

The Impact of China's WTO Accession on Trade and Economic Relations across the Taiwan Strait

*Zhi Wang**

*Economic Research Services
U.S. Department of agriculture*

Abstract

This paper evaluates the impact of China's WTO accession on trade and economic relation across the Taiwan Strait and its implications for rest of the world by a recursive dynamic, 17-region, 25-sector computable general equilibrium (CGE) model according to actual market access commitments that China and Taiwan have made to date. The simulation results show that both China and Taiwan will substantially benefit from their WTO memberships, and their economic interdependence and their dependence with rest of the world will further deepen. The rest of the world may also benefit because of the expansion of world trade and improvement of their international terms of trade, but some developing countries with a endowment structure similar to China, like those in South America and Southeast Asia, may experience keener competition in labor-intensive exports and lower prices for their products.

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* Zhi Wang is an economist at the Economic Research Services, United State Department of Agriculture. Corresponding address: Room 5141, 1800 M Street, N.W. Washington D.C 20036-5831. Tel:(202)694-5242. Fax:(202)694-5793. E-mail: zwang@ers.usda.gov. Views expressed in this paper are those of the author and do not represent the opinions of USDA/ERS.

I. Introduction

Taiwan has long been an active player in the world economy and an important trader in the global market. Its total volume of exports and imports reached \$148 billion and \$140 billion respectively in 2000. With more than two decades of market-oriented reform, China has also advanced rapidly in international trade. Its trade volume has grown from \$38 billion in 1980 to \$474 billion in 2000, doubling more than three times in two decades, far faster than world trade growth as a whole during the same period. China, Hong Kong, and Taiwan have been among the fifteen largest trading regions in the world since 1992. The total external trade of these three Chinese economies reached \$810 billion in 1999 (after minus \$137 billion intra-regional trade), far exceeding the total trade of Japan (\$731 billion) and equaling to nearly half of that of the United States. Their roles in the world economy will likely grow as the integration among the three Chinese economies intensifies by the recent re-unification of Hong Kong and Macao with China and the anticipated accession to the World Trade Organization (WTO) by both China and Taiwan.

In spite of huge political differences, complementary factor endowment and mutual economic interests, geographical proximity and cultural affinity, plus the efficiency of Hong Kong as a "commercial middleman," have enabled China and Taiwan to develop a rather intense trade and investment linkages in the past 15 years. The indirect trade between Taiwan and China increased from less than \$1 billion in 1987 to nearly \$26 billion in 1999¹. The dependence of Taiwan's exports on China and Hong Kong's market increased dramatically from less than 8 percent in 1987 to 26 percent in 1997. Cross-Straits trade has become the major source of Taiwan's trade surplus in recent years. Surplus with China has exceeded Taiwan's total trade surplus every year since 1993², and China has become Taiwan's second largest export market, next only to the United States. Taiwan has also become the second largest import source for China next only to Japan since then. The rapid growth of indirect trade was fueled by Taiwan's direct investment in China. The actually used direct investment from Taiwan reached \$26.5 billion by the end of June 2000 and accounted for more than 40 percent of Taiwan's total overseas investment³. While nearly 60% of China's total FDI inflow during the reform period comes from Taiwan and Hong Kong.

¹. Based on *Monthly Report of Cross-Straits Economic Statistics*, August, 2000, p.22. Council for Mainland Affairs, Taipei, ROC.

². Based on *Monthly Report of Cross-Straits Economic Statistics*, August 2000, p.22. Council for Mainland Affairs, Taipei, ROC.

³. *Monthly Report of Cross-Straits Economic Statistics*, August 2000, p.26 and p.29. Council for Mainland Affairs, Taipei, ROC. The number was based on data from Ministry of Foreign Trade and Economic Cooperation, PRC, while the investment approved by Ministry of Economic affair ROC was \$15.8 billion. However, even PRC's figure

Although political tension over the issue of sovereignty promises no easy solution, economic relations between China and Taiwan are expected to improve further after the two economies enter the WTO. The increasingly deepening economic tie driven by market forces between the three Chinese economies may eventually bond them into a common market exemplified by the West European experience (Cheng, 1998). The world is very likely, therefore, to witness the gradual emergence of a Chinese Economic Area (CEA) in East Asia. It would contain an array of potential markets that far exceed that of Europe and has the potential for providing a principal engine of world economic growth in the new century.

Trade between China and Taiwan, even indirectly go through Hong Kong, is still highly regulated today. For example, as of the end of 2000, only 56 percent (or 5,777 items) of 10,238 10-digit commodities under the Harmonized Tariff Schedule (HS) system are permitted to be imported from China to Taiwan. However, in order to fulfill their membership requirements to the WTO, both China and Taiwan have to implement their commitment to adopt broad and deep trade liberalization measures to bring their trade regimes consistent with WTO rules, including de-regulating cross Straits trade and investment. Implementation of these liberalization measures implies a substantial reduction in tariffs and non-tariff barriers across all economic sectors and across Straits in one of the world's largest and most rapidly expanding markets. Obviously, its impact on structure of production and import demand in both economies will have significant effects on trade patterns across the Taiwan Straits as well as trade relations between the emerging Chinese Economic Area and its major trade partners. World trade patterns and production structures in rest of the world will have to adjust to accommodate such changes. What opportunities will the growing and liberalizing of Chinese markets likely bring to Taiwan and other countries in the world? What challenges will the rest of the world have to face as the tremendous low-cost Chinese labor force is integrated into the world economy? How will the increase in the export competitiveness of Chinese products affect world markets? Who will gain? Who will lose? What are the geographical and sectoral distributions of these gains and losses? To answer these questions, I used a 17-region, 25-sector recursive dynamic Computable General Equilibrium (CGE) model with import embodied technology transfer to estimate the differences in world trade and economic growth under alternative scenarios of the world trade liberalization with or without China's and Taiwan's participation. The model includes China's and Taiwan's major trading partners in both developed and developing

might underestimate Taiwan's "real" investment in China because many Taiwan business began in the mid-90s to investment in China through their holding companies in third tax-exempt countries such as British Central America (Tung, 2001).

countries and covers major production and trade activities in the world economy from 1997 to 2010. Simulation results show that both China and Taiwan will substantially benefit from their WTO memberships. Their economic structures and trade flows across the Taiwan Strait will undergo substantial changes. The economic interdependence between China and Taiwan and their interdependence on rest of the world will further deepen and integration of the two economies will accelerate after both of them enter the WTO. By viewing China's and Taiwan's future development in a comparative world economic system, this analysis shows that economic integration across the Taiwan Straits is an unavoidable trend driven by market forces. It will not only benefit Chinese Economic Area as a whole, but will also consistent with the long-term strategic interest of the United States.

The rest of the paper is organized as follows: the next section outlines the basic structure of the model used in the analysis. Section 3 provides an economic analysis of production factor endowments and comparative advantages of China, Taiwan and their major trade partners, while also introduces the data used in the model. Section 4 describes major assumptions about calibrating the baseline and designing the simulation scenarios. Major simulation results are presented and discussed in Section 5. Section 6 concludes the paper with its major policy implications.

II Structure of the model

The model used in this paper is an extension of the CGE models used in the China's WTO accession study by Wang (1997a, 1997b, 1999) with import embodied technology transfer and trade policy induced TFP growth. It is part of a family of models used widely to analyze the impact of global trade liberalization and structural adjustment programs. It focuses on the real side of the world economy and incorporates considerable detail on sectoral output and real trade flows, both bilateral and global. However, this structural detail is obtained at the cost of not explicitly modeling financial markets, interest rates, and inflation. While not designed to generate short-term macroeconomic forecasts, the model could be linked to a macro economic model including asset flows and generating macro scenarios. Given a macro scenario, however, this model could then be used to determine the resulting real trade flows and sectoral structural adjustments for each region in a recursive dynamic framework. Under assumptions for a likely path of future world economic growth, it generates the pattern of production and trade resulting from world economic adjustment to the shocks specified in the alternative scenarios.

In this study, 17 fully endogenized regions and 25 production sectors in each region are specified to represent the world economy. The 17 regions are: (1) the United States, (2) Canada, (3) West Europe (4) Japan, (5) Australia and New Zealand, (6) Mexico, (7) Korea, (8) Singapore, (9) Taiwan, (10) Hong Kong, (11) China, (12) South East Asia (ASEAN, includes Malaysia, Thailand, Philippines, Indonesia,

and Viet Nam), (13) South Asia (Indian, Bangladesh, Nepal, Pakistan, and Sri Lanka), (14) Latin American MFA restricted countries (Central America and Caribbean, Brazil, Colombia, Peru, Uruguay), (15) Mid-east and South African MFA restrict countries (Turkey, Botswana, rest of south African custom Union, and rest of Middle East), (16) Low income South African countries (Malawi, Mozambique, Tanzania, Zambia, and rest of sub-Saharan Africa) and (17) Rest of the World.

The 25 sectors are: (1) rice, (2) wheat, (3) other grains (4) oilseeds, (5) plant based fiber, (6) other non-grain crops, (7) livestock, (8) meats and dairy products, (9) processed food, (10) beverage and tobacco, (11) forestry and fishery, (12) mineral products, (13) energy products (14) textile, (15) wearing apparel, (16) leather, shoes and sport goods, (17) other light manufactures, (18) wood and paper products, (19) manufactured intermediates, (20) motor vehicles and parts, (21) other transport equipment, (22) electronic equipment, (23) other machinery, (24) utility, housing and construction, (25) transportation and traded services, a portion of which is allocated to international shipping. (The correspondence between sectors in the model, GTAP and ISIC are listed in Appendix A).

There are six primary factors of production: agricultural land, natural resources, capital, agricultural labor, unskilled-labor, and skilled-labor. Skilled- and unskilled-laborers have basic education in common, but skilled-laborers usually have more advanced training. While the agricultural laborers are those who have little or no education and work only in farm sectors. Natural resources are sector specific, while other primary factors are assumed to be mobile across sectors, but immobile across regions. Land is only used in agricultural sectors.

Agricultural labor and urban unskilled labor are not substitutable in production function, but are linked by rural-urban migration flows. These flows are endogenous in the model and are driven by the rural-urban wage differential and structural changes in production and trade. The increase in the skilled labor force is based on the growth in the stock of tertiary educated labor in each region estimated by the World Bank (Ahaja and Filmer, 1995), which provides an indication of changes in the numbers of those qualified for employment as professional and technical workers. That is, as tertiary education grows, the share of skilled labor force will grow correspondingly.

Accumulation patterns for capital stock depend upon the depreciation rate and gross real investment rate, the later is set exogenously based on forecast from Oxford world macroeconomic model (Oxford Economic Forecasting, 1999). However, household savings, government surplus (deficit), and foreign capital inflow (foreign savings) are assumed to be perfect substitutes and collectively constitute the source of gross investment in each region. Given the assumption that aggregate real investment is determined as a share of real GDP, changes in the trade balance, which directly affect foreign savings, are

assumed to have only a partial effect on aggregate real investment in the region. Instead, they lead to an equilibrium adjustment in the domestic savings rate, which partially offsets the change in foreign savings.

Household saving decisions are endogenous in the model. It represents future consumption goods for the household with zero subsistence quantity (by assuming inter-temporal separable preferences, ELES demand system). Government surplus (deficit) is the difference between government tax revenue and its spending, the later is fixed as percentage of each regions GDP based on forecast from the Oxford model. There are no expectations explicitly specified in the model.

Foreign capital inflow or outflow is determined by the accumulation of the balance of trade, which is also fixed as percentage of GDP in each region based on the Oxford model's projection except for the United States. The model does not include financial markets and portfolio investment. The trade balance is the only sources of foreign savings (can be inflow or outflow). No explicit specification of Foreign Direct Investment (FDI). However, it is counted by trade flows, because in order to convert FDI into production capital, technology and equipment have to be purchased via domestic or international trade.

There are an economy-wide and a set of sector specific TFP growth variables for each region in the model. The economy-wide TFP variable is solved endogenously in baseline calibration to match a pre-specified path of real GDP growth in each region based on forecast from the Oxford model. Then the economy-wide TFP variable is fixed when alternative scenarios are simulated. In such case the growth rate of real GDP and the sector specific TFP variables that links productivity growth and imports are solved endogenously.

Similar to Hertel et. al (1995), the MFA quotas rents are assumed to be captured by exporting countries as export taxes. These export tax rates are adjusted endogenously to equate with quotas. Such a treatment assumes that all quotas are binding constraints at the equilibrium. Consistent with this modeling practice, we divide developing countries subject to MFA quota restrictions into quota binding and non-binding regions⁴ based on historical trade statistics. Quantity constraints only apply to those regions with binding quotas.

4. There are eleven developing regions in the model, nine of them are subject to binding MFA quotas. They are Korea, Singapore, Taiwan, Hong Kong, China, ASEAN, South Asia, Latin America MFA restricted countries, Mid-east and Africa MFA restricted countries. While Low income Africa countries and rest of the world are modeled as MFA quota non-binding countries.

III Basic economic force shapes trade patterns between China, Taiwan and rest of the world

The CGE model used in this analysis was calibrated around a world Social Accounting Matrix (SAM) estimated for 1997 based on version 5 (pre-release) of the Global Trade Analysis Project (GTAP) database (Hertel, 1997). Details of this type of multi-regional SAM and its construction from the GTAP database are described in Wang (1994).

This section analyzes fundamental economic forces shaping production and trade patterns among China, Taiwan and their major trade partners based on information of factor endowments, structure of net trade contained in the base year data. The purpose of this data based analysis is to provide an overview of China's and Taiwan's comparative advantages in the world economy, and trade linkages between them and their major partners so as to facilitate the understanding of simulation results reported later in this paper.

