Front (EPDRF), emerged after winning a seventeen-year guerrilla war against the military junta. The EPDRF advocated support for a market-oriented economy and disbanded the system of centrally fixed producer and consumer prices. The government allowed farmers to sell their produce at competitive market prices as opposed to a marketing board at depressed prices. Moreover, the government is also implementing an agriculture-development-led industrialization development strategy (ADLI) for Ethiopia. Rural development has emerged as a pivotal determinant of the success of the ADLI strategy, and the government has designed and is implementing various agricultural support programs. For instance, in order to address the constraints related to restricted road network coverage and low standards, the government launched a 10-year Road Sector Development Program (RSDP) in 1997. The first phase of the program (1997-2002) focused on the restoration of the road network to acceptable condition, while the second phase (2002-2007) aimed at both consolidating the achievements of the first phase and increasing network connectivity and providing sustainable road infrastructure to rural areas. By the end of June 2006, a total of 51,437 km of roads had been constructed, upgraded/rehabilitated, and maintained in the country.

The other major infrastructure investment is rural electrification. In order to increase electricity generation capacity and access in the country, three diesel-powered generating stations and one hydro dam were constructed over the past seven years that raised the total generation capacity from around 400MW in 1991 to more than 700MW by the end of 2006. Currently, over five dams are under construction to raise total electricity generation capacity to 3300MW by 2010. Electricity access in the meantime has increased from less than 10 percent of households in 1991 to more than 21 percent in 2007, including connecting more than 857 rural towns and villages. The total plan calls for connecting 50 percent of Ethiopian households by 2010.

The government has also made six tariff revisions since the launch of its economic improvement program in 1993. The revisions have reduced the tariff ceiling from a high of 230 percent in 1993 to its current level of 35 percent, and the weighted average tariff rate has been reduced from 41.6 percent to 17.5 percent. The number of tariff bands including zero have also been reduced from 24 to 6, while the tariff distance has been reduced from 225 to 30. The current working regime divides imports into three categories: duty free commodities, duty paying commodities, and prohibited commodities. Depending on the commodity type, duty rates range between 0 -35 (0, 5, 10, 20, 30, and 35) percent. The identification of commodities and duty assessment is based on the 2007 version of the Harmonized Commodity System, and follows the International Convention on the Harmonized Commodity Description and Coding System. Overall, the tariff regime comprises 5608 commodity types, of which 5424 or 96.7 percent of the commodity types pay duty. 179 or 3.2 percent enter duty free, while 5 commodities, about 0.1 percent, are prohibited. The overall import tariff reduction is accompanied by exemptions and waivers granted to investors and other "qualifying" entities, which are increasing by a significant margin in recent years. In fiscal year 2005/06 for instance, about 46.5% of total imports were duty exempted. With these exemptions, although the weighted average statutory import tariff rate is 17.5 percent, the weighted average effective tariff rate was only 8.3 percent, perhaps one of the lowest in the developing world.

Export taxes on all agricultural products have been removed since 2003, although an export tax on raw leather was instituted in early 2008 with limited duration to encourage value addition in the sector. Furthermore, in order to mitigate escalating food prices, a ban on cereal exports was instituted in the middle of 2007, again with a limited duration.

Clearly, both during the feudal system under the monarchy as well as the Marxist-inspired rule under the military junta, the prevailing economic structures and policies were characterized by a strong bias against agriculture, even though the predominant share of the population eked its living out of the sector. However, there appears to be positive developments under the present government in terms of policies to increase the sector's productivity and contribution to the overall economy. Given this shift in policy focus toward encouraging agriculture, this paper examines whether the existing mix of taxes and exchange rate policy is consistent with the stated objective of supporting agriculture, and whether it favors or biases market incentives against agriculture.

