CARNEGIE ENDOWMENT
FOR INTERNATIONAL PEACE

What Could the Doha Round Mean for Africa?[1]

Katherine Vyborny[2]

Figures are included in the Appendix in the order discussed in the text, beginning on page 11.

I. Introduction.

Since the launch of a new round of trade negotiations in 2001, members of the World Trade Organization (WTO) have been struggling to reach a deal that can deliver significant benefits for all member countries. This round of trade talks was christened the "Doha Development Round" at its launch in Doha, Qatar, because developing countries felt that earlier deals had created global trade rules that favored high-income countries and insisted that more attention be paid to their needs.

If history is any guide, the slow progress does not mean the round will fail: previous rounds have taken longer and floundered often before succeeding.[3] And it is widely held that a good multilateral deal would be far better than more regional agreements, because it is less economically distorting, allows more balanced negotiations, and ensures access for all countries rather than just a few key players. But it is also clear that the Doha Round will have to be a development round to succeed politically – developing countries have taken a seat at the negotiating table as never before.

How can that be achieved? Many developing countries are poised to take advantage of global trade liberalization, and many of the millions of poor in those countries will benefit as a result. But it is less clear how to ensure that the poorest countries benefit from trade, particularly those in Sub-Saharan Africa, which saw their share of global exports drop from 6% to 2% in the last two decades.[4] Advocates of the Round routinely cite studies showing millions of people in these

---

[1] This outlook is a followup to the March 2006 report of the Carnegie Endowment, Sandra Polaski, *Winners and Losers: Impact of the Doha Round on Developing Countries,* available at http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=18083&prog=zgp&proj=zted. For additional detail and analysis of the Carnegie model, please see this report. The Africa-specific work was informed in great part by the input of a group of African and global modelers at an expert workshop held in Bellagio, Italy in March 2006 with the generous support of the Rockefeller Foundation.

[2] The author was Junior Fellow with the Trade, Equity and Development Project at the Carnegie Endowment from 2005-2006, and is now at the Center for Global Development. Correspondence: kvyborny@cgdev.org.

[3] See Sandra Polaski, "The Future of the WTO," Carnegie Endowment for International Peace, 2006. Available online at http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=18684&prog=zgp&proj=zted

[4] 1980 to 2002. "Economic Development in Africa: Issues in Africa's Trade Performance." United Nations Conference on Trade and Development, 2003. Available at http://www.unctad.org/en/docs/tb50d6&c1_en.pdf

countries will be lifted out of poverty, while opponents find numbers to the contrary. Could any trade deal really deliver on the promised "Doha Development Round" for the continent?

A closer look at *all* the numbers shows that the way forward is clear. A bad round will hurt Africa; no round would be a loss as well. Africa needs a development round, with full duty-free quota-free access as a part of multilateral liberalization. To revive the WTO negotiations and benefit the world's poor, the U.S. should offer this development package and negotiate a true Doha Development Round.

The economic models cited to support the arguments for and against the round are helpful tools for assessing the relative impact of different trade policy choices on countries and sectors within countries. But confusion over the interpretation and reliability of the results has generated skepticism among policymakers. This brief aims to clarify the results relevant to Africa from leading current global equilibrium trade models. It looks at four studies that assess Africa's prospects in a realistic outcome of the Doha Round. These are models designed by the World Bank, the French think tank Centre d'Etudes Politiques et Informations Internationales (CEPII), the International Food Policy Research Institute (IFPRI); and the Carnegie Endowment for International Peace (Carnegie). They represent analyses of how plausible Doha round liberalization in the agricultural and manufacturing sectors would affect developing countries.[5] The models are not intended to predict how the world or country level economies will evolve in the future, but rather to estimate the specific role of trade policy changes apart from other changes in the economy. They measure the impact of the changes in tariffs and subsidies on prices, and thus on the exports, imports and income of countries. The models cannot measure well some impacts, such as technology transfer (see Section IV); but are the best way we have to measure the overall impact of trade. This brief examines in detail their results for Africa.[6]

Close examination of the models' results reveals a common pattern. A range of possible cuts in trade barriers that could be achieved in a realistic Doha Round, while allowing some African countries and sectors to gain, will likely cause many African countries to experience net losses. All countries will experience some structural adjustment and will have to cope with its associated costs; for those with less diversified economies the adjustment costs could be daunting. It is not surprising that low-income African countries should gain less in absolute terms because their economies are smaller and they face many challenges that make them less competitive. However, the fact that they could lose income belies the notion of a development round.

But if the trade round is expanded to include a targeted "development package" of full preferential tariff treatment, then Africa's losses would turn to gains. Limiting rich country exclusions to agricultural products that African countries can export (or "sensitive products") would also help Africa win in the round. Aid to assist the poorest countries to build competitive

---

[5] A range of other studies have assessed the impact of full free trade or other highly ambitious trade liberalization. These illustrate the potential of trade for poor countries, but do not assess scenarios that are plausible outcomes of the Doha Round.

[6] More technical detail on a range of models, including those covered here, is available in a recent synopsis of global trade modeling by Antoine Bouet, "What Can the Poor Expect from Trade Liberalization? Opening the 'Black Box' of Trade Modeling," International Food Policy Research Institute, March 2006. Available at http://www.ifpri.org/divs/mtid/dp/papers/mtidp93.pdf.

advantage and increase exports will also be key to help African countries take advantage of the round.[7] This "development package" would be cheap for rich countries, but would change a Doha deal from a win-win-lose outcome to a win-win-win outcome for high, middle, and low-income countries, including African countries. In order to help African countries emerge as winners from the round, a full development package will be indispensable.

II. Consensus on Global Impact: Win-Win-Lose

The plausible Doha scenarios in the models show global welfare gains for the round of between $32 billion and $55 billion.[8] Table 1 presents the details of the plausible Doha scenarios used in the different models and the global gains they produce. In each case, the scenario corresponding most closely to proposals under consideration in the Doha Round is included.

These global gains are much smaller than earlier estimates of global gains from the Doha round; this is because almost all studies conducted before 2005 used now-outdated and incomplete global trade data that exaggerated the gains; the magnitude of earlier estimates should be discounted. For example, earlier estimates did not include data on existing trade preference programs for developing countries.

The differences between these updated models are attributable to two main factors. First, they rely on a number of different assumptions that modelers make about how economies operate, discussed further below. Second, they reflect different levels of ambition that the modelers projected for the Doha Round agreement. These estimates can be considered a range of possible impacts from agricultural and manufactures liberalization in the Round.

[7] Aid for trade is not incorporated into the CGE models, and it is difficult to quantify the impact it would have on the outcomes for the poorest countries. However, the allocation and management of aid would be an important element of the "development package."

[8] Note that all gains and losses are expressed in U.S. dollars for the final year of each simulation, which is given in Table 1. Because the results give a general rather than specific magnitude of gains and losses and the distribution between countries, we have not adjusted for inflation to make these strictly comparable.

