Evaluating Accession to WTO by China and Chinese Taipei

by

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Abstract

China is the biggest beneficiary of WTO accession, followed by Taiwan, China and the industrialized and newly industrialized economies. Developing economies competing with China in third market may lose, but their losses are relatively small. China has already benefited from reforms between 1995 and 2001 (US$26.7 billion) and additional reforms will lead to a much smaller gain of around $US6 billion. However, accession will have important distributional consequences for China. Wages of skilled workers and wages of unskilled non-farm workers will rise in real terms and relative to wages of farmers. Reduction in agricultural protection lowers the attractiveness of farming implying that some farmers may be hurt by WTO accession. To help these vulnerable groups the Chinese government could fine tune its current policies. Possible policy changes include increased education spending and reform (abolition) of the hukou system.

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Trade policy reforms such as those flowing from accession to the WTO lead to changes in policy instruments such as tariffs, nontariff barriers and the rules of the trading system. However, the main interest of policy makers in trade policy is its impacts on key economic indicators such as prices, quantities, factor returns and household incomes. The objective of this paper is to assess some of the broad impacts of China's and Chinese Taipei's accession, and key supporting policies, on key variables such as prices, quantities and real incomes.

The obvious instrument for performing this assessment is the computable general equilibrium model. Many such models now exist and a cottage industry has emerged in generating such estimates (Gilbert and Wahl, 2001). The availability of the internationally standard GTAP modeling framework has facilitated such modeling work, and reduced the burden involved in obtaining estimates of basic information such as trade flows, and patterns of production and consumption. Unfortunately, generally available modeling frameworks such as the GTAP model (Hertel, 1997; www.gtap.org) cannot readily account for some of the non-standard features of economies such as China, where many imports enter duty-free if used in the production of exports; labor market policies result in serious barriers between urban and rural; and many features of trade policies cannot readily be captured by simple tariff equivalent measures.

Because China is one of the economies we focus on in this study, we have invested heavily in identifying the particular features of China's economy that needed to be addressed in modeling trade reforms. We have also invested in accurately assessing the impacts of the policy reforms required by accession on the economies of China and Chinese Taipei. Like Ianchovichina and Martin (2001), we explicitly allow for the duty exemption arrangements that result in close to half of China's imports entering duty free as inputs into the production of exports. We extend that work in several dimensions, however, particularly by moving to the GTAP Version 5 database for 1997 from the previous 1995 base year; by incorporating improved estimates of protection and the effects of liberalization as described in the final, multilateral agreements;[1] by allowing for the consequences of major labor market distortions in China (Sicular and Zhao, 2002); and by taking into account the effects of restructuring on the automobile sector in China and the liberalization of the agricultural sector (Huang and Rozelle, 2002) and the service sectors in China (Francois, 2002).

The quantitative evaluation reported in this paper is of interest in its own right, because it provides indications of the extent to which key quantities and prices can be expected to adjust to the changes resulting from WTO accession. It also provides a basis for evaluating the impact of WTO accession on households, and particularly poor households in China. Because the model that we utilize is so comprehensively documented in Hertel (1997) and the GTAP web site (www.gtap.org), we do not discuss the structure of the model in this paper but instead focus on the changes made to it.

[1] We use updated estimated of protection for Taiwan, as well as Taiwan's final WTO offer.

In the next section of the paper, we examine some of the key assessments made in formulating the analysis reported in this paper. Then, in the third section, we describe the experimental design and examine the specific shocks imposed on the model. Following this, we examine the results from the simulation analysis. Finally, we make some concluding remarks.

Methodology

The first major adjustment we made to GTAP was to incorporate the special implications of the export processing system applying in China. As Rodrik (2001) has emphasized, China's reductions in tariffs and nontariff barriers followed its initiation of reforms by a decade or more. However, the introduction of export processing schemes that gave exporters access to intermediate inputs at world prices came very early in the reform process. Ianchovichina, Martin and Fukase (2000) show that failure to account of China's duty exemption in the analysis of WTO accession will overstate the increase in China's export share of apparel by as much as 60 percent, and the increase in China's welfare by roughly 50 percent. We also consider the implications of some of China's key labor market mechanisms and institutions for the structure of the model.

Export Processing Arrangements

Export processing arrangements in China take many forms, from formal, fenced duty-free zones through open cities to plants outside these areas undertaking export processing through duty exemption arrangements. A common feature of all of these arrangements is that they allow firms to import intermediate inputs at world prices in order to produce and export finished goods.

These arrangements have been implemented in the special version of the GTAP model used in this study by creating two activities for each sector. In those sectors covered or potentially covered by export processing arrangements one sector is specialized in production for export, while the other is specialized in production for the domestic market.[2] The choice to fully separate domestic and export production is necessary to simplify the representation of the trade regime in an already large global model. It is also a fairly accurate depiction of the trade regime in China where duty drawbacks have been used as export promotion instruments while protection was maintained in the rest of the economy. In China the rules of the export processing system and the local-content requirements have in effect created a dual market structure with local (domestic) and export (international) markets being to a large extent segmented. The tax arrangements for export processing[3] discourage export processors from selling in the local market. The

[2] Some sectors, particularly the service sectors do not participate in export processing arrangements, and so are not allowed duty-exempted intermediate inputs for use in the production of exports.

[3] The tax arrangements referred to include duty/VAT exemptions on imported intermediate inputs and VAT refunds on domestic intermediates inputs used in the production of exports.

arrangements also encourage ordinary exporters[4] to use mainly domestic, and not imported, intermediates. The local content requirement and foreign exchange balancing rules,[5] and the tax arrangements have restricted the ability of companies selling locally to use imported intermediates.

The export-specialized sector uses all imported intermediates that are used for the production of exports and we assume that all imported intermediates used by the export sector are either exempt from duties or are eligible for refunds on the import tax paid. This assumption is a fairly accurate representation of the situation in China. According to China's Customs, in 2000, 60 percent of imports entered China duty-free, out of which 41 percentage points were imports used for export processing, 13 percentage points were capital goods, and 6 percentage points were goods that fall in the special categories, such as materials used by research institutions, etc. Input-output information for 1995 from the Global Trade Analysis Project database v. 4. (McDougall, 1997) suggests that 23 percent of imports in China were used to produce for the domestic market, and only an estimated 3 percent were used to produce ordinary exports.[6] Therefore, the vast majority of exports were produced with intermediate imports that benefited from the duty drawbacks system.

The domestic and export-oriented sectors were initially created by dividing the intermediate inputs into each sector in proportion to the export and domestic shares of output. However, this yielded unsatisfactory results with, in particular, the database showing insufficient use on imported intermediates in the export sector. In some cases, the reported imports of duty-free intermediate inputs for export production obtained from China Customs (Li Yan, personal communication) exceeded total intermediate use obtained from the input-output table. There are several possible explanations for this phenomenon, ranging from simple data errors, through strong substitution towards the duty-free intermediates in the export processing sectors to fraudulent misclassification of intermediates not destined for exports. The response adopted in this paper was to begin with equal intermediate shares in domestically and export-oriented activities, and then to allow for increased use of imported intermediates in the export sector in accordance with the elasticities of substitution between domestic and intermediate goods in the model. This increased the import-intensity of the exporting sectors.[7]

China's Labor Market Policies

[4] Ordinary exporters, unlike export processors, use mainly domestic materials. Exports produced using domestic intermediates or duty/VAT paid imported materials fall into the customs regime of "ordinary" exports. This type of exports are a major source of China's foreign exchange income.