Our analytical approach is to develop a static, single-country Computable General Equilibrium (CGE) model of Ethiopia and use the model to provide general equilibrium effective rate of protection (GE-ERP) measures of price incentive bias prevalent in the Ethiopian economy. The modeling methodology and the supporting data are summarized in Section 2. Section 3 provides a summary of the recent performance of the agriculture sector. Section 4 discusses simulations with the model to measure the nature and extent of agriculture distortions and the impact of tax and exchange rate policies. Section 5 concludes.

2. Country Model and Data Set

Past studies of the trade policy-induced price incentive bias have relied on a partial equilibrium methodology and measures of nominal protection rates (NPRs), focusing on the agricultural sector and the impact of policies on relative prices. In effect, in this approach, policy bias is measured by the changes in relative prices induced by policy interventions. If agricultural prices relative to non-agricultural prices (the agricultural terms of trade) are improved by the removal of various policies, then those policies discriminate against agriculture, defining the policy bias. The partial equilibrium approach focuses on measuring the direct impact of taxes and subsidies on agricultural and manufacturing prices, especially for tradable products where the undistorted price would be given by the price in world markets. Policies that cause domestic agricultural prices to be below world prices or domestic prices of non-agricultural traded goods to be above world prices will discriminate against agriculture.

Relative price incentives are inherently a general equilibrium issue, with important feedback effects from policy interventions through intersectoral linkages, degrees of tradability, and changes in incomes that all affect relative output prices and factor returns. The adoption of a general equilibrium methodology to measure policy bias has recently been facilitated by the increased availability of economy-wide data sets in the form of Social Accounting Matrices (SAMs) for a large number of developing countries in the Global Trade and Analysis Project (GTAP) at Purdue University. World Bank researchers have recently started using the GTAP database to revisit the issue of whether there exists a trade policy bias against poor agricultural farm households in developing countries. In a number of papers, Anderson et al. (2005, 2006a, 2006b) employ the dynamically recursive LINKAGE CGE model of the global economy

developed at the World Bank to study the effects of trade liberalization on agriculture. They find that, with global trade liberalization, "developing country agricultural production, employment and real net income would increase". In addition, they hypothesize that "individual model simulations … may well get that result also", Anderson et al. (2006a).

This work is methodologically in line with the use of single-country, SAM-based, CGE models to study agricultural incentive bias proposed in Jensen, Robinson and Tarp (2002) and Bautista, Robinson, Wobst, and Tarp (2001). The CGE methodology makes it possible to take account of intersectoral linkages, varying degrees of tradability, and feedback effects from changes in relative prices and factor returns in the measurement of trade policy bias.

The analysis is based on an extension of a "standard" trade-focused computable general equilibrium (CGE) model fully described in Lofgren et al. (2002).[1] The model is neoclassical in spirit, simulating the operation of competitive product and factor markets, generating equilibrium prices and wages that clear all markets. A model solution provides equilibrium values of wages, prices, production, exports, imports, and final demand by households, government, enterprises, and the world. Producers maximize profits, generating output supply and factor demand. Households maximize utility, generating commodity demand, and receive income from factors of production (wages and profits) and various transfers.

To measure agricultural policy bias, the CGE model is used to simulate the removal of various distorting taxes and/or changes in exchange rates. If the removal of a particular policy distortion yields a new equilibrium in which the agricultural sector is better off, then that policy distortion generated a bias against agriculture. How to measure "better off" is an important issue. One approach is to examine the share of total value added originating in the agricultural sectors before and after the change, and measure the bias by the relative increase or decrease in the share. The increase in agricultural share can arise from two sources: (1) an increase in relative prices—the agricultural terms of trade—in favor of agriculture, and/or (2) an improvement in factor returns in agriculture relative to non-agriculture, which attracts factors of production (labor and capital) into agriculture. In the second case, the final equilibrium will have more labor and capital in agriculture, increasing agricultural production and supply, and mitigating the changes in relative prices.

