

CHINA'S WTO ACCESSION AND IMPLICATIONS
FOR ITS REGIONAL ECONOMIES *

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1. Introduction

Since the beginning of economic reform and its opening to the outside world, China's economy has been growing at a rate of nearly 10 percent annually and its external trade has expanded by more than 15 percent a year. In 1999 China's trade volume reached \$360.7 billion, ranking 9th in the world, with export volume reaching \$195 billion. China has emerged to become an important player in world trading system. A World Trade Organization (WTO) without China as members will have difficulty in claiming to represent the global economy. Integration of China into WTO's global trading system would significantly expand world trade, and strength the multilateral trade system's integrity and credibility. After 15 years of negotiations, China has become the member of WTO at the end of 2001. Substantial trade liberalization is expected in China in the coming 5-10 years to fulfil its commitment and further reform its foreign trade regime.

China is a country with large size and huge population, it is also a developing country with per capita GDP around 840 U.S.D. (based upon official exchange rate of 2000) in the year 2000, but the per capita GDP of Shanghai is nearly 12 times of that of Guizhou province in the Southwestern region. It is therefore necessary to study the development of China not only from the national perspective, it is also necessary to study the development of different regions, especially, the impact of China's accession to WTO should also be studied from the regional perspective as well.

Accompanying the rapid economic growth, however, the variation in economic performance across provinces has widened, particularly since the late 1980s. After declining in the later 1970s and 1980s, the dispersion of provincial per capita income has increased steadily. Despite a tendency towards convergence among the coastal provinces and also among the inland provinces, there is strong tendency towards divergence between coastal and inland provinces since the late 1980s (World Bank, 1997a).

The divergence trend in provincial development is the result of profound structural change in the Chinese economy. Some empirical literature have addressed the issue on development of regional disparity and its determining factors in China (Jian, Sachs and Warner, 1996; Chen and Fleisher, 1996; Naughton, 1999). However, it is not clearly revealed that how the trade expansion has affected regional disparity since economic reform and opening up in existing literatures. Undoubtedly, China's WTO membership will have important implication on provincial development in China. As China is a large and diverse country, the effects on regional growth have significant meaning for the political feasibility of any trade policy reform in China. While the overall welfare gains may arise from the WTO accession, the uneven distribution of the gain may result in strong opposition to trade

liberalization. Therefore, to evaluate the regional effects of trade policy reform is important for successfully implementing this reform.

This paper aims at providing a relative comprehensive analysis of the impact of China's accession to the WTO on China's economy, based on the China-US bilateral agreement on market accession which was made in November, 1999. We try to provide some empirical evidence for policy makers to evaluate the effects of China's WTO accession from both national and provincial perspective. This analysis mainly uses a 53-sector, 2-region recursive dynamic computable general equilibrium (CGE) model of China. It investigates the impact of China's WTO accession, quantitatively estimates the relevant benefit and cost, and help to fully understand the challenge and opportunities it brings about to relevant parties.

This paper is organized as follows: Section 2 of this paper outlines the basic structure of the CGE model for China and presents major assumptions. Section 3 describes the basic characteristics of the base year data, and highlights the economic structure and market openness in China. Section 4 describes the simulation scenarios and section 5 uses simulation results to assess the impact of China's WTO accession. Section 6 concludes by drawing policy implications.

2. Model Features

The two-region Chinese CGE model we employ in this study is an extension of the single region Chinese CGE model that had been used in China's WTO accession study (Development Research Center, 1998; Zhai and Li, 2000). The Chinese CGE models are closely related to the applied general equilibrium model already used extensively over the past two decades to analyze the impact of trade policy reform (see Derivis, de Melo and Robinson, 1982; de Melo, 1988; Shoven and Whalley, 1992; de Melo and Tarr, 1992; Hertel, 1997). The starting point for the structure of single region Chinese model is the prototype CGE model developed for the Trade and Environment Programme of the OECD Development Centre (Beghin, et al., 1994). But some significant modifications were done in this model to capture the major features of trade and tax system in current Chinese economy. A more complete description of the model is provided in the annex. This section summarizes the main features.

An important feature of the single region Chinese CGE model is the explicitly treatment of two separate foreign trading regimes. As pointed out by Naughton (1996), China had established two separate trading regimes by 1986-87. One is the export processing or export promotion regime, which is extremely open, most foreign-invested firms and parts of domestic firm participate it. The other is traditional, but increasing reformed, ordinary trade regime. Since 1990s export processing has grown rapidly, which accounts for more than half of all exports. Obviously, to analysis the external trade

behavior and the impact of alternative changes of trade policy in such an economy, it is very important to have an explicitly treatment of its dualistic foreign trading regimes in the model.