[5] The local content requirements and foreign exchange balancing rules typically require companies selling domestically to source 70-80 percent from domestic producers and to finance imports by selling exports. These rules are being removed as a result of WTO accession.

[6] According to GTAP v.4 14% of imports are for final consumption and according to China's Customs 40% of imports are ordinary imports that are not duty exempt. This means that approximately 26% are ordinary imports used as intermediates. According to GTAP v. 4 China's firms export on average 10% of its output implying that only 3% of imports are used for the production of ordinary exports.

[7] It more than doubled the share of imports used by the export-specialized sector implied in the GTAP data base. Still this share, estimated to be 25%, is lower than the one implied by Customs data (41%) for 2000.

China's labor market policies have introduced a substantial barrier to mobility between rural and urban activities. Rural workers tend to be reluctant to permanently cut their ties with the rural sector because doing so may mean losing the returns from family-owned land which could be important as a form of old-age insurance, as well as the direct support and assistance of family members (Hussain, 2002). It is frequently possible to move from a rural area to a large urban area on a temporary basis, although quantitative restrictions are frequently imposed on such movements, and social welfare benefits such as health care and schooling for children typically enjoyed by urban residents are not available to such migrants. While it is possible, under some circumstances, to overcome these problems by purchasing a residence permit (a *hukou*), this imposes an additional cost on migrants from rural to urban areas, a group with particularly limited access to capital.

These policies, and the general tendency for prime-age agricultural workers to be reluctant to move from rural to urban sectors during rapid industrialization because of the sector-specific nature of much of their human capital (Tweeten, 1979), have contributed to a very large gap in labor returns and incomes between the rural and urban labor markets. The income per head of workers engaged in agriculture is only about one-third that of urban workers (World Bank, 2002). This difference does not provide an accurate indication of the difference in income created by barriers to mobility between the sectors, because urban workers typically have higher skills, work more intensively than rural workers, and face higher costs of living than rural workers.

To capture these different factors, we concluded that it was necessary to introduce both an implicit "tax" wedge between agricultural and non-agricultural employment, and to allow for imperfect transformation between unskilled workers in agricultural and non-agricultural employment. The "tax" wedge is designed to reflect the pure policy-induced barriers between rural and urban workers, such as the requirement for a residence permit in urban areas. The imperfect transformation is designed to reflect the imperfect substitution between unskilled workers with rural residence and rural workers, and the ability to transform agricultural workers into non-agricultural workers by a range of means including training, and creating industrial jobs in rural settings.

We represented the imperfect transformation between agricultural and non-agricultural workers using a constant-elasticity-of-transformation between workers in agriculture and workers in other sectors:

$$L_{NF} / L_F = \alpha (W_{NF} / W_F)^{\sigma},$$

where α is a constant term; L is the number of workers; W is the wage; the subscripts NF and F stand for nonfarm and farm types of employment and σ is the elasticity of transformation. The value of the elasticity of transformation σ is set at 1.32 based on an analysis of mobility between agricultural and non-agricultural sectors by Sicular and Zhao (2002). The pure "wedge" between rural and urban was estimated at 34 percent by Sicular and Zhao (2002) after adjusting for the differences in skills and work effort between rural and urban workers.

The inclusion of this implicit tax wedge between agricultural and non-agricultural sectors could potentially have important implications for welfare results in the model. If an analysis is undertaken that results in large numbers of workers moving from agricultural to non-agricultural employment, there are likely to be important welfare consequences because of the large differences in rates of labor returns between sectors.

Trade policies as part of WTO accession

We consider next the implications of reforms that have taken place in China's and Taiwan's trade policies during recent years.

Changes in China's Trade Policies

The reform process during the 1980s focused heavily on changing the qualitative nature of the trade regime, from a planned system to a system driven by price-based instruments. By the beginning of the 1990s, the coverage of nontariff barriers remained high, as did tariff rates. Over the course of the 1990's China has made substantial progress in reducing the number and coverage of nontariff barriers in its trade regime, reducing tariffs, as well as abolishing the trade distortions created by the exchange rate regime.

Lardy (2001) estimates that the number of tariff lines subject to quotas and licenses fell from 1247 tariff lines in 1992 to 261 in 1999. In 2001, an estimated 257 tariff lines were covered by a combination of licenses and quotas and 47 by licenses only, while 245 were subject to designated trading and 84 to state trading. Tendering and other registration requirements, primarily for machinery and electrical products, covered an additional 120 tariff lines. By 2001, nontariff barriers of one kind or another covered 664 tariff lines, or less than 10 percent of total tariff lines (see Appendix Table A.1), with over a third of these being subject to designated trading, which is generally regarded as one of the less intrusive forms of quantitative restriction employed in China.

Examination of data on NTB frequency alone may be misleading because of the enormous variations in the importance of tariff lines. To gain some indication of the potential importance of nontariff barriers, the import coverage of the key nontariff barriers was calculated using data on nontariff barrier coverage of tariff lines, and import data by tariff line. For 1996, the trade data used were for 1992, while for 2001, the data used were for the year 2000.

Table 1. Changes in the import coverage of nontariff barriers from 1996 to 2001

	Licenses & Quotas	Tendering	Licensing only	State Trading	Designated Trading	Any NTB	No NTBs	Total
	%	%	%	%	%	%	%	%
2001	12.8	2.7	0.5	9.5	6.2	21.6	78.4	100
1996	18.5	7.4	2.2	11.0	7.3	32.5	67.5	100

Note: Calculations for 2001 performed by Mei Zhen during an internship at the World Bank.

The import coverage of NTBs in China has fallen from 32.5 percent in 1996 (World Bank 1997b, p15) to 21.6 percent in 2001 (see Appendix Table A.2). The coverage of import

licensing has fallen from 18.5 percent in 1996 to 12.8 percent in 2001, while the coverage of state trading has fallen from 11 percent to 9.5 percent. The import coverage of tendering requirements has fallen particularly rapidly, from 7.4 percent in 1996 to 2.7 percent in 2001.

Appendix Table A.3 shows the importance of particular commodity imports covered by a range of nontariff barriers. The table reveals that oil imports were by far the largest import subject to NTBs, and accounted for almost half the value of restricted goods. Ferrous metals, subject to designated trading arrangements, were the second most important category. While agricultural nontariff barriers, and particularly state trading, have received particular attention (see Martin, 2001b for example) agricultural imports account for a similar proportion on NTB restricted imports (5.7 percent) as their share of total imports (5.1 percent). Within state trading, imports of oil and oil products were particularly dominant, accounting for 84 percent of total imports subject to state trading.