In a general equilibrium model, the effect of changes in policies will be to change both prices and quantities in the new equilibrium, and it is impossible to measure bias in terms only of prices or quantities. The partial equilibrium measures, which focus on changes only in relative prices, abstract from the quantity effects—the shifts in employment, production, and trade. Measuring bias in terms of the shares of nominal value added incorporate both quantity and price effects, and provide an appropriate measure of policy bias.[2]

To make the CGE model provide measures of policy bias that are comparable to the partial equilibrium measures, the model has been adapted to segment factor markets so that labor and capital are free to move across sectors within the agricultural and non-agricultural economies,

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[1] The standard CGE model was developed at the International Food Policy Research Institute (IFPRI) and arose from work on a number of country models with an agricultural focus. An early example is Arndt, Jensen, Robinson, and Tarp (2000).

[2] Note that CGE models solve only for relative prices, relative to a specified numeraire. Changes in shares of nominal value added in the model will not be affected by choice of numeraire and depend only on relative prices.

but not move between then. By restricting factor mobility between agriculture and non-agriculture, the model then solves for equilibrium values of relative factor returns between agriculture and non-agriculture, forcing the bias to appear in relative prices rather than in factor movements. Total agricultural supply response is limited, since the sector cannot acquire more factor inputs, even it generates higher factor returns. Equilibrium agricultural prices will be higher than would occur if factors were mobile, and changes in the agricultural terms of trade will provide a complete measure of policy bias.

Rather than use output prices, we focus on the returns to factors, or value added, since changes in intermediate input prices might well affect relative returns in agriculture and non-agriculture. The model incorporates a measure of real value added in each activity, and a corresponding price of value added, called PVA, which measures aggregate factor returns by sector. With restricted factor mobility, the theoretically appropriate measure of bias will be relative value added prices in agriculture and non-agriculture. This measure is a general equilibrium measure of the relative effective rate of protection (ERP) to agriculture and non-agriculture arising from a specified set of policy. So, our measure of policy bias can be seen as a general equilibrium measure of effective rate of protection (GE-ERP).[3]

The goal here is to use the CGE model as a measuring instrument rather than its more common use in doing policy analysis. The result is not a "realistic" model, but instead a model that generates a benchmark general equilibrium measure of the incentive effects of a mix of policies. The data set underlying the model accurately reflects the economic environment, but the behavior of agents and markets is restricted to provide measures of bias that reflect changes only in equilibrium prices and not movements of factors into or out of agriculture.

The model is implemented with data for Ethiopia in the year 2001. As described above, the economy is evolving rapidly and the policy environment, as well as the structure of the economy, is changing. The structure of the economy in 2001 is presented in tables 1 and 2. Table 1 shows the structure of value added and employment, and various trade shares. Table 2 shows indirect tax rates: tariffs, export taxes, and commodity taxes. From Table 1, agriculture is very important in Ethiopia, accounting for 43% of value added and 29% of employment. Agriculture is significantly involved in international trade, representing 33% of total imports but only 7% of total exports. However, some agricultural sectors are heavily traded: for example, coffee represents 18% of total exports and 46% of coffee production is exported.

Table 2 provides information on tax rates. The most important indirect tax is tariffs, providing significant revenue and highly variegated, and hence distorting. The only export tax in 2001 was on coffee, and was only 1.86%. Commodity tax rates are significant and also variegated, but less important than tariffs.

[3] De Melo and Robinson (1981) and Devarajan and Sussangkarn (1992) describe the use of CGE models to measure the effective rate of protection and compare them to partial equilibrium measures.

3. Recent Agriculture Sector Performance in Ethiopia

There has been encouraging progress in economic growth in recent years, which in turn is improving many aspects of life in the country. There are also several indications that the economy is undergoing major structural changes. Economic performance measured by growth in real GDP has registered continuous growth in the past four years, jumping to an annual average rate of more than 11 percent during 2003/04 – 2006/07. The forecast for the current fiscal year (2007/08) is also well above 10 percent.