Table 1. Global Welfare Gains from Doha Scenarios			
Model	**Global Gains**	**Agriculture**	**NAMA[9]**
Carnegie (2001 U.S. dollars)	$43 billion	Cuts from applied tariffs: 36% by developed, 24% by developing, 0% by LDCs; One third cut in domestic support; export subsidies eliminated	Cuts from applied tariffs: 36% by developed, 24% by developing, 0% by LDCs
Composite World Bank (see Box 1) (2015 U.S. dollars)	$39.1 billion	Cuts from bound tariffs: harmonizing formula with average applied cuts of 44% by developed, 21% by developing, and 0% by LDCs. Tiered cuts from bound domestic support. Export subsidies eliminated. 2% sensitive and 4% special product exceptions.	Cuts from bound tariffs: 50% by developed, 33% by developing, 0% by LDCs.
CEPII (2020 U.S. dollars)	$32.1 billion	Cuts from bound tariffs: 36% average linear tariff cut. Domestic support halved. Export subsidies eliminated. G90 (LDCs and African countries) make no cuts. 25% cut to special products (any that currently have specific tariffs).	Cuts from bound tariffs: 36% average linear cut. G90 make no cuts.
IFPRI scenario with basic development package (97% duty-free, quota-free for LDCs)	$54.7 billion	Cuts from bound tariffs: Agriculture formula with G20 thresholds and EU reduction coefficients. Cuts for developing countries are 1/3 less. 0% cuts by LDCs. Tariff caps in agriculture at 150% for developed, 300% for middle-income. 5% sensitive and 5% special products. Export subsidies eliminated. No change in domestic subsidies 97% duty-free quota-free access for LDCs to OECD markets.	Cuts from bound tariffs: Swiss formula cuts for manufacturing tariffs (developed-country coefficient, 10 percent; developing country coefficient, 25 percent) 0% cuts by LDCs.

Notes: Carnegie model Hong Kong scenario in Sandra Polaski, *Winners and Losers: Impact of the Doha Round on the Developing Countries,* (2006), Carnegie Endowment for International Peace, Washington DC. World Bank scenario with sensitive and special products includes manufactures gains from Scenario 7 (Scenario 7 minus Scenario 1) plus agriculture Scenario 2 in "Market and Welfare Implications of Doha Reform Scenarios," chapter 12 of *Agricultural Trade Reform and the Doha Development Agenda*, ed. Kym Anderson and Will Martin, Washington, DC, World Bank, 2006, Table 12.14. CEPII scenario is Scenario A in Yvan Decreux and Lionel Fontagne, "A Quantitative Assessment of the Outcome of the Doha Development Agenda," CEPII Working Paper No. 2006-10, May 2006. IFPRI scenario is the Central scenario in Antoine Bouet, Simon Mevel, and David Orden, "Two Opportunities to Deliver on the Doha Development Pledge," International Food Policy Research Institute, 2006.

[9] Non-Agricultural Market Access, the sector of negotiations including tariffs on all non-agricultural goods including manufactures and commodities. It does not include services.

How are the gains distributed between developed and developing countries? The standard Doha models consistently show a win-win-lose outcome: high-income countries realize the largest portion of global gains, followed by middle-income countries (Figures 1-3). Low-income countries (including most of Africa, India and the rest of South Asia) receive a much smaller portion of the benefits, which is a larger gain in proportion to their GDP, but a very small gain per capita.[10] The low-income African group (all Sub-Saharan regions excluding South Africa) is included in the low-income total but also illustrated separately. These countries make the smallest gains or actually lose income in all the models. Given the lower capacities of the economies of the poorest countries, it is not surprising that they stand to gain less than developed countries; but a true development round would have to ensure that these countries experience sufficient gains to outweigh the costs of the adjustment they will undergo. But in the IFPRI scenario with a targeted development package of preferences, the poorest countries' losses turn to small gains.

Box 1: The World Bank's Doha Scenarios

The World Bank modelers simulated a range of different possible agricultural liberalization scenarios, as well as two scenarios with both agricultural and manufactures liberalization. However, both of the joint scenarios, including the most frequently reported central Doha scenario (Scenario 7), feature ambitious agricultural liberalization with no sensitive or special products excluded. However, a zero sensitive products outcome is not a plausible result of the Doha round: no WTO member has made any proposal that comes close to such a level of ambition. So, we use here a composite scenario comprised of the manufactures component of the Bank's central scenario (Scenario 7 minus Scenario 1) and the Bank's Scenario 2, a plausible agriculture scenario that includes 2% sensitive and 4% special products.

The impact of sensitive and special products on this scenario is dramatic (see figure Box 1): low-income Sub-Saharan Africa goes from a small win in agriculture and a small loss in manufactures, to an unambiguous loss in both sectors. Full results for all regions for all the Bank's scenarios are available in chapter 12 in *Agricultural Trade Reform and the Doha Development Agenda*, ed. Kym Anderson and Will Martin, Washington, DC, World Bank, 2006, Table 12.14.

III. Consensus on Africa: Plain Doha Not Much of a Development Round

In the simulations of plausible outcomes of the Doha round, the models give consistent results on the impact of liberalization on Africa. Apart from South Africa, the African regions modeled experience small gains or lose income in all the plausible plain Doha scenarios, although in all

[10] Gains and losses per capita are included here because they give an approximation of the effects on the poor better than do absolute gains or gains per GDP. Some studies attempt to quantify the number of poor people whose incomes are increased by trade liberalization, but the methodology used to assess this requires many additional assumptions about how the gains from trade are distributed.

but one of the scenarios they do not make any liberalization commitment themselves (they get a round for free). The results for individual countries are presented in Table 2.

Table 2. Welfare Gains and Losses for African Countries Under Plausible Doha Scenarios

Model	Country/Region	Gains or Losses from Plausible Doha Round	
		Millions of Dollars	Percent of GDP[11]
Carnegie	South Africa	$284	0.25%
	East Africa (Tanzania, Uganda, Malawi)	-$134	-0.80%
	Rest of Sub-Saharan Africa	-$197	-0.10%
Composite World Bank	South Africa	$600	0.53%
	Selected Sub-Saharan Africa[12]	$0	0%
	Rest of Sub-Saharan Africa	-$400	-0.27%
CEPII	South Africa	$360	0.32%
	Rest of Sub-Saharan Africa	-$370	-0.18%
IFPRI scenario with basic duty-free, quota-free for LDCs	Madagascar	-$10	-0.22%
	Malawi	$70	4.06%
	Mozambique	$0	-0.11%
	Tanzania	$20	0.21%
	Uganda	$20	0.35%
	Zambia	$0	-0.08%
	Rest of Sub-Saharan Africa	-$140	-0.07%
IFPRI scenario with full duty-free quota-free for LDCs	Madagascar	$40	0.75%
	Malawi	$170	6.67%
	Mozambique	$10	0.33%
	Tanzania	$100	0.49%
	Uganda	$30	0.23%
	Zambia	$40	0.66%
	Rest of Sub-Saharan Africa	$1,210	0.63%

In all the basic Doha scenarios, low-income African countries lose. But with the development package of duty-free, quota-free access for LDCs modeled by IFPRI, many of the countries gain. That study is the only one to model a commitment made by rich countries at the Hong Kong WTO ministerial meeting in December 2005 towards a development package. That commitment, to provide substantial duty-free, quota-free access to their markets for all least developed countries (97% free access), creates a significant improvement in the outcome for Sub-Saharan African countries. Two modeled regions experience losses in the IFPRI model, and

[11] Real income gains are calculated as a percentage of 2001 GDP according to Global Trade Analysis Project data, which is the base data for all the models discussed in this brief. Percentage gains reported in other papers may use slightly different bases.

[12] Includes the following countries: Botswana, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe Madagascar, Uganda.

those losses are smaller and spread among a large number of countries. And when the development package that the IFPRI modelers simulated is improved to *full* duty-free quota-free access (100%), all the sub-Saharan African countries' losses turn to gains (figures 4a and 4b).

