Comparative Study of Trade Liberalization Regimes: The Case of China's Accession to the WTO

by

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Abstract

During the past twenty years, the Chinese economy has become substantially more integrated into the world economy. China's share of world exports has risen dramatically, and its composition has shifted strongly away from primary commodities towards manufactures. China's recent offers for WTO accession involve another large step forward in integrating China into the world economy. Central to China's liberalization over the past decades have been tariff exemptions on inputs used in the production of exports. While these "new trade liberalization" instruments have overridden existing protection in China and have effectively opened up many sectors of the Chinese economy, they have been given relatively little attention either in trade negotiations or in multilateral trade liberalization studies. This paper provides a new modeling framework that permits the analysis of large-scale liberalization scenarios in the presence of "new trade liberalization" instruments. Our results suggest that failure to account of the duty exemptions on imports for production of exports will significantly misstate the impact of China's accession to the WTO on the country's structure of production and trade. More specifically, we found that studies which abstract from the presence of duty exemptions might overstate the increase in China's export share due to accession to the WTO by as much as 75 percent, in the case of apparel, and the increase in China's welfare due to accession by more than 66 percent!

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Since the beginning of the reform era in China, the growth in the volume and importance of trade for China and its trading partners has been extraordinary. Part of this growth has followed from policy reforms that have directly helped to open the Chinese economy—and to stimulate economic growth that has, in turn, stimulated growth and change in trade patterns. Concessional import rights, which override existing protection, have been an important element of the gradual trade liberalization that boosted growth in China. These duty exemptions were pervasive, and contributed strongly to China's actual duty collection rate being only one sixth of its weighted average tariff rate (World Bank 1994).[1] China allowed relief from import duty at the point of entry, rather than through refunds of duties paid, with exemptions for intermediate inputs used in the production of exports being particularly important. The share of concessional imports in total imports rose from a third to around a half between 1988 to 1991 and has remained around this level ever since. Total exports associated with concessional import arrangements doubled between 1988 and 1991 and accounted for about 64 percent of China's manufacturing exports (World Bank, 1994).By 1998, around 50 percent of all imports in China were inputs used in production of exports.

Despite the vast importance of duty exemptions in China and other developing countries, these "new trade liberalization" instruments have been given relatively little attention both in trade negotiations and in multilateral trade liberalization studies. Standard global trade models such as GTAP (Hertel, 1997) have largely abstracted from the presence of concessional imports, while trade liberalization studies using these models have at best offered only partial solutions to the problem (Bach, Martin and Stevens, 1997). Recently, the topic of concessional import arrangements has been considered in papers by Gruen (1999) and Fan and Li (2000). Gruen (1999) illustrates the similarities and differences between traditional and "new trade liberalization" instruments such as export processing zones (EPZs) and duty drawback schemes and conclude that, in theory, both can bring about complete free trade. Fan and Li (2000)

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[1]Concessional imports cannot alone explain the low collection rates. A collection rate of 5.6 percent represents only 17.5 percent of the trade weighted average tariff of 32 percent for 1991 (World Bank 1994). Therefore, it is very possible that other imports by the government such as imports used for priority projects, are also exempt or there are other leakages in the revenue collection system.

incorporate mechanisms to model duty exemptions by including two types of firms, export and domestic-oriented, in a one region recursive dynamic model of China.

This paper contributes to the literature by providing a new global framework for looking at "new trade liberalization" measures. We extend the GTAP model of global trade so that duty exemptions are modeled explicitly. Within this model the effects of policy reform are differentiated based on the trade-orientation of the firms, i.e. whether they produce for the domestic market or for exports. We use the new modeling tool to look at the major changes in trade policy that are likely to take place in the near future, as China makes the adjustments required by WTO members for accession to the WTO, and as the Chinese economy adjusts to the post-WTO trading environment. We see these changes as likely driven by two major forces— changes in trade policies, and underlying changes in the Chinese economy that can be expected to change the level and composition of output. These underlying structural changes include changes in the rate of growth of the population and workforce; changes in the rate of capital accumulation; and changes in the rate at which human capital and skills are acquired.

Both changes in trade policies, and the underlying changes in the structure of the Chinese economy and of its trading partners involve complex general-equilibrium interactions. Therefore, the global general equilibrium framework allows us to capture these changes in a simple, intuitive manner. The trade policy reforms undertaken to date, and those being discussed in the WTO negotiations involve different degrees of liberalization in different sectors, and cannot simply be analyzed as a uniform liberalization of all sectors. Similarly, the pressures for structural change arising from rapid accumulation of capital and human capital create pressures for differential rates of growth in different sectors that will have important implications for the composition and direction of trade.