The present high growth performance is broad-based with successful agriculture providing a major driver. The four fiscal years (2003/04 – 2006/07) average growth rate for real agricultural value added was above 13 percent, while the average value of crop production in real terms was above 18 percent. Although the past four years were relatively free from exogenous shocks associated with adverse climatic changes and the consequential harvest failures, the overall performance of the agricultural sector could be attributed to a concerted policy drive that particularly encourages commercialization of smallholder agriculture. To this end, several measures are being undertaken to mitigate the impacts of exogenous shocks, including rainfall failures that undermine the sector's performance. One of these efforts is the expansion of irrigation schemes and water harvesting structures/ponds in the country, where by the end of 2006/07, the total irrigated land coverage had risen to more than 610,000 (ha), out of the estimated 4.5 m (ha) of potentially irrigable land the country possesses. In addition to irrigation, the number of water harvesting structures including hemispherical, trapezoidal and community ponds as well as hand-dug wells in rural communities have reached about a million by the end of 2006/07. The capacity of ponds varies from 60,000 liters to 180,000 liters.

Another notable policy effort is enabling farmers' access to credit at favorable terms such that they can maintain liquidity to purchase farm inputs and diversify their asset base (e.g., by raising livestock). The credit access is channeled through micro-finance institutions and through other arrangements coordinated by the Ministry of Agriculture and Rural Development (MOARD) and regional agriculture offices. Micro-finance credit started in earnest in 2001 with 23 regionally organized finance institutions. By December 2001 the institutions had a total of 461,326 clients. By December 31, 2006 the number of lending institutions had risen to 26 and the total number of clients to well over 1.5 million. As of June 2007, the number of clients has further increased to about 2.5 million. The outstanding loan portfolio and savings balance have also increased from 308 million birr in loans and 243 million birr in savings in December, 2001 to almost 2.2 billion birr in outstanding loans and more than 816 million birr in savings by December 31, 2006. The total outstanding loans have also risen to well over 3 billion birr at the end of June, 2007.

As part of its agricultural extension program, the government has embarked on the construction of Farmers Training Centers (FTCs) across rural Ethiopia. The plan was launched in 2004/05 with the target of constructing one Farmers Training Center in each rural *Kebele* of the country.

In total, 15,000 – 18,000, FTCs are planned for construction. At the end of the 2006/07 fiscal year, a total of 7,401 FTCs have been established. In each Farmers Training Center, three Development Agents (Das) are assigned to provide training to the farmers and pastoralists in three major areas of crop production and protection, livestock development and health, and natural resource management. In addition to the Development Agents, two experts for every three Farmers Training Centers (FTCs) are assigned to provide veterinary service and co-operative support.

Two levels of agricultural technical and vocational education and training (ATVET) are being pursued. The FTCs are providing farmers with training of 2-3 months on specialized technologies and techniques (for example water-harvesting or sericulture) for which modules have been developed. At the broader level, 25 technical colleges and training institutes nationally are providing a three year intensive training of 55,000 extension agents. Of these, 45,000 will be placed at FTCs to provide direct support to farmers; 5,000 will provide veterinary services, and 5,000 will support cooperatives. The plan is that this intensive ATVET effort will be completed by 2010, and the colleges will then shift on to short-term training, skills upgrading, and outreach.

The investments in the sector could very well extend the present performance of the agriculture sector in the coming years, and in turn driving overall growth in the short term due to its large linkage effects in the economy. Particularly commercialization of smallholder agriculture is poised to gather momentum.

4. Simulation Results

Section 4 present two sets of simulations. Section 4.1 measures the historical level of agricultural bias, including the impact of indirect tax and tariff structures. Subsequently, Section 4.2 presents two groups of simulations to assess the range of possible price incentive effects of exchange rate policies.

