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The impact of comprehensive tariff reductions in multilateral trade: further results from computable general equilibrium simulations

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Abstract

Despite their welfare-improving properties, negotiations on tariff reductions remain a highly contentious issue. Using the GTAP general equilibrium approach, this paper identifies potential winners and losers from partial removal of remaining tariffs in disaggregated sectors. By considering alternative approaches to further liberalising trade in three broadly defined sectors (agriculture, textiles and manufacturing), the paper establishes empirically the clear superiority of a comprehensive trade reform package which encompasses all sectors and geographic regions. Trade negotiators at the currently deadlocked Doha Round should take note of this result as a possible means of breaking the impasse.

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1. Introduction

The benefits of removing tariff barriers are unambiguous for a small economy, if undertaken in a non-discriminatory fashion. When a tariff is removed, resources will be transferred from protected sectors in the importing country and reallocated to other, more efficient, uses, giving rise to allocative efficiency gains there. Similar efficiency gains in the exporting country will result when resources are re-allocated there. A further source of gain/loss is the expected change in the terms-of-trade resulting from the removal of barriers that increase the prices of some traded goods, and lower those of others. Only for very large importers, under some extreme conditions, it is possible for the terms-of-trade loss to outweigh efficiency gains.

The driving force motivating removal of tariff barriers should, therefore, be the fact that a country benefits from opening its own markets, regardless of what policies other countries choose to pursue. An overwhelming body of trade theory literature, as well as country evidence, supports this view. In the past three decades, most countries including many "inward-looking" economies, have decided unilaterally to abandon the old autarkic model of import substitution in favour of greater integration into the global economy. China and Russia, two virtually closed economies until the late 1980s, have already established themselves in global trading discipline.

With China joining the World Trade Organization (WTO) in 2003 and expected accession of Russia by mid-2012, it would be fair to say that the full benefits of trade liberalisation can be best realised by multilateral trade negotiations under WTO auspices, such as those currently underway under the banner of the Doha Round. Unfortunately, stalemate at the Doha Round continues despite the original completion date of 2005. Bouet and Laborde (2010) used a variant (MIRAGE) dynamic computable general equilibrium (CGE) model to estimate the cost of a failure of the Doha Round and return to a protectionist regime. Their projections show global welfare would potentially be reduced by US$412 billion, most of it in terms of lost opportunity for new tariff reduction commitments, along with a smaller amount for domestic support.

Problems arise in comprehensive multilateral trade negotiations, as the reform agenda includes more 'contentious sectors' or product categories. Countries that are largely free-traders can exhibit extreme protectionism when it comes to some sectors (typically agriculture), or politically sensitive products (typically labour-intensive goods). Several studies on such selective, sectoral, approaches to trade liberalisation confirm, however, the (globally) trade-distorting nature of them (see Rae *et al.* 2001). Their welfare impacts therefore, are, by no means all beneficial. At the same time, it would be foolish to postulate that universal free trade is likely to be on the WTO agenda in the foreseeable future. Policy formulation must, therefore, involve considerations of what is feasible, and how best to provide incentives for conflicting interest groups to cooperate in order to achieve such a goal. The present research is indeed undertaken in that spirit. By considering some possible trade-liberalising options in agriculture and selected labour-intensive manufactured products for the current WTO negotiations, welfare implications from their implementation are estimated here. These outcomes are then compared with those arising from the unlikely scenario of complete freeing-up of trade in all sectors, which, of course, is the first-best option. It therefore provides an ideal benchmark against which any actual outcome may be judged.

High tariffs on agricultural products result in misallocation of resources, and exorbitant food prices for consumers in protectionist countries. Hoekman *et al.* (2010, p. 508) reports weighted average applied tariff by high-income countries (15.5%), are higher than developing (13.7%) and least developed countries (12.5%). Liberalising trade in agriculture need not be considered a concession to lesser-developed countries, but a favour

the high-income countries can do for themselves. For industrials, despite the GATT/ WTO's success in lowering the tariff rates on manufactured products, there is systematic discrimination against those imported manufactured products in which developing countries have a strong comparative advantage. Hertel and Martin (2000, p.464) noted that the average tariffs imposed by high-income countries on manufactured imports from developing countries are, on average, four times as high as those imposed on manufactured imports from other high-income countries. They assert that the primary reason for this is the tariff treatment of textiles and clothing in the high-income countries.

The developing countries lag behind their developed counterparts in implementing their trade liberalisation commitments despite being given more moderate targets and longer adjustment period. The Doha Round has been criticised for not requiring developing countries to reciprocate concessions with obligations on market access.[1] The effects of tariff reductions by all groups are quantified in this research.