Our findings suggest that failure to account for the duty exemptions on imports for production of exports will seriously misstate the impact of China's accession to the WTO on the country's structure of production and trade. In our cases, analyses that abstract from the presence of duty exemptions will overstate the increase in China's export share in total world exports of apparel by 75 percent and that of automobiles by 1520 percent! In addition, in most cases these analyses will overestimate the impact of accession on Chinese imports.

The following section outlines the new features of the modeling framework. We then consider some of the developments in China's trade policies. Next we present the simulation

approach used to project future developments in China's trade and discuss key results of this study. We conclude with a summary of our findings.

The Methodology

To capture the main features of China's trade tax system and study the impacts of China's accession to the WTO in a global context, we modify the GTAP global trade model (Hertel, 1997) so that duty exemptions are modeled explicitly. We introduce two separate trade regimes - ordinary and export promotion - into the analysis. For this purpose we assume that each sector in each region consists of two sub-sectors – an export-oriented one and a domestic one. The two sub-sectors produce the same product using the technology specific to the sector. This representation is general and allows us to have an explicit dual treatment of foreign trade regimes in each sector and region in the model.

The model has 4 production factors, 19 regions, 22 export-oriented sub-sectors and 22 domestic-oriented sub-sectors in each sector, producing tradeable commodities. Skilled and unskilled labor, and capital are used by all sectors, land is used only by the agricultural sectors, while natural resources are used as an input only in the natural resource sector. Capital, skilled labor, and unskilled labor are perfectly mobile across sectors, as well as, across the sub-sectors in each sector.

The domestic and export processing sub-sectors have identical, constant-returns-to-scale technologies as specified in the standard GTAP model (Hertel, 1997). Because GTAP does not distinguish inputs based on the purpose for which they are used, to determine the factor and intermediate inputs going into the domestic and export processing activities, it was necessary to split the factor and intermediate inputs into those used by the domestic processing sub-sector and those by the export processing sub-sector. To do this, the sectoral use of endowments and intermediates in each region was first allocated between export processing and domestic-oriented firms based on the share of exports in total output of sector j in region s:

$$\alpha_{js} = \sum_r X_{jsr} / Y_{js},$$

where r spans the set of regions in the model, j represents the sector producing tradeables, Y_{js} is the value of output of sector j in region s computed from the GTAP data base, X_{jsr} is the value of exports of j from region s to region r in the GTAP data base. Then, the use of the imported

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intermediate product i by the export processing sub-sector of sector j in region s, I_{ijs}^E (superscript E refers to the export oriented sub-sector; superscript D refers to the domestic-oriented sub-sector), is assumed to be:

$$I_{ijs}^E = \alpha_{js} I_{ijs} \,,$$

for all traded commodities i and all regions s **except** China, and where I_{ijs} is the value of the imported intermediate product i used by sector j in region s in GTAP. We allocate in the same way the use for export production of factor endowments and domestic intermediates by sector in all regions.

In the case of China, we employed additional information on duty-exempt imports at the HS2 level from Fan and Li (2000). These data were mapped and then aggregated to the GTAP commodity aggregation used in this study in order to compute the share of imports exempted as inputs into export processing in China's total imports by commodity:

$$\beta_{is} = \sum_j I_{ijs}^E / \sum_r M_{irs} \,,$$

where i refers to the traded commodity, j to the importing sector, s to China, and M_{irs} are imports of commodity i from region r into s. Since our goal is to compute I_{ijs}^E for every sector j in China from this one equation, we assume that $I_{ijs}^E = y_{is} I_{ijs}$ in each export sector j. This allows us to compute y as:

$$y_{is} = \beta_{is} / \sum_j I_{ijs} / \sum_r M_{irs} \,,$$

and from there I_{ijs}^E for China. We use the GTAP data to compute the share $\sum_j I_{ijs} / \sum_r M_{irs}$. In the cases when this share is smaller than β_{is}, we restrict the value of y to 1. This implies that in this case, all imported intermediate products are used for the production of exports. We have restricted y to 1 in only three cases among which are apparel and textiles.

The domestic-oriented sub-sector of sector j in all regions s uses the remaining part of the imported intermediate i in the GTAP data base:

$$I_{ijs}^D = I_{ijs} - I_{ijs}^E \,.$$

Once we know the split between imported intermediates for domestic and export production, we then calculate imports of commodity i into region s used for production of exports by source r, M_{irs}^{E} as follows:

$$M_{irs}^{E} = \gamma_{is} M_{irs},$$

and γ_{is} equals:

$$\gamma_{is} = \frac{\sum_{j} I_{ijs}^{E}}{\sum_{r} M_{irs}}.$$

Please note that this way of splitting the data on intermediate and primary factor input use by sector and region ensures that the sum of imported intermediate use of i across all export-oriented sub-sectors in a region equals the sum of imports of i from all sources r into the same region, or

$$\sum_{j} I_{ijs}^{E} = \sum_{r} M_{irs}^{E},$$

The same applies to the imported intermediate inputs of the domestic-oriented sub-sectors in a region.