Why does the outcome of the basic Doha scenarios look so bleak for many African countries, and why does the development package make all the difference? The African countries' gains from the improved market access are small because their resources are concentrated in sectors that are not competitive on world markets, particularly small-scale agriculture. Most African countries would experience some erosion of preferences in any Doha round, because the most favored nation (MFN) tariff is reduced on goods which they already export duty-free to the markets of many developed countries through preferential arrangements including the United States' Africa Growth and Opportunity program (AGOA) and Europe's Everything But Arms (EBA) initative and Cotonou agreement.[13] In addition, countries that are net importers of food experience welfare losses because of the increase of world food prices following cuts in agricultural subsidies. But a targeted development package offering duty-free, quota-free access for the poorest countries would expand African countries' access to developed country markets in products they can produce. Increasing the duty-free, quota-free offer from the commitment made at the December 2005 Hong Kong ministerial of 97% to a full 100% may seem like a small difference, but in fact it makes all the difference, ensuring that all the African countries' losses turn to gains. This is because the offer covers 97% of all tariff lines, rather than 97% of the products these countries actually produce; yet 99% of the exports of the Least Developed Countries fall within 3% of all tariff lines, and thus would likely be excluded from the offer (see Rangaswami 2006). Improving the offer up to 100% would ensure that the few products that the least developed countries can produce are covered. And even a 100% duty-free, quota-free deal would come at a tiny cost for the U.S. and other rich countries: in the U.S. even the most sensitive industries, textiles and apparel, experience negligible impact on production from increasing the development package to 100% (.01 and .02% decrease respectively over the more limited Doha scenario).

IV. Sectoral Gains and Losses

How does this evidence square with the frequently cited argument that agricultural liberalization would benefit poor countries? Are there any sectors of African economies that would win under "plain Doha" liberalization? The models shed some light on the sectors most likely to grow or shrink through price changes induced by tariff cuts and their impact on production and exports. In the "plain Doha" scenarios, Sub-Saharan Africa as a whole (excluding South Africa) loses real income from both agriculture and manufactures liberalization. Clearly, Doha round liberalization in either of these areas without the needed "development package" would present significant challenges for Africa.

[13] The accuracy of the models' outcomes on preference erosion assumes that current levels of trade reflect the benefit of the preferences: in other words, it reflects the assumption that the preferences are being utilized. The accuracy of this assumption depends on the country and the product. Where a country exports a product eligible for preferential treatment but does not receive the preferences due to restrictions such as rules of origin, the losses due to preference erosion would therefore be overstated by the model. For a full discussion of preferences utilization and CGE modeling, see Bouet (2005) and Bouet, Fontagne, and Jean (2005).

Figures 5 and 6 show the changes in gross exports and in domestic production by sub-sector for East Africa; Figures 7 and 8 show these changes for the rest of sub-Saharan Africa excluding South Africa. In these two primarily low-income African regions, exports and production change little, except in a few products. Total exports increase by 0.2% from East Africa, but domestic production drops by 0.2%; exports drop by 0.3% and production increases by less than one-tenth of one percent in the rest of Sub-Saharan Africa. In these two regions, sugar, and meat and dairy show the biggest production increases; while sugar exports increase by $10 million (from a base of approximately $40 million), more meat and dairy is produced in East Africa for the domestic market (production increases without an increase in exports). East Africa increases exports of sugar and of "other crops," a category that includes cotton, tea, coffee and cocoa. Oilseeds, tobacco and beverages also experience production increases in both regions. The hardest-hit production sectors for the low-income African regions are a range of manufacturing sectors, including textiles, leather and shoes, and metal products.

Figures 9 and 10 show the changes in gross exports and production by sub-sector for South Africa under the Carnegie scenario. South Africa's total exports and production both experience small increases (a 1.3% increase in exports, and a 0.3% increase in production). Exports and production of a range of manufactured goods rise, including metal products, motor vehicles, and machinery, and food products including processed foods, sugar, meat and dairy products, grains and oilseeds. South Africa's exports and production of wood and paper products, petroleum and other minerals, and chemical, rubber and plastic products fall; domestic production of footwear also decreases, replaced by new imports.

V. Disparities in Results at the Global Level and for Africa

While the findings of all the models tend to converge on the major points, there are some important differences in the results. As noted earlier, these differences can be attributed to the type of scenarios they simulate, as well as to their assumptions about how economies work.

A significant apparent discrepancy between the models is the distribution of gains between agricultural and manufactures liberalization. At first glance, the estimates of gains from agricultural liberalization appear to range from a World Bank estimate that this sector will account for the large majority of the benefits from liberalization to the Carnegie model, which suggests a small role for agriculture and much larger role for manufactures liberalization in generating gains. All the models show significant gains under agricultural liberalization scenarios more extensive than has occurred in any previous trade rounds When Doha deals of a scale comparable to what has been achievable in earlier rounds are simulated, the results differ much less. In the most realistic scenarios in all models, the majority of gains come from manufactures liberalization.

Although most of the gains arise from manufactures liberalization, the proportions vary. There are a number of reasons for the differences, including the depth of liberalization in each sector under the different scenarios, the way labor and land markets are modeled, and the assumed propensity in different countries to buy imports rather than domestic products (called trade elasticities).

One source of differences arises from the way labor markets are modeled by these studies. The World Bank models two types of labor: skilled and unskilled, and assumes full employment of both types of labor in developed and developing countries. The Carnegie model uses an innovative feature to model three types of labor: skilled, urban unskilled, and agricultural, and takes into account unemployment in developing countries. Modelers at UNCTAD also adapted their model to capture the impact of trade policy changes in the presence of unemployment, while CEPII has modeled dual agricultural and urban unskilled labor markets in several previous studies. In general, accounting for unemployment yields greater gains for some developing countries from liberalization, particularly in manufactures, because the ready supply of new workers entering the labor market keeps costs low even as factories produce and export more. When the Carnegie model simulated a Doha round *without* taking into account unemployment, losses to Sub-Saharan Africa excluding South Africa were greater, by $100 million (see Polaski 2006).

The modeling of land supply is also an important cause of differences in the balance of agricultural and manufacturing gains. The models all assume that more land becomes available as agricultural prices rise and can be used to produce different crops as they become more lucrative, but with different degrees of ease. This clearly has an impact on the gains developing countries can derive from agriculture. A CEPII study run with a fixed supply of land showed that the loss for Sub-Saharan Africa excluding South Africa was $50 million instead of $30 million. Assuming that land could be made available quickly and at low cost as agricultural prices rose made the results less negative for Africa.

Another key assumption driving model results is the propensity of industries and consumers to substitute imports for domestically produced goods (called the elasticity of substitution). In other words, modelers have to estimate how likely an apparel producer in India is to switch from Indian fabric to Chinese fabric if the price goes down. The World Bank model uses its own estimates of these values, which are higher than the estimates used by other models. In general, higher elasticities lead to higher gains for developing countries because their products are assumed to be more similar to those currently available in rich country markets, and thus compete more easily when they enter new markets. In a sensitivity analysis (using only the scenario of full free trade) the World Bank's model showed that when standard elasticities were used, the gains for Sub-Saharan Africa (excluding South Africa) changed from gains to losses.

VIII. Knowledge Gaps

While the models provide useful information on the differential impacts of a potential Doha round on the world and on Africa, there are several areas in which modeling yields limited insight because of insufficient data and technical and conceptual limitations.

One of the most serious problems for modelers with regard to Africa is the limited data available. The global trade database commonly used for general equilibrium models contains separate data on South Africa, Zimbabwe, Zambia, Tanzania, Uganda, Malawi, Madagascar, Mozambique, Botswana, the rest of the Southern African Customs Union, and the rest of the Southern African Development Community. Recently Nigeria and Senegal were added. But the remaining

countries in Sub-Saharan Africa can only be modeled as a group with limited data. This clearly masks significant heterogeneity among the countries grouped together, for example between net food exporters and importers, or net energy exporters and importers. This challenge is being addressed as economists in African countries gather data and work to make existing data compatible with the common global database.