In the extension from single region Chinese CGE model to multi region setting, two regions - Guangdong province and rest of China - are specified, each with a demand and production structure, and interregional trade in commodities and services. The interregional factor mobility and intergovernmental transfer are also introduced in the model. Guangdong province locates in southern China, neighboring Hong Kong and Marco. As the largest economy in China, it accounts for nearly 40 percent of national foreign trade. The development of Guangdong since 1978 and its economic structure could be a representation of China's coastal area. The regional disaggregation in our CGE model, which specify Guangdong and the rest of China as endogenous agents and allow for inter-regional and national-regional feedback, makes it possible to access the impact on coastal and inland areas of trade or other policy reforms.

Production is modeled using nested constant elasticity of substitution (CES) functions, and constant returns to scale is assumed. Household demand is modeled using the Extended Linear Expenditure System (ELES). The other final demand accounts assume a fixed-coefficient expenditure function. Trade is modeled using the Armington assumption for import demand, and a constant elasticity of transformation (CET) for export supply. The small country assumption is assumed for import, hence world import prices are exogenous in foreign currency. Exports are demanded according to constant-elasticity demand curves, the price-elasticities of which are high but less than infinite.

All commodity and factor markets are assumed to clear through prices. For each labor skill type, labor is assumed to be perfectly mobile across sectors, and thus there is a single region-wide equilibrating wage rate for each labor type. Capital is assumed to be partial mobile, reflecting difference in the marketability of capital goods across sector.

The model assumes imperfect interregional factor mobility to reflect the policy and institution factors that limit regional factors movement, as well as the location preference of residents. The movement of capital is driven by the relative rental rates across region and the constant elasticity of transformation, and the movement of labor is determined by the relative real income across region and the constant elasticity of transformation. The real income of labor is defined as the wage plus per capita net intergovernmental transfer income.

The current version of the China's CGE model has a simple recursive dynamic structure. Dynamic in the model originate from accumulation of productive factor and productivity changes. The base year of the data and the model is 1997. The model is solved for subsequent years in 1998, 2000,

2002, 2004, 2006, 2008 and 2010. The growth rate of population, labor forces, labor productivity are exogenous. The growth of capital is endogenously determined by the saving/investment relation.

3. Economic Structure, Market Openness in China

Our CGE model for China is constructed according to two SAMs for the year of 1997. The section outlines the basic features of industrial structure and market openness of Chinese economy in 1997 based upon the SAMs.

Table 1 summarizes the sectoral structure and market openness of Chinese economy in the base year. For each of the 53 sectors, the base year data for shares of output, employment, imports, exports, trade dependence, and the share of ordinary trade are reported. Columns 10 and 11 give information about the degree of import protection. As may be seen in columns 1 through 4, the data are notably asymmetric among the shares of output, employment, and trade. For example, the crop sectors (sector 1-5) account for 40 percent of China's labor employment but only produce 6 percent of its output and account 2 percent of China's total trade. While textile, apparel and leather industries employ 2.5 percent of China's labor force, but produce 7.7 percent of its total output and account for more than 26 percent of the country's total exports.

Export dependency is high for the apparel, leather, social articles, electronics and instruments sectors as more than 30 percent of their products depend on foreign markets. Textile is also the export-oriented sectors in which almost 20 percent of the output are sold on international markets. The sectors with the largest shares in imports are machinery, electronics and chemicals as they account for more than 10 percent of China's total imports, respectively. The wool, instruments, electronics and special equipment and two raw materials sector (crude oils and ferrous ore mining) have higher market penetration ratio. The electronics and instruments sectors have both high export and import dependency, reflecting the fact that a large percentage of production in this sector represents processing and assembling products from abroad, i.e. processing trade.

The trade balances by industry in column 10 reflect China's comparative advantage. China is a net exporter of labor-intensive manufactures and a net importer of capital-intensive manufactures. The largest share of the trade surplus in China comes from apparel and textile. In agricultural sector, China is net importer of grain, but has trade surplus of other agricultural products.