We eliminate tariffs levied on imports used in the production of exports, using an ALTERTAX simulation as described in Malcolm (1998). In the resulting data base which serves as the benchmark data for our experiments, the import tax rates on imports used in the production for the domestic market are preserved and equal to the import tax rates on imports in version 4 GTAP data base, however taxes on imports for the production of exports are eliminated.

To test the model we conduct four simulations. The first experiment provides a baseline scenario in which China does not enter the WTO but other countries liberalize and benefit from abolition of their textile quotas. The second experiment provides a companion scenario in which both China and Taiwan enter the WTO and only then benefit from abolition of their textile quotas. We conduct both the first and the second scenario using the standard GTAP model and the simulation design in Martin, Dimaranan and Hertel (1999). The third and forth scenarios are the same as the first and second ones, respectively, only now we use the new model of duty exemptions and the new benchmark data in which there are no import tariffs on imports used for export production.

To demonstrate the importance of duty exemptions for China's economy we review the evolution of China's trade policies and their impact on trade. We then focus on the assumptions and design of the four experiments and analyze our results.

China's Trade Barriers

China's trade regime is a complex combination of a modern, tariff-based and relatively open trade regime, and elements derived from the planning system used prior to 1978. The details of the system are discussed in Martin and Bach (1998), Martin, Dimaranan and Hertel (1999), and World Bank (1997a,b). While the system includes a state trading regime and a number of nontariff barriers, their overall protective effect has been declining, and it is probably reasonable to focus on the tariff regime, whose protective effect is relatively clear, and subject to sharp reductions under the WTO accession package.

Tariff barriers

As is clear from Table 1, there has been substantial progress in reducing tariff barriers during the 1990s. A significant tariff reform was implemented in October 1997, reducing average tariffs significantly below 20 percent, while a more limited reform in January 1999 focussed on timber products. Some basic data on trends in average tariff rates are given in Table 1.

Table 1. Changes in average tariff rates in China						
	All products		Primary products		Manufactures	
	Simple	Weighted	Simple	Weighted	Simple	Weighted
	%	%	%	%	%	%
1992	42.9	40.6	36.2	22.3	44.9	46.5
1993	39.9	38.4	33.3	20.9	41.8	44.0
1994	36.3	35.5	32.1	19.6	37.6	40.6
1996	23.6	22.6	25.4	20.0	23.1	23.2
1997	17.6	18.2	17.9	20.0	17.5	17.8
1998	17.5	18.7	17.9	20.0	17.4	18.5
Source: World Bank (1999, p340)						

The progressive reductions in tariffs since 1992 have reduced average tariffs by more than half over the period. For the important manufactures sector, the reductions have been

greater than average. The fact that these reductions have been phased in means that the reductions proposed in the ongoing WTO negotiations will be much less abrupt than would otherwise have been the case. Another important feature of the reforms has been a substantial reduction in the dispersion of tariff rates—with the standard deviation of tariffs falling from 32.1 percent in 1992 to 13.1 in 1998. This reduction in the dispersion of tariffs can be expected to greatly reduce the costs of protection. Bach, Martin and Stevens (1996) found that reductions in the variance of tariffs associated with China implementing its (then) proposed WTO accession package accounted for a large share of the benefits.

According to China's Customs authorities, seventy-five percent of imports entered either duty-free or subject to reduced duties. The exempt and reduced categories, with their 1998 import shares in parentheses, were:

1. Processing trade (50 percent, exempted)
2. Initial investment of joint ventures (10 percent, exempted)
3. Bonded warehouse imports (5 percent, exempted)
4. Other exempted/reduced (10 percent, exempted or reduced)

China's heavy reliance on exemptions for goods used in the production of exports as a way to stimulate its export production has clearly stimulated the development of export processing industries that rely heavily on imported intermediate goods. In many respects, this is a good thing, since global manufacturing production is increasingly moving towards production sharing, where the production chain is broken up into many small links, and each of these links is located wherever comparative advantage is greatest (see Ng and Yeats 1999). However, the reliance on high protective barriers and deep exemptions, rather than more comprehensive liberalization, has the disadvantage of discriminating against industries that rely more heavily on domestic value added, rather than imported intermediate inputs. The continued presence of high tariffs on goods used indirectly in the production of exports raises the price of locally produced goods that embody traded goods. Further, protection raises the price of nontraded goods (the so-called real exchange rate effect), and hence discriminates against exports that embody significant amounts of domestic value added. The end result is an export mix like China's that depends heavily on processing-sector exports with little domestic value added.