The average protective impact of the complete set of nontariff barriers in China was estimated (very crudely) to be 9.3 percent in the mid-1990s (World Bank, 1997), with most of the protective effect arising from license and quota-constrained goods. The protective effect of these nontariff barriers has clearly declined since this estimate was made because of the progressive phase-out of NTBs, a standstill on introduction of new NTBs during the accession process, and a likely reduction in the severity with which many of these measures have been used to restrict imports. Within agriculture, however, there are indications that some of these measures have been used in a way that reduced negative rates of protection and increased some positive levels of protection (Martin, 2001a) and this is the subject of the work by Huang and Rozelle (2002). Using a naïve rule of thumb that protection provided by NTBs declines with their import coverage would suggest that the protective impact of NTBs is no more than around 5 percent.

The pace of tariff reform in China has also been rapid. While average tariffs were very high in the early 1990s, they fell sharply after 1994. A significant tariff reform in October 1997, reduced average tariffs significantly below 20 percent. Three subsequent tariff reductions, on January 1 of 1999, 2000 and 2001 have further reduced tariffs on a wide range of items. Some basic data on trends in average tariff rates are given in Table 2, together with an assessment of the average tariff rates applying after China's Accession to the WTO.

The progressive reductions in tariffs between 1992 and 2001 reduced average tariffs to a third of their original levels, with larger than average cuts in the manufacturing sector. These cuts reduced average tariff levels by over 25 percentage points. These reductions mean that the future reductions in tariffs required under the WTO accession agreement are much smaller in percentage points than the reductions that have occurred to date. As a consequence, the fall in tariffs to the levels proposed in the 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 10 percent in 2001.

Table 2. Changes in average statutory 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
1999	17.2	14.2	21.8	21.8	16.8	13.4
2000	17.0	14.1	22.4	19.5	16.6	13.3
2001	16.6	12.0	21.6	17.7	16.2	13.0
Post-Accession	9.8	5.4	13.2	4.0	9.5	5.7

*Source: World Bank (1999, p340) to 1998. Authors' calculations for tariff lines with imports from 1999 and China's final WTO offer. CDS Consulting Co. provided applied tariffs for 2001. Trade data come from COMTRADE.

Table 3 shows weighted average applied tariffs for 1995 and 2001 and post-accession bound tariffs[8] by product. In calculating these numbers, we have been able to draw on the details of the accession agreements provided on the WTO web site. In earlier studies, we were forced to rely on information from bilateral agreements such as those between the United States and China, and the EU and China. Only with the integration of the bilateral offers into a consolidated agreement has it become possible to make a definitive assessment of the degree of trade liberalization implicit in China's Accession Agreement.

The numbers suggest that substantial merchandise trade liberalization has occurred in China over the period 1995-2001. Weighted average tariffs dropped substantially for wheat, beverages and tobacco, textiles and apparel, light manufactures, petrochemicals, metals, automobiles, electronics. Analysis by Huang and Rozelle (2002) suggests that some agricultural commodities such as vegetables and fruits, livestock and meat, and rice faced negative protection in 1995. Protection on these commodities rose (or negative protection fell) over the period 1995-2001. It is not expected that accession will lead to a significant fall in protection on most agricultural commodities after 2001. Import protection is expected to remain unchanged for most commodities except oilseeds, sugar and dairy products.

Protection will continue to fall for all other merchandise commodities with especially big cuts for processed food, beverages and tobacco, automobiles, electronics, and other manufactures. Francois (2002) finds that liberalization of the automobile sector will be accompanied by a massive restructuring of the industry to realize economies of scale. This restructuring is expected to lead to a 20% productivity boost for car assembly

[8] These are the lesser of 2001 applied and post-accession bindings.

operations. Furthermore, Francois (2002) estimates that protection on trade in services will be halved between 2001 and the post-accession period.

With accession to the WTO China will have to remove all export subsidies. Huang and Rozelle (2002) estimate that in 2001 there were 32% subsidy on feedgrains and 10% subsidy on plant-based fibers. These will be abolished in the post-accession period as China has committed to zero export subsidies in the post-Accession period.

Table 3. Pre- and post-accession protection by sector (tariff or tariff equivalent)

	China			Chinese Taipei		
	1995	2001	Post-accession	1997	2001	Post-accession
Rice	-5.0	-3.3	-3.3	1.9	0.0	0.0
Wheat	25.0	12.0	12.0	6.5	6.5	6.5
Feedgrains	20.0	32.0	32.0	1.0	1.0	0.0
Vegetables & fruits	-10.0	-4.0	-4.0	35.7	**36.9**	**16.0**
Oilseeds	30.0	20.0	3.0	1.8	0.8	0.2
Sugar	44.0	40.0	20.0	22.1	25.8	22.7
Plantfibers	20.0	17.0	20.0	0.0	0.0	0.0
Livestock & meat	-20.0	-15.0	-15.0	7.5	6.5	4.0
Dairy	30.0	30.0	11.0	16.6	9.3	5.9
Processed food	20.1	26.2	9.9	14.9	14.2	9.9
Beverages & tobacco	137.2	43.2	15.6	48.1	**22.0**	**13.0**
Extract	3.4	1.0	0.6	5.5	5.5	4.1
Textiles	56.0	21.6	8.9	6.1	6.3	5.6
Apparel	76.1	23.7	14.9	12.8	13.4	11.2
Light manufactures	32.3	12.3	8.4	4.0	4.1	3.4
Petrochemicals	20.2	12.8	7.1	4.2	4.2	2.9
Metals	17.4	8.9	5.7	4.0	3.8	1.5
Automobiles	123.1	28.9	13.8	23.9	**21.5**	**13.3**
Electronics	24.4	10.3	2.3	2.9	0.5	0.3
Other manufactures	22.0	12.9	6.6	4.4	3.3	2.1
Trade & transport	1.9	1.9	0.9	1.3	1.3	0.7
Construction	13.7	13.7	6.8	5.9	5.9	2.9
Communications	9.2	9.2	4.6	9.2	9.2	4.6
Commercial Services	29.4	29.4	14.7	3.7	3.7	1.9
Other services	24.5	24.5	12.7	7.1	7.1	3.5
Total merchandise trade*	21.3	12.2	6.3	5.1	4.5	3.1

* If 1997 trade weights are used the total weighted average tariffs in 2001 and 2007 are 12.0% and 5.4%, respectively, for China, and 4.0% and 2.5%, respectively, for Taiwan.

Changes in China's Partners' Policies

The arrangements for textiles and clothing will be particularly important for China. Unlike most other developing economy exporters, China was excluded from the Uruguay

Round Agreement on Textiles and Clothing.[9] This means that China has not benefited from the integration of textile and clothing products into GATT or the increases in quota growth rates provided for under this agreement and the export tax equivalents of these measures have risen. Under the accession agreement, China will benefit immediately from the integration of textiles and clothing into GATT, and hence abolition of quotas, and the increases in quota growth rates, that have occurred since 1994 (WTO, 1994a). All existing quotas are to be phased out by 2005. Importing economies will be allowed to introduce special textile safeguards during the period 2005-2007, but these will be effective for only one year at a time. It seems likely that they will be less popular than the general transitional product safeguards that are also contained in the agreement. This aspect of the agreement is the only important case where China will benefit in terms of improved market access—all of the other benefits will arise from China's commitments to reduce its own barriers.