Processing trade is the most rapid expanding portion of China's foreign trade. It accounted for 50 percent China's total exports and 46 percent of China's total imports in 1997. It was more important for finished goods than primary and intermediates products. For instance, nearly 80 percent of China's primary iron and steel, electric machinery, electronics and instruments exports, and more than two

thirds of China's leather, social articles and chemical fibers exports were processing exports. It also constitutes a significant portion of China's exports on apparel, paper and printing products. The high shares of processing exports in these sectors require a large volume of raw materials, components, and semi-processed products imported from abroad as their inputs. Column 8 in Table 1 shows that in the sectors of textiles, apparel, leather and other manufacturing, the ordinary imports were only about 5 percent of their total imports. Almost all those imports were used for the production of processing exports. Most imports on paper products, build materials, chemicals, basic metal and metal products, machinery and electronics were also used by foreign or joint-venture companies as intermediate inputs to produce processing exports.

Table 1 Economic Structure and Market Openness in China, 1997 (%)

	Output	Employment	Imports	Exports	Import/ Domestic Use	Export/ Outputs	Ordinary Exports/ Total Exports	Ordinary Imports/ Total Imports	Net Export (bn. Yuan)	Nominal Tariff Rate	Collect Tariff Rate
Rice	1.2	7.5	0.2	0.1	0.9	0.9	100	92	0.0	1.0	0.4
Wheat	0.7	4.1	0.9	0.0	7.9	0.0	-	78	-11.3	1.0	0.2
Corn	0.4	2.6	0.1	0.4	1.1	7.9	100	21	6.3	1.0	0.0
Cotton	0.3	2.0	0.6	0.0	10.7	0.0	100	17	-7.7	3.0	0.6
Other non-grain crops	3.8	23.8	0.5	1.1	0.8	2.3	100	25	12.8	4.4	5.7
Forestry	0.4	2.0	0.5	0.2	6.8	3.6	96	33	-2.6	28.6	8.3
Wool	0.0	0.0	0.3	0.0	56.0	8.9	100	6	-3.8	15.0	0.7
Other livestock	3.8	8.2	0.1	0.4	0.1	0.9	97	47	6.8	5.0	2.1
Fishing	1.1	3.2	0.0	0.2	0.2	1.2	92	77	2.5	0.8	0.5
Other agriculture	0.6	2.2	0.0	0.1	0.0	1.2	88	12	1.5	16.0	1.7
Coal mining	1.1	1.2	0.1	0.6	0.4	3.1	100	63	8.6	6.0	3.3
Crude oil and natural gas	0.8	0.2	3.6	1.5	24.6	14.4	100	71	-20.6	1.5	1.0
Ferrous ore mining	0.2	0.1	1.1	0.0	30.2	0.0	100	43	-14.4	0.0	0.0
Non-ferrous ore mining	0.4	0.2	0.5	0.1	6.5	1.1	92	37	-4.9	0.0	0.0
Other mining	0.9	0.8	0.8	0.6	5.5	4.3	79	36	-0.5	2.9	0.9
Vegetable Oil	0.6	0.1	1.2	0.3	12.3	4.3	19	46	-10.3	17.0	5.3
Grain mill and forage	1.6	0.2	1.1	0.3	4.0	1.6	76	94	-7.9	4.7	4.4
Sugar	0.2	0.1	0.2	0.1	6.0	3.3	12	36	-0.8	30.0	9.5
Processed food	2.6	0.6	1.0	3.3	2.5	9.7	72	18	42.4	23.2	3.7
Beverage	1.3	0.3	0.1	0.5	0.5	3.1	84	45	7.5	60.2	24.0
Tobacco	0.7	0.1	0.2	0.3	1.3	3.2	96	24	3.3	49.1	10.6
Textile	4.6	1.5	6.8	11.4	10.1	18.4	60	1	104.5	27.5	0.2
Apparel	1.9	0.6	0.7	9.9	3.6	37.0	45	2	156.2	41.8	0.7
Leather	1.1	0.3	1.8	5.0	13.2	32.6	29	1	61.4	35.5	0.3
Sawmills and furniture	1.1	0.4	0.9	2.1	5.6	13.1	61	20	22.8	14.4	2.5
Paper & printing	1.7	0.6	2.9	0.5	9.9	2.0	35	33	-29.2	11.0	3.1
Social article	1.1	0.3	1.0	6.0	9.0	40.0	32	28	87.6	3.1	1.0
Petroleum refining	1.6	0.2	3.1	1.2	11.8	5.7	69	62	-19.6	8.7	4.8
Chemicals	4.0	1.0	11.8	4.2	16.7	8.3	80	31	-77.8	10.8	3.0
Medicine	0.9	0.2	0.2	0.7	1.8	5.9	84	75	8.5	10.9	7.2