4.1. Tax and Tariff Structures' Induced Bias on Agriculture

The first set of simulations is used to measure the level of agricultural bias on the basis of our SAM database for the year 2001. The indirect tax and tariff simulations include a base run and five alternative simulations to measure the cumulative impact of eliminating import tariffs (TM), export taxes (TE), consumption taxes (TQ), and a combination of import tariffs and export taxes (TM & TE) and finally, a combination of import tariffs, export taxes and consumption taxes (TM & TE & TQ). The results are presented in tables 3, 4, and 5.

The experiments indicate that indirect taxes and tariffs are largely neutral. A closer examination of the sector, however, shows that tariffs and taxes in fact moderately discriminate against traded agriculture, while favoring non-traded agriculture and vies versa. Traded agriculture appears to benefit the most from the complete elimination of the taxes and tariffs, particularly from the elimination of import tariffs. On the other hand, the complete liberalization of foreign trade appears to discriminate against the manufacturing sector. In fact, the effects of the tariff

liberalization are opposite on the two sectors, traded agriculture and manufacturing, where elimination favors traded agriculture and discriminates manufacturing by even a bigger margin, and vies versa. This finding is particularly significant and underscores certain aspects of the tariff structure. First, given the structure of the country's manufacturing sector, it appears that the tariffs are applied on those commodities that are also produced by the domestic manufacturing sector. Second, it also appears that the high tariffs on the manufactured commodities that are substitutable with domestic production is pushing the real exchange rate to appreciate, which in turn is discriminating against traded agriculture. This second factor is further discussed with the aid of the second simulation results in section 4.2 below.

Other than the effects emanating from the import tariffs, other taxes appear to be neutral on all sectors of the economy. Moreover, as tables 4 and 5 show, there are also little changes observed both in the shares of nominal value added as well as the percentage change from the base in the price of value added as a result of the experiments.

4.2. Measurement of Policy Bias on Key Economic Indicators

The biggest gain is derived again from the elimination of import tariffs by the export sector. Although, all sectors tend to moderately do well in response to the total tariff elimination, the biggest beneficiaries, however, are exports. This result is consistent with the discussion in section 4.1., where the elimination of tariffs has favored traded agriculture. Since over 90 percent of the country's exports are agricultural products, the elimination of tariffs, even on the non-agricultural commodities does strongly favor traded agriculture and exports. As might be expected, imports also do well. In the aggregate, the net effects on real GDP is, however, minimal, as the gain in the agricultural sector is promptly offset by the loss in the manufacturing sector as a result of the tariff eliminations.

The most important transmission link between the elimination of tariffs on the non-agricultural commodities and their impacts on traded agriculture is the exchange rate. Here, the exchange rate significantly depreciates in response to the tariff eliminations, presumably improves the competitiveness of the traded agricultural sector, and by implication export performance. Hence, the sector is influenced by the exchange rate, which in turn is influenced by the tariff on imports.

5. Conclusion

The experiments show that there are moderate signs of indirect tax policy induced traded agriculture sector bias in Ethiopia. But this also indicates that the historical trade policy bias against agriculture was largely eliminated during the 1990s. The impact of indirect tax structures on relative price incentives has a moderate bias against traded agricultural production and exports.

In conclusion, the factor that emerges as the most important policy biases on the traded agriculture sector is the high tariff on non-agricultural commodities, which in turn leads to the overvaluation of the exchange rate. An overvalued exchange rate in turn discriminates against traded agriculture and exports. This calls for a comprehensive tax reform that is less distorting of the productive sectors, while there is a need to maintain a stable macro-economic policy to ensure an effective exchange rate regime.