The agreement allows China's trading partners to continue to apply non-market economy rules in antidumping action cases against Chinese exporters for up to 15 years after accession. As noted by Messerlin (2002), these rules make it easier for antidumping measures to be applied—even when no dumping is occurring. During this period, China as a whole, or particular groups of Chinese firms may seek to be treated as operating in a market environment. Eventually, this agreement will provide relief to China from the discriminatory non-market economy provisions. However, we have not considered this benefit in our analysis because of the great uncertainty about how long this will take.

The accession agreement also includes a Transitional Product Safeguard mechanism which allows China's trading partners to take safeguard actions under rules that are more liberal than the regular safeguard rules of the WTO (Messerlin, 2002). While such safeguards were probably inevitable for such a fast-growing exporter as China, these provisions have the regrettable implication of introducing a new form of protection against China. Further, these provisions allow third economies to impose (under poorly-defined conditions) barriers against exports claimed to be diverted from markets by safeguard measures. These potential dangers need to be weighed against the substantial gains to China from being able to take action against economies imposing GATT-inconsistent barriers against her exports. In light of these offsetting gains and losses, we have assumed, for our illustrative analysis, that the net effect of these terms is zero.

Changes in Chinese Taipei's Trade Policies

We have considered the following aspects of Chinese Taipei's market access commitments for WTO membership - liberalization of merchandise trade as captured by reduction in tariff barriers and services liberalization. The impact of improved market access due to the removal of textile and apparel quotas for Taiwan in Western European and North American markets.

With the completion of all the scheduled tariff reductions on merchandise trade, Chinese Taipei's already low average tariffs, which were around 4.5% in 2001, will fall by about

[9] This agreement applied only to members of the GATT 1947.

almost one and a half percentage points to 3.1%. Chinese Taipei has committed to a tariff reductions on thousands of industrial and agricultural product lines, a gradual phase-out of tariffs on a number of products as part of the Zero-for-Zero program of the Uruguay Round,[10] and reduction in tariffs as part of the Chemical Harmonization program. According to this program Taiwan has agreed to reduce tariff rates on finished chemical products to 6.5 percent, on intermediate chemical products to 5.5 percent, and on basic chemical products and those with medicinal applications to 0 percent. In accordance with the Information Technology Agreement (ITA) Tariffs on the vast majority of products related to information technology were reduced in 2000. The result is a near zero tariff (0.5 percent) on electronics products when accession was agreed in 2001 (Table 3).

Taiwan has eliminated area restrictions applied to some agricultural products,[11] implemented tariff-rate quotas on twenty-two agricultural and fisheries products formerly subject to import restrictions, and agreed to construct transparent sanitary and phytosanitary regulations. Taiwan has eliminated export subsidies and local content requirements on the domestic production of automobiles, and replaced area restrictions on imports of automobiles with tariff-rate quotas. Taiwan will eliminate the import ban on passenger cars with diesel engines in 2003. However, we have not considered in our analysis the benefit of removal of nontariff barriers for the manufacturing sector.

We have considered also the opening of Taiwan's service sector, which reflects Taiwan's horizontal and sector-specific commitments for the following sectors: business, communication, construction, engineering, distribution, education, environmental, financial, health, social, transport services, tourism and recreation. Francois (2002) estimated that Taiwan's WTO accession will halve nontariff barriers for the services sector.

The accession agreement includes other important stipulations such as the abolition of the monopoly on the manufacture and sale of tobacco and alcohol products in Taiwan, conformity with the WTO's Government Procurement Agreement (GPA) and the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPSs).

Experimental Design

We evaluate the impact of accession in a dynamic context taking into account China's relatively high growth rate expected during the first decade of the 21st century, the growth of Taiwan, China and the growth rate of their trading partners. To evaluate the impact of accession in this dynamic context, we construct a baseline scenario, in which China does not enter the WTO, for the period between 1997 and 2007. We consider the liberalization since 1995 to have been undertaken as part of the accession process, so in order to estimate the full impact of WTO accession we adjust 1997 protection in China in the

[10] Tariffs applied on a number of products will be phased out on a pre-determined schedule of annual reductions. These products include selected liquors, pharmaceuticals, medial equipment, furniture, paper products, farm equipment, toys, construction equipment steel, beer and others.
[11] They include peaches, lemons, apples, grapes, pears, grapefruit and others.

benchmark data (GTAP version 5) to 1995 levels.[12] The baseline broadly replicated World Bank projections for overall growth in each region, and uses projections of factor input growth and a residually determined level of total factor productivity growth to ensure consistency between the two given the theory in the model (Table 4).

We then evaluate the impact of WTO accession and the trade liberalization that has taken place in China between 1995 and 2001, by conducting two scenarios. The first one assesses the impact of the fall in tariffs from 1995 to 2001 levels and the restructuring of the automobile sector that has accompanied the removal of tariffs on autos and auto parts. The second one assesses the impact of the fall in tariffs to post accession (2007) tariff levels, the liberalization of the service sectors, the restructuring of the automobile sector, the removal of the quotas on China's clothing and textiles exports, and the removal of agricultural export subsidies. The first scenario implies that the reductions in applied rates of protection between 1995 and 2001 were part of the preparations for WTO accession. The difference between the two scenarios isolates the adjustment to WTO accession policies that is going to take place after 2001.

We use the same macro closure for all experiments – full employment, perfect mobility of skilled and unskilled workers between nonagricultural sectors and perfect mobility of unskilled workers within agriculture. We make the working assumptions that there is little change in international capital flows, and China's and Chinese Taipei's trade balances are therefore fixed as a share of their GDP. This treatment is preferred since the model is static in nature. We also assume that taxes lost due to trade liberalization are replaced via a uniform consumption tax affecting both private and government final consumption.[13]

[12] This adjustment is made with ALTERTAX so that the consistency and the shares in the GTAP database are preserved.
[13] This tax is designed to be non-destortionary.

Table 4. Percentage Growth Rates over the Period 1997-2007 (annual rates in parentheses)

Regions	Population	Unskilled Labor	Skilled Labor	Capital	Manufacturing TFP*
North America	11	11	12	49	High
	(1.05)	(1.08)	(1.11)	(4.07)	
Western Europe	0	-1	1	30	High
	(0.03)	(-0.08)	(0.07)	(2.69)	
Australia/New Zealand	10	12	10	55	High
	(0.98)	(1.14)	(0.99)	(4.45)	
Japan	1	-2	-7	35	Medium
	(0.06)	(-0.19)	(-0.71)	(3.02)	
China	8	13	50	174	High
	(0.81)	(1.26)	(4.15)	(10.62)	
Taiwan, China	9	11	14	96	High
	(0.86)	(1.05)	(1.36)	(6.97)	
Other NICs	10	-1	55	88	Medium
	(0.93)	(-0.10)	(4.47)	(6.53)	
Indonesia	16	17	123	25	Low
	(1.50)	(1.59)	(8.36)	(2.27)	
Vietnam	15	32	36	111	Medium
	(1.40)	(2.79)	(3.10)	(7.78)	
Other Southeast Asia	18	22	134	60	Low
	(1.70)	(2.04)	(8.87)	(4.83)	
India	18	23	78	88	Medium
	(1.67)	(2.10)	(5.92)	(6.54)	
Other South Asia	25	30	80	72	Medium
	(2.22)	(2.69)	(6.06)	(5.55)	
Brazil	14	19	72	31	Medium
	(1.31)	(1.77)	(5.60)	(2.75)	
Other Latin America	18	6	90	54	Low
	(1.68)	(0.57)	(6.65)	(4.42)	
Turkey	16	19	107	55	Low
	(1.47)	(1.75)	(7.55)	(4.46)	
Other Middle East & North Africa	24	37	67	28	Low
	(2.16)	(3.23)	(5.24)	(2.50)	
Economies in Transition	-1	6	9	33	High
	(-0.11)	(0.56)	(0.90)	(2.88)	
South African Customs Union	15	31	47	34	Low
	(1.39)	(2.76)	(3.92)	(2.94)	
Other Sub-Saharan Africa	30	40	54	38	Medium
	(2.65)	(3.42)	(4.42)	(3.26)	
Rest of World	18	23	35	68	Low
	(1.63)	(2.10)	(3.05)	(5.32)	