2. Model, data and liberalisation scenarios

Scott and Wilkinson (2011) surveys the current literature, concluding that CGE simulations have increasingly become the preferred method of estimating how much is to be gained from concluding liberalised trade deals. This research uses the Global Trade Analysis Project (GTAP) CGE model (Hertel 1997) to quantify the impacts of global trade reforms. This is a relatively standard, multi-region, model built on a complete set of economic accounts and detailed inter-industry linkages for each of the economies are represented. In GTAP, products are differentiated by country of origin, allowing bilateral trade to be modelled, and bilateral international transport margins are incorporated and supplied by a global transport sector. Aggregations applied to the Version 5 GTAP database to the level of 20 commodities and 15 regions are shown in Appendix Tables A.1 and A.2 respectively. The 20 aggregated commodity sectors in Table A.1 were then collapsed into 3 broad sectors: (i) agriculture and food, (ii) textiles, clothing and leather (TCL) and (iii) other manufacturing sectors, to show decomposition of gains to various regions from liberalising trade in these broad sectors. They are presented in Table 1 below.

Table 1. Aggregation of GTAP Sectors with Selected Products

Aggregated sector name	**Included products**
Agriculture and food	Paddy rice, Wheat, Vegetables, fruit, nuts, Raw milk, Dairy products, Cereal grains, Meat: cattle, sheep, goats, horses, Meat products, Animal products.
Textile, clothing and leather (TCL)	Textiles, Leather products, Clothing & wearing apparel.
Remaining manufacturing and services	Processed foods, beverages and tobacco, Forestry & minerals, Motor vehicles & parts, transport equipment, Electronics, machinery and equipment, Other manufacturing, Services.

Source: GTAP Database

[1] Jagdish Bhagwati at the 2002 Annual Meeting of the World Economic Forum. Bhagwati also criticised bilateral trade deals and sectoral agreements by adding these are increasingly "taking the good players away from Geneva".

It should be noted that the services sector in Table 1 is combined with the category of the remaining manufacturing industries. This is standard in GTAP models; one drawback of GTAP is that it does not collect data on services trade. Being a general equilibrium model, however, closure requires that all sectors be included. So, the services sector had to be lumped into one of the other sectors. GTAP data is updated on a 3-year cycle and the latest version (version 7) database is currently available. Version 5 database that is used in our simulations made significant improvements on previous versions with the use of Agricultural Market Access Database (AMAD). Finally, to solve the model, we used the GEMPACK software (Harrison and Pearson 1996).

Two liberalisation scenarios are modelled. The first is a partial liberalisation of existing trade barriers in (i) the agriculture and food, (ii) textiles, clothing and leather (TCL) and (iii) other manufacturing sectors. By using the decomposition technique of Harrison *et al*. (1999), the separate impact of each of these three groups of sectoral trade reforms on the model variables are obtained. Thus, for example, an overall welfare gain or expansion in trade can be broken down to the changes due to agricultural, TCL and other manufacturing liberalisations. The decomposition of our estimated gains are later illustrated in Figure 1 in next section. The detailed reforms of the first liberalisation scenario is as follows: reduce tariffs on agriculture and food, TCL, and other manufactures by 36% in all regions; and cut expenditures on agricultural and food export subsidies by developed countries by 36%. The reforms for the second liberalisation scenario are the complete removal of tariffs in all regions for the above sectors, and the elimination of agricultural export subsidies. The latter is the ideal free trade scenario.

3. Results and interpretations

The results of the trade liberalisation scenarios outlined above are summarised in Table 2. The agricultural sector being the most protected sector, potential global gains from liberalising agricultural trade forms the biggest component of the total gain. Half of the global gains from agricultural reform alone will accrue to Japan, the EU and the European Free Trade Association (EFTA) nations, where most of the trade distortions currently remain (see Table 2). These gains are calculated as equivalent variation (EV) measures. When agriculture is included in overall trade reform, these regions will experience the efficiency gains from the release of resources from agriculture to other sectors. Improved market access in these important and protected markets will deliver substantial gains (in relative terms) to South America, Australia and New Zealand as major net exporters of agricultural products. Many of these countries belong to the Cairns Group, for whom inclusion of agriculture is an important enticing factor to the new Round. The important point to note is that none of the 15 regions stand to lose from partial liberalisation involving only the agricultural sector. That is not the case with partial liberalisation in the other two sectors.