This problem can be overcome by more comprehensive liberalization. With lower tariffs, the costs of domestic inputs to exporters will fall. This, in turn, can be expected to result in a

shift towards reliance on exports that embody a greater amount of domestic value added. Clearly, this is a favorable development, building well on the export base developed under the period of partial liberalization. However, it is likely to require substantial adjustments in the pattern of China's exports, and hence could be threatened by protection measures such as anti-dumping that tend to resist changes in trade patterns.

China's likely WTO accession package

WTO entry will require China to bring its rules into line with WTO norms in a wide range of areas. Perhaps the most important of these stipulations are those on nondiscrimination between suppliers in accordance with the Most Favoured Nation principle; and the abolition of most nontariff barriers. However, WTO rules require much more, including the implementation of Intellectual property regimes consistent with the TRIPS agreement, Customs Valuation procedures consistent with the agreement on Customs Valuation, safeguards procedures consistent with GATT rules; and standards and phyto-sanitary restrictions on imports. As part of its accession process, China has agreed to undertake some reforms, such as participation in the Government Procurement Agreement, which go beyond the normal requirements of WTO membership.

The Protocol of Accession will also include important stipulations designed to increase the transparency of China's trade regime, including the phasing out of the general restrictions on trading rights. Unfortunately, it is also likely to include transitional procedures that will make it easier for China and its trading partners to impose product-specific protective barriers during the transition period, when China's trade mix is likely to need to adjust sharply in response to liberalization.

In addition, China will make specific commitments to reduce protection in merchandise and services. USTR (1999) reports that China has committed to bind all agricultural and industrial tariffs. The simple average tariff on manufactures is to be reduced to 9.44 percent—a substantial reduction from the 17.4 percent reported in Table 5 for 1998. The simple average tariff for agriculture is reported to be 17 percent—broadly in line with the 1998 estimate in Table 5 for all primary products. China will also commit not to use agricultural export subsidies.

The reductions in tariff protection in manufactures will clearly be an important liberalization step for China. They are to be phased in over the period to 2005, with a limited number of exceptions. The MFA quotas that sharply restrict China's exports of textile and

clothing products are also to be phased out by 2005, or at the latest by 2008. The transition period allows some time for investors to anticipate the changes in competitiveness in the Chinese economy. Because these commitments are given greatly enhanced credibility by being bound at WTO, investors should be able to make plans with much less uncertainty about the trade regime than has been the case in the past.

In agriculture, the main impact of the WTO commitments are likely to operate through induced reductions in uncertainty about agricultural trade policies (Martin 1999). While state trading will be retained for some important commodities, the WTO's rules on state trading impose significant disciplines on the protection that state trading enterprises can provide (Davey 1998). In particular, they require importing state trading enterprises to meet market demand, and restrict their ability to restrict imports to the extent that the domestic price would consistently exceed the agreed tariff binding.

The disciplines on agricultural protection may become extremely important if comparative advantage continues to shift against agriculture in China. In the absence of WTO disciplines, China would almost certainly have followed the general East Asian pattern of sharply rising agricultural protection (Anderson and Hayami 1986).

China has also made important commitments on Services under GATS, including comprehensive commitments on distribution and tourism; and commitments on in a range of areas including telecommunications, insurance, banking, professional services and audiovisual services. The commitments on distribution are particularly important because of the transparency they create, and because they preclude the emergence of *de facto* import barriers through controls on distribution. Importantly, the agreement will include provisions for the phase out of quotas on textiles and clothing exports by 2008.

Growth, Structural Change and Liberalization: Simulation Design

China's economy seems likely to continue growing at a relatively high rate in the early years of the new century, and this process of growth will cause substantial changes in the composition of output. In addition, the liberalization associated with WTO accession are likely to have important implications for the structure of output, and the orientation of production between domestic and international markets. To evaluate the impact of duty exemption on China's economic structure and trade, we assess the likely future growth in Chin's economy using the

standard GTAP Version 4 model of the global economy (Hertel 1997; www.agecon.purdue.edu/gtap) and the new model with duty exemptions, which we refer to as GTAP-DE or GTAP with duty exemptions.

We look at two scenarios – a baseline scenario in which China does not enter the WTO, and a companion scenario under which China and Taiwan, China enter the WTO. The two scenarios are first implemented using standard GTAP as in Martin, Dimaranan and Hertel (1999), and reflect removal of tariffs without distinguishing imports for export production or for domestic use[2]. We then redo the simulations using the new model (GTAP-DE), in which the liberalization affects only import taxes on intermediates for domestic use.