*The low, medium, and high growth assumptions for total factor productivity (TFP) in manufacturing correspond to annual growth rates of 0.1%, 1.0%, and above 2.0% (between 2% and 4%), respectively.

Assessment of China's and Chinese Taipei's WTO Accession

Impact on China

The removal of quotas on apparel and textiles gives a significant boost to the textile and apparel sectors in China. Output and employment in these sectors rises by about 16 percent and 57 percent, respectively (Table 5). The expansion of textiles and apparel in turn stimulates the production of plant-based fibers (mainly cotton) which increases by 16 percent as a result of accession. Output and employment in the other agricultural sectors with the exception of livestock are expected to fall as unskilled agricultural labor moves into the textile and apparel sectors and unskilled non-farm real wages rise. Sugar and oilseeds contract more than other farm sectors as a result of falling protection. Tariffs on sugar fall from 40 percent to 20 percent, while tariffs on oilseed fall from 20 percent to 3 percent. Protection on other agricultural sectors is assumed to remain almost unchanged. The automobile sector and the electronics sector also expand slightly creating opportunities for skilled labor mainly. Results suggest that approximately 6 million people will leave their farm jobs in China as a result of WTO accession reform after 2001 in pursuit of employment in the non agricultural sectors.

Real wholesale prices fall due to trade liberalization. Retail prices reflect a uniform consumption tax of 2.6 percent levied to compensate for the loss of tariff revenue. The fall in the real retail prices of some products reflects a larger than proportionate drop in protection on these products, e.g. beverages and tobacco, automobiles, and sugar.

Increased demand for nonagricultural labor means higher real nonfarm wages and higher returns to nonagricultural relative to agricultural labor. Removal of protection on some agricultural sectors additionally lowers the attractiveness of farming and implies that returns to farm labor and land will fall making farming less attractive. Real farm wages fall by 1.5 percent and the real rental price of land falls by 6.4 percent. The decline in farm incomes and the rise in the real retail price of many nonfarm products implies that farmers in remote areas may be hurt by WTO accession. Nonfarm wages rise by 0.5 percent and skilled labor wages rise by 0.1 percent implying that workers in urban centers will be better off as a result of WTO accession.

Table 5. Changes in China's output, employment, and trade due to WTO accession for the period after 2001

	Output	Employment	Exports	Imports	Trade Balance	Wholesale prices	Consumer prices
Rice	-2.1	-2.3	6.1	-7.1	64	-1.7	0.9
Wheat	-2.0	-2.3	18.9	-10.1	174	-2.5	0.4
Feedgrains	-2.3	-2.6	-77.8	-2.4	-596	-2.8	1.9
Vegetables and fruits	-3.4	-3.7	14.6	-6.3	214	-2.7	-0.1
Oilseeds	-7.9	-8.4	29.8	20.9	-789	-3.6	-4.7
Sugar	-6.5	-7.4	13.9	24.1	-73	-2.7	-3.1
Plant based fibers	15.8	16.4	-51.8	7.7	-189	-0.8	3.1
Livestock & meat	1.3	1.1	15.5	-8.9	837	-2.5	0.2
Dairy	-2.0	-2.4	13.5	23.8	-143	-2.3	0.2
Other food	-5.9	-6.4	11.4	62.6	-3460	-2.5	-1.8
Beverages & tobacco	-33.0	-33.1	9.7	112.4	-14222	-2.7	-6.9
Extractive industries	-1.0	-1.3	7.5	-4.4	2088	-1.5	1.2
Textiles	15.6	15.5	32.7	38.5	-10366	-2.6	-3.2
Apparel	57.3	56.1	105.8	30.9	49690	-1.4	-1.9
Light manufacturing	3.7	3.7	5.9	6.8	1786	-1.7	0.0
Petrochemical industry	-2.3	-2.3	3.1	11.8	-8810	-1.5	0.8
Metals	-2.1	-2.1	3.7	6.8	-1893	-1.2	1.3
Autos	1.4	-2.2	27.7	24.0	516	-4.7	-4.2
Electronics	0.6	0.4	6.7	6.8	453	-2.1	-1.7
Other manufactures	-2.1	-2.2	4.1	18.9	-11291	-1.4	0.8
Trade and transport	0.0	0.0	0.8	-0.4	493	-1.0	1.6
Construction	0.9	0.9	2.7	17.5	-436	-1.0	1.7
Communication	-0.5	-0.5	-0.5	10.9	-56	-0.7	1.9
Commercial services	-2.0	-2.0	-0.4	35.4	-1749	-0.6	1.9
Other services	-1.7	-1.8	1.4	33.6	-1525	-0.9	1.6

Accession will make China much bigger player in world markets. China's share in world export markets increases from 6.9 percent in 2001 to 7.5 percent upon completion of accession (2007). Similarly, China's share in world import markets rises from 5.8 percent in 2001 to 6.4 percent in the post-accession period (2007). Not surprisingly due to the removal of textile and apparel quotas, apparel exports lead the export expansion with an increase in export volume of about 106 percent, followed by textiles, and automobiles. Due to the dramatic fall in the protection on beverages and tobacco, imports of these products more than double, followed by increases in imports of food products, textiles, agricultural products, automobile parts and commercial services.

WTO accession has a positive impact on China's economy. China's total welfare gain from WTO accession is estimated to be US$ 32.7 billion[14] or 2 percent increase in per capita income (Table 6).

[14] These are 1997 US $.