3.1 Structure of factor endowment

Table 1 presents the data on factor endowments, intensity, cost, and the relative size of the economic regions included in the model. It shows that the five high-income OECD regions (USA, Japan, West Europe, Canada, and Australia/New Zealand) account for less than 15 percent of the global labor force, but possess more than 70 percent of the world's capital stock. In contrast, more than 60 percent of the global labor force with just 6 percent of the world's production capital resides in the four largest low-income developing regions (China, South Asia, ASEAN, and low income South Africa). The five high-income OECD regions are also relatively abundant in skilled-labor, since their skilled labor share in the world is one or two times more than their world share of total labor force, while the same share is much smaller relative to their total labor endowment in China, ASEAN, South Asia and Africa. Japan, Korea, Taiwan, Hong Kong, Singapore, and China are poorly endowed with arable land relative to labor. Conditions are just the opposite in the United States, Canada, and Australia/New Zealand where land is abundant and cheap. Western Europe, Mexico and Latin American MFA restricted countries, ASEAN and South Asia have intermediate amount of arable land per worker and are between the two extremes.

(Insert table 1 here)

Uneven distribution of factor endowments induces wide differences in factor intensities and costs among regions. Because China, ASEAN, South Asia and other developing countries are poorly endowed with capital relative to labor, they have the lowest capital intensity (capital stock per worker), the largest shares of unskilled labor in their total labor force, and the highest rental-wage ratios. The reverse is true for the five high-income OECD regions. Korea, Singapore, Hong Kong and Taiwan, as newly

industrialized economies, fall somewhere between the advanced industrial countries and those developing countries. They are at a stage of development between the advanced industrial countries and most other developing countries. This is indicated by the fact that they either have a lower capital intensity or a higher rental-wage ratio. Their skilled labor share is larger than low-income developing countries, but only about one half that of high-income developed regions. Their labor costs are only a half or a third of high-income countries, but much higher than those of low-income developing regions (Table 1).

Japan, Korea, Taiwan, Singapore, and China are poorly endowed with arable land relative to labor. Therefore, they have the lowest land/labor intensities (arable land per worker) and relatively higher land returns (relative to labor and capital) compared with other regions. This condition is just the opposite in the United States, Canada and Australia/New Zealand. Land as an abundant factor earns a relatively lower return there. These factor endowment differences are quite important for understanding net trade flows across regions based on conventional trade theory.

3.2 Net trade patterns

Trade theory suggested that world trade patterns are determined by the relative costs in delivering commodities by trading nations. Although many factors, such as distance, technical efficiency, prices of intermediate inputs, etc., may influence such costs, the relative scarcity of factor endowments is the most basic determinant. A country tends to export commodities that require relatively intensive use of the country's relatively abundant factors of production, and tends to import commodities that use its scarce production factor intensively. In other words, the direction of net trade flows is a function of the relative factor-intensity of production, and the relative factor scarcities among countries. The scarcer the production factors, the higher the cost in production.

Table 2 presents data on sectoral net trade by region in the base year. It shows that the United States, Canada, Australia/New Zealand, and Rest of the World as land abundant regions, are net exporters in almost all food and agricultural products, especially those land intensive products such as grains, cotton and oilseeds. Japan, Korea, Singapore, Taiwan and Hong Kong, as land scarce economies, are net importers of all food and agricultural products. Western Europe, Mexico, South Asia, Latin American, Mideast and African MFA restricted countries, with intermediate land endowments, are net exporters and net importers of different agricultural products. The European countries are net exporters of meat and milk products, beverages, and processed food, but net importers of land intensive products. Mexico, ASEAN, South Asia and Latin America MFA restricted countries are net exporters of non-grain crops, and process food, which are often labor-intensive, but net importers of land-intensive agricultural products.

China also seems consistent with this pattern as its market forces play a more and more important role in determining production and trade driven by its market oriented economic reform. As a land scarce economy, it is a net importer of land intensive agricultural products, but a net exporter of labor-intensive agricultural commodities such as non-grain crops. The on-going domestic economic reform and trade liberalization as China implements its WTO commitment, will reinforce market forces and further push China's agricultural production and trade away from its current grain self-sufficiency policy in the years to come.

(Insert table 2 here)

The net trade data in Table 2 also demonstrate that labor-intensive manufactured goods (textile, apparel, leather & shoes, and other light manufactures) and natural resource based products are the major net imports for the United States, Japan and Western Europe, while capital and skill-intensive manufactures (manufactured intermediates, motor vehicles, machinery and other transport equipment) are their major net exports (except for the US in motor vehicles because of its deficit with Japan). The trade patterns of China and other labor abundant economies such as ASEAN, South Asia, and other MFA restricted developing countries exhibit some similarities. They are net exporters of labor-intensive manufactured goods and net importers of capital-intensive manufactured goods. The largest share of the trade surplus for both China and South Asia comes from light manufactured products (\$68 and \$23 billion respectively), while trade surplus in ASEAN countries is more diversified. Electronics, processed food as well as forest & wood products also contribute a significant portion of their net trade, although labor-intensive manufactures are also a large trade surplus sector (\$21 billion) in the region. At an intermediate level of capital intensity, Taiwan, Korea, Singapore, and Mexico, are net suppliers and net demanders of different skill/capital-intensive manufactured goods, while remaining net exporters of labor-intensive manufactured goods. However, upstream products such as textiles, are a major portions of their net exports of such products, with more labor intensive exports such as apparel playing less and less role as they further shift such production to China and other developing countries.

3.3 Comparative position of China and Taiwan in the world economy

The factor endowment and net trade data in the base year reviewed above provides detailed information on trade patterns between China, Taiwan, and their major trade partners. The impression given by the data is generally consistent with intuition about these economies based on conventional international trade theory. At one extreme, China and other labor abundant developing countries are seen as major competitors in labor-intensive manufactured exports and important importers of

capital/technology-intensive products for their modernization program. At the other extreme, Japan, Western Europe, and the United States are seen as major suppliers of capital/technology-intensive goods and as the final market for labor-intensive consumer products. Taiwan and other newly industrialized economies (NIEs) are seen as intermediate between the two extremes. They are important suppliers of manufactured goods to China and other developing countries, and become both demanders and suppliers of technology/capital-intensive products from Japan, European Union and the United States, while still remaining important suppliers of labor-intensive goods for industrial countries.

Numerous studies (Gereffi, 1998) noticed the important role that Asian NIEs have played in the system of global division of labor along a world commodity production chain that spans many economies, with each economy performing certain tasks in which it has a comparative advantage. The developed countries usually provide high-technology software and hardware for the NIEs because of their superior R&D capabilities. In turn, the NIEs provide intermediates and capital goods for their directly invested firms in developing countries because of their manufacturing technology and management expertise, while developing countries produce and export finished goods such as apparel or electronic products to developed countries because of their cheap labor and raw materials.

Obviously, industrial countries such as the United States and China are generally not competing economically for international trade at their current stage of development because their comparative advantages differ greatly. **Their different factor endowment structures and difference in technology development make their trade complementary.** Other developing countries compete with each other and with China for exporting labor-intensive goods and electronic products in industrial countries, and compete to attract FDI from those countries. Similarly, Japan, Western Europe, and the United States compete to meet the demand for the technology/capital-intensive goods markets in China and other developing countries, and to benefit from investment opportunities there.

The structure of factor endowments in China, Taiwan and their major trading partners as well as their position in the system of the world division of labor is also the basic economic force shaping the direction of impact of China's and Taiwan's WTO entry on world production and trade. Joining the WTO, especially when industrial countries eliminate restrictions on imports of labor-intensive manufactures such as textile and apparel from China, would further realize China's comparative advantage in producing such goods and increase its net exports. The expansion of labor-intensive manufactures in China would cause resources to be bid away from farming and drive up demand for agricultural and capital/technology intensive goods. This would increase China's net agricultural and capital/technology intensive imports and push up world market prices for such products. The opposite

impact would occur to most developed economies because of their different endowment structures. Developing countries whose endowment structures are similar to China's will encounter keener competition in the world labor-intensive goods markets and face lower prices for their exports.

The impact of China's and Taiwan's WTO accession is also affected by China's and Taiwan's current import protection structure and the structure of tariff cut in their WTO offers (which is listed in Table 4a and 4b respectively). The larger the initial distortion, the deeper the tariff cuts in the offers, the greater the induced impact. However, the relative factor scarcity and intensity in production discussed above are the more fundamental force driving the impact and its resulted adjustment pattern in the world economy. Production resources will be released from those previously highly protected industries in China and Taiwan, and draw into sectors where China and Taiwan have comparative advantages, thus enabling them to become more efficient suppliers in the world manufacture goods market.

IV. Baseline Calibration and Simulations Design

Both China's and Taiwan's market accession commitments for WTO membership include a complex package of trade and investment liberalization measures. In this paper, however, only the following five aspects are considered: (1) tariff reduction in both agricultural and manufacturing products (China and Taiwan); (2) elimination of non-tariff barriers in manufacturing sectors (China and Taiwan); (3) reduction of non-tariff barriers in agricultural commodities and liberalization of import quota on agricultural products (China and Taiwan). The accelerated growth of import quota of rice in Taiwan and wheat and plant based fiber in China, and elimination of such quotas in 2005; (4) opening of major service sectors (China); and (5) the phase out of MFA quotas on textile and clothing (China and Taiwan). Once China and Taiwan become members of the WTO, their exports in textile and apparel in North America and European markets will be subject to accelerated MFA quota growth from 2001-2004 similar to other developing countries that are WTO members. The remaining quota restrictions will be eliminated at the year 2005 according to the Agreement on Textiles and Clothing (ATC)⁵.

Because both China's and Taiwan's market accession commitments to WTO entry will be phased in over a transition period, a baseline from 1998-2010 is established first as Scenario I (the Uruguay Round Case) under a set of assumptions. It generates a reference growth path of the world economy with the implementation of the Uruguay Round trade liberalization, but without China's and Taiwan's

⁵ On January 1, 1995, the ATC entered into force and replaced the old Multi Fiber arrangements (MFA). The ATC provides for the elimination of the quotas and the complete integration of textiles and apparel into the WTO regime

participation. This calibrated “benchmark” will serve as a basis of comparison for counterfactual simulation conducted in Scenario II.

Table 3 summarizes the major macro economic assumptions and results from the baseline calibration. It uses the economy-wide TFP variable in each region as a residual and adjustment mechanism to match the pre-specified real GDP growth rate under assumptions on the three major macro economic variables (gross investment, government spending, and balance of trade) in the model. It incorporates the impact of the recent Asian financial crisis by imposing actual negative GDP growth during 1998-1999 and current account surplus of the affected regions. All the three macro-variables from 2000-2010 are specified as percentages of GDP and are based on forecasts by the Oxford model. China’s imports of wheat and plant-based fiber and Taiwan’s imports of rice are subject to quota control with a 3 percent annual growth rate. Those quotas are also assumed to be binding and a NTB rate adjusted endogenously to clear the market⁶. Because China and Taiwan are excluded from the WTO under this scenario, their exports in textile and clothing are subjected to a constant growth in MFA quotas and the quantity restriction continues after 2005. All other MFA quota restricted regions are subjected to accelerate quota growth and the termination of the quota system in 2005. The base quota growth rates are calculated from bilateral data provided by the International Textiles and Clothing Bureau in Geneva. The annual quota growth rate is 25 percent higher for WTO members during 1998-2001 than quota growth rate in 1995-1997, then an additional 27 percent is applied to the last three years of ATC implementation.

(Insert Table 3 here)

In Scenario II (the Accession Case), all the macro economic assumptions and exogenous growth factors are the same as in Scenario I, but with both China and Taiwan joining the global trade liberalization process. The extent of China's tariff reduction is aggregated from the Harmonized Commodity Description and Coding System (HS) tariff schedules at the 6-digit level based on the US-China agreement (November, 1999) and weighted by 1998 import data from China's Customs. The import quotas for wheat and plant fiber is assumed to grow at a 5 percent annual rate and will be eliminated at the year 2005, and replaced by a 15 percent uniform tariff. Taiwan’s tariff reduction is based on Taiwan’s official WTO offer provided by its council of Agriculture. It is also aggregated from the 6-digit HS tariff schedules and weighted by Taiwan’s import data during 1997-2000 from the World Trade Atlas. All non-tariff barriers of manufacturing products in both China and Taiwan are reduced by 20 percent each year

over a 10-year transition period ending on January 1, 2005. All WTO countries are subject to ATC disciplines, and only WTO members are eligible for ATC benefits.

from 2001 and set to zero in 2005, while non-tariff barriers of agricultural commodities are reduced 10 percent a year and eliminated to zero in 2010. A 50 percent cut in protection on traded service sector is also implemented to represent the opening of major service sectors in China's WTO offer. The base year service sector protection rate in China was adopted from Hoekman (1995). Both China's and Taiwan's tariff rates for all sectors each year in the simulation period and China and Taiwan's initial NTB rates are listed in Table 4a and 4b. Because China and Taiwan become WTO members under this scenario, their exports of textile and apparel are subjected to the same treatment as other developing countries.

(Insert Tables 4a and 4b here)

It is well known that China's tariff collection is significantly below its normal tariff level because of a large volume of processed trade and extensive import duty exemptions. By 1998, more than 50 percent of all imports in China were inputs used in production of exports and exempted from tariff collections. This implies that the Chinese economy is more open than it seems and the existing import restriction has been largely lifted prior to China's WTO accession. Several studies have shown that without accounting the presence of duty exemptions in China's trade regime leads to serious overestimate on the impact of China's WTO entry at both aggregate and sectoral levels (Ianchovichina, Martin and Fukase 2000, Lejour, 2000). By using 1998 China's Custom Statistics, I incorporated China's processing trade and duty exemption pattern by sectors and by import sources into simulation design, which scale down the tariff level by routine specific information. The tariff rates in the lower panel of Table 4a are the tariff level that take duty exemption into consideration, which are substantially lower than normal tariff (listed in the up panel of Table 4a) and is much closer to China's actual tariff collect rate at the aggregate level.