All experiments broadly replicate World Bank projections for overall output growth in each region, and use projections of factor input growth, and a residually determined level of total factor productivity growth to ensure broad consistency between the two. For most countries and regions in the model, protection rates were based on tariffs in (or near) the model's base year of 1995, but for China, the 1997 tariff rates were used.

Because the available projections suggest that the growth of factor endowments in high-regions such as East Asia will be highly unbalanced, the structure of output can be expected to change quite sharply as a result of Rybczynski effects. These pressures for change are in addition to those resulting from Engel effects in consumption, which are incorporated in the model through non-homothetic preferences in the model's consumer demand systems. The simulations have been performed over the period from the model's benchmark year of 1995 to 2005. While this provides only a short "forecast", it does provide an indication of the pressures for change operating over longer or shorter periods of interest. The details of the projection scenario are given in Martin, Hertel and Dimaranan (1999), and Anderson *et al* (2000) and are not presented here for lack of space.

Under the baseline scenario, tariff rates on all industrial products are held constant, and the MFA quotas are projected to grow at the rates determined in each country's agreements. Tariff rates on agricultural products are also held constant, in line with the move to tariffication in the Uruguay Round. Since the MFA quota growth rates for WTO members are subject to quota growth rate acceleration (WTO 1994a), but those for nonmembers such as China are not,

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[2] For consistency with Martin, Dimaranan and Hertel (1999), we use the latest tariff offer made in the WTO's Working Party, which does not reflect concessions made in bilateral negotiations, particularly those with the US and the EU. The final version of this paper will use China's final tariff offer.

the MFA quota growth rates become an increasing burden for China in the absence of WTO accession.

Simulations and Results

The tariff rates for China used in the baseline, and in the case of WTO accession are given in Table 2. The numbers presented in the table highlight the substantial nature of the offer for industrial products. Protection to textiles and apparel products fall dramatically, as does protection to automobiles and electronics. The sharp decline in protection to electronics is undoubtedly related to China's agreement to implement the Information Technology Agreement as part of its accession package. The actual reduction in protection to the automobile sector is even larger than is suggested by these tariff results, since quota protection to this sector is also to be phased out. Overall, the reduction package appears to be an important step towards developing a much more efficient and competitive industrial sector, particularly given some of the largest reductions in protection are in the most highly protected industrial sectors.

Table 2. Weighted average tariffs in China with and without WTO accession		
	Baseline	*With Accession*
	%	%
Foodgrains	0.00	0.00
Feedgrains	3.69	3.69
Oilseeds	11.96	11.96
Meat & livestock	9.97	9.97
Dairy	22.28	22.28
Other agriculture	22.09	22.09
Other food	27.68	27.68
Beverages & tobacco	97.99	97.99
Extractive industries	6.06	2.41
Textiles	36.57	5.78
Wearing apparel	74.87	15.87
Wood & paper	19.81	7.92
Petrochemicals	17.65	10.60
Metals	15.22	7.22
Automobiles	97.60	19.10
Electronics	22.99	5.41
Other manufactures	25.49	10.92

The implications of the baseline growth scenario, and the liberalization scenario for China's share of world output, export, and import markets are shown in Tables 3, 4, and 5.

Columns 2 through 4 refer to results obtained with the standard GTAP model, while columns 5 through 9 present results from the new duty exemptions (GTAP-DE) model. Differences between results in columns 2 and 6 reflect differences in the benchmark data which reflect ALTERTAX adjustments necessary to eliminate import tariffs on exempted imported intermediates in China. Differences between the results in columns 3 and 7, i.e. the baseline projection results that capture the liberalization of all regions except China reflect both modeling and data differences that have an impact on China's output and trade. These differences can be attributed to an important feature of the new model, namely the de-coupling of the export from the domestic prices of commodities which is due to the different cost structure of the two sub-sectors. Columns 4 and 8 present results when China liberalizes and its MFA quotas are removed as a result of its accession to the WTO. In this paper we would like to focus on the predictions of the two models about the change in China's share of world output, exports and imports due to China's accession, i.e. on the comparison of columns 5 and 9 of Tables 3, 4, and 5.

The results in Tables 3, 4, and 5 provide the basis for a number of interesting conclusions and comparisons. The first is the rapid growth in China's share of world output and exports even in the absence of WTO accession. Without accession, China's share of world output is projected to increase from 3.4 to 5.25 percent over the decade, and its share of exports to 4.8 percent. While the accession offer has almost no impact on China's share of world output, it has an enormous impact on the share of trade. With implementation of the accession offer, China's share of world export markets rises to 7.3 percent, and of world import markets, to 7.2 percent.

Table 3 shows that the output predictions without accession do not change significantly when we use the new model in which the liberalization affects only imports for domestic production. In this case China's share of world output is expected to rise from 3.18 to 4.95. With China's accession to the WTO, China's share of world output remains almost unchanged, but its share of world exports jumps to 6.01 percent and its share of world imports to 5.80 percent.