Table 6. Welfare and sources of welfare change (1997 US$ million)

	Full Impact	Tariff Cuts	Quotas	Export Subsidies	Service Liberalization	Auto Restructuring	Impact after 2001
North America	6072 (0.0)**	3207	2713	24	172	-44	5259
Western Europe	18189 (0.2)	9724	8285	-51	338	-107	14200
Australia/New Zealand	136 (0.0)	175	-47	2	18	-12	152
Japan	5694 (0.1)	5522	291	-22	5	-102	2553
China	32690 (2.0)	20785	2111	346	1222	8226	6023
Taiwán	2985 (0.6)	2300	338	-4	265	85	1376
Other NICs	6831 (0.7)	6539	-82	-185	49	511	1456
Indonesia	-408 (-0.2)	-167	-216	-10	1	-16	-310
Vietnam	-453 (-1.4)	-63	-395	0	6	0	-405
Other South East Asia	-585 (-0.1)	-109	-464	-46	16	18	-268
India	-3357 (-0.4)	-1087	-2338	-5	-23	96	-2999
Other South Asia	-1622 (-0.8)	-176	-1427	-7	1	-12	-1619
Brazil	-76 (-0.0)	-76	3	4	5	-12	359
Other Latin America	-32 (-0.0)	59	-171	20	32	29	-36
Turkey	-338 (-0.1)	-50	-295	-2	7	2	-327
Other Middle East and North Africa	368 (0.0)	675	-467	-13	57	116	-365
Economies in Transition	19 (0.0)	318	-321	4	15	3	-185
South African Customs Union	78 (0.0)	89	-18	0	5	2	13
Other Sub-Saharan Africa	-45 (-0.0)	71	-159	4	15	24	-78
Rest of World	155 (0.0)	330	-210	-15	27	23	-78
World	66302	48064	7128	45	2232	8832	24721

*Source: Authors' simulations with modified GTAP model.

**Numbers in parentheses are percentage changes in per capita utility.

Most of this gain (US$26.7 b.) has already been realized as a result of the massive liberalization that took place between 1995 and 2001 and the restructuring of the automobile industry that has been underway. The remaining reforms are going to lead to an additional welfare increase of US$6 billion (after 2001). The removal of quotas on

textiles and apparel will lead to the largest gain in welfare about US$2.1 billion or 35% of the 6 billion increase in welfare, followed by the automobile sector restructuring US$1.3 billion or 21% of the welfare gain, and service liberalization US$1.2 billion or 20% of the welfare gain (Table 7). Additional merchandise trade liberalization will generate 18% of the US$6 billion increase in welfare, while the removal of agricultural export subsidies will amount to only US$346 million in additional benefits.

Table 7. Source of welfare change (1997 US$ million)

	Tariff Cuts	Quotas	Export Subsidies	Service Liberalization	Auto Restructuring	Impact after 2001
North America	2355	2713	24	172	-4	5259
Western Europe	5682	8285	-51	338	-54	14200
Australia/New Zealand	179	-47	2	18	0	152
Japan	2281	291	-22	5	-2	2553
China	1072	2111	346	1222	1272	6023
Taiwan	754	338	-4	265	22	1376
Other NICs	1543	-82	-185	49	131	1456
Indonesia	-82	-216	-10	1	-3	-310
Vietnam	-20	-395	0	6	4	-405
Other South East Asia	215	-464	-46	16	12	-268
India	-676	-2338	-5	-23	43	-2999
Other South Asia	-198	-1427	-7	1	13	-1619
Brazil	348	3	4	5	-1	359
Other Latin America	74	-171	20	32	10	-36
Turkey	-39	-295	-2	7	2	-327
Other Middle East/N. Africa	24	-467	-13	57	34	-365
Economies in Transition	114	-321	4	15	3	-185
South Afr. Customs Union	25	-18	0	5	1	13
Other Sub-Saharan Africa	54	-159	4	15	8	-78
Rest of World	111	-210	-15	27	9	-78
World	13815	7128	45	2232	1501	24721

Impact on Taiwan

WTO accession reduces the cost of imported industrial materials and the cost of production leading to a fall in real wholesale prices. Retail prices drop less than wholesale price since they reflect a small uniform consumption tax (0.8%) levied to compensate for the loss of tariff revenue (Table 8). The drop in retail prices stimulates domestic competition and encourage domestic consumption.

Taiwan's total welfare gain from accession is estimated to be US$ 3.0 billion – the second largest gain after China's (Table 6). About half of this gain (US$1.6b.) has

Table 8. Changes in Taiwan's output, employment, and trade due to WTO accession for the period 2001-2007

	Output	Employment	Exports	Imports	Trade Balance	Wholesale prices	Consumer prices
Rice	-1.1	-1.8	0.8	6.0	0	-1.2	-0.4
Wheat	-1.1	-1.6	4.4	-3.5	7	-1.3	-0.5
Feedgrains	-1.3	-1.8	37.3	-3.0	27	-1.3	-0.5
Vegetables and fruits	-5.7	-6.4	7.8	**85.0**	-248	-2.0	-2.8
Oilseeds	-0.9	-1.5	9.3	-3.8	33	-1.4	-0.8
Sugar	-5.5	-6.1	2.5	4.6	-2	-0.7	0.0
Plant based fibers	6.6	6.5	-3.6	16.6	-66	-0.7	0.1
Livestock & meat	-0.9	-1.6	0.7	9.2	-150	-0.9	-0.2
Dairy	-5.0	-5.4	12.4	8.7	-40	-0.7	-1.1
Other food	-3.1	-3.5	1.6	10.0	-260	-1.2	-1.3
Beverages & tobacco	-17.5	-17.7	-3.4	**27.8**	-988	-0.9	-3.6
Extractive industries	-1.6	-1.8	-3.2	4.2	-546	-0.8	0.0
Textiles	**16.6**	16.5	19.9	14.2	**4403**	-0.5	-0.4
Apparel	-6.1	-6.1	-4.6	17.8	-339	-0.4	-0.6
Light manufacturing	**2.9**	2.8	4.5	6.6	**153**	-1.1	-0.7
Petrochemical industry	**4.8**	4.7	11.6	6.5	**1927**	-0.7	-0.3
Metals	-1.8	-1.9	3.3	8.5	-621	-0.7	-0.3
Autos	-7.3	-7.4	13.1	20.6	-867	-2.0	-3.6
Electronics	-1.2	-1.3	-1.2	-0.3	-701	-0.6	0.1
Other manufactures	**0.9**	0.7	5.3	3.9	**542**	-0.6	-0.3
Trade and transport	-0.3	-0.4	-1.1	3.8	-375	0.0	0.6
Construction	0.3	0.2	-2.3	10.3	-86	-0.3	0.5
Communication	-0.5	-0.6	-4.2	-2.1	-7	-0.1	0.6
Commercial services	-0.8	-0.9	-4.4	7.2	-705	0.0	0.8
Other services	-0.5	-0.6	-4.4	12.3	-537	0.0	0.5

already been realized as a result of the liberalization that took place in Taiwan between 1997 and 2001. The remaining reforms are going to lead to additional US$1.4 billion in welfare increase after 2001 (Table 7). Tariff cuts will lead to the largest increase in welfare ($US 0.8 billion or 55% of the US$1.4 b.), followed by removal of quotas on textiles and apparel (US$338 million or 25% of the welfare gain), and service liberalization US$265 million or 20% of the welfare gain (Table 7). The per capita income change from WTO accession is small and positive – about 0.6% increase (Table 6).

WTO accession will boost domestic production and employment of Taiwan's textiles, light manufactures, petrochemical industry, and machinery and equipment sectors (Table 8). The expansion of these sectors implies increased demand for labor and capital and higher wages and rental rates for capital.