For each of the two scenarios, the CGE model generates results regarding the effects on social welfare, terms of trade, the volume of trade, output, consumption, the real wages paid to each factor, and changes in prices and resource allocation. The differences in results generated by the two simulation scenarios provide estimates of the impact of China's and Taiwan's accession to the WTO. However, those estimates should be regarded as outcomes from conditional projections rather than as forecasts. In reality, actual trade and output patterns are affected by many more factors than just trade liberalization, such as domestic macroeconomic and income policy changes.

6 Martin (2001) used China's average historical import levels from 1961-1997 as a guide, pointed out wheat imports would be subject to import quotas relatively frequently, maize imports less frequently, and rice imports very infrequently.

V. Simulation results

5.1 Impact on trade patterns between China, Taiwan and their major trade partners

Figure 1 shows the time path of net trade flows in agricultural, labor-intensive and capital-intensive products for China during the simulation period under the two scenarios. Even excluded from the WTO, China's net exports of labor intensive products and net import of food and agricultural products will continue to increase because of China's rapid industrialization and population growth. WTO accession will accelerate this trend. The annual growth rate of China's net exports in labor-intensive goods will increase from 3.3 percent to 6 percent. Its net food and agricultural imports annual growth rate will increase from 22 percent to 26 percent, resulting in an additional \$166 billion net exports in labor-intensive manufactures and \$73 billion additional net imports in food and agricultural products during the 10 year simulation period (Table 5). In the same period, China's net imports in capital-intensive products will increase by \$7 billion because of its WTO accession (Table 5), although there is a general declining trend in China's net capital-intensive imports over time under both simulation scenarios. It is interesting to note from Table 5 that China's net exports on three categories of finished capital-intensive manufactured goods will increase during the 10-year simulation period. They are electronics (\$23 billion), machinery (\$42 billion) and other transportation equipment (\$19 billion), and those products would replace part of net exports previously from OECD countries. At the same time, China's net imports on manufactured intermediates will dramatically increase by \$74 billion, especially from Japan, United States, Taiwan and other Asia NICs. This pattern of net trade changes is consistent with the important character of China's manufacturing exports: it is dominated by processing trade with high imported contents fueled by FDI inflow. Firms in U.S., Japan and Asian NICs provide China with intermediate and capital goods accompanied with their FDI to China, and China serves as the production and assembling base for those countries and export finished final products to developed country markets. In the earlier stage of China's economic reform, it is concentrated in the labor-intensive sector and now is happening in the above mentioned three categories of capital intensive products⁷.

(Insert figure 1 and Table 5 here)

Where would those additional net labor-intensive exports from China go and where would those additional net imports in food and agricultural products by China come from? Table 5 shows that part of those increased labor intensive exports from China will go to markets in industrial countries, where import demand increases because of the elimination of MFA quotas, while part of them are substitutes of

net exports originally from other MFA restricted developing countries in Asia and Latin America (more than 70 percent). Table 5 also shows that a large part of those increased net imports of land-intensive agricultural products to China after it joins the WTO will come from land abundant developed countries such as Australia, Canada and the United States. However, a significant portion (about a third) of them will come from other developing countries. The major underlying reason is that China's entry to the WTO diverts exports of labor-intensive products from other developing countries to China. The labor-intensive sectors in those regions cannot attract as many production resources as they could when WTO excludes China and Taiwan because of reduced profitability from lower world prices for their manufacturing exports. Therefore, more factors of production will remain in those countries' agricultural sectors. At the same time, the increased agricultural import demand from China and Taiwan pushes up world food prices, agricultural exports become relatively profitable and agricultural imports become relative expensive. It results in an expansion of production and exports of agricultural products in those countries (remember most of those countries have an intermediate agricultural land endowment, i.e. they have a higher land/labor ratio than China's). However, the increase of production in labor-intensive sectors in China also demands more manufactured inputs from the world market, causing the manufacturing sector to expand and agriculture production to decline in Japan, Korea and Taiwan, thus increasing these countries' net import demand for food and agricultural products, as shown in Table 5. Another underlying reason for this disparity other than relative scarcity of agricultural production factors in those countries is that they are in a higher stage of economic development and have the technology to produce what China's manufacturing sector demands. Because of their lower stage of economic development, most developing countries do not have such capacities or are not able to produce what China's manufacture sector needs at a competitive cost.

Why does China's net imports in capital-intensive products show a declining trend over time in both simulation scenarios (Figure 1)? It indicates that exports in some capital-intensive products from China are rising and there is an industrial upgrade process going on as China continues to grow and industrialize. There are three fundamental factors that contribute to this trend. First, there are quantitative constraints such as MFA quotas in developed countries' markets that limit China's growth potential in producing labor-intensive products and cause China to divert its production resources to other manufacturing activities, including capital-intensive sectors. Second, China was undergoing rapid investment growth and capital accumulation during the last decade. During 1991-2000, China was the

⁷ Based on China Custom statistics, 93 percent of China's electronic equipment exports was process exports in 1998, while the numbers for other machinery and other transport equipment were 71 and 77 percent respectively.

largest FDI recipient among developing countries, with over \$320 billion FDI inflows. The direct impact is the booming of capital-intensive manufacturing industries. As trade theory points out, an increase in the supply of capital will lead to an increase in the output of the sector which uses capital intensively, and a reduction in the output in other sectors that use other factors intensively (Rybczynski theorem). Finally, as mentioned earlier, China's manufacturing exports usually contain very high import contents with low value-added rates due to the rapid growth of processing trade in recent years, which may exaggerate the extent of industrial upgrade in China's exports.⁸

Joining the WTO cannot fundamentally change this trend because China ultimately will upgrade its industrial structure during its modernization, as most newly industrialized countries are doing now. But as both Figure 1 and Table 5 show, joining the WTO will increase China's net imports in capital-intensive products about \$7 billion over the 10-year simulation period. This is because the expansion of the labor-intensive sector will bid productive resources away from capital-intensive production on the one hand, and increase domestic demand for such products on the other hand, causing exports to decline and imports to increase.

(Insert table 6 and 7 here)

As pointed by Naughton (1995), the adjustment of trade flow among East Asia countries and between East Asia and developed economies since the late 80's reflected the reorganization of various global commodity productions among these countries. The basic trend is intermediate and capital goods were exported from Asian newly industrialized economies to China, where Chinese workers processed those intermediate goods into finished products and exported them to the developed countries, especially the United States. At the same time, exports from East Asia newly industrialized economies to developed countries have been substituted by exports of their direct investment firms in China and thus dramatically declined. As a result, for example, Taiwan's trade with both the United States and China has radically shifted⁹. Simulation result shows that this redirection of trade flow will further accelerate after both China and Taiwan enter the WTO. As shown in tables 6 and 7, which report the differences in exports by destination and import by source between the two simulation scenarios for both China and Taiwan. With the reduction of trade barriers, total exports increase significantly for both China and Taiwan during the 10-year simulation period. China and Taiwan trade more with each other and the increased trade is

⁸ For example, the largest items of electronics exports in 1995 were radio cassette players and telephone sets. They are produced from imported semi-processed materials and assembled by spare parts from abroad for re-exports. The portion of production process conducted in China was basically labor intensive in nature.

almost totally concentrated in manufacturing sectors (\$18 billion labor-intensive and \$52 billion capital intensive). Such a dramatic increase of trade flows in industrial products reflects that the interdependence of manufacturing activities across the Taiwan Strait is deepening at an accelerated speed as firms on both sides are further integrated via input-output linkages. Most of Taiwan's export expansion to China are intermediates and capital goods demanded by Taiwanese FDI firms in China, which includes textiles (\$14.7 billion), manufactured intermediates (\$22.8 billion), electronics (\$7.1billions) other machinery and transport equipment (\$8.9 billions). The relatively smaller increase of China's exports to Taiwan comes from Taiwan's current highly restrictive import policy for goods from China on which the model simulation is based, and there is no non-tariff barrier reduction across the Taiwan Strait is incorporated into the simulation design. However, even under current restrictive trade across the Strait, trade flows will increase substantially after both China and Taiwan enters the WTO.

While increasing its exports to China dramatically, Taiwan reduces its labor-intensive exports to many of its trade partners. More than 90 percent of its increased exports because of WTO accession will go to China. This is because Taiwan, as a newly industrialized economy, is upgrading its industrial structure and becoming a strong competitor in the world market for manufactured goods, especially in electronic products and high-end labor-intensive goods. Even though its manufacturing export expansion to China reduces its labor-intensive exports to other economies, it increases its exports of capital and technology intensive goods, especially electronic products to rest of the world (its electronic exports increase \$12 billion, or more than 11 percent over the baseline).

Interestingly, different from what happens in Taiwan, table 7 shows that when China increases its exports to Taiwan, its exports in labor intensive consumer goods and electronics products to other countries do not decline but increase dramatically. There is no trade diversion in manufactured products for China, its exports of manufactured products to other countries increase much rapidly than its sales to Taiwan. There are two factors contributing to this interesting trade pattern. First, the expansion of imports of capital and intermediate goods from Taiwan enhances the capacity of China to export manufactured goods. Second, the manufactured goods from Taiwan to China usually contain a large portion of semi-processed products and parts for assembling or further processing operations in China, then re-export to

9 In 1986, Taiwan's exports to the United States accounted for 48 percent of its total exports while Taiwan's exports to China accounted for only 2 percent. In 1999, Taiwan's exports to the United States accounted for 25 percent of its total exports while Taiwan's exports to China accounted for 18 percent.

industrial countries¹⁰. The dramatic increase of such products imported from Taiwan further boost China's manufactured exports.

It is evident from Tables 6 and 7 that WTO entry would increase the complementary of manufacturing industries across the Taiwan Strait, allow the combination of Taiwan's capital and know-how to efficient use of the huge reservoir of low-cost labor in China, making both China and Taiwan stronger competitors of manufactured products in the world market. Therefore, there is a simultaneous expansion of capital and technology intensive production and exports from both China and Taiwan except for motor vehicle sector, especially for electronics, machinery, and other transportation equipment. It indicates that WTO entry will facilitate the industrial upgrade process for both economies and enable them to become a stronger competitor in producing relatively sophisticate manufacture products (such as computers and motor bicycles) to meet the demand for low-end capital and technology intensive products from both developed and developing economies. There seems a natural division of labor between manufacturing firms across Strait: Taiwan firms provide China with intermediates and capital goods, and China serves as the production base for Taiwan and export finished final products to developed countries' markets. However, such complementary of manufacturing activities across the Strait has a declining trend in recent years due to rapid economic growth in the south east coast of China. However, because of the disparity of economic development over China's vast inland area, such a complementary relation will exist for a long time if taking main land China as a whole as our simulation results shown.

Another interesting phenomenon is the dramatic increase of manufactured exports from China to the United States during the 10-year simulation period. It suggests that after China and Taiwan enter the WTO, the U.S. trade deficit with China may increase. However, the total U.S. trade deficit may not change very much as show in Table 8 because the reductions of U.S trade deficit with Taiwan and other Asian countries due to China's WTO accession. As China exports more finished manufactured products to the United States, it will import more intermediate and capital inputs from Taiwan, Hong Kong, Korea, and Singapore, increasing its trade deficit with those newly industrialized economies (compare China's exports to and imports from those economies in Table 7). Such an adjustment is a continuation of Taiwan, Hong Kong and Korea shifting their trade surplus with industrial countries to China that started in the late 80's due to production relocation in East Asia, driven by changing comparative advantages of each economy within the region. The further increase in NIE's exports of intermediate and capital goods to China, the further increase in China's exports of manufactured finished goods to developed countries and

10. The processing trade (processing and assembling, processing with import materials) was 46.7 percent of China's total exports in 1995, and more than a half of its exports (55.8 percent) in 1996.

low-end durable manufactured products to developing countries, the further decline of NIE's exports of labor-intensive finished goods to developed countries, and the further increase of NIE's high technology products imports from advanced industrial countries are all the results of such an adjustment process. China and Taiwan's WTO entry will further accelerate this process.

Figure 2 shows that Taiwan's total export dependence on China's market will increase over time as the result of economic integration among Chinese Economies driven by market forces regardless China and Taiwan's WTO membership. However, entry to the WTO will further increase Taiwan's export dependence on China by about 3 additional percentage points, decrease its dependence on U.S. and other countries' market, thus enable China exceed the United States become its largest export market. China will absorb more the half of Taiwan's labor-intensive exports by 2005 and a quarter of Taiwan's capital-intensive exports by 2007 if both China and Taiwan enter the WTO. Overall, Taiwan's export dependence on China (29.2 percent) and Hong Kong (3.1 percent) combined will over 32 percent at 2010.¹¹

(Insert Figure 2 here)

5.2 Impact on economic growth in China, Taiwan and their major trade partners

The expansion of trade accelerates economic growth, increases real purchasing power for households. Table 8 summarizes major aggregate economy-wide effects between a WTO with and without China and Taiwan. Admitting China and Taiwan into the WTO will accelerate world economic growth, the average annual growth rate of world real GDP would be 0.02 percentage points higher and the total accumulated world GDP growth would be 0.22 percentage points higher in 2010 than that in the baseline scenario. However, the strongest stimulus to economic growth occurs to China and Taiwan. China's real GDP growth would increase by 0.15 percentage points (0.03 percentage points for Taiwan) a year from 2001 to 2010, and 2.9 percentage points higher (0.5 percentage points higher for Taiwan) in 2010 than in the case if they are excluded from the WTO. Real GDP growth in all developed countries and most developing countries also increases from China and Taiwan's WTO accession. These increases may seem small in annual terms, however, they are notable if accumulated over the whole simulation period. By 2010, real GDP would be 0.21 percent higher in the United States and 0.15 percent higher in West Europe than in the case of a WTO without China and Taiwan. Newly Industrialized Economies such as Singapore, Hong Kong, and Korea that have closer ties with China and Taiwan will benefit more and grow faster because of China's and Taiwan's WTO accession. Certain developing countries that have a endowment and export structure similar to China's, may be slightly negatively affected, especially those

MFA quota restricted countries in ASEAN, South Asia and South America¹². They have to divert resources from manufacture to food and agricultural products because stronger Chinese competition would reduce their potential export shares in the world market. This result, however, may be partially due to the highly aggregate nature of textile and apparel sectors in the model. They are treated as two commodities. In the real economy, there are thousands of types of textile and apparel products. Developing countries that produce and export different types or less substitutable textiles and apparels compared with China will be less effected.