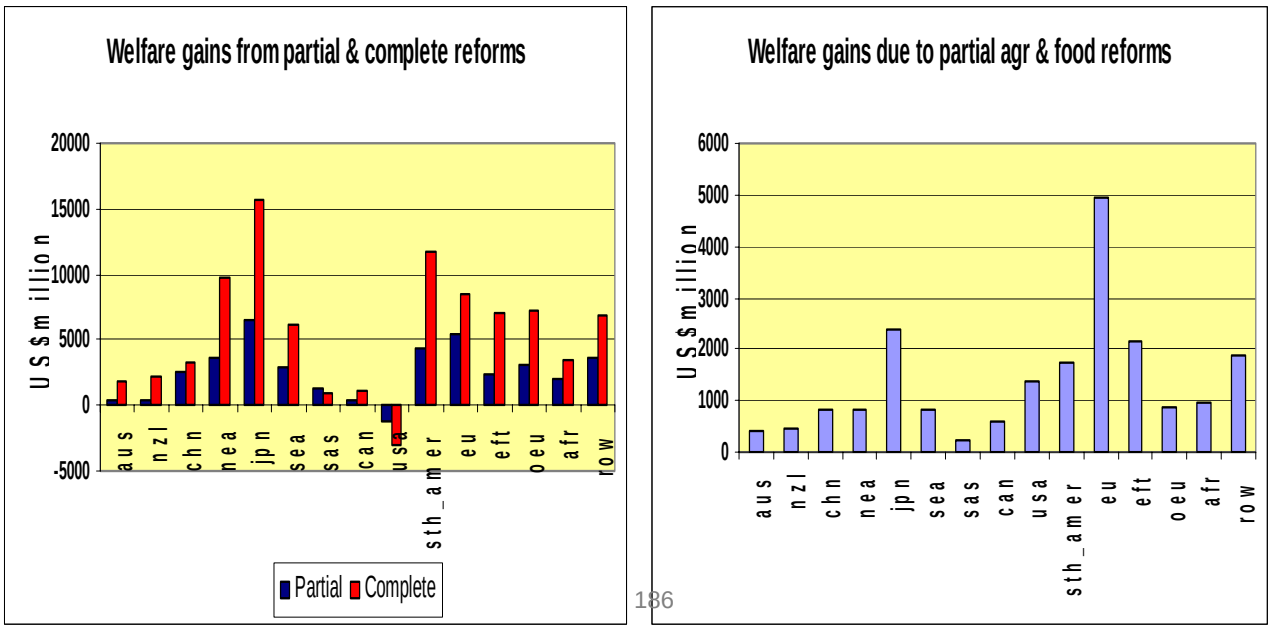
Despite the success of previous trade Rounds in attaining low average tariffs in the manufacturing sector, further reductions in this sector alone will bring substantial gains in global welfare (equal to more than half of those emanating from agricultural sector reform alone). Once again, Japan would be the largest single-nation beneficiary. There would be substantial developing country gains in South America and Southeast Asia. North America and non-EU Europe would be substantial losers from continued manufactures tariff reduction, while the EU can expect a small gain. China and Australia would lose somewhat. In regard to tariff reductions in the TCL sector, the developing countries in Southeast and South Asia, China and Africa would be the big winners. Other gains would accrue to some developed countries in non-EU Europe, Northeast Asia and Canada. The USA and the EU would be the significant losers here.

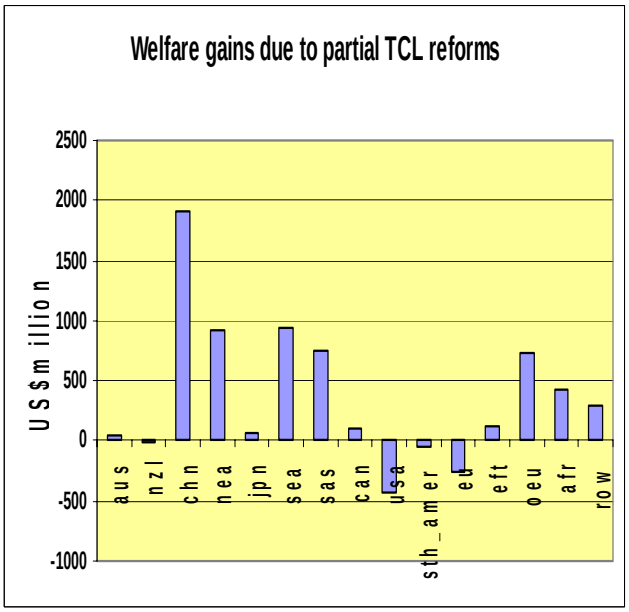
Table 2. Welfare changes due to partial and complete liberalisations (US$ million)