The expansion of textiles, light manufactures, petrochemicals and machinery and equipment exports is driven by demand for these products in China. A steep drop in the

tariff on vegetables and fruits and beverages translates into a significant increase in imports of these products. A fall in tariffs in general boosts imports across all product lines. Since tariffs on electronic products are already low there is not much of an effect on the electronics industry from WTO accession after 2001.

The overall impact on Taiwan's trade is modest and positive. Taiwan's share in world export markets increases from 2.7% in 2001 to 2.8% in 2007, and in world import markets rises from 2.0% in 2001 to 2.2% in 2007.

Impact on Major Partners

Industrialized and newly industrialized economies benefit from China's accession to the WTO (Tables 6 and 7). Most of these benefits are associated with the liberalization and MFA quota removal which translate into gains from terms of trade improvement for these economies after 2001.

The world as a whole and some developing economies benefit from China's and Chinese Taipei's accession to the WTO, but developing economies in South East Asia, South Asia and Latin America whose primary interactions with China involve competition in third markets will lose from the removal of textile and apparel quotas after 2001. The losses will be largest for Vietnam – an economy that is following in China's footsteps and has a similar comparative advantage in the production and export of labor intensive products. The welfare loss for Vietnam are estimated to be are US$453 million or 1.4 percent drop in per capita income (Tables 6 and 7). The losses to other regions are negligible.

Conclusions

Our analysis suggests that China will be the biggest beneficiary of accession to the WTO, followed by Taiwan and the industrialized economies. Accession will boost the labor-intensive manufacturing sectors in China and especially the textile and apparel sectors which will benefit directly from the removal of quotas on textile and apparel exports destined for the North American and Western European markets. Fiber production will benefit indirectly as demand for fibers increases with the expansion of the textile sector.

Accession will have important distributional consequences. Wages of skilled workers and wages of unskilled nonfarm workers will rise in real terms and relative to wages of farm workers. Approximately, 6 million people will leave their farm jobs in pursuit of employment in industry and services. Reduction in agricultural protection additionally lowers the attractiveness of farming leading to lower real farm wages and land rental rates. The decline in farm incomes and the rise in the real retail prices of many nonfarm products implies some farmers may be hurt by WTO accession after 2001.

To help farmers the Chinese government may fine tune its current policies. We estimate that an increase in education spending represented as a change in annual growth rates for skilled and unskilled labor from 4.15% and 1.26% to 5.0% and 1.1%, respectively, will have a positive impact on the structure of the Chinese economy. It will lead to a stronger

expansion or a smaller contraction of those manufacturing sectors that are more intensive in skilled labor compared to accession in which there is no change in education spending. The following industries get a boost – metals, automobiles, electronics, other manufactures (equipment and machinery). An increase in education does not affect the overall level of output and welfare, however, it does have important distributional effects. Real wages of skilled workers fall as supply of skilled workers increases, while in the case of no increase in education spending real wages of skilled workers were rising. Real wages of unskilled workers rise with increased education spending.[15] Thus, on the income side it is clear that increased education spending will induce pro-poor growth and decrease poverty. Finally, increased education slows down the need for migration as demand for unskilled workers falls in the larger urban areas. The number of workers expected to change farm jobs for manufacturing jobs falls by half (from 6 million to 3 million).

Another policy reform that the Chinese government may consider is policies to abolish or reform the hukou system. We estimate that the removal of the hukou system will raise farm wages and allow 35 million people to migrate out of rural areas to urban centers in search of better life. It will lead to an even bigger expansion of the labor-intensive manufacturing sector, which however may result in a bigger deteriorating in China's terms of trade and to reduction in the welfare gain from accession.

Chinese Taipei's WTO accession will stimulate domestic competition and encourage domestic consumption as it reduces production costs leading to a fall in real wholesale and retail prices. Accession will boost domestic production and employment of leading sectors such as petrochemicals, light manufactures, textiles, and equipment. It will raise the standard of living by boosting wages and the rental rates for capital.

China's and Chinese Taipei's WTO accession will have a noticeable impact on global trade and trade pattern. With accession China will become a much bigger player in world markets. Apparel exports will lead the export expansion, followed by textiles, and automobiles. In addition to being an important source of traded goods, China will be become an important destination for other economies' products. Imports of beverages and tobacco will more than double, followed by imports of food products, textiles, agricultural products, automobile parts and commercial services. The expansion of textiles, light manufactures, petrochemicals and equipment exports from Taiwan will be driven almost entirely by demand for these products in China.

China has already benefited from the massive liberalization and restructuring that took place between 1995 and 2001 and that was part of the preparatory process toward accession. The remaining reforms are going to lead to an additional and much smaller gain (US$ 6 b.) largely due to the removal of textile and apparel quotas in North American and Western European markets, automobile sector restructuring and services liberalization. Taiwan also has benefited from own trade liberalization prior to 2002. The remaining reforms are going to lead to additional (US$1.4 b) in welfare gain largely due to tariff cuts and quota removal. Industrial economies are expected to benefit from the

[15] Wages of unskilled farm workers, however, rise less than wages of unskilled nonfarm workers.

removal of textile and apparel quotas, while developing economies that compete with China in third markets such as Vietnam will lose from accession. The world as a whole will benefit however approximately US$25 b.

The gains to China are understated because tariff aggregation hides much of the variation in tariffs and the welfare gains from reducing this variation within our product aggregates (Bach and Martin, 2001). When Bach, Martin and Stevens (1996) adjusted for this in a partial equilibrium context, gains to China almost doubled when appropriate aggregators were used. Furthermore, while we have improved this paper relative to our earlier work by having a better idea about the extent of liberalization in agriculture and services and the changes in the automobile sector, there are still areas that we have ignored. One is the NTBs in the manufacturing sectors apart from MFA quotas. The other one is the impact of accession on capital flows and capital accumulation.

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Appendix Table A.1. Tariff Lines Subject to Import NTBs, China, 2001

	Licenses & Quotas	Tendering	Licensing only	State Trading	Designated Trading	Unrestricted	Any NTB	Total Tarifflines
Paddy rice	0	0	3	3	0	0	3	3
Wheat	0	0	3	3	0	0	3	3
Cereal grains nec	0	0	1	2	0	9	2	11
Vegetables, fruit, nuts	0	0	0	0	0	109	0	109
Oil seeds	0	0	0	0	0	25	0	25
Sugar cane, sugar beet	0	0	0	0	0	1	0	1
Plant-based fibers	1	0	0	1	0	6	1	7
Crops nec	5	0	0	5	0	96	5	101
Cattle, sheep, goat, horses	0	0	0	0	0	6	0	6
Animal products, nec	0	0	0	0	0	62	0	62
Wool, silk-worm cocoons	3	0	0	1	2	9	3	12
Forestry	0	0	0	0	12	23	12	35
Fishing	0	0	0	0	0	57	0	57
Coal	0	0	0	0	0	6	0	6
Oil	0	0	2	1	0	1	3	4
Gas	1	0	0	1	0	1	1	2
Minerals nec	0	0	0	0	0	106	0	106
Meat: cattle, sheep, goats	0	0	0	0	0	26	0	26
Meat products nec	0	0	0	0	0	47	0	47
Vegetable oils and fats	0	0	12	7	0	32	12	44
Dairy Products	0	0	0	0	0	24	0	24
Processed rice	0	0	2	2	0	0	2	2
Sugar	7	0	0	9	0	3	9	12
Food products nec	0	0	0	8	0	311	8	319
Beverages and tobacco	1	0	9	5	1	17	15	32
Textiles	39	0	0	3	25	711	46	757
Wearing apparel	0	0	0	0	0	289	0	289
Leather products	11	16	0	0	0	73	27	100
Wood products	0	0	0	0	18	106	18	124
Paper products, publishing	0	0	0	3	0	160	3	163
Petroleum, coal products	8	0	0	7	0	25	8	33
Chemical, rubber, plastic	35	0	15	21	5	1248	51	1299
Mineral products nec	0	0	0	0	0	198	0	198
Ferrous metals	0	0	0	0	181	49	181	230
Metals nec	0	0	0	0	0	190	0	190
Metal products	0	0	0	0	1	264	1	265
Motor vehicles and parts	64	0	0	0	0	93	64	157
Transport equipment nec	7	10	0	0	0	72	17	89
Electronic equipment	36	17	0	0	0	205	53	258
Machinery and equipment	39	77	0	2	0	1199	116	1315
Manufactures nec	0	0	0	0	0	219	0	219
Electricity	0	0	0	0	0	1	0	1
Gas manuf, distribution	0	0	0	0	0	1	0	1
Total	257	120	47	84	245	6080	664	6744