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Table 3. China's Output as a Share of World Output								
	GTAP				GTAP-DE			
	1995	2005			1995	2005		
		Without Accession (3)	With Accession (4)	% Change In Share due to Accession [(4)-(3)]/(3)%		Without Accession (6)	With Accession (7)	% Change In Share due to Accession [(7)-(6)]/(6)%
Foodgrains	14.19	19.38	19.92	2.79	13.11	18.30	18.46	0.87
Feedgrains	8.23	10.40	10.45	0.48	7.61	9.72	9.77	0.51
Oilseeds	5.13	6.22	6.37	2.41	4.82	5.98	6.08	1.67
Meat & livestock	6.72	11.64	12.51	7.47	6.23	11.13	11.44	2.79
Dairy	0.74	1.32	1.50	13.64	0.69	1.25	1.33	6.40
Other agriculture	10.39	15.33	15.69	2.35	9.65	14.71	14.82	0.75
Other food	2.26	3.14	3.17	0.96	2.10	2.95	2.95	0.00
Beverages/tobacco	5.09	7.32	7.50	2.46	4.66	6.86	6.83	-0.44
Extractive industries	8.05	12.25	11.76	-4.00	7.59	11.65	11.33	-2.75
Textiles	10.89	14.03	**12.48**	-11.05	10.37	13.23	**13.22**	-0.08
Wearing apparel	7.03	8.88	**28.01**	215.43	6.87	8.57	**17.54**	104.67
Wood & paper	2.40	3.64	3.42	-6.04	2.26	3.43	3.26	-4.96
Petrochemicals	4.99	7.55	7.23	-4.24	4.71	7.10	6.84	-3.66
Metals	5.44	8.97	8.09	-9.81	5.19	8.42	7.94	-5.70
Automobiles	1.91	3.77	**1.95**	-48.28	1.80	3.47	**0.85**	-75.50
Electronics	2.65	4.55	4.80	5.49	2.56	4.41	4.49	1.81
Other manufactures	6.40	10.42	9.43	-9.50	6.17	9.95	9.46	-4.92
Utilities	2.68	3.88	3.82	-1.55	2.51	3.64	3.56	-2.20
Trade/transport	2.54	3.72	3.78	1.61	2.38	3.49	3.45	-1.15
Construction	3.23	6.10	6.15	0.82	3.04	5.79	5.70	-1.55
Business/finance	0.88	1.33	1.33	0.00	0.83	1.25	1.23	-1.60
Govt services	1.59	2.39	2.44	2.09	1.45	2.24	2.21	-1.34
Total	3.37	5.25	5.25	0.00	3.18	4.95	4.87	-1.62

A comparison of the percentage change in total output share due to accession obtained with the two models (last row of columns 5 and 9, Table 3) suggests that the new model of duty exemptions does not predict a significantly different outcome from the one obtained with standard GTAP. However, a comparison of the percentage change in sectoral output shares (columns 5 and 9, Table 3) revealed the value added from using the new model.

At the sectoral output level, the most important impact of accession is on China's output of textiles, apparel, and automobiles. When standard GTAP is used, the China's share in world apparel output rises dramatically--by 215 percent. When the new duty exemptions model is used, this share rises significantly, but the increase is only half as large as the one predicted with regular GTAP (105 percent). In standard GTAP this share rise is associated with the lifting of the burdens imposed by the MFA on China's exports and by China's protection on the cost structure

of the industry. In the new model, the share rise is attributed mainly to the lifting of the burden imposed by the MFA on China's apparel exports. The duty exemptions have already removed much of the burden of protection on the apparel export sector in China and any additional benefits of removal of tariffs have a relatively small impact on this sector.