(Insert figure 3 and Table 8 here)

Those gains to economic growth from China's and Taiwan's trade liberalization are mainly generated from three sources that reinforce each other: (1) more efficient allocation of production factors through increased specialization according to each country's comparative advantage, including the migration of additional agricultural labor to manufacturing activities, which increase labor productivity. (2) More rapid physical capital accumulation, so that there will be more physical capital stock available in the economy; which compounds the efficiency gain, and (3) more rapid growth of TFP due to speeding technology transfer via expansion of capital and intermediate goods imports from advanced industrial countries. The additional capital accumulation and TFP growth in each region due to China's and Taiwan's WTO accession are reported in the first half of Table 8. Since both China and Taiwan adopt dramatic liberalization measures to meet the WTO entry requirement in the simulation exercises, it is expected that they will subject to the largest impacts from all the above three sources and gain the most from their WTO membership. For instance, physical capital accumulation in China will be 1.5 percent higher in year 2010 and 5.3 million additional agricultural laborers will become production workers in various manufacturing sectors over the 2001-2010 period if China is admitted into the WTO.

As classical trade theory indicates, removing trade distortions leads to further realization of each region's comparative advantage, more efficient allocation of production factors, and expansion of trade. This type of efficiency gain is driven by each region's comparative advantages, resulting in a structural adjustment in each regional economy and reshaping of the world net trade pattern. In addition, there will be a strong positive feedback between trade expansion and productivity growth. As China expands its labor-intensive exports to the world market after joining the WTO, Chinese firms will import more capital

11 In 1997, exports from Taiwan to China and Hong Kong accounted for 18.8 percent and 3.8 percent, respectively, of its total exports to the world.

12 Please note it does not mean that these countries' growth rates will be lower than their current actual growth rate, it only indicates economic growth in those countries will be lower than the situation excluding China and Taiwan in the world trade liberalization process, in other words, those countries gain less than the case excluding China.

and technology intensive goods as both investment and intermediate inputs from industrial countries. Those goods are usually embodied with advanced technology from other countries, thus stimulating productivity growth. The simulation results show that WTO membership will accelerate China's TFP growth by about 0.12 percentage points a year, and contribute significantly to the additional real GDP growth due to its entry to the WTO over the whole simulation period.

Households in China and its major trade partners would benefit from further realization of each region's comparative advantage in a freer trade environment and faster economic growth. As shown in the second half of Table 8 and Figure 3, real purchase power measured by the Hicksian equivalent variation rises in almost all regions across the world, about \$47 billion a year on average for the world as a whole over the 2001-2010 period. Similar to other trade liberalization exercises, the liberalizer—China and Taiwan, gain the most. However, the rest of the world also gains substantially, especially industrial countries. For example, the U.S. real purchasing power would increase more than \$130 billion during the whole simulation period, and about \$24 billion annually after 2010. Only MFA quota restricted developing countries in Asia, South America and Mexico slightly lose because trade will be diverted away from those countries to China after China's WTO entry as discussed in the previous section.

Generally speaking, developed countries and newly industrialized economies in Asia would benefit relatively more than other developing countries from China's WTO entry because their factor endowment and stage of technology development are different from China's. Favorable changes in international terms of trade induced by integrating China into the world market are another fundamental factor. As we discussed earlier, joining the WTO and obtaining the benefit of phasing out the MFA will enable China to dramatically increase its production and exports of labor intensive products, thus intensifying competition in the world market. This will in turn reduce export prices in developing countries and import prices in developed countries, the largest final market for such products. The expansion of China's production and trade in labor intensive manufactures result in higher demand for capital and skill-intensive manufactured goods, thus driving up the world prices for such products, which are major exports from developed and newly industrialized countries. Such a world price movement would improve international terms of trade for developed countries relative to developing countries (as shown in the bottom of Table 8), thus enabling them to benefit relatively more from China's WTO accession. However, terms of trade may also improve due to China and Taiwan's WTO entry for those least developed countries whose development stage are behind China's. This is because major exports from those countries are primary products, which will face higher world prices because of the increased world demand, while the expansion of low-end capital and technology intensive manufacturing products from China and Taiwan to those countries will lower their import prices.

VI. Conclusions and Implications for Cross-Strait Relation Policies

This paper provides a quantitative assessment of the anticipated impact of China's and Taiwan's WTO membership on cross Strait trade and economic relations based on actual market access offers that China and Taiwan have made to date using a numerical applied general equilibrium model for world production and trade. Although market access is only a part of WTO membership, the analysis does not take into account other major aspects of WTO membership, such as reduction of barriers in foreign investment, protection of intellectual property rights, enforcement of commitment, and cooperation in dispute settlement. (It at best captures only one aspect of the issue). The results obtained so far already show that the economic structures in both China and Taiwan as well as the cross Strait economic relationship will undergo substantial changes after both of them join the WTO. The dependence of Taiwan's exports on China will increase more than 3 additional percentage points from the baseline level, enabling China to replace the U.S. as the number one export market for Taiwan and further enhance Taiwan as an upstream base for China's massive manufacturing industries. In the meantime, China will obtain the benefit from expansion of imports from Taiwan fueled by direct investment to accelerate its industrialization, reduce the pressure of unemployment and expand its manufacturing exports to rest of the world because of its huge reservoir of cheap labor and gradually improved infrastructures. This study has also shown that although China and Taiwan will gain the most from their WTO memberships, rest of the world, especially developed countries and Asian newly industrialized economies, as well as least developed countries would also benefit from the expansion of world trade and improvement of their international terms of trade. Only developing countries with an endowment and export structure similar to China's, such as South Asia and ASEAN countries *may* experience keener competition in labor-intensive exports and lower prices for their products.

Furthermore, by recognizing the proper position of China and Taiwan in a comparative world economic system based on their factor endowments and stages of technology development, this analysis indicates that the economic interdependence between China and Taiwan will further deepen. Moreover, integration of the two economies will accelerate after both of them enter the WTO. This is a continued trend that started in the mid 80's driven by the market based on fundamental economic forces and is a part of the production relocation process based on changing comparative advantages in East Asia and consistent with the general trend of economic globalization. In other words, the economic integration across the Taiwan Strait is not a policy preference but a fact of life determined by the "invisible hand". It is bound by both the forces of globalization and production relocation in East Asia, rooted from the position of China and Taiwan in the dynamic Chain of international comparative advantage. No matter

what efforts made by governments on both sides of the Strait, this economic integration process may only be slowed down or accelerated. The future direction of the course is impossible to change by any political wills. The failure of the “go to the south” investment strategy promoted by the Taiwan government during last decades is obvious proof.

As a politically unified China remains a distant goal rather than a short-term possibility, a realistic and desirable strategy to promote a peaceful and stable cross Strait relation after WTO entry could be started from resuming the “three direct links” towards establish a Greater Chinese Common market, which include Taiwan, Hong Kong and Macao and mainland China as equal active partners. This integrated economic identity will be able to consider the division of labor among Chinese economies in a global market perspective and promote the best strategy of industrial structure upgrade for all members. If the leaders on both sides of the Taiwan Strait have enough political wisdom to make full use of the opportunity brought by China’s and Taiwan’s WTO entry to establish such deep and broad dimensions of economic cooperation¹³ as their clear mid-term objective, it may not only generate economic benefits to all Chinese economies but also prevent future security incidents in the Taiwan Strait area. This strategy hence provides a win-win prospect for China, Taiwan and the United States.

For Beijing, it is the best strategy to pursue China’s unification under current conditions. Reunification via economic integration, when the two sides of the Taiwan Strait are deeply linked by trade and investment flows and become an organic part of the division of labor system in a highly integrated Chinese common market, step away from this process will not only hurt firms and workers on the mainland (especially the south east coast), but also bring nightmare to firms and workers in Taiwan, any Taiwan independent movement will lose economic steam and become a remote and fade dream of few, which will better serve Beijing’s long term interests and facilitate and lead to the ultimate reunification of China.

For Taipei, active engage with China to obtain maximum benefit for Taiwanese people through negotiation and economic cooperation with Beijing in the unavoidable economic integration process, will not only enable Taiwanese firms to take a large share of the vast market and make full use of abundant production resources in the mainland, but will also provide opportunities to use Taiwan’s experience to shape whole China in the direction of a democratic market economy. This may ultimately reduce the political and economic difference across the Strait and contribute to democracy and prosperity for all Chinese people.

13 It includes free trade and mobility of production factors among members, financial and monetary integration and co-ordination of economic policies. It will base on WTO rules to make the institution arrangement for cross strait trade and investment.

For Washington, supporting an economic integrated Chinese common market not only create opportunities for American firms in the world largest potential market, increase the economic interdependence between American and Chinese economies, which is the foundation for a peaceful and stable US-China relation, but also help bring stability and security to East Asia, which is an important part of the long term strategic interest of the United States, and eventually make China a member of America's friendly nations.

The results of this paper provide useful insights in understanding the impact of China's accession to the WTO on trade and economic relations across the Taiwan Strait and demonstrate that CGE model can be a valuable tool for policy evaluation. Although the numerical model is large (there are more than 30,000 equations in each simulation period), the results are followed transparently from the model's (conceptually straightforward) structure based on basic theory of international trade. However, there are several obvious limitations need to mention. First, it does not take into account other major aspects of WTO membership, such as reduction of barriers in foreign investment, protection of intellectual property rights, securing market access, enforcement of commitment, and cooperation in dispute settlement. It at best captures only one aspect of the issue at hand. Second, China has not finalized all terms of its WTO entry when this analysis has finished. There are still uncertainties in the size of its trade concessions, the time schedule of implementation for each of the liberalization measures, and the length of the phase-in period, especially regard to quantitative restriction on imports and barriers to service trade. A relatively stylized representation of trade liberalization measures in these areas was adopted in the simulation design. Third, the CGE model used in this paper is a highly stylized simplification of the world economy, and is far from perfect (Wang, 1997a). Finally, there are uncertainties about the size of parameters, such as elasticities of substitution of products from different sources and elasticities between capital goods imports and TFP growth, while the actual size of the impact is very sensitive to those key parameters. (See Appendix table for key parameters used in the model). Therefore, the results reported in this paper need to be interpreted with caution: they can be viewed as indicative but not as precise real outcomes.

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Table 1 Factor Endowment, Intensity, and Relative Size of Model Regions, 1997