Source: WTO 2001. Commodity definitions are for GTAP-5, see www.gtap.org for concordances.

Appendix Table A.2. The Import Coverage of Nontariff Barriers in China, 2001

	Licenses & Quotas	Tendering	Licensing only	State Trading	Designated Trading	Any NTB	Unrestricted Trading	Total
	%	%	%	%	%	%	%	%
Paddy rice	100	0	100	100	0	100	0	100
Wheat	100	0	100	100	0	100	0	100
Cereal grains nec	0	0	0	0	0	0	100	100
Vegetables, fruit, nuts	0	0	0	0	0	0	100	100
Oil seeds	0	0	0	0	0	0	100	100
Sugar cane, sugar beet	0	0	0	0	0	0	100	100
Plant-based fibers	93	0	0	93	0	93	7	100
Crops nec	48	0	0	48	0	48	52	100
Cattle, sheep and goats, horses	0	0	0	0	0	0	100	100
Animal products, nec	0	0	0	0	0	0	100	100
Wool, silk-worm cocoons	0	0	0	0	95	95	5	100
Forestry	0	0	0	0	94	94	6	100
Fishing	0	0	0	0	0	0	100	100
Coal	0	0	0	0	0	0	100	100
Oil	100	0	0	100	0	100	0	100
Gas	0	0	0	0	0	0	100	100
Minerals nec	0	0	0	0	0	0	100	100
Meat: cattle, sheep, goats, horse	0	0	0	0	0	0	100	100
Meat products nec	0	0	0	0	0	0	100	100
Vegetable oils and fats	59	0	60	59	0	60	40	100
Dairy Products	0	0	0	0	0	0	100	100
Processed rice	100	0	100	100	0	100	0	100
Sugar	85	0	0	85	0	85	15	100
Food products nec	1	0	0	1	0	1	99	100
Beverages and tobacco products	20	0	16	20	0	36	64	100
Textiles	9	0	0	0	8	14	86	100
Wearing apparel	0	0	0	0	0	0	100	100
Leather products	0	0	0	0	0	0	100	100
Wood products	0	0	0	0	55	55	45	100
Paper products, publishing	0	0	0	0	0	0	100	100
Petroleum, coal products	58	0	0	58	0	58	42	100
Chemical, rubber, plastic prods	5	0	1	5	2	7	93	100
Mineral products nec	0	0	0	0	0	0	100	100
Ferrous metals	0	0	0	0	85	85	16	100
Metals nec	0	0	0	0	0	0	100	100
Metal products	0	0	0	0	1	1	99	100
Motor vehicles and parts	32	0	0	0	0	32	68	100
Transport equipment nec	1	3	0	0	0	4	96	100
Electronic equipment	9	5	0	0	0	14	86	100
Machinery and equipment nec	1	8	0	0	0	10	90	100
Manufactures nec	0	0	0	0	0	0	100	100
Total Import Coverage	12.8	2.7	0.5	9.5	6.2	21.6	78.4	100

Note: Based on WTO (2001) and import data from China Customs for 2000

Appendix Table A.3. Commodity Import Shares by NTB Measure

	Licenses & Quotas	Tendering	Licensing only	State Trading	Designated Trading	Any NTB	Unrestricted Trading	Total
	%	%	%	%	%	%	%	
Paddy rice	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wheat	0.0	0.0	13.0	0.7	0.0	0.6	0.0	0.1
Cereal grains nec	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Vegetables, fruit, nuts	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Oil seeds	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.5
Sugar cane, sugar beet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plant-based fibers	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Crops nec	1.1	0.0	0.0	0.8	0.0	0.0	0.1	0.1
Cattle, sheep and goats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Animal products, nec	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4
Wool, silk	4.3	0.0	0.0	0.0	4.7	0.7	0.0	0.1
Forestry	0.0	0.0	0.0	0.0	11.7	2.4	0.1	0.3
Fishing	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil	0.0	0.0	0.0	69.4	0.0	48.9	0.0	5.6
Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minerals nec	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.2
Meat: cattle, sheep, goat	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Meat products nec	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3
Vegetable oils and fats	0.0	0.0	55.0	2.8	0.0	0.7	0.2	0.3
Dairy Products	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Processed rice	0.0	0.0	9.9	0.5	0.0	0.5	0.0	0.1
Sugar	0.8	0.0	0.0	0.5	0.0	0.4	0.0	0.1
Food products nec	0.0	0.0	0.0	0.1	0.0	0.0	1.4	1.2
Beverages and tobacco	0.0	0.0	2.9	0.2	0.0	0.2	0.1	0.1
Textiles	16.2	0.0	0.0	1.3	8.2	0.7	7.1	6.3
Wearing apparel	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5
Leather products	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.4
Wood products	0.0	0.0	0.0	0.0	8.8	0.8	0.6	0.6
Paper products	0.0	0.0	0.0	0.1	0.0	0.0	4.0	3.5
Petroleum, coal prods	20.8	0.0	0.0	14.8	0.0	3.4	1.3	1.6
Chemical, rubber, plastic	17.0	0.0	19.1	8.1	4.2	0.5	17.9	15.9
Mineral products nec	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.0
Ferrous metals	0.0	0.0	0.0	0.0	62.1	29.9	0.9	4.3
Metals nec	0.0	0.0	0.0	0.0	0.0	0.0	5.2	4.6
Metal products	0.0	0.0	0.0	0.0	0.3	0.0	2.0	1.7
Motor vehicles and parts	8.7	0.0	0.0	0.0	0.0	2.4	1.6	1.7
Transport equipment nec	0.2	1.6	0.0	0.0	0.0	0.1	1.8	1.6
Electronic equipment	26.8	41.1	0.0	0.0	0.0	6.0	23.8	21.7
Machinery and equip	3.8	57.3	0.0	0.3	0.0	1.6	22.2	19.8
Manufactures nec	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0