Besides the limitations on African data, there is also insufficient data on a number of features of the global trading system relevant to modeling. For example, the impact of domestic agricultural subsidies is not completely understood because the data on these programs are not sufficient.

In addition to data limitations, the models also have a number of theoretical and technical aspects that limit our understanding of specific phenomena. Some level of aggregation of countries and sectors is always necessary, both because of data limitations for specific African countries, and because of the capacity of the models, which can capture only a certain amount of complexity.

Beyond welfare gains resulting from better use of a country's comparative advantage, a range of dynamic effects, such as foreign investment and technology transfer, could arise from trade liberalization, which would increase countries' benefits. All the models discussed in this brief attempt to model some of these effects. Some, such as the World Bank model, use projections of future growth and investment to estimate dynamic effects, in which the trade policy changes interact with other changes in the economy over time. The Carnegie model is static, meaning it does not take these interactions into account. But some effects, such as technology transfer, are incorporated into the Carnegie model. In general, the assumptions of the dynamic models tend to affect the size of the income gains or losses, more than their overall pattern. So the conclusion that a development package is crucial for Africa to reap the benefits of the Doha Round, and that offering such a package would be key to re-establishing a Doha Development Round, should be robust despite these issues.

WTO negotiations cover issues beyond agriculture and manufactures liberalization; services negotiations are also a component of the talks. While economists think services liberalization is likely to yield significant welfare gains for the global economy, this liberalization is not included in most global trade models because of data limitations and the difficulty of modeling services trade. Services barriers are largely regulatory and thus difficult to quantify. In addition, the nature of services negotiations, which take place in a request-and-offer format rather than a set of common reductions in barriers, makes any number of configurations possible for the final outcome, and so predicting potential Doha outcomes is difficult. The same limitations apply to negotiations on technical barriers to trade and trade facilitation. As a result, the models miss potential gains from these aspects of the Round. How large these gains might be, and how much would accrue to Africa is largely unknown.

Most significantly, most of the costs of adjustment to trade liberalization are not captured by general equilibrium models. The cost of unemployment of workers, capital and land while economies undergo structural adjustment to trade-induced changes is not incorporated into the model results, because the models take an image of the world economy before the trade policy changes and produce an image of the world economy after it reaches a final equilibrium under the new trade regime. Even dynamic models do not capture most of these costs. Quantifying

adjustment costs from liberalization is difficult, but we know they will be more significant for less developed, poorly diversified economies. An UNCTAD study showed that these adjustment costs may sometimes exceed poor countries' gains from trade.[14] The losses for some African regions discussed in this paper do not include adjustment costs, which will very likely make the burden for countries that lose from liberalization even greater. Significant assistance will still be required be required to ease the transitions in some of the poorest countries, even with a development-enhanced Doha round.

[14] Santiago Fernandez de Cordoba and Sam Laird, *Coping with Trade Reforms* (Geneva: UNCTAD, 2006); available at http://192.91.247.38/tab/events/namastudy/coping.asp?pf=1.

Appendix

Box Figure 1. World Bank Scenarios With and Without Special Products

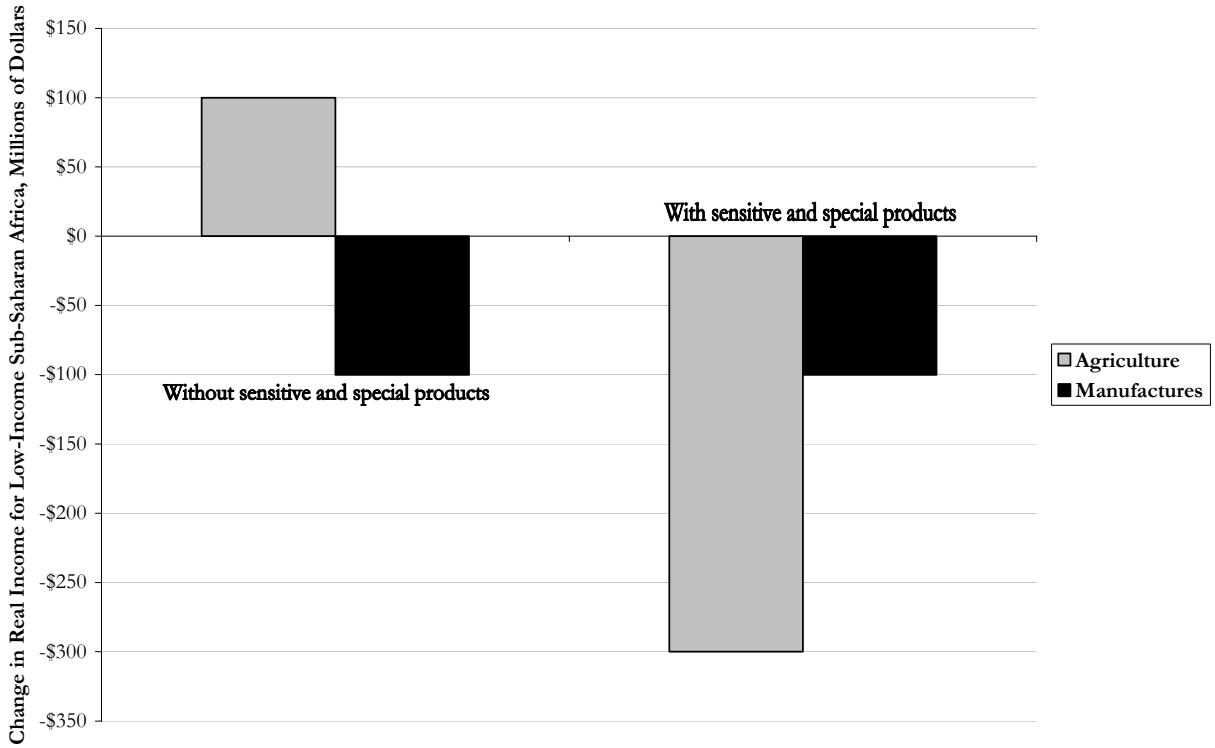
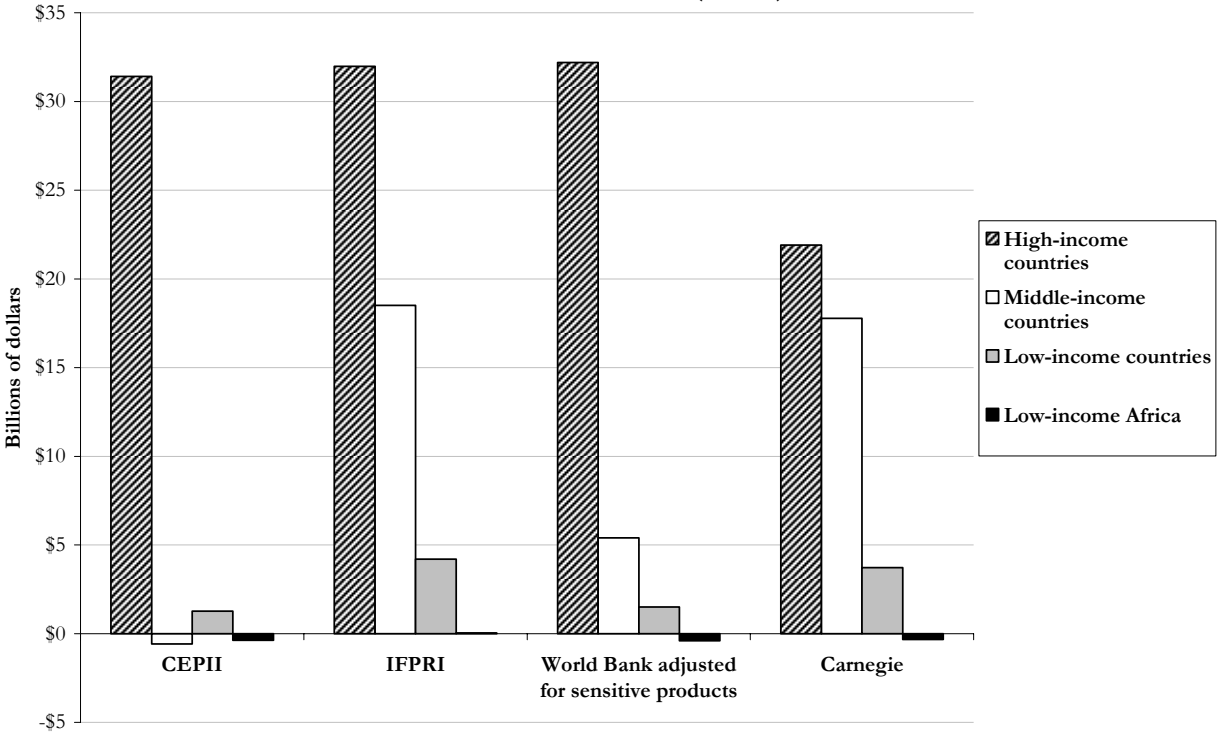