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	China	ASEAN	South Asia	Latin America MFA	Mid east Africa MFA	Low income Africa	Rest of the world
GDP and trade flows																	
	Billion U.S. dollars																
GDP	7945	8374	4255	458	631	389	445	80	140	300	855	573	530	1062	870	174	1902
Exports	853	1007	491	82	231	115	149	126	53	136	239	255	65	114	249	43	337
Imports	1024	962	419	84	217	102	159	136	94	111	215	261	74	161	260	53	394
Relative size in the world																	
	Percent																
GDP	27.4	28.9	14.7	1.6	2.2	1.3	1.5	0.3	0.5	1.0	3.0	2.0	1.8	3.7	3.0	0.6	6.6
Exports	18.8	22.2	10.8	1.8	5.1	2.5	3.3	2.8	1.2	3.0	5.3	5.6	1.4	2.5	5.5	1.0	7.4
Imports	21.7	20.4	8.9	1.8	4.6	2.2	3.4	2.9	2.0	2.4	4.6	5.5	1.6	3.4	5.5	1.1	8.3
Trade dependence																	
	Percent																
Exports/Output	10.7	12.0	11.5	17.9	36.6	29.6	33.5	157.7	38.2	45.5	28.0	44.6	12.2	10.7	28.6	24.9	17.7
Imports/Absorption	12.9	11.5	9.9	18.3	34.4	26.2	35.6	170.0	67.3	37.2	25.2	45.6	13.9	15.2	30.0	30.6	20.7
Share in world factor endowment																	
	Percent																
Land	12.8	5.6	0.3	4.0	3.3	1.8	0.1	0.0	0.0	0.1	9.0	3.5	14.1	5.3	5.8	8.9	25.5
Rural labor	0.3	0.7	0.3	0.1	0.0	0.7	0.2	0.0	0.0	0.1	39.2	8.5	25.7	2.2	2.6	11.7	7.9
Unskilled labor	7.6	10.3	4.4	0.6	0.8	2.0	1.5	0.1	0.2	0.6	14.1	7.1	16.1	7.3	4.7	5.6	17.1
Skilled labor	14.4	16.1	3.7	1.1	1.8	1.5	0.8	0.1	0.2	0.4	18.8	3.7	7.8	4.2	4.1	2.9	18.2
Total labor	4.9	6.5	2.4	0.4	0.6	1.3	0.8	0.1	0.1	0.3	26.2	7.4	19.6	4.6	3.7	8.1	13.0
Capital	22.1	30.4	18.5	1.5	1.9	1.4	1.6	0.3	0.6	0.7	2.6	1.9	1.4	3.6	4.1	0.5	7.0
Factor share in value-added																	
	Percent																
Land	0.6	0.8	0.3	0.8	0.5	3.2	2.5	0.3	0.2	0.7	7.6	5.2	11.7	1.9	1.6	2.5	2.5
Rural labor	0.5	1.5	0.8	2.1	1.4	4.4	2.1	0.5	0.5	1.6	12.0	7.4	10.8	3.1	3.2	15.5	5.0
Unskilled labor	37.9	32.6	35.9	29.3	41.0	19.3	36.5	30.8	25.4	34.2	33.9	23.5	24.1	28.2	29.0	28.3	34.0
Skilled labor	26.1	22.8	22.5	21.8	16.9	9.1	16.2	17.4	19.7	25.0	10.9	8.2	7.9	14.7	15.6	10.9	14.7
Total labor	64.5	56.9	59.2	53.3	59.2	32.8	54.8	48.6	45.6	60.8	56.7	39.0	42.9	45.9	47.7	54.7	53.7
Capital	35.0	42.3	40.5	45.9	40.3	64.0	42.8	51.1	54.2	38.5	35.7	55.8	45.4	52.2	50.7	42.9	43.8
Skill distribution of regional labor force																	
	Percent																
Rural labor	2.3	4.8	4.8	5.5	2.7	23.2	11.8	0.2	0.6	9.3	69.1	52.9	60.3	22.2	32.3	66.5	28.2
Unskilled labor	66.9	69.2	79.3	66.4	64.0	65.4	77.5	73.8	80.9	77.2	23.4	41.8	35.5	68.3	55.8	29.7	57.1
Skilled labor	30.8	26.0	16.0	28.1	33.4	11.4	10.7	26.0	18.6	13.5	7.5	5.3	4.1	9.6	11.9	3.8	14.7
Capital(land) intensity																	
	US\$ 1,000 per worker																
Capital/labor	131.7	136.9	222.7	108.9	99.1	30.4	57.0	181.2	141.8	56.7	2.9	7.4	2.1	22.6	33.1	1.9	15.6
	Hectares per worker																
Land/labor	1.28	0.42	0.06	4.80	2.86	0.67	0.07	0.00	0.00	0.09	0.17	0.23	0.35	0.56	0.78	0.54	0.96
Relative factor prices																	
	Ratio																
Rental/wage	0.41	0.54	0.31	0.79	0.69	6.41	1.37	0.58	0.84	1.12	21.72	19.45	49.48	5.03	3.21	41.23	5.22
Land rent/wage	0.70	3.31	8.21	0.32	0.29	14.7	60.2	970.9	342.7	12.6	79.7	57.9	77.4	7.48	4.21	8.34	4.73
Rental/land rent	0.59	0.16	0.04	2.51	2.36	0.44	0.02	0.00	0.00	0.09	0.27	0.34	0.64	0.67	0.76	4.95	1.10

Data Source: Calculated from the 1997 multi-regional SAM estimated by the author from Version 5 (pre-release) GTAP Database and additional factor endowment data collected by the author. Land and total labor (economically active population) endowment data are from the *FAO Statistical Year Book, 1999*. Factor returns are calculated as value-added data from GTAP divided by their endowments. The disaggregation between skilled and unskilled labor endowment was based on International Labor Office *Year Book of Labor Statistics, 1993*, and various statistical publications from various countries.

Table 2 Sectoral Net Trade Pattern by Region, 1997

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	China	ASEAN	South Asia	Latin America MFA	Mid east Africa MFA	Low income Africa	Rest of the world
<i>Billion U.S. dollars</i>																	
Grains & oilseeds	17.4	-4.2	-6.5	2.6	5.2	-2.3	-2.1	-0.1	0.0	-1.6	-0.1	-2.7	-0.8	-1.0	-2.9	-0.6	-0.1
Planted fiber	2.8	-1.3	-0.5	1.0	-0.1	-0.3	-0.5	0.0	-0.2	-0.2	-1.3	-1.5	0.3	-0.9	-0.1	1.3	1.7
Non-grain crops	-3.4	-17.3	-4.8	1.0	-1.1	2.5	-0.5	-0.5	-1.2	-0.4	1.7	2.5	1.1	11.2	2.5	5.2	1.5
Livestock	0.3	-1.6	-1.2	3.3	1.5	-0.2	-1.0	-0.3	-0.9	-0.4	0.4	-0.1	-0.1	0.1	-0.7	0.1	0.8
Dairy and meats	4.6	6.1	-7.9	8.2	1.1	-1.3	-0.7	-0.4	-1.2	-0.3	0.1	-1.2	0.0	0.6	-3.0	-0.5	-4.1
Processed food	-1.9	3.0	-15.5	1.2	0.0	0.5	-0.8	-0.5	-3.0	-0.5	0.2	12.1	2.6	7.0	-4.5	0.0	0.1
Tobacco & Beverage	0.5	10.2	-3.4	0.4	0.2	0.6	-0.6	-0.8	-0.5	-1.0	0.1	-1.0	0.0	-0.3	-1.4	-0.4	-2.7
Food & agriculture	20.3	-5.2	-39.8	17.7	6.7	-0.5	-6.2	-2.6	-7.1	-4.3	1.1	8.3	2.9	16.6	-10.1	5.1	-2.8
Forest and fishery	1.1	-2.2	-5.1	0.9	0.3	0.1	-0.5	0.0	-0.8	-0.2	-0.1	1.4	-0.2	0.3	0.1	1.4	3.4
E Energy products	-60.3	-55.8	-45.3	5.1	13.5	9.0	-17.4	-4.5	-2.0	-6.7	-3.7	4.8	-10.0	-6.0	103.6	14.8	60.8
Mineral products	-1.6	3.3	-4.9	3.8	1.0	0.5	-3.1	-1.0	-1.6	-0.5	0.7	-0.1	0.3	3.3	-0.7	0.1	0.5
Textiles	-9.1	-2.9	-2.0	-0.4	-2.1	0.6	10.1	-1.2	-3.6	9.6	4.0	2.0	9.2	-1.0	-2.2	-1.1	-10.0
Clothing	-29.4	-23.3	-10.7	-1.0	-1.0	2.2	1.3	-0.6	3.0	1.3	24.8	10.1	10.0	2.8	3.2	-0.2	7.4
Leather & shoes	-17.7	-3.6	-5.0	-0.3	-1.2	0.2	1.4	-0.4	-0.7	1.6	18.6	5.9	1.8	1.9	-1.5	-0.1	-0.9
Other light manufacture	-25.5	3.2	-1.4	-0.8	-1.4	0.5	0.5	-0.7	-2.3	3.3	20.2	2.8	2.3	-1.0	0.8	1.7	-2.2
Total Labor intensive	-81.7	-26.5	-19.1	-2.5	-5.7	3.6	13.3	-3.0	-3.5	15.8	67.7	20.7	23.3	2.7	0.3	0.3	-5.6
Wood & paper	-12.2	5.6	-13.2	-1.3	22.9	-0.5	-1.3	-0.6	-1.4	0.4	-1.5	10.2	-1.0	-0.1	-4.6	-0.2	-1.4
Intermediates	-1.4	69.5	24.4	1.1	0.5	-8.4	-4.4	-6.1	-13.1	3.1	-14.8	-20.7	-9.5	-7.5	-7.9	-4.8	-0.1
Motor vehicle	-52.2	33.5	64.0	-5.2	4.2	7.1	8.4	-1.5	-3.8	-1.8	-2.1	-7.9	-0.7	-5.7	-14.5	-2.0	-19.7
Other Trans	28.2	-0.2	11.2	-1.3	0.3	-0.4	3.4	-4.0	-1.2	-0.1	-1.1	-7.9	-1.0	-9.9	-7.7	-3.0	-5.2
Electronics	-42.2	-45.0	66.5	-7.3	-7.9	1.1	20.2	15.1	-14.3	22.6	4.6	26.4	-2.2	-9.7	-9.3	-1.2	-17.3
Machinery	12.7	109.4	91.1	-11.8	-14.8	3.5	-9.0	-8.7	-9.0	0.9	-7.5	-30.6	-8.1	-18.7	-38.1	-6.6	-54.8
Traded Services	51.7	-6.7	-36.2	2.0	-3.7	0.4	-5.7	11.7	19.9	0.0	-0.9	0.1	0.6	-4.4	-16.6	-12.5	0.2
Housing & Construction	1.1	0.9	-0.6	-0.1	1.1	-0.1	-0.1	0.0	-0.2	0.0	-0.9	-1.0	-0.1	-2.3	1.9	0.0	0.4
Total	-136.5	80.6	93.0	1.1	18.6	15.4	-2.1	-5.1	-38.2	28.9	41.5	3.7	-5.6	-41.4	-3.6	-8.6	-41.7

Data source: Calculated from Version 5 GTAP Database by excluding intro-regional trade (Hertel, 1997).

Table 3 Major Assumptions for Baseline Calibration in the Model^a

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	China	ASEAN	South Asia	Latin America MFA	Mideast & Africa MFA	Low income Africa	Rest of the World	World Average
Average annual growth rate, %, 2000-2010																		
Real GDP	3.0	2.5	2.5	3.3	2.8	4.9	4.9	5.1	5.3	4.6	7.6	5.1	5.8	3.8	6.6	3.8	5.6	3.5
Labor Force	0.8	-0.1	-0.2	1.0	0.6	2.4	1.1	0.3	0.2	0.8	0.8	1.9	2.2	1.8	3.1	3.0	1.5	1.5
Skill Labor	3.1	3.7	2.9	6.7	5.6	2.4	1.1	0.1	4.0	4.1	2.9	5.6	2.2	1.8	6.4	6.4	5.7	4.0
TFP	0.7	1.0	1.2	1.0	1.9	0.1	1.9	1.1	1.8	0.9	3.7	1.4	2.2	1.3	3.6	0.7	3.1	1.5
Capital Stock	4.7	2.7	2.5	3.8	3.6	6.6	5.3	6.7	4.6	6.6	9.1	5.8	5.5	3.1	2.7	2.6	3.6	3.8
Gross Investment	4.4	3.5	2.7	2.9	3.5	10.5	5.1	5.1	6.4	3.6	7.6	5.1	5.8	3.8	6.6	3.8	5.6	4.4
Government Spending	1.9	1.4	1.9	2.6	2.2	3.0	2.8	5.1	7.1	3.4	8.3	5.1	5.8	3.8	6.6	3.8	5.6	2.6
Exports	3.7	3.3	1.0	3.6	2.8	5.0	4.1	4.5	3.1	4.4	7.6	6.3	7.7	4.0	7.0	3.1	5.9	4.3
Imports	3.4	3.5	3.8	3.1	3.2	6.2	5.3	4.8	4.7	4.2	6.3	5.1	6.2	4.3	5.8	3.7	5.1	4.3
HH. Consumption	2.8	2.3	2.9	3.3	2.8	3.4	5.9	6.2	5.7	5.2	7.7	4.9	5.8	3.9	6.6	3.9	5.6	3.4
Total Absorption	3.0	2.4	2.7	3.1	2.8	5.4	5.4	5.5	6.0	4.6	7.7	5.0	5.8	3.8	6.6	3.8	5.6	3.6
Average annual agricultural labor force migration, 1000 persons, 2000-2010																		
Ag. Labor migration	35	75	42	5	5	124	45	0	0	13	4774	1536	2729	446	1233	1164	1716	13942
Labor composition, %, 2000																		
Agricultural labor	2.2	4.6	4.4	5.4	2.6	21.8	11.2	0.2	0.7	8.7	67.8	52.7	61.1	22.3	30.3	65.7	27.6	45.8
Unskilled labor	64.2	66.0	78.1	60.1	58.5	66.8	78.1	74.4	78.9	76.5	24.3	41.4	34.7	68.1	56.6	30.1	55.8	42.9
Skilled labor	33.6	29.5	17.6	34.5	39.0	11.4	10.7	25.4	20.5	14.8	7.9	5.8	4.1	9.6	13.1	4.2	16.6	11.3
Labor composition, %, 2010																		
Agricultural labor	2.0	4.2	3.7	5.0	2.3	19.1	9.5	0.3	0.7	7.4	61.8	46.5	57.0	19.3	20.8	61.7	23.4	42.2
Unskilled labor	55.7	53.2	72.3	35.2	34.8	69.5	79.9	75.0	69.5	72.0	28.4	45.2	38.8	71.1	61.2	32.5	51.7	43.5
Skilled labor	42.3	42.7	24.0	59.9	63.0	11.4	10.7	24.8	29.9	20.6	9.8	8.3	4.1	9.6	18.1	5.8	24.9	14.4
Gross investment as % of real GDP																		
2000	19.8	18.8	24.7	21.9	18.8	22.9	29.3	45.1	29.2	23.8	37.3	32.0	22.7	18.8	21.4	14.9	20.2	
2010	22.6	20.7	25.2	21.2	20.2	38.2	29.9	45.1	32.4	21.6	37.3	32.0	22.7	18.8	21.4	14.9	20.2	
Government spending as % of nominal GDP																		
2000	16.2	18.8	9.5	17.7	17.9	9.3	8.7	10.5	7.8	12.4	12.1	9.7	11.0	17.0	21.3	10.3	11.7	
2010	14.5	16.8	8.9	16.6	16.8	7.7	7.1	10.5	9.2	11.1	12.9	9.7	11.0	17.0	21.3	10.3	11.7	
Balance of trade as % of nominal GDP																		
2000	-3.0	1.2	2.9	-1.7	2.7	0.4	4.8	11.8	3.1	1.7	1.9	6.2	-1.3	-1.1	-0.4	-5.1	-2.1	
2010	-2.4	2.2	1.0	0.1	2.8	-4.2	0.5	8.2	-3.1	1.8	0.8	7.7	-1.3	-1.3	-0.4	-5.1	-1.9	

a. Data in bold face are based on forecast by Oxford Macro Economic Model and set exogenously during the calibration (Oxford, 1999). Economy-wide TFP growth is a weighted average (Dormar weights) of sector level TFP growth generated by the model endogenously.