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Table 1: Structural Data

	Shares (%)					
	Value added	Employ-ment	Exports	Exports/ output	Imports	Imports/ supply
Tef	0.99	1.89	1.21	10.48	0.00	0.00
Barley	1.60	3.21	0.00	0.01	0.00	0.01
Wheat	1.95	3.90	0.00	0.00	6.79	60.97
Maize	5.53	10.64	0.10	0.27	0.08	0.62
Pulses	5.09	7.79	4.07	10.93	0.02	0.17
Vegetables	6.20	1.08	0.71	1.76	0.01	0.09
Oil crops	0.70	1.30	4.09	56.59	0.06	4.49
Sugar cane	0.22	0.25	0.00	0.08	0.00	0.00
Fruit	0.44	0.08	0.15	5.31	0.01	1.28
Tea	0.32	0.36	0.02	0.81	0.00	0.63
Chat	0.39	0.45	0.13	4.33	0.00	0.00
Coffee	4.40	0.74	17.98	45.52	0.00	0.02
Cash crops	0.46	0.88	0.04	0.43	0.31	8.39
Fibres	0.97	1.12	4.03	57.36	0.13	10.49
Meat	3.14	3.53	0.09	0.37	0.00	0.00
Poultry	3.01	3.38	0.00	0.00	0.01	0.15
Milk	0.67	0.76	0.00	0.00	0.00	0.00
Cotton	0.48	0.56	0.40	11.17	0.00	0.01
Other agric	0.79	0.89	0.09	1.68	0.00	0.24
Forestry	4.83	5.43	0.02	0.05	0.01	0.04
Fishery	0.08	0.09	0.01	1.95	0.00	1.41
Coal	0.00	0.00	0.00	0.00	0.02	100.00
Gas	0.00	0.00	0.00	0.00	0.03	100.00
Minerals	0.74	0.66	4.41	49.64	0.05	3.12
Meat	0.05	0.07	0.13	4.03	0.01	4.23
Veg prdcts	0.07	0.10	0.46	10.14	1.20	75.46

Table 1: Structural Data

	Shares (%)					
	Value added	Employ-ment	Exports	Exports/ output	Imports	Imports/ supply
Dairy prdcts	0.02	0.02	0.00	0.46	0.12	60.57
Sugar	0.70	0.76	1.73	19.80	0.15	7.17
Grain milling	0.74	0.79	0.02	0.06	0.47	11.91
Food	0.48	0.52	0.45	1.95	2.15	49.08
Beverages	0.98	0.80	0.02	0.14	0.20	4.33
Tobacco	0.10	0.08	0.00	0.00	0.27	42.22
Textiles	0.47	0.61	0.34	3.15	4.24	60.11
Apparel	0.05	0.07	0.00	0.00	3.28	87.51
Leather prdct	0.43	0.57	6.17	20.81	0.11	3.86
Wood prdct	0.05	0.07	0.01	0.29	0.44	58.26
Paper prdct	0.29	0.44	0.00	0.04	2.14	54.60
Oil & Petrl	0.00	0.00	0.00	25.00	13.46	100.00
Fertilizer	0.00	0.00	0.00	0.00	2.96	100.00
Chemicals	0.48	0.49	0.04	0.40	10.80	77.17
Minrl prdct	0.41	0.42	0.00	0.01	0.75	20.68
Ferrous mtl	0.25	0.26	0.00	0.00	3.10	64.15
Othr metal	0.00	0.00	0.00	0.00	0.12	100.00
Metal prdct	0.14	0.14	0.16	1.59	4.07	79.20
Vehicles	0.09	0.09	0.27	6.31	8.69	93.99
Machinery	0.00	0.00	0.03	14.91	10.90	99.79
Other mfg	0.15	0.16	0.07	0.61	6.92	85.78
Electricity	1.26	0.27	0.00	0.00	0.00	0.00
Water	1.39	0.30	0.00	0.00	0.00	0.00
Construction	5.30	5.01	0.00	0.00	0.48	0.76
Trade	12.38	8.92	0.00	0.00	0.00	0.00
Hotels	1.38	0.55	4.80	30.80	0.47	8.70