Figure 1. Distribution of Global Gains from Plausible Doha Scenarios: Total Real Income Gains (Losses)



Note: High, middle and low-income countries as classified by the World Bank; other studies may aggregate according to different groupings. Low-income includes African regions. Low-income Africa is also illustrated separately, and includes all Sub-Saharan African regions except South Africa.

Figure 2. Distribution of Global Gains from Plausible Doha Scenarios: Percentage of GDP

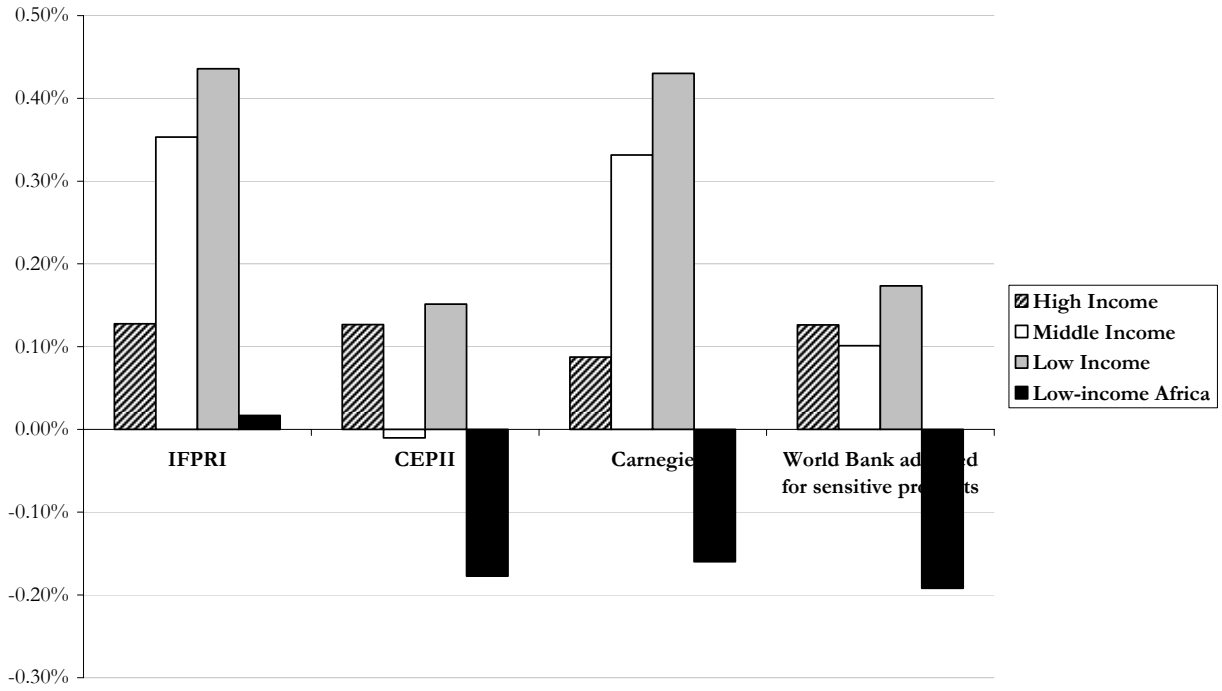
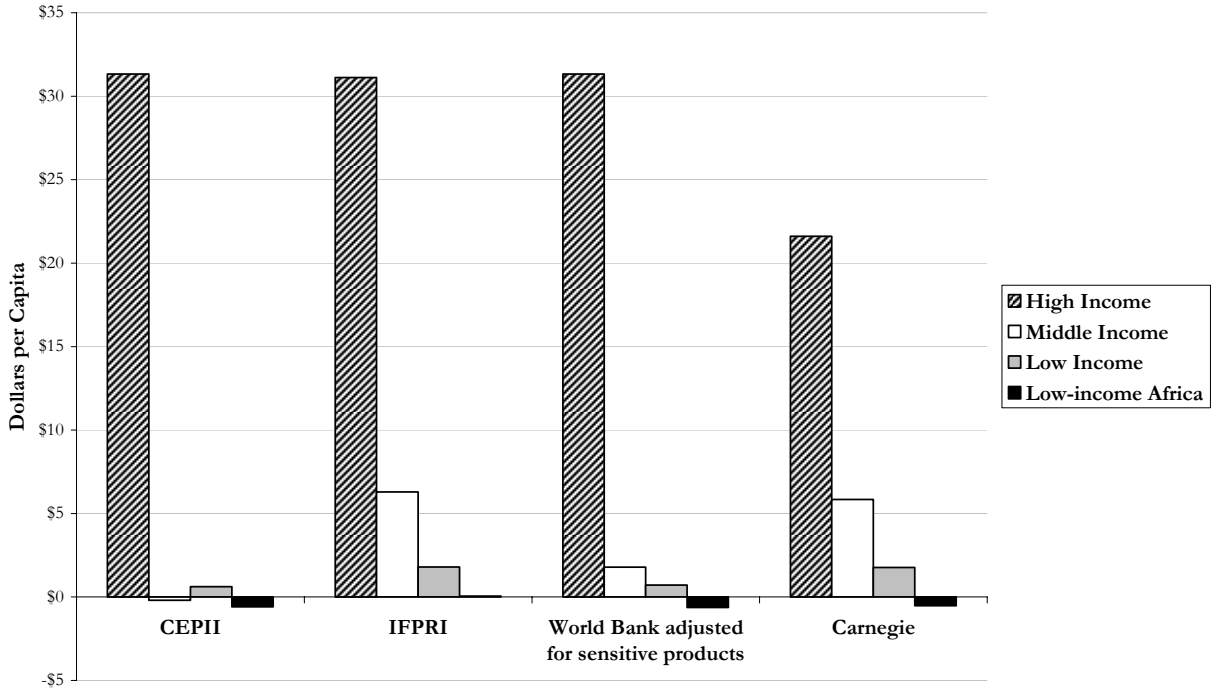
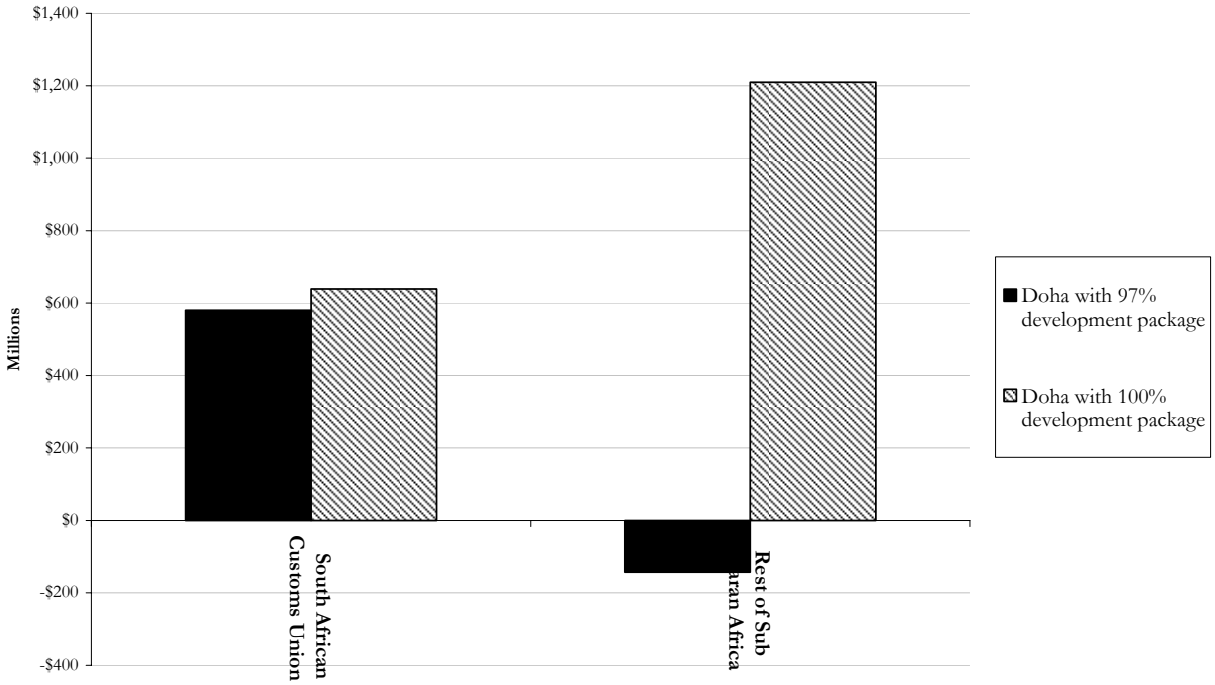