Table 4a Tariff and Non-tariff Protection Rates in China for its WTO Accession (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008-2010	Rate of Reduction	Initial NTBs
Normal Tariff											
Rice	78.6	63.6	49.7	37.0	25.4	25.4	25.4	25.4	25.4	-67.7	31.0
Wheat	2.0	2.0	2.0	2.0	2.0	15.0	15.0	15.0	15.0	na	109.3
Other grains	8.9	8.7	8.6	8.4	8.2	8.2	8.2	8.2	8.2	-7.3	78.9
Oilseeds	14.3	12.7	11.2	9.6	8.0	8.0	8.0	8.0	8.0	-44.0	94.4
Planted fiber	1.0	1.0	1.0	1.0	1.0	15.0	15.0	15.0	15.0	na	72.7
Non-grain crops	21.7	19.3	17.0	14.8	12.6	12.6	12.6	12.6	12.6	-41.7	2.9
Livestock	20.7	20.1	19.6	19.1	18.5	18.5	18.5	18.5	18.5	-10.4	0.0
Dairy and meats	17.0	15.5	13.9	12.4	10.9	10.9	10.9	10.9	10.9	-35.8	2.8
Processed food	31.7	28.6	25.5	22.5	19.6	17.6	15.9	15.9	15.9	-50.0	8.7
Tobacco & Beverage	50.5	42.9	35.2	27.6	20.0	19.2	19.2	19.2	19.2	-61.9	12.4
Forest and fishery	3.5	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	-41.1	1.2
Energy products	5.2	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	-24.8	9.4
Mineral	9.6	8.7	8.3	8.1	8.0	8.0	8.0	8.0	8.0	-17.4	9.4
Textiles	25.4	21.7	17.9	14.4	11.2	9.1	9.1	9.1	9.1	-64.1	7.0
Clothing	32.1	28.4	24.9	21.3	17.8	15.0	15.0	15.0	15.0	-53.3	5.1
Leather & shoes	12.2	10.4	9.3	8.9	8.6	8.6	8.6	8.6	8.6	-29.6	5.1
Other light manufacture	22.1	20.4	18.9	17.7	16.6	15.6	15.6	15.6	15.6	-29.4	1.7
Wood & paper	11.4	9.3	7.3	5.7	4.4	4.1	4.1	4.1	4.0	-64.6	11.0
Intermediates	11.9	10.1	8.6	7.9	7.3	7.0	6.8	6.6	6.3	-46.7	15.9
Motor vehicle	33.4	28.0	22.7	19.3	16.3	13.7	13.7	13.7	13.7	-58.9	26.3
Other Trans	4.9	3.8	3.7	3.6	3.5	3.5	3.5	3.5	3.5	-29.3	12.2
Electronics	11.6	7.7	3.9	3.0	2.9	2.9	2.9	2.9	2.9	-75.0	7.8
Machinery	13.5	10.9	8.6	7.7	7.3	7.3	7.3	7.3	7.3	-46.1	5.1
Traded Services	70.9	63.8	56.7	46.1	35.5	35.5	35.5	35.5	35.5	-50.0	0.0
Average	17.9	15.1	12.6	10.7	9.3	8.9	8.8	8.8	8.7	-51.4	10.1
<i>Tariff after taking processing trade and duty exemption into account</i>											
Rice	72.4	58.6	45.8	34.0	23.4	23.4	23.4	23.4	23.4	-67.7	31.0
Wheat	1.6	1.5	1.5	1.5	1.5	11.1	11.1	11.1	11.1	na	89.7
Other grains	5.9	5.8	5.7	5.6	5.5	5.5	5.5	5.5	5.5	-7.3	78.9
Oilseeds	11.8	10.5	9.2	7.9	6.6	6.6	6.6	6.6	6.6	-44.0	94.3
Planted fiber	0.9	0.1	0.1	0.1	0.1	1.6	1.6	1.6	1.6	na	6.9
Non-grain crops	14.6	13.0	11.4	10.0	8.5	8.5	8.5	8.5	8.5	-41.7	2.9
Livestock	7.2	7.0	6.8	6.7	6.5	6.5	6.5	6.5	6.5	-10.4	0.0
Dairy and meats	11.1	10.1	9.1	8.1	7.1	7.1	7.1	7.1	7.1	-35.8	2.8
Processed food	20.6	18.6	16.6	14.6	12.7	11.5	10.3	10.3	10.3	-50.0	8.5
Tobacco & Beverage	25.7	21.8	17.9	14.0	10.1	9.8	9.8	9.8	9.8	-61.9	12.4
Forest and fishery	2.5	1.7	1.6	1.5	1.5	1.5	1.5	1.5	1.5	-41.1	1.2
Energy products	3.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	-24.8	9.4
Mineral	4.2	3.8	3.6	3.5	3.5	3.4	3.4	3.4	3.4	-17.4	9.4
Textiles	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.3	0.3	-64.1	7.0
Clothing	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	-53.3	5.1
Leather & shoes	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	-29.5	5.1
Other light manufacture	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.1	1.1	-29.4	1.7
Wood & paper	4.6	3.7	2.9	2.3	1.8	1.7	1.6	1.6	1.6	-64.6	11.0
Intermediates	3.7	3.2	2.7	2.5	2.3	2.2	2.1	2.1	2.0	-46.7	15.9
Motor vehicle	25.0	21.0	17.0	14.5	12.2	10.3	10.3	10.3	10.3	-58.9	26.3
Other Trans	4.2	3.3	3.2	3.1	3.0	3.0	3.0	3.0	3.0	-29.3	12.2
Electronics	3.3	2.2	1.1	0.8	0.8	0.8	0.8	0.8	0.8	-75.0	7.8
Machinery	4.0	3.2	2.5	2.2	2.1	2.1	2.1	2.1	2.1	-46.1	5.1
Traded Services	71.0	63.9	56.8	46.2	35.5	35.5	35.5	35.5	35.5	-50.0	0.0
Average	8.0	6.9	5.9	5.0	4.2	4.1	4.1	4.1	4.0	-49.6	9.6

Data Source: China's tariff cut is aggregated by the author from 6 digit Harmonized Commodity Description and Coding System (HS) tariff schedules based on US-China agreement (November, 1999) and weighted by 1998 import data from China's Customs. China's non-tariff barrier (NTB is the difference between import protection rate in version 5 GTAP database and China's tariff after adjustment for duty exemptions. Industrial products are modified on additional information from Zhang et al. (1998) and Li et al. (1998). Detailed data on processing trade and duty exemption are kindly provided by Dr. Shunli Yao based on the China trade database maintained at the University of California-Davis (Yao, Shunli and Robert Feenstra, 1999). The base year service sector protection rate was adopted from Hoekman (1995) and they are tariff equivalent of no-tariff barriers.

Table 4b Tariff Rates in Taiwan for its WTO Accession (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Rate of Reduction	Initial NTBs
Rice	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na	2.4
Wheat	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	0.0	0.0
Other grains	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-71.4	0.8
Oilseeds	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-98.3	1.9
Planted fiber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na	0.5
Non-grain crops	17.5	14.7	11.8	11.5	11.2	11.0	10.8	10.8	10.8	10.8	10.8	-38.0	10.2
Livestock	1.5	1.6	1.7	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	-8.3	0.0
Dairy and meats	5.2	4.9	4.7	4.5	4.4	4.4	4.3	4.3	4.3	4.3	4.3	-16.8	7.6
Processed food	13.7	12.9	12.1	11.7	11.5	11.3	11.2	11.2	11.2	11.2	11.2	-18.3	4.6
Tobacco & Beverage	19.3	17.3	15.4	15.4	15.4	15.3	15.3	15.3	15.3	15.3	15.3	-20.7	30.1
Forest and fishery	9.4	8.8	8.2	8.0	7.8	7.7	7.6	7.6	7.6	7.6	7.6	-18.3	9.7
Energy products	2.9	2.7	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	-15.5	2.8
Mineral	5.4	5.0	4.6	4.5	4.4	4.3	4.3	4.3	4.3	4.3	4.3	-21.7	0.8
Textiles	6.8	6.5	6.2	6.2	6.1	6.1	6.1	6.1	6.1	6.1	6.1	-10.6	0.8
Clothing	12.9	12.2	11.4	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	-13.0	0.3
Leather & shoes	4.8	4.7	4.5	4.4	4.3	4.2	4.2	4.2	4.2	4.2	4.2	-13.2	0.6
Other light manufacture	3.7	3.0	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	-43.7	1.1
Wood & paper	3.0	1.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	-76.8	1.1
Intermediates	3.4	2.9	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	-45.5	0.7
Motor vehicle	38.4	35.4	32.4	29.7	27.1	24.7	22.3	20.5	18.7	16.9	15.2	-60.2	0.0
Other Trans	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	-15.5	0.8
Electronics	2.6	1.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-81.1	0.6
Machinery	4.7	3.9	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	-35.8	0.2
Traded Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na	na
Average	4.7	3.9	3.3	3.1	3.0	2.9	2.8	2.8	2.7	2.7	2.6	-43.9	1.2

Data Source: Taiwan's tariff cut is aggregated by the author from 6 digit Harmonized Commodity Description and Coding System (HS) tariff schedules based on Taiwan's official WTO offer provided by Council for Agriculture, Taiwan and weighted by its import data from 1997-2000 from World Trade Atlas. The weights of each year are 0.1, 0.2, 0.3, and 0.4 respectively. Taiwan's non-tariff barrier (NTB is the difference between import protection rate in version 5 GTAP database.

Figure 1 Impact of WTO accession on China's net trade patterns – agricultural, labor and capital intensive products, 2001-2010

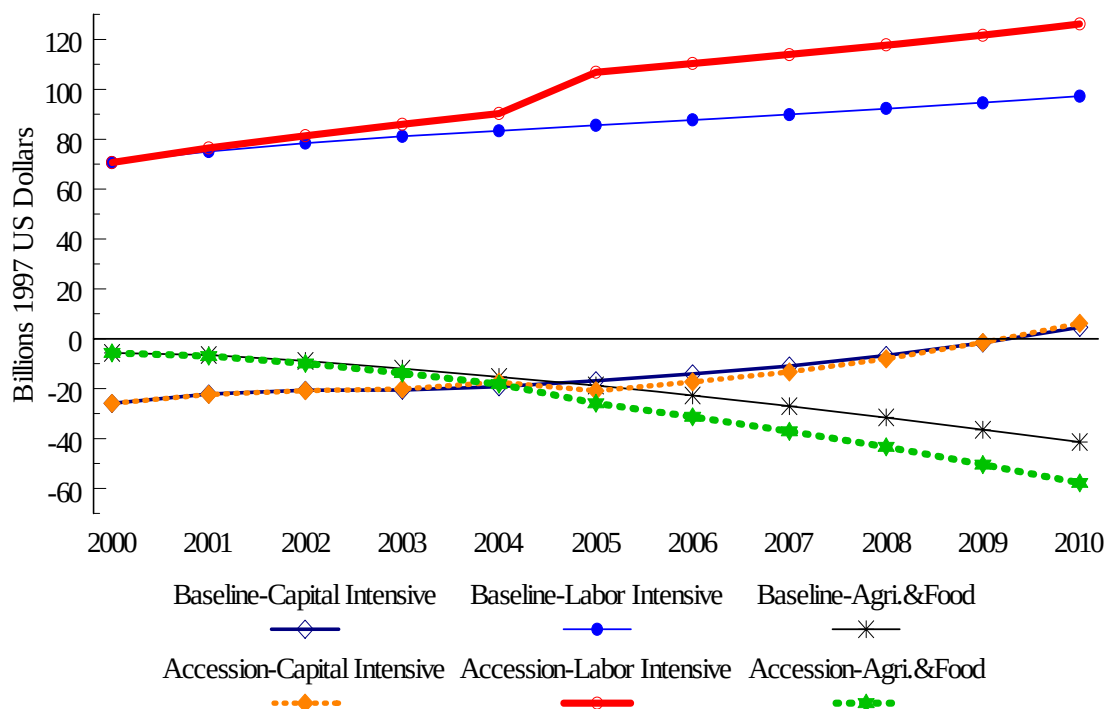


Figure 2 WTO entry will increase Taiwan's export dependence on China, but decrease its dependence on U.S. market, especially in manufactured products, 2000-2010