Table 1: Structural Data

	Shares (%)					
	Value added	**Employ-ment**	**Exports**	**Exports/ output**	**Imports**	**Imports/ supply**
Transport	5.56	3.66	23.79	19.81	9.69	18.16
Communication	0.63	0.41	2.62	19.41	0.13	2.59
Financial svc	1.52	1.05	1.52	12.11	0.63	11.18
Business svc	0.99	0.39	11.17	100.00	4.51	100.00
Public admin	6.91	12.64	8.65	8.23	0.00	0.00
Education	3.57	6.01	0.00	0.00	0.00	0.00
Health	0.98	1.64	0.00	0.00	0.00	0.00
Other svcs	2.01	0.80	0.00	0.00	0.00	0.00
Real estate	7.20	2.88	0.00	0.00	0.00	0.00
Total-1	100.00	100.00	100.00	8.14	100.00	27.01
Agriculture	42.27	48.33	33.14	10.85	7.46	6.54
Non-agric	57.73	51.67	66.86	7.20	92.54	31.96
Total-2	100.00	100.00	100.00	8.14	100.00	27.01

Table 2: Tax Rates (%)

Commodity	Tariffs	Export tax	Commodity tax
Tef	0.00	0.00	0.00
Barley	11.52	0.00	0.00
Wheat	11.15	0.00	0.00
Maize	11.51	0.00	0.00
Pulses	27.61	0.00	0.00
Vegetables	37.82	0.00	0.00
Oil crops	5.55	0.00	0.00
Sugar cane	0.00	0.00	0.00
Fruit	26.25	0.00	0.00
Tea	60.05	0.00	0.00
Chat	0.00	0.00	0.00
Coffee	48.27	1.86	0.00
Cash crops	11.43	0.00	0.00
Fibres	21.71	0.00	0.00
Meat	0.00	0.00	0.00
Poultry	15.11	0.00	0.00
Milk	0.00	0.00	0.00
Cotton	11.37	0.00	0.00
Other agric	48.24	0.00	0.00
Forestry	1.33	0.00	0.00
Fishery	17.80	0.00	0.00
Coal	0.06	0.00	0.00
Gas	24.76	0.00	0.00
Minerals	21.81	0.00	0.00
Meat	44.81	0.00	0.00
Veg prdcts	66.30	0.00	0.00

Table 2: Tax Rates (%)

Commodity	Tariffs	Export tax	Commodity tax
Dairy prdcts	37.34	0.00	0.00
Sugar	56.15	0.00	22.52
Grain milling	23.23	0.00	0.00
Food	55.50	0.00	1.83
Beverages	49.71	0.00	19.98
Tobacco	79.85	0.00	26.52
Textiles	59.30	0.00	1.63
Apparel	32.80	0.00	0.00
Leather prdct	59.89	0.00	1.69
Wood prdct	26.07	0.00	0.00
Paper prdct	25.14	0.00	2.29
Oil & Petrl	6.32	0.00	0.00
Fertilizer	1.26	0.00	0.00
Chemicals	27.94	0.00	2.00
Minrl prdct	35.73	0.00	5.93
Ferrous mtl	22.35	0.00	3.72
Othr metal	20.43	0.00	0.00
Metal prdct	22.66	0.00	0.00
Vehicles	38.66	0.00	0.00
Machinery	17.25	0.00	0.00
Other mfg	24.83	0.00	4.65
Electricity	0.00	0.00	0.00
Water	0.00	0.00	0.00
Construction	0.00	0.00	0.38
Trade	0.00	0.00	0.17
Hotels	0.00	0.00	0.46
Transport	0.00	0.00	0.00

Table 2: Tax Rates (%)

Commodity	Tariffs	Export tax	Commodity tax
Communication	0.00	0.00	9.49
Financial svc	0.00	0.00	7.82
Business svc	0.00	0.00	8.37
Public admin	0.00	0.00	0.00
Education	0.00	0.00	0.00
Health	0.00	0.00	0.00
Other svcs	0.00	0.00	0.43
Real estate	0.00	0.00	0.47