Figure 3. Distribution of Real Income Gains from Plausible Doha Scenarios: Real Income Gains (Losses) per Capita



Note: 2001 Population data aggregated by country from World Development Indicators.

Figure 4a. Impact of Increasing "Development Package" to 100% under IFPRI Model Scenarios



Note: Rest of Sub-Saharan Africa includes 36 countries and three territories: Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Mayotte, Niger, Nigeria, Reunion, Rwanda, Saint Helena, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Togo, Angola, Congo, the Democratic Republic of the, Mauritius, Seychelles.

Figure 4b. Impact of Increasing "Development Package" to 100% under IFPRI Model Scenarios

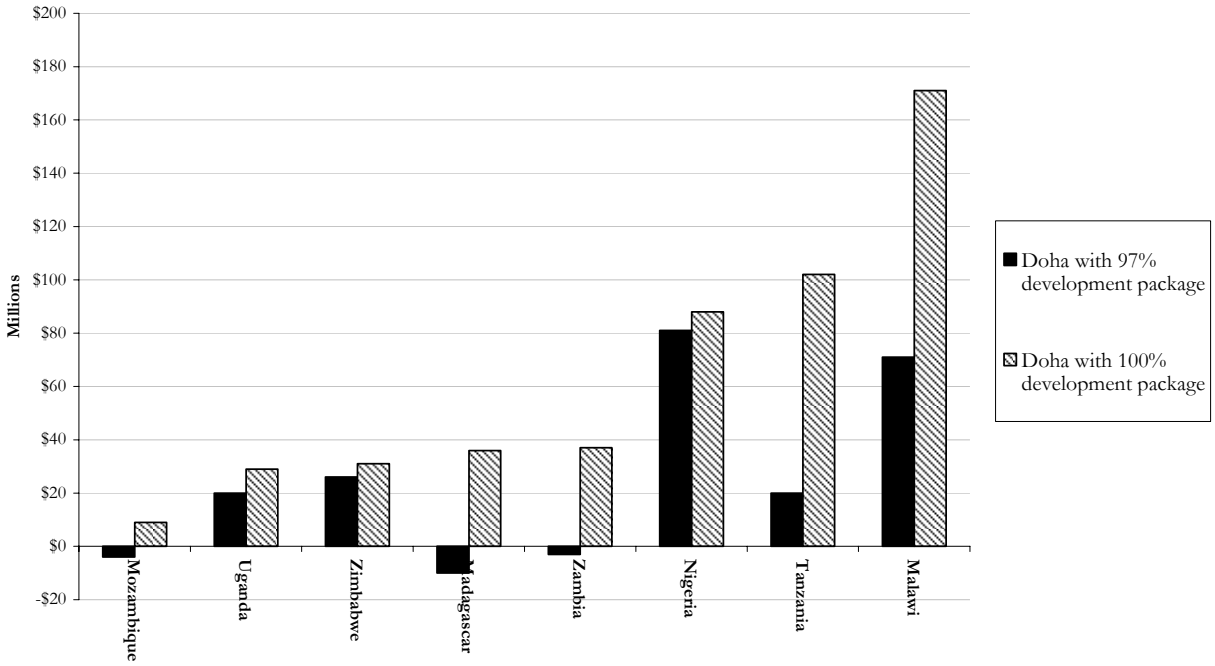
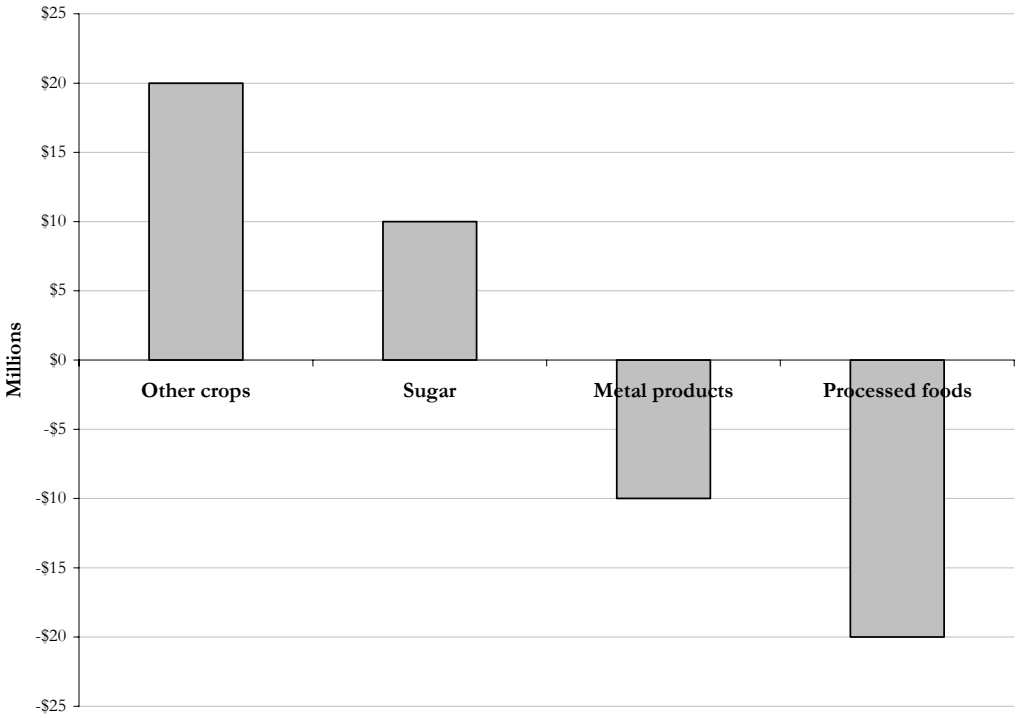


Figure 5. Change in Exports from East Africa under Carnegie Model Scenario



Note: "Other crops" category includes cotton, tea, coffee and cocoa. Sectors not included in this figure experience no change in exports in East Africa. Changes in production (Figure 8) are due to changes in imports and domestic demand.