Table 4. China's Exports as a Share of World Exports								
	GTAP				*GTAP-DE*			
	1995	*2005*			*1995*	*2005*		
		Without Accession *(3)*	*With Accession* *(4)*	*% Change In Share due to Accession [(4)-(3)]/(3)%*		*Without Accession* *(6)*	*With Accession* *(7)*	*% Change In Share due to Accession [(7)-(6)]/(6)%*
Foodgrains	0.30	0.06	0.04	-33.33	0.30	0.18	0.19	5.56
Feedgrains	0.72	0.12	0.09	-25.00	0.72	0.34	0.36	5.88
Oilseeds	4.05	0.77	0.59	-23.38	4.03	0.94	0.89	-5.32
Meat & livestock	3.50	0.52	0.35	-32.69	3.51	0.58	0.53	-8.62
Dairy	0.08	0.03	0.02	-33.33	0.08	0.04	0.04	0.00
Other agriculture	2.31	0.37	0.28	-24.32	2.30	0.74	0.73	-1.35
Other food	2.60	1.22	1.05	-13.93	2.59	1.06	1.06	0.00
Beverages/tobacco	2.49	1.06	0.88	-16.98	2.49	0.86	0.90	4.65
Extractive industries	1.69	0.12	0.15	25.00	1.68	0.16	0.19	18.75
Textiles	8.52	8.98	10.81	20.38	8.19	8.34	9.84	17.99
Wearing apparel	19.59	18.61	61.26	229.18	19.52	18.23	42.15	131.21
Wood & paper	2.18	2.59	2.81	8.49	2.18	2.50	2.81	12.40
Petrochemicals	2.56	3.06	3.18	3.92	2.54	2.81	3.09	9.96
Metals	3.38	5.46	5.56	1.83	3.37	4.85	5.59	15.26
Automobiles	0.13	0.69	5.61	713.04	0.13	0.45	0.65	44.44
Electronics	4.98	7.80	10.50	34.62	4.96	7.68	8.92	16.15
Other manufactures	5.50	8.08	8.89	10.02	5.48	7.87	9.03	14.74
Utilities	5.76	6.62	7.07	6.80	5.85	5.01	5.53	10.38
Trade/transport	1.70	2.79	2.68	-3.94	1.70	2.43	2.59	6.58
Construction	0.00	0.00	0.00	N/A	0.00	0.00	0.00	N/A
Business/finance	1.92	2.50	2.30	-8.00	1.92	2.35	2.51	6.81
Govt services	1.01	0.62	0.56	-9.68	1.01	0.81	0.87	7.41
Total	3.71	4.79	7.31	52.61	3.70	4.58	6.01	31.22

Table 4 shows that while with standard GTAP, China's share of world export markets for apparel due to accession also increases dramatically by 229 percent, for the reasons mentioned earlier, with the new model this share increases only by 131 percent (columns 5 and 9, Table 4). This suggests that standard GTAP overstates the export expansion of the apparel industry by 75 percent because it does not currently allow for the partial liberalization implicit in the exemption schemes on intermediate inputs used in the production of exports.

A comparison of the predictions with GTAP and the new model reveals also substantial differences between the increase in China's share in world exports of a number of relatively high-tech sectors, such as automobiles and electronics. In GTAP, China experiences very substantial increases in their automobiles export shares under the accession scenario, since the model assumes that costs are reduced substantially following the liberalization. In the new model, costs have already been reduced via duty exemptions, and therefore, the effect of the accession is substantially dampened. For example, while GTAP predicts that China's share of world exports of automobiles will increase by 713 percent due to its accession to the WTO, our model suggests a much lower increase of 44 percent (Table 6). This also suggests that GTAP overstates the export expansion of the automobiles sector by 1520 percent.

On the import side, China becomes a much bigger market for its trading partners following accession to the WTO. A comparison of columns 5 and 9 in Table 5 suggests that standard GTAP substantially overestimates the effect of accession on Chinese imports by sector. Since duty exemptions have lifted the restrictions on imports prior to accession, the new model results in changes in the share of China's imports in total world imports due to accession that are substantially lower than those obtained with GTAP.

Table 6 shows regional welfare changes due to China's accession to the WTO in 2005 computed with GTAP (column 2) and with GTAP-DE (column 3). The numbers in this table confirm that China's accession will have a positive impact on China's economy as the fall in its protection and the removal of barriers on its textile and apparel exports to North America and Western Europe improve the country's competitiveness and efficiency in resource utilization. Developed countries benefit from China's accession as they increase imports to China's market, while other developing countries, mostly in South and South East Asia, that compete with China in third markets lose primarily due to the removal of quotas on Chinese textiles and apparel.

A comparison of the results from GTAP and GTAP-DE reveals that, while the qualitative changes in regional welfare are broadly preserved when the new model is employed, quantitatively the regional welfare changes differ substantially across the two models. Modeling duty exemptions explicitly implies that to a large extent China's liberalization has already been captured prior to accession, and therefore the increase in China's welfare due to accession will be substantially smaller than is suggested by the standard model. Indeed, our model suggests that the reduction in predicted welfare gains is 66 percent! For other regions, this implies that the change in their welfare will be mainly due to the removal of restrictions on Chinese exports and