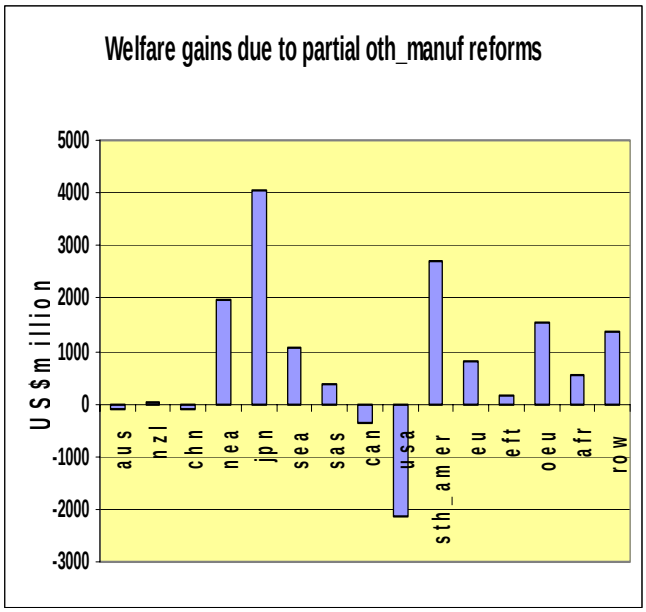
Region	Due to partial liberalisation in				Complete liberalisation
	Agriculture and food	TCL	Other manufacturing	Total	
Aus	408	52	-83	377	1759
NZ	469	-4	18	483	2182
China	821	1905	-86	2640	3186
NE Asia	830	918	968	3716	9757
Japan	2392	64	047	6504	15696
SE Asia	823	939	1062	2824	6091
S Asia	228	755	394	1376	937
Canada	611	101	-376	336	1074
USA	1372	-431	-2117	-1176	-3101
S America	1756	-42	2690	4405	11662
EU	4924	-263	824	5486	8491
EFTA	2175	115	162	2452	7041
Other Europe	857	730	1531	3118	7314
Africa	976	419	530	1925	3375
ROW	1883	292	1374	3549	6813
Global	20526	5551	11937	38015	82279

Source: GTAP calculations

Figure 1: Decomposition of global and regional welfare gain







The total global gains from partial removal of remaining tariffs in all sectors together is higher, when compared to equivalent reductions in any of the sectors in isolation; and all regions gain, except the USA. Finally, global gains from complete removal of remaining tariffs in all sectors are higher (more than twice), when compared to our scenario of partial tariff removal in all sectors. Once again, all regions would gain, except the USA. In both scenarios, the terms-of-trade effect becomes substantially negative for the USA. In terms of agriculture, the simulations required either substantial or total removal of export subsidies. Increase in world export prices for grains and livestock products are thus dampened by the fall for the goods the USA exports. In addition, price increases in US imports of TCL and some other manufactured imports also impacted US terms-of-trade negatively.

4. Conclusion

Frictions amongst developed countries as well as between developed and developing members of the WTO continues to threaten a successful outcome from the WTO's already protracted current trade round. Scott (2008) observes that CGE modelling, by informing the negotiating positions of the member states, has come to play an increasing role in WTO negotiations. Results from our CGE estimates suggest perhaps liberalising initiatives that combine agricultural trade and trade involving labour-intensive industrial products might bear fruit because they are capable of offering incentives to both the industrialised and developing countries to cooperate. Finally, by applying across-the-board uniform tariff reductions in all sectors, involving all countries, the paper unleashes the practicality of a potentially comprehensive trade Round acceptable to all parties. The applied general equilibrium model (GTAP) used in the simulations captures the interactions between these sectoral reforms, and brings out the advantages offered by a comprehensive Round of trade negotiations.

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Appendix

Table A.1: Aggregation of GTAP (Version 5)- Sectors

Acronym	Description	Acronym	Description
pdr	Paddy rice	tex	Textiles
wht	Wheat	leather	Leather products
vgf	Vegetables, fruit, nuts	transp_equip	Motor vehicles & parts, transport equipment
mil	Dairy products	mach_equip	Electronic equipment, machinery and equipment
proc_food	Processed foods, beverages and tobacco	oth_manuf	Other manufacturing
nat_res	Forestry & minerals	svc	Services
gro	Cereal grains	clothing	Clothing & wearing apparel
cmt	Meat: cattle, sheep, goats, horse	rmk	Raw milk
omt	Meat products	oap	Animal products
ctl	Cattle, sheep, goats, horses	---	---

Table A.2: Aggregation of GTAP (Version 5) - Regions

Acronym	**Countries included**	**Acronym**	**Countries included**
aus	Australia	chn	China and Hong Kong
nz	New Zealand	sas	South Asia
oeu	Other European countries	usa	U.S.A.
eft	EFTA	can	Canada
jpn	Japan	sth_amer	Mexico, Central & South America
nea	South Korea and Taiwan	eu	EU
sea	Indonesia, Malaysia, Philippines, Thailand, Singapore, Vietnam	row	Rest of the world
afr	Africa		