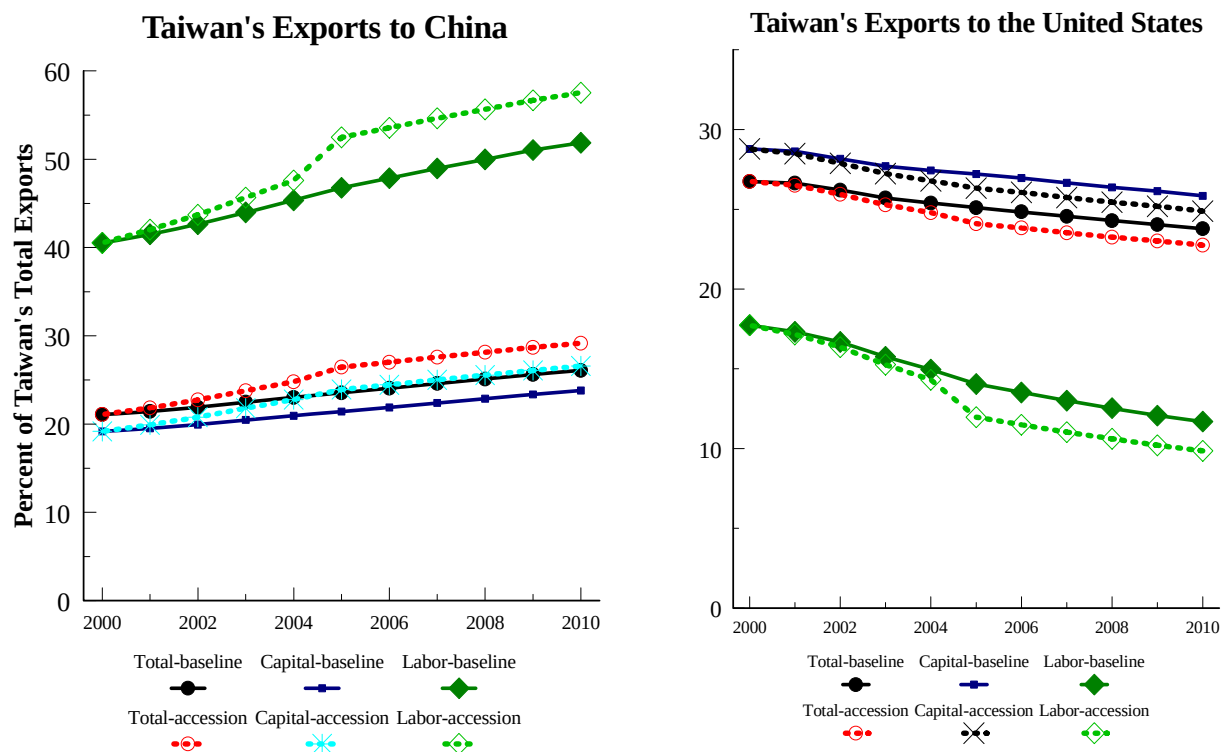


Figure 3 China is the biggest gainer in real purchasing power measured as Equilvaent Variation, United States and rest of the world also gain -- Differences between WTO with and without China

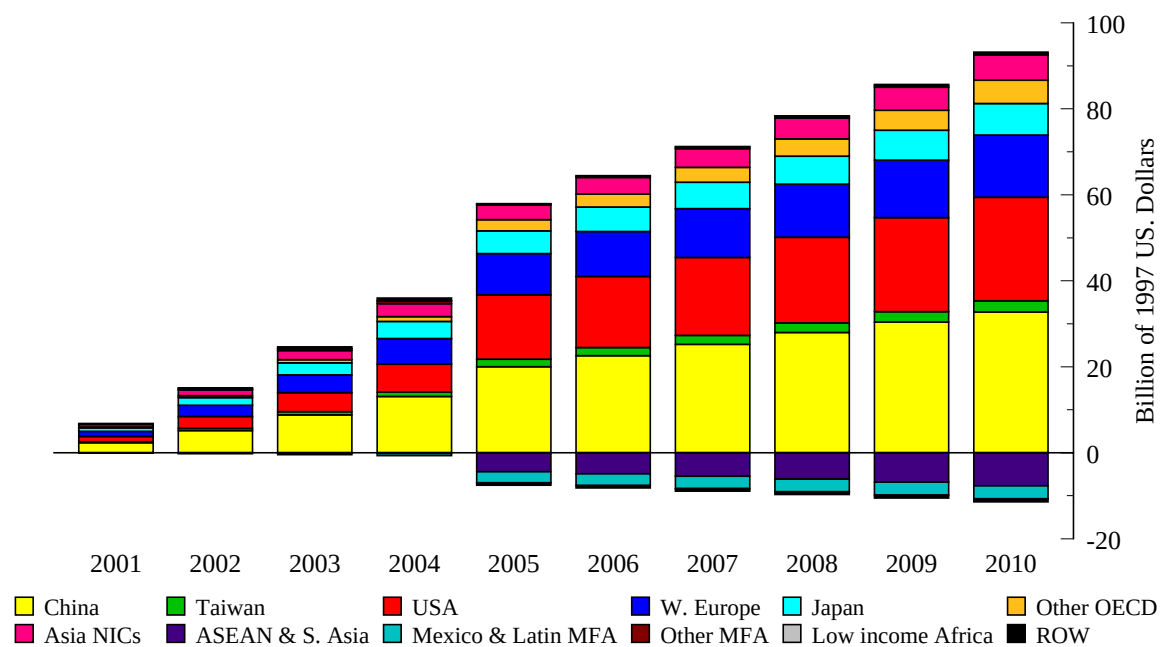


Table 5 Differences between a WTO with and without China: Accumulated Sectoral Net Trade by Region during 2001 - 2010

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	China	ASEAN	South Asia	Latin America MFA	Mideast & Africa MFA	Low income Africa	Rest of the World
Billion U.S. dollars																	
Rice	-0.3	0.0	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-2.3	2.8	0.3	0.0	0.0	0.0	0.0
Wheat	1.7	-0.2	-0.2	1.8	11.1	0.0	-0.1	0.0	0.0	0.0	-14.8	-0.2	0.5	0.1	0.0	0.0	0.2
Other grains	-0.4	0.0	-0.1	5.3	2.4	0.1	0.3	0.0	0.0	0.1	-7.3	-0.1	0.0	0.0	0.1	0.0	-0.3
Oilseeds	13.6	-0.2	-0.2	-0.1	-0.7	-0.1	0.0	0.0	0.0	0.1	-16.7	0.0	0.1	3.9	0.0	0.0	0.3
Planted fiber	5.9	0.2	-0.1	0.7	0.0	0.2	-0.1	0.0	0.0	-0.2	-11.6	0.2	0.7	0.3	0.2	1.1	2.3
Non-grain crops	-0.4	-0.8	-0.3	-0.6	-1.3	0.3	-0.2	-0.1	0.0	-1.3	-0.1	0.0	1.8	1.7	0.2	-0.3	1.6
Sub-total	20.2	-1.1	-1.0	7.0	11.4	0.5	-0.2	-0.2	0.0	-1.3	-52.8	2.7	3.5	6.0	0.5	0.8	4.0
Livestock	-0.6	-0.6	-0.1	-2.2	-1.0	0.1	-0.1	0.0	0.0	0.3	3.7	0.0	0.3	0.0	0.1	0.0	0.1
Dairy and meats	0.9	0.5	-0.3	-0.8	-0.5	0.1	0.0	0.1	0.0	-0.5	-0.8	0.2	0.2	0.4	0.2	0.0	0.5
Processed food	2.6	6.7	-1.1	-0.2	0.8	0.1	-0.2	1.6	0.6	-1.0	-12.4	-0.2	1.9	0.8	0.1	-0.1	0.2
Tobacco & Beve.	3.9	9.6	0.8	-0.1	-0.1	0.2	-0.1	0.2	0.8	-5.8	-10.3	0.2	0.1	0.3	0.1	0.0	0.4
Sub-total	6.8	16.1	-0.7	-3.3	-0.8	0.4	-0.4	1.9	1.3	-7.0	-19.8	0.2	2.5	1.5	0.4	-0.2	1.1
Forest and fishery	0.2	0.2	0.3	0.6	0.0	0.0	0.0	0.0	-0.1	-0.4	-1.1	-0.3	0.4	0.1	0.0	-0.1	0.1
Energy products	-0.5	0.4	-0.8	-0.6	-0.2	0.6	-0.3	3.5	-0.1	-2.0	-11.4	1.6	2.3	0.7	4.1	0.1	2.4
Mineral products	-0.3	-1.0	-0.8	0.1	-0.4	0.2	-0.3	-0.2	0.1	-0.6	0.3	0.7	1.9	0.9	-0.1	-0.1	-0.1
Wood & paper	1.9	0.2	0.5	-0.1	-0.8	0.4	1.3	-0.3	1.3	-0.5	-11.1	4.3	0.6	0.8	0.2	0.0	1.3
Sub-total	1.3	-0.4	-0.8	0.0	-1.4	1.1	0.7	3.1	1.3	-3.4	-23.3	6.3	5.2	2.5	4.1	-0.1	3.8
Textiles	1.8	-4.2	6.7	0.1	0.6	-0.5	5.5	-0.1	6.5	10.5	-35.0	3.3	2.5	0.2	0.5	-0.1	1.7
Clothing	-6.4	-10.9	-4.2	-0.4	-1.0	-4.8	-3.3	-0.3	-11.4	-2.1	160.8	-20.1	-36.8	-21.1	-10.4	-0.3	-27.4
Leather & shoes	-1.0	-8.1	-0.5	-0.2	0.1	-0.4	0.1	-0.2	-0.1	0.2	22.3	-7.0	0.6	-2.3	-0.4	-0.1	-3.1
Other light mann.	-0.5	-8.9	-2.0	-0.2	-0.2	-0.3	-0.7	-0.2	0.2	-1.6	17.6	-1.0	1.8	-0.3	-2.7	-0.5	-0.6
Sub-total	-6.1	-32.1	0.0	-0.6	-0.6	-6.0	1.5	-0.7	-4.8	7.0	165.7	-24.9	-31.9	-23.4	-12.9	-0.9	-29.3
Intermediates	7.0	0.6	17.7	0.3	-1.6	1.0	10.5	0.5	3.0	11.4	-73.7	7.4	5.5	2.4	1.4	0.0	6.8
Motor vehicle	3.1	3.7	11.5	-0.9	-0.6	3.6	-3.1	-0.2	-0.1	-8.5	-16.9	1.5	2.2	3.1	0.1	0.0	1.5
Other Trans	-9.3	-4.6	-4.8	-0.5	-1.3	0.0	-3.6	0.0	0.0	2.2	18.6	1.5	1.9	0.7	0.0	-0.1	-0.6
Electronics	-7.0	-6.5	-5.1	0.2	-1.3	-1.1	-3.9	-0.5	1.9	3.6	23.0	-4.1	0.8	0.6	0.0	0.1	-0.6
Machinery	-10.5	-17.0	-12.3	-0.7	-3.1	-0.8	-3.1	-1.4	0.6	0.0	41.7	2.3	2.8	1.7	0.2	0.4	-0.8
Sub-total	-16.7	-23.8	7.0	-1.8	-7.9	2.7	-3.2	-1.6	5.4	8.8	-7.3	8.5	13.2	8.5	1.7	0.4	6.2
Traded Services	6.0	15.0	-5.6	-1.4	-0.9	1.9	-3.5	-3.4	-3.7	-2.2	-27.8	5.1	7.0	4.5	3.0	-0.5	6.5
Construction	0.0	-0.9	-0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	0.1	0.2	0.0	0.0	0.1
Total	11.5	-27.2	-2.0	-0.1	-0.3	0.7	-5.2	-1.0	-0.7	1.9	36.2	-2.0	-0.4	-0.2	-3.2	-0.5	-7.5

Table 6 Differences between a WTO with and without China and Taiwan: Accumulated sectoral trade during 2001 – 2010: Taiwan

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	China	ASEAN	South Asia	Latin America MFA	Mid east Africa MFA	Low income Africa	Rest of the world	World Total
Exports																	
Grains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oilseeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Planted fiber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-grain crops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dairy and meats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Processed food	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Tobacco Beverage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Forestry & Fishery	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Energy products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Mineral products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Textile	-0.5	-0.2	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.3	14.7	-1.2	-0.1	-0.1	-0.1	0.0	-0.1	11.7
Apparel	-1.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.5
Leather & shoes	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-0.1	0.0	0.0	0.0	0.0	0.0	0.5
Other Light Manuf	-0.3	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	-0.9
Wood & paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.6
Intermediates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	0.0	0.0	22.9
Motor vehicle	0.7	0.1	0.2	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.1	1.9
Other Trans	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	-0.1	0.0	0.0	0.0	0.0	3.8
Electronics	1.5	1.0	0.3	0.1	0.2	0.1	0.2	0.3	0.8	7.1	0.4	0.0	0.0	0.0	0.0	0.2	12.1
Machinery	-0.2	-0.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	4.9	0.0	0.0	0.0	0.0	0.0	0.0	4.7
Traded Services	-0.2	-0.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	-0.1	-0.1	0.0	0.0	-0.1	-0.5
Total	-0.5	0.3	0.3	0.1	0.2	0.1	0.2	0.3	0.8	57.4	-0.7	-0.3	-0.1	-0.1	0.0	0.0	58.1
Imports																	
Grains	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
Oilseeds	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	-0.1
Planted fiber	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Non-grain crops	1.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6
Livestock	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
Dairy and meats	0.4	0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6
Processed food	0.3	0.1	0.3	0.3	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	-0.2	1.2
Tobacco Beverage	1.1	3.5	1.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.2
Forestry & Fishery	0.1	-0.1	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.1	-0.3	0.0	0.0	0.0	0.0	0.0	0.7
Energy products	0.4	1.6	0.1	-0.6	0.0	0.0	0.0	0.2	0.0	0.1	0.4	0.0	0.0	0.3	0.0	0.0	2.4
Mineral products	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	1.5
Textile	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	1.3
Apparel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Leather & shoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Other Light Manuf	0.0	-0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Wood & paper	0.1	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.9	0.0	0.0	0.0	0.0	0.0	2.2
Intermediates	1.0	2.4	3.9	0.2	0.1	0.0	0.6	0.3	0.0	2.2	0.5	0.1	0.1	0.1	0.0	0.3	12.0
Motor vehicle	1.5	3.7	2.7	0.0	0.1	0.0	0.6	0.1	0.0	0.9	0.7	0.0	0.0	0.2	0.0	0.0	10.5
Other Trans	-1.7	-0.2	0.3	0.0	0.0	0.0	-0.2	0.5	0.0	2.1	0.6	0.1	0.0	0.4	0.0	0.0	1.7
Electronics	0.2	0.3	2.2	0.0	0.0	0.0	0.9	0.8	0.0	3.2	1.1	0.0	0.0	0.1	0.0	0.0	8.8
Machinery	0.0	0.6	-0.8	0.0	0.0	0.0	0.0	-0.1	0.1	5.2	0.3	0.0	0.0	0.0	0.0	0.0	5.4
Traded Services	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.1	0.1	0.0	0.1	1.7
Total	4.6	13.3	10.4	1.0	0.2	0.2	2.1	1.8	0.7	17.6	4.5	0.5	0.5	1.2	0.0	0.6	59.3

Data source: Results from simulations at current fob/cif price. A positive number indicates an increase in exports/imports from China and Taiwan entering the WTO..