	Output	Employment	Imports	Exports	Import/ Domestic Use	Export/ Outputs	Ordinary Exports/ Total Exports	Ordinary Imports/ Total Imports	Net Export (bn. Yuan)	Nominal Tariff Rate	Collect Tariff Rate
Chemical fibers	0.6	0.1	2.1	0.5	18.3	6.6	31	7	-17.4	15.5	1.0
Rubber and plastics	2.1	0.6	2.1	4.2	7.0	15.7	28	12	42.8	19.8	2.0
Build materials	4.4	2.1	0.8	2.1	1.2	3.4	82	20	23.9	20.8	3.6
Primary iron and steel	2.7	0.7	3.8	1.8	8.6	5.5	21	28	-17.5	8.1	2.0
Non-ferrous metals	1.2	0.3	2.6	1.2	13.0	8.0	56	14	-13.1	7.1	0.9
Metal products	2.5	0.7	2.6	4.1	7.0	13.1	57	20	36.4	13.1	2.4
Machinery	2.5	1.0	5.6	1.8	13.3	5.9	61	35	-41.0	13.7	4.2
Special equipment	1.7	0.6	8.0	1.1	23.6	5.6	63	21	-82.9	14.1	2.6
Automobile	1.6	0.4	1.1	0.4	4.2	1.9	63	73	-7.6	50.7	32.6
Oth. Transport equipment	1.3	0.4	2.6	1.6	12.1	9.7	24	28	-5.8	5.6	1.3
Electric machinery	2.8	0.6	4.0	5.5	9.6	15.9	21	20	42.2	17.9	3.1
Electronics	2.5	0.4	13.2	11.5	34.7	36.3	9	20	25.2	11.8	2.1
Instruments	0.4	0.2	2.7	2.7	44.3	49.5	15	20	12.3	12.5	2.3
Other manufacturing	0.8	0.6	0.4	0.9	3.1	8.1	29	3	9.6	38.9	0.9
Utilities	2.2	0.5	0.0	0.2	0.0	0.9	100	-	3.8	0.0	0.0
Construction	8.7	5.8	0.4	0.1	0.3	0.1	100	100	-2.6	0.0	0.0
Transportation	2.5	3.1	0.7	2.8	1.8	9.4	100	100	38.9	0.0	0.0
Post and communication	1.0	0.3	0.2	0.7	1.3	5.7	100	100	8.7	0.0	0.1
Commerce	6.6	9.0	1.2	0.7	1.2	0.9	100	100	-4.2	0.0	0.0
Finance	1.8	0.5	0.4	0.1	1.2	0.5	100	100	-2.7	0.0	0.0
Social services	3.8	1.6	2.9	4.5	5.2	10.1	100	100	38.8	0.0	0.0
Education & health	3.3	4.0	0.2	0.3	0.4	0.7	100	100	1.7	0.0	1.7
Public administration	2.2	1.8	0.2	0.0	0.5	0.1	100	100	-1.5	0.0	0.0
Total/Average	100.0	100.0	100.0	100.0	6.4	7.7	51	32	409.5	11.2	2.5

Note: 1) Imports/Domestic use and Exports/output are at domestic price. The sectoral share of imports and exports are at world price.

2) The imports of rice, wheat, corn, cotton, grain mill & vegetable oil are average of 1993-97.

Source: Chinese Social Accounting Matrix, 1997, Development Research Center of the State Council

Another notable feature of the base year data is the significant differences between China's nominal tariff rate and the actual collected rate. It is well known that China's tariff collection is significantly below its nominal tariff level because of a large volume of processed trade, extensive import duty exemptions and widespread smuggling activities (World Bank, 1994, Bach, *et al.*, 1996). The final two columns of Table 1 provide the nominal tariff rate and actual collected rate. It indicates the dramatic variation of the nominal/actual tariff rate ratio among sectors as this statistic ranges from 140 in textile and leather industries to less than 2 in medicine and automobile industries. In general, the more export-oriented sectors have the higher nominal/actual rate gaps because of the tariff exemptions applied to their imports of intermediate inputs and processed trade.