Figure 6. Sectoral Production Changes for East Africa under Carnegie Model Scenario

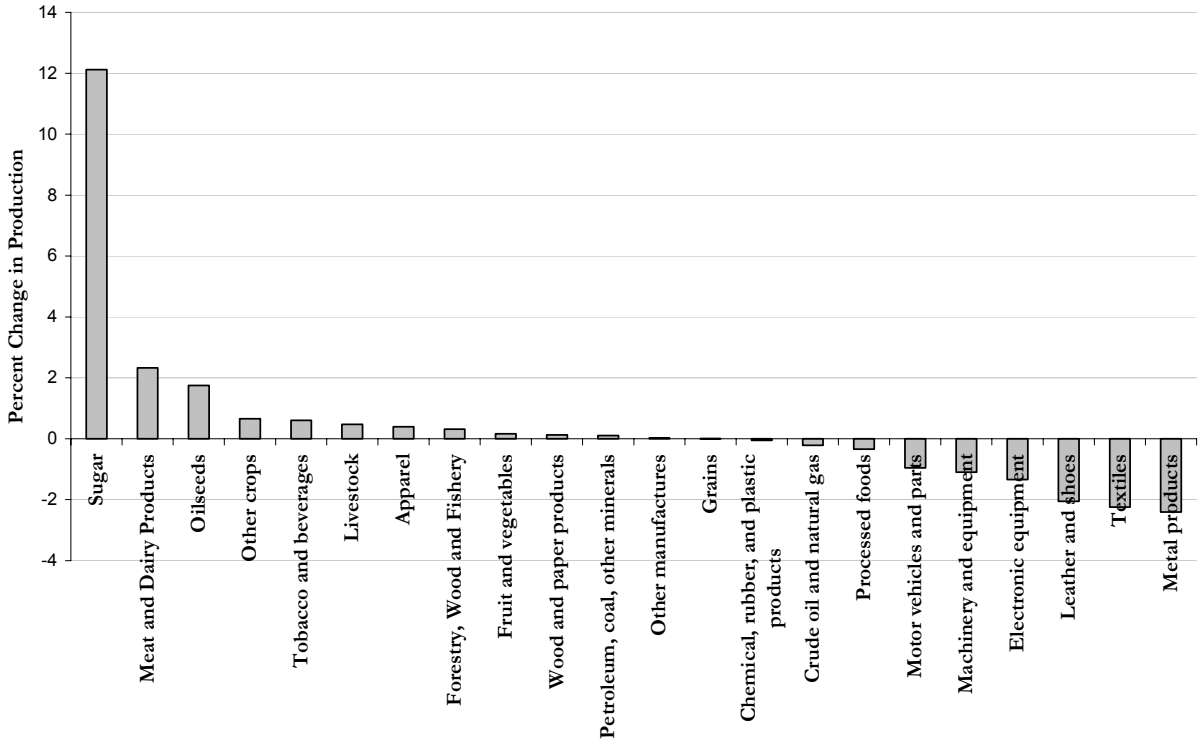
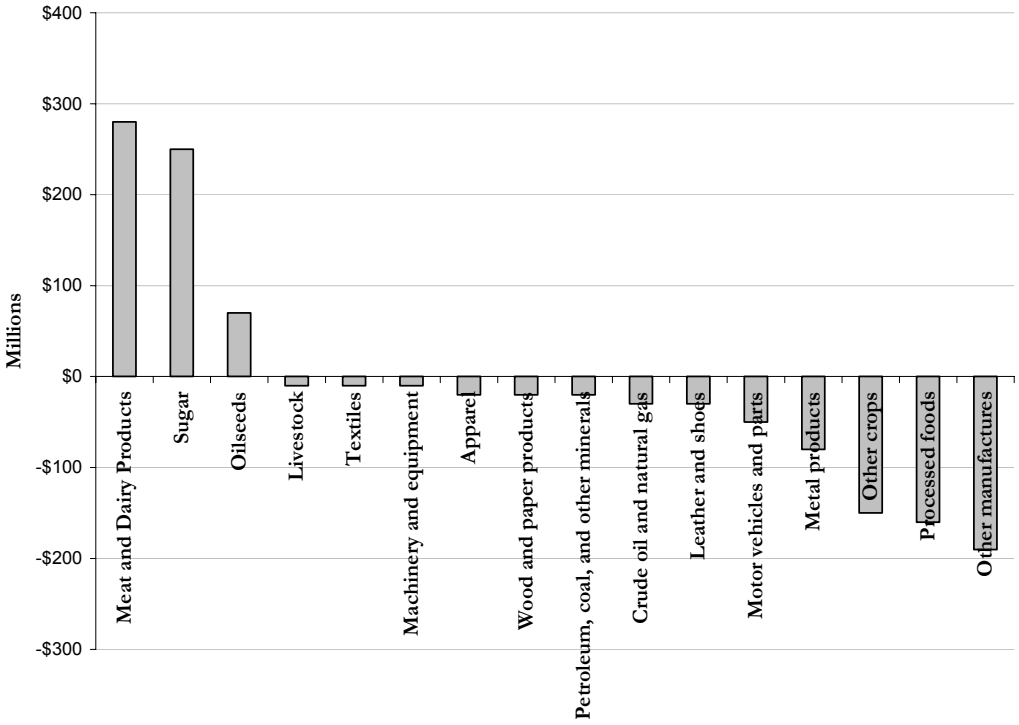
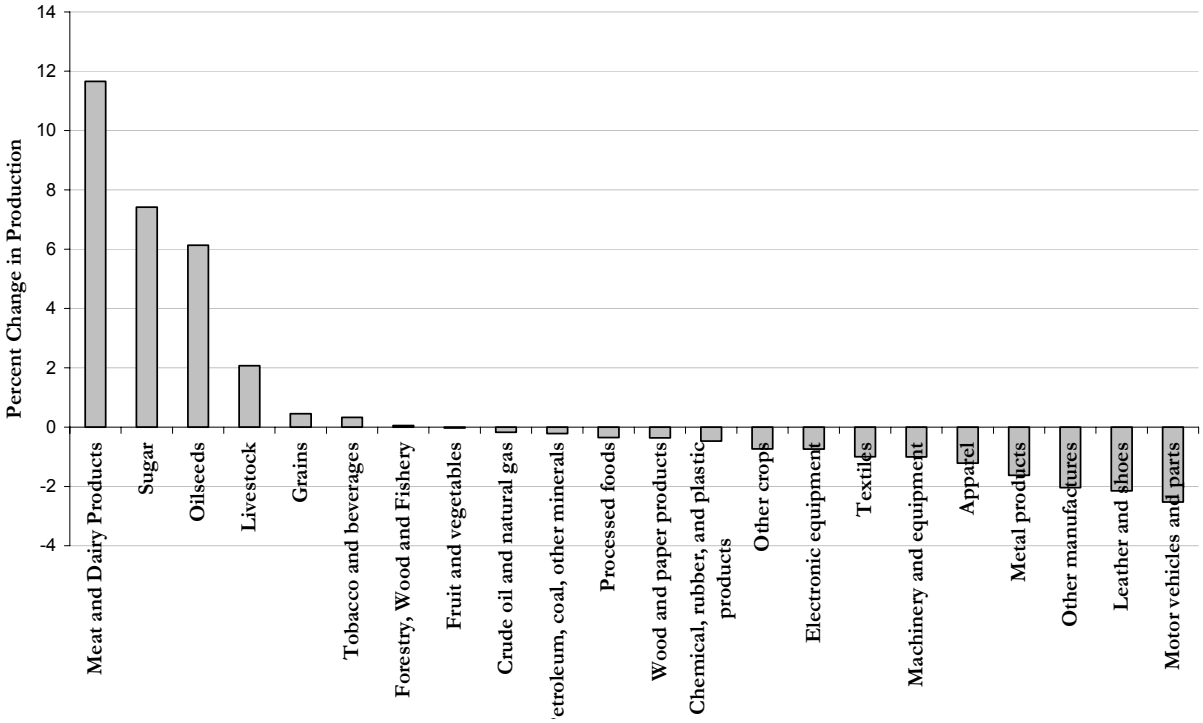