Table 7 Differences between a WTO with and without China and Taiwan: Accumulated sectoral trade during 2001 – 2010: China

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	ASEAN	South Asia	Latin America MFA	Mid east Africa MFA	Low income Africa	Rest of the world	World Total
Exports																	
Grains	0.0	0.1	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	1.1
Oilseeds	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Planted fiber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-grain crops	0.1	0.1	0.5	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.3	0.0	0.0	0.1	0.0	0.1	1.8
Livestock	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.9
Dairy and meats	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.8
Processed food	0.4	0.3	1.6	0.0	0.0	0.0	0.4	0.1	0.4	0.2	0.1	0.1	0.0	0.1	0.0	0.2	4.0
Tobacco Beverage	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	1.0
Forestry & Fishery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Energy products	0.4	0.3	1.4	0.0	0.0	0.0	1.1	0.4	0.2	0.0	0.5	0.2	0.0	0.1	0.0	0.2	4.9
Mineral products	2.0	1.3	1.5	0.2	0.2	0.1	0.7	0.2	0.3	0.4	0.5	0.3	0.1	0.5	0.1	0.7	8.9
Textile	4.1	2.5	1.7	0.4	0.5	0.0	0.9	0.2	-0.4	0.4	0.1	0.1	0.3	0.6	0.2	1.1	13.0
Apparel	99.0	39.3	7.7	0.8	5.6	0.3	1.3	0.3	0.4	0.5	0.4	0.0	1.2	1.5	0.1	5.5	164.1
Leather & shoes	11.2	4.7	2.9	0.4	0.5	0.1	0.5	0.2	0.0	0.3	0.3	0.0	0.6	1.2	0.2	3.0	26.2
Other Light Manuf	6.2	4.5	1.9	0.3	0.5	0.1	0.4	0.2	0.0	0.7	0.3	0.1	0.4	1.0	0.1	1.1	18.0
Wood & paper	1.8	0.8	1.1	0.1	0.1	0.0	0.2	0.1	0.3	0.4	0.1	0.0	0.0	0.1	0.0	0.2	5.4
Intermediates	8.9	7.6	4.7	0.8	0.9	0.2	3.7	1.5	1.7	2.1	2.8	0.9	0.6	2.0	0.4	2.1	40.8
Motor vehicle	3.3	1.2	1.5	0.2	0.2	0.0	2.5	0.4	1.7	0.9	0.6	0.8	0.1	0.4	0.3	0.4	14.4
Other Trans	7.2	5.9	2.1	0.6	1.2	0.1	0.4	1.7	0.3	1.9	1.6	0.4	1.6	1.5	1.4	2.4	30.5
Electronics	23.8	16.4	8.6	1.1	1.2	1.1	2.3	4.6	0.0	3.0	4.2	0.3	0.9	2.6	0.2	2.1	72.3
Machinery	23.0	15.1	8.4	1.3	1.1	0.6	1.9	2.4	0.0	4.6	4.7	1.5	1.2	3.9	0.7	3.3	73.5
Traded Services	1.8	6.7	1.2	0.3	0.2	0.1	0.4	0.3	0.1	0.4	0.8	0.1	0.3	0.6	0.1	1.1	14.6
Total	193.3	107.7	47.7	6.7	12.3	2.7	17.2	13.1	5.7	16.2	18.1	4.8	7.4	16.4	3.8	24.0	497.1
Imports																	
Grains	1.8	-0.6	0.0	8.9	16.3	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	-0.5	28.8
Oilseeds	15.5	0.0	0.0	-0.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	3.6	0.0	0.0	0.0	18.7
Planted fiber	6.3	0.0	0.0	1.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.2	1.3	2.5	12.3
Non-grain crops	0.6	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	1.4	2.3
Livestock	-0.6	-0.5	-0.1	-1.3	-0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	-3.0
Dairy and meats	0.8	0.4	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	1.9
Processed food	3.7	9.2	0.0	0.0	1.4	0.0	0.0	2.4	0.5	0.0	0.1	0.1	0.2	0.2	0.0	0.6	18.4
Tobacco Beverage	3.3	8.0	0.1	0.1	0.0	0.0	0.0	0.4	0.7	0.1	0.1	0.0	0.0	0.0	0.0	0.1	12.9
Forestry & Fishery	0.1	0.4	0.8	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	1.7
Energy products	0.3	0.3	0.1	0.2	0.0	0.0	2.0	7.7	0.0	0.0	1.5	0.1	0.0	4.8	0.2	1.0	18.2
Mineral products	0.8	2.1	1.0	1.1	0.1	0.0	0.4	0.2	0.3	1.1	0.6	0.7	0.6	0.5	0.1	0.5	10.1
Textile	1.1	1.8	8.9	0.8	0.2	0.2	13.0	0.1	5.1	17.5	2.5	2.2	0.3	0.1	0.0	0.7	54.6
Apparel	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	2.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.4
Leather & shoes	0.4	0.4	0.1	0.0	0.0	0.0	1.5	0.0	0.0	0.9	0.2	0.2	0.2	0.0	0.0	0.1	4.1
Other Light Manuf	-0.2	-0.2	0.5	0.0	0.0	0.0	0.1	0.0	0.6	-0.4	0.0	0.0	0.0	-0.1	0.0	0.0	0.3
Wood & paper	3.2	2.0	1.5	0.3	0.7	0.0	2.0	0.2	1.6	1.9	3.6	0.0	0.2	0.1	0.0	1.3	18.6
Intermediates	12.4	13.0	24.9	2.0	1.1	0.3	17.8	2.8	4.9	25.4	6.3	0.6	0.8	3.4	0.1	10.5	126.4
Motor vehicle	1.6	5.4	23.8	0.0	0.0	0.2	1.1	0.0	0.0	0.2	0.1	0.0	0.3	0.0	0.0	0.2	33.1
Other Trans	2.7	2.3	0.8	0.0	0.1	0.0	0.4	0.2	0.0	4.4	0.9	0.2	0.0	0.0	0.0	0.5	12.5
Electronics	6.6	4.1	17.0	0.1	0.5	0.0	4.5	4.3	4.0	7.6	3.5	0.0	0.0	0.1	0.0	0.1	52.6
Machinery	4.5	8.6	9.4	0.1	0.2	0.0	1.7	0.6	2.6	5.5	0.8	0.0	0.0	0.0	0.0	0.3	34.6
Traded Services	7.2	22.6	1.7	1.0	0.4	0.5	0.6	1.0	-3.6	0.4	1.6	0.7	1.2	2.5	0.2	4.3	42.4
Total	72.5	78.8	90.9	14.3	20.7	1.4	45.2	20.1	19.8	64.7	25.2	5.5	7.6	11.9	1.9	23.5	504.0

Data source: Results from simulations at current fob/cif prices. A positive number indicates an increase in exports/imports from China and Taiwan entering the WTO..

Table 8 Differences between a WTO with and without China: Aggregated Economic Indicators by Region

	United States	Western Europe	Japan	Australia & New Zealand	Canada	Mexico	Korea	Singapore	Hong Kong	Taiwan	China	ASEAN	South Asia	Latin America & Africa	Mideast MFA	Low income Africa	Rest of the World	World Average
<i>Accumulated Growth from 2000-2010, percentage point change from baseline</i>																		
Real GDP	0.21	0.15	0.16	0.38	0.37	-0.22	0.50	2.23	0.70	0.52	2.85	-0.22	-1.06	-0.19	0.00	0.06	-0.05	0.22
Real Export	0.25	-0.26	0.35	-0.58	-0.43	-0.31	0.16	0.03	0.07	7.36	54.05	-0.96	-4.34	-0.88	-0.92	-0.52	-0.66	2.94
Real Import	2.62	1.53	2.36	1.66	0.88	-0.52	2.53	1.50	1.63	7.64	31.12	-0.21	-3.86	-0.37	0.31	0.87	0.34	2.68
TFP	0.00	0.00	0.00	0.00	0.00	-0.04	-0.07	-0.22	-0.06	0.16	1.72	-0.09	-0.25	-0.10	-0.12	-0.13	-0.08	0.09
Capital Stock	0.09	0.04	0.05	0.10	0.10	-0.10	0.23	1.08	0.28	0.23	1.50	-0.07	-0.34	-0.06	0.01	0.01	-0.01	0.09
<i>Average Annual Growth Rate from 2000-2010, percentage point change from baseline</i>																		
Real GDP	0.02	0.01	0.01	0.03	0.03	-0.01	0.03	0.14	0.04	0.03	0.15	-0.02	-0.06	-0.02	0.00	0.00	0.00	0.02
Export	0.02	-0.02	0.03	-0.04	-0.04	-0.02	0.01	0.00	0.01	0.49	2.52	-0.05	-0.23	-0.06	-0.05	-0.04	-0.04	0.20
Import	0.19	0.11	0.17	0.13	0.06	-0.03	0.16	0.10	0.11	0.52	1.67	-0.01	-0.23	-0.02	0.02	0.07	0.03	0.20
TFP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.01	0.12	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.01
Capital Stock	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.06	0.02	0.01	0.07	0.00	-0.02	-0.01	0.00	0.00	-0.01	0.01
<i>Agricultural Labor Force Migration, 2001-2010, 1000 persons</i>																		
Accumulated	-37	-7	0	-8	-9	-27	0	0	0	18	5333	-318	-347	-152	-33	-146	-161	4103
<i>Change of Equivalent variation, Billion 1997 US\$</i>																		
Accumulated	130.4	85.7	47.4	11.7	14.2	-5.6	16.3	11.6	6.9	15.6	188.1	-3.0	-33.1	-13.0	3.7	1.4	-2.4	476.0
<i>Real Exports, Change from baseline, 2001-2010, Billion 1997 US\$ in fob price</i>																		
Accumulated	16.0	-15.8	13.1	-1.9	-5.2	-1.9	1.8	-0.8	0.7	65.8	883.4	-15.4	-15.6	-6.8	-12.5	-1.3	-13.9	889.7
<i>Real imports, Change from baseline, 2001-2010, Billion 1997 US\$ in fob price</i>																		
Accumulated	164.7	93.1	60.4	8.0	10.3	-3.5	23.7	11.7	8.5	64.0	460.4	-4.1	-15.7	-5.0	3.9	2.4	7.0	889.7
<i>Nominal trade balance, Change from baseline, Billion US\$</i>																		
Accumulated	-2.6	2.3	2.5	-0.1	0.4	0.6	0.5	1.0	0.0	-0.1	-5.8	-1.1	1.5	0.7	0.0	-0.1	0.5	0.0
<i>Term of trade, Change from baseline, percent</i>																		
2004	0.25	0.23	0.48	0.46	0.15	-0.11	0.59	0.39	0.64	-0.58	-3.35	0.30	-0.03	0.05	0.13	0.22	0.13	
2010	0.39	0.24	0.44	1.28	1.20	-0.41	0.82	0.52	0.49	-0.98	-5.66	0.22	-1.93	-0.24	0.05	0.55	0.02	

Data source: Results from simulations.

Appendix Table Key Substitution Elasticities Used in the Model

	Domestic / Imports ^a	Sources of Imports ^a	Primary Factors ^a	Value-added / Intermediate ^b
Rice	1.760	3.520	0.248	0.628
Wheat	1.760	3.520	0.248	0.628
Other grains	1.760	3.520	0.248	0.628
Oilseeds	1.760	3.520	0.248	0.628
Planted fiber	1.760	3.520	0.248	0.628
Non-grain crops	1.760	3.520	0.248	0.628
Livestock	2.100	4.387	0.248	0.628
Dairy and meats	1.430	2.860	1.120	0.628
Processed food	1.430	2.860	1.120	0.628
Tobacco & Beverage	2.015	4.030	1.120	0.978
Forest and fishery	1.820	3.640	0.200	0.628
Energy products	1.455	3.245	0.398	1.147
Mineral	1.820	3.640	0.977	1.147
Textiles	1.430	2.860	1.260	0.978
Clothing	2.860	5.720	1.260	0.978
Leather & shoes	2.860	5.720	1.260	0.978
Other light manufacture	1.820	3.640	1.260	0.978
Wood & paper	1.382	2.925	1.260	0.978
Intermediates	1.513	2.949	1.260	0.978
Motor vehicle	3.380	6.760	1.260	0.804
Other Trans	3.380	6.760	1.260	0.804
Electronics	1.820	3.640	1.260	0.804
Machinery	1.820	3.640	1.260	0.804
Traded Services	1.235	2.470	1.407	0.321
Housing, utility and construction	1.336	3.021	1.326	0.321

Data Source: a. Down scale from version 5 GTAP elasticities for short run effects (Hertel, 1997).
b. Based on G-cubed model (McKibbin, 1998).