Table 3: Real Value Added, Percent Change from Base Value

	Base value	Tariffs (TM)	Export taxes (TE)	Commodity taxes (TQ)	TM & TE	TM & TE &TQ
Traded agriculture	55.55	5.05	0.07	0.90	5.07	6.68
Non-traded agriculture	193.49	-1.48	-0.02	-0.26	-1.49	-1.97
Total agriculture	249.05	-0.03	0.00	0.00	-0.03	-0.04
Traded mfg	39.34	-6.95	-0.01	2.10	-6.96	-4.91
Non-traded mfg	300.86	0.86	0.00	-0.30	0.86	0.60
Total mfg	39.34	-6.95	-0.01	2.10	-6.96	-4.91
Traded services	68.17	0.87	0.00	-0.41	0.87	0.50
Non-traded services	232.69	0.85	0.00	-0.26	0.85	0.63
Total services	300.86	0.86	0.00	-0.30	0.86	0.60
Non-agriculture	340.20	-0.05	0.00	-0.02	-0.05	-0.04
Total	589.24	-0.04	0.00	-0.01	-0.04	-0.04

Table 4: Shares of Nominal Value Added

	Base value	Tariffs (TM)	Export taxes (TE)	Commodity taxes (TQ)	TM & TE	TM & TE &TQ
Traded agriculture	9.43	9.98	9.49	9.33	10.05	10.04
Non-traded agriculture	32.84	31.49	32.82	31.91	31.48	30.62
Total agriculture	42.27	41.47	42.32	41.24	41.52	40.66
Traded mfg	6.68	5.81	6.67	7.22	5.81	6.26
Non-traded mfg	51.06	52.71	51.01	51.54	52.67	53.08
Total mfg	6.68	5.81	6.67	7.22	5.81	6.26
Traded services	11.57	12.22	11.56	11.53	12.21	12.16
Non-traded services	39.49	40.49	39.46	40.02	40.46	40.92
Total services	51.06	52.71	51.01	51.54	52.67	53.08
Non-agriculture	57.73	58.53	57.68	58.76	58.48	59.34
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 5: Price of Value Added, Percent Changes from Base

	Base value	Tariffs (TM)	Export taxes (TE)	Commodity taxes (TQ)	TM & TE	TM & TE &TQ
Traded agriculture	1.00	1.03	1.01	0.99	1.04	1.03
Non-traded agriculture	1.00	0.99	1.00	0.98	0.99	0.98
Total agriculture	1.00	1.00	1.00	0.98	1.00	0.99
Traded mfg	1.00	0.95	1.00	1.07	0.95	1.01
Non-traded mfg	1.00	1.05	1.00	1.02	1.05	1.07
Total mfg	1.00	0.95	1.00	1.07	0.95	1.01
Traded services	1.00	1.07	1.00	1.01	1.07	1.08
Non-traded services	1.00	1.04	1.00	1.03	1.04	1.06
Total services	1.00	1.05	1.00	1.02	1.05	1.07
Non-agriculture	1.00	1.03	1.00	1.03	1.03	1.06
Agricultural bias	0.00	-3.18	0.21	-4.12	-2.98	-6.40

Table 6: Real GDP, Tax Simulations- Percent change from base value

	Base value	Tariffs (TM)	Export taxes (TE)	Commodity taxes (TQ)	TM & TE	TM & TE &TQ
Absorption	737.0	0.6	0.0	0.2	0.6	0.8
Consumption	490.6	0.9	0.0	0.2	0.9	1.2
Investment	142.5	0.0	0.0	0.0	0.0	0.0
Government	103.9	0.0	0.0	0.0	0.0	0.0
Exports	80.3	15.1	0.1	0.5	15.2	16.2
Imports	-177.1	6.8	0.0	0.2	6.9	7.4
Real GDP	640.2	0.7	0.0	0.2	0.7	0.9
Exchange rate	1.0	6.8	-0.1	-0.2	6.8	6.6