Figure 7. Change in Exports from Rest of Sub-Saharan Africa under Carnegie Model Scenario



Note: Rest of Sub-Saharan Africa includes all Sub-Saharan countries except South Africa and the model's East Africa region (Tanzania, Uganda, and Malawi).

Figure 8. Sectoral Production Changes for Rest of Sub-Saharan Africa under Carnegie Model Scenario



Note: Rest of Sub-Saharan Africa includes all Sub-Saharan countries except South Africa and the model's East Africa region (Tanzania, Uganda, and Malawi).

Figure 9. Change in Exports from South Africa under Carnegie Model Scenario

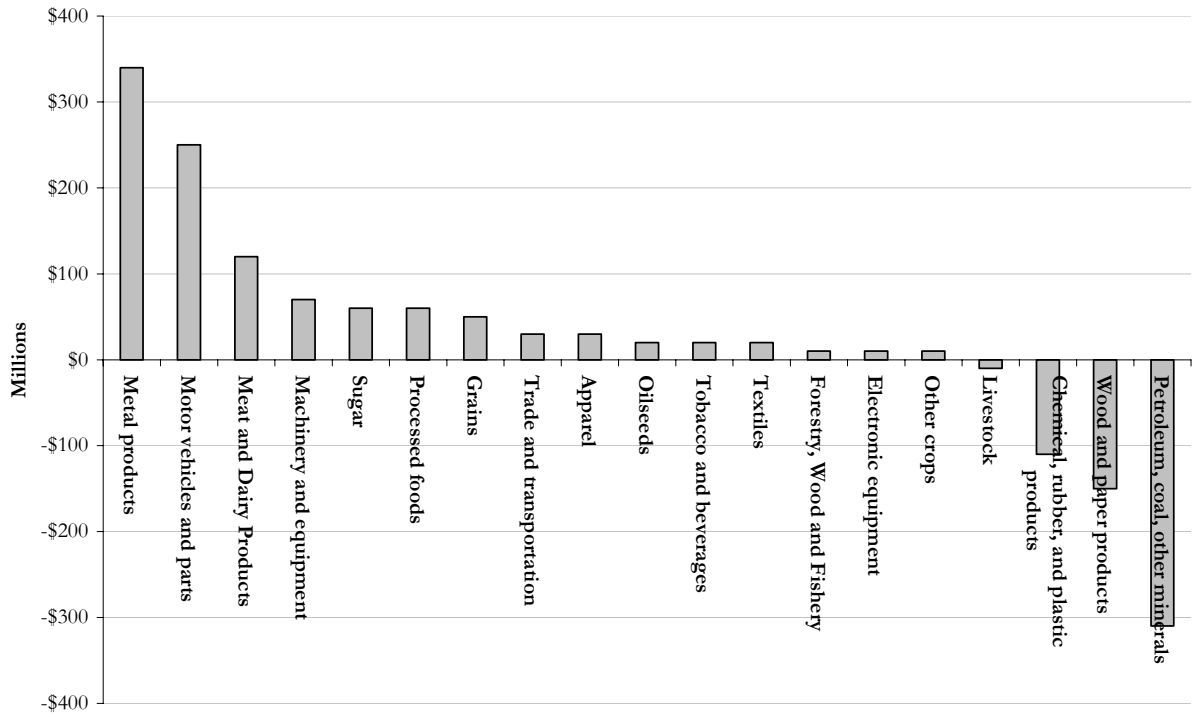


Figure 10. Sectoral Production Changes for South Africa under Carnegie Model Scenario

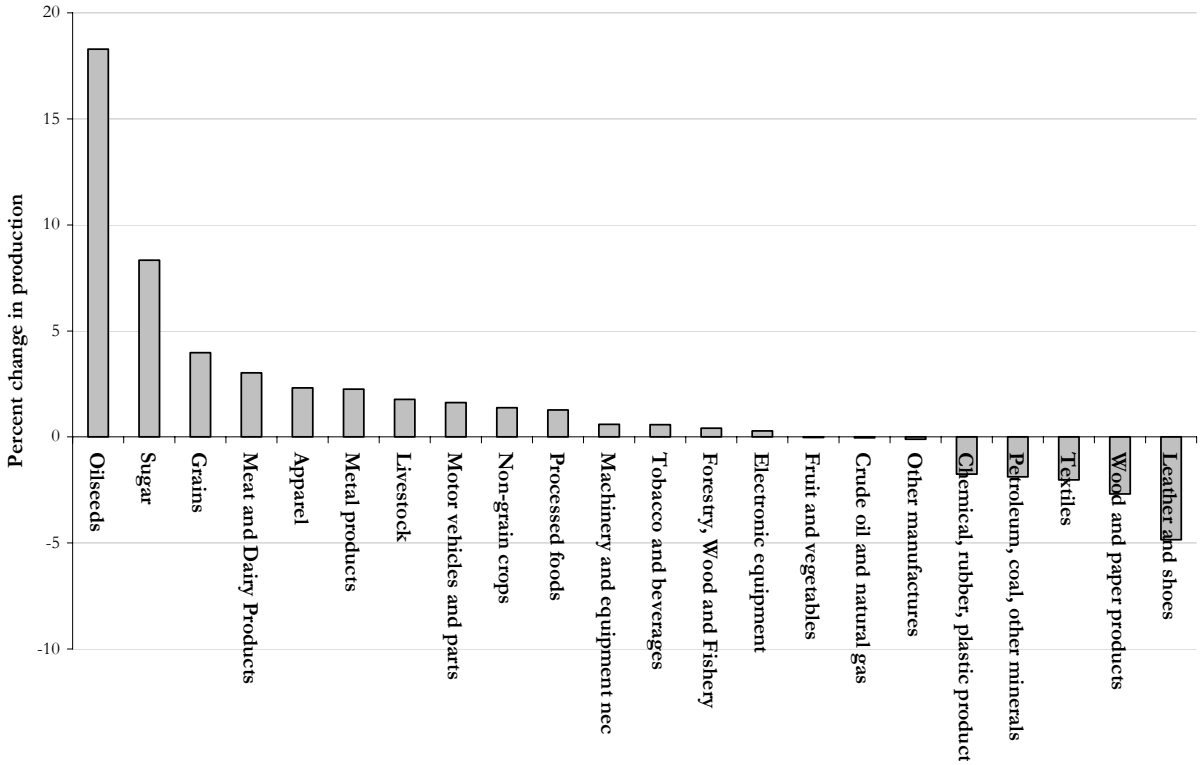


Figure 11. Sectoral Impact of Plausible Doha Scenarios on Low-Income Africa