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Table 5. China's Imports as a Share of World Imports								
	GTAP				GTAP-DE			
	1995	2005			1995	2005		
		Without Accession (3)	With Accession (4)	% Change In Share due to Accession [(4)-(3)]/(3)%		Without Accession (6)	With Accession (7)	% Change In Share due to Accession [(7)-(6)]/(6)%
Foodgrains	6.38	16.02	18.00	12.36	5.87	15.78	16.14	2.28
Feedgrains	3.17	8.98	10.16	13.14	2.90	8.81	9.12	3.52
Oilseeds	1.14	3.91	4.46	14.07	1.11	2.53	2.66	5.14
Meat & livestock	2.03	8.83	11.14	26.16	1.92	7.75	8.84	14.06
Dairy	0.16	0.59	0.73	23.73	0.15	0.53	0.57	7.55
Other agriculture	2.70	9.41	10.43	10.84	2.59	8.18	8.93	9.17
Other food	3.06	6.29	6.79	7.95	2.93	4.80	4.90	2.08
Beverages/tobacco	0.93	1.33	1.47	10.53	0.85	1.23	1.19	-3.25
Extractive industries	1.55	9.04	8.44	-6.64	1.49	8.14	7.95	-2.33
Textiles	13.47	18.10	34.00	87.85	13.14	15.83	21.86	38.09
Wearing apparel	1.04	1.09	3.89	256.88	0.97	0.97	3.24	234.02
Wood & paper	2.56	3.84	4.79	24.74	2.48	3.19	3.57	11.91
Petrochemicals	4.02	5.76	6.34	10.07	3.91	4.60	4.89	6.30
Metals	4.23	5.77	7.13	23.57	4.11	5.08	5.63	10.83
Automobiles	1.96	1.82	6.45	254.40	1.85	1.72	6.73	291.28
Electronics	3.61	5.31	6.51	22.60	3.48	4.92	5.47	11.18
Other manufactures	4.23	5.89	7.85	33.28	3.99	5.54	6.63	19.68
Utilities	1.19	1.71	1.62	-5.26	1.12	1.65	1.47	-10.91
Trade/transport	2.04	2.42	2.45	1.24	1.89	2.27	2.12	-6.61
Construction	1.82	2.82	2.88	2.13	1.68	2.65	2.57	-3.02
Business/finance	1.49	1.95	2.05	5.13	1.36	1.83	1.74	-4.92
Govt services	0.72	1.31	1.39	6.11	0.66	1.24	1.17	-5.65
Total	3.36	5.33	7.22	35.46	3.21	4.75	5.80	22.11

Table 6. Welfare Change due to China's Accession to the WTO in 2005 ($US Millions)		
	GTAP	GTAP-DE
North America	11845	7234
Western Europe	10430	6387
Australia and New Zealand	450	234
Japan	4427	2045
China	35604	12111
Taiwan	5517	2763
Other NICs	5600	2384
Indonesia	-149	-73
Other Southeast Asia	-288	-233
India	-4350	-2562
Other South Asia	-1085	-574
Brazil	219	57
Other Latin America	240	59
Turkey	-339	-142
Other Middle East & North Africa	10	-68
Economies in Transition	99	-25
South African Customs Union	93	73
Other Sub-Saharan Africa	84	-7
Rest of World	-346	-208
Total	68059	29454

not so much due to removal of China's import tariffs. This, in turn, translates into smaller gains for developed countries and larger loses for developing countries when duty exemptions are modeled explicitly.

Conclusions

Concessional import rights, such as duty exemptions, which override existing protection, have been an important element of the process of gradual trade liberalization that boosted growth in China. Despite the vast importance of these "new trade liberalization" instruments in China and other developing countries, they have been given relatively little attention both in trade negotiations and in multilateral trade liberalization studies. Standard global trade models have largely abstracted from the presence of concessional imports, while trade liberalization studies using these models have at best only acknowledged their importance and have not offered in-depth solution to the problem.

To evaluate the importance of duty exemptions for trade analysis we develop a new global framework in which the effects of policy reform are differentiated based on the trade

orientation of the firms. We then conduct a comparative analysis of the impact of China's accession to the WTO on the country's economy using a traditional global trade model (GTAP) and the new modeling framework (GTAP-DE). For the purpose we implement a baseline scenario, in which China does not enter the WTO, and a second one, in which both China and Taiwan enter the WTO, first with the GTAP model and then with the new model. Our findings are that:

(a) both models lead to very similar changes in China's share in world output;

(b) changes in *sectoral* output shares and export shares due to accession differ significantly across the two models; these differences reflect the fact that in many sectors duty exemptions have already reduced costs substantially;

(c) the new model predicts much lower changes in import shares due to accession than those obtained with GTAP; this is because duty exemptions in China have lifted the restrictions on imports prior to accession;

(d) welfare increases due to China's accession will be significantly lower in the new model-- the change in welfare in this case arises more from removal of restrictions on Chinese exports, rather than from removal of China's import tariffs.

Our results suggest that trade liberalization studies focusing on regions, in which import concessions play an important role, must treat the new trade liberalization measures explicitly in order to avoid serious errors in their sectoral, export and import predictions.

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