China's tariff structure is typical of that of developing countries, i.e. providing high protection for manufacturing sector, especially the capital-intensive manufacture and final consumption goods sectors. But in the aggregated level, China's actual tariff rate is moderate. Automobile subjects to the highest nominal tariff rate of 50% and its actual collection rate for ordinary import is 45%. The tariff rates in other manufactures, textile and apparel sector are also relatively high, but their effects are limited because the share of duty imports (ordinary imports) is very small.

China is large country. There are different factor endowments, industrial structure and comparative advantage, openness across provinces in China

The quotient of location can be used to analyze the comparative advantage of the province. If the quotient of location of the sector in j province is larger than 1, it means that sector in j province has comparative advantage in the country. The Table 2 shows that in the eastern region manufacture goods and service have comparative advantage; in some province of the Central region (Inner Mongolia, Jilin, Anhui, Jiangxi, and Hunan) and Western region (Sichuan, Guizhou) agriculture sector has comparative advantage; also the some provinces in central and Western regions the mining and quarrying sector has comparative advantage. Therefore many provinces in the Central and Western region have comparative advantage in resource-based sector. We should point out that in the most provinces in the Western region location quotient on service is larger than one, but it does not mean they have strong service sector. Refer to table 2 we can find in these provinces the share of agriculture is relative higher than national average and the share of industry is lower. That means their industrialization level is lower.

Table 2 Quotient of Location¹ of Regions and Provinces

	Agriculture	Mining and quarrying	Consumption goods	Intermediate Input	Capital Goods	Construction	Service
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¹ Note: Quotient of Location is a_{ij}/a_i a_{ij} is the share of the i'th industry output in the j'th region output a_i is the share of the i'th industry output in national output.

	Agriculture	Mining and quarrying	Consumption goods	Intermediate Input	Capital Goods	Construction	Service
Eastern	0.57	0.64	1.09	1.25	1.56	1.00	1.15
Beijing	0.15	0.12	0.50	0.75	1.25	1.14	2.00
Tianjin	0.22	0.73	1.06	1.20	2.18	0.86	1.34
Hebei	0.75	1.06	1.14	1.66	1.01	0.97	0.89
Liaoning	0.56	1.12	0.68	1.74	1.28	0.93	1.16
Shanghai	0.09	0.00	0.85	1.49	2.47	0.87	1.45
Zhejiang	0.55	0.21	1.46	1.42	2.06	0.92	0.99
Jiangsu	0.56	0.33	1.29	1.45	1.67	1.11	0.99
Fujian	0.77	0.51	1.05	0.78	1.12	1.12	1.20
Shandong	0.72	1.36	1.01	1.12	1.30	0.89	1.09
Guangdong	0.54	0.49	1.28	0.98	1.80	1.11	1.16
Guangxi	1.27	0.97	0.87	0.75	0.73	0.83	1.05
Central	0.96	1.55	0.98	1.10	0.96	0.89	0.93
Shanxi	0.54	3.65	0.45	1.51	0.60	1.02	0.97
Inner Mongolia	1.17	1.44	0.80	0.93	0.33	1.09	0.99
Jilin	1.02	0.81	0.65	1.07	1.57	0.94	0.99
Heilongjiang	0.72	3.83	0.90	0.93	0.78	0.90	0.87
Anhui	1.10	0.87	1.15	1.40	1.22	0.70	0.81
Jiangxi	1.10	1.06	0.74	0.88	1.07	1.08	1.01
Henan	0.98	1.37	1.06	1.09	0.90	0.97	0.90
Hubei	0.89	0.62	1.23	1.27	1.07	0.74	1.01
Hunan	1.14	1.09	1.15	0.82	0.92	0.87	0.95
Western	0.98	0.99	0.93	0.93	0.99	1.09	1.05
Chongqing	0.91	0.47	0.45	0.85	2.12	1.18	1.11
Sichuan	1.11	0.74	1.00	0.92	1.06	1.06	0.97
Guizhou	1.34	0.69	0.86	0.83	0.66	0.93	0.96
Yunnan	0.95	0.45	2.05	0.81	0.45	1.00	0.97
Gansu	0.72	1.23	0.60	1.63	0.74	0.55	1.14
Ningxia	0.85	1.32	0.43	1.58	0.64	1.15	1.05
Qinghai	0.81	1.24	0.31	0.96	0.40	1.77	1.23
Shaanxi	0.82	1.08	0.62	0.90	1.50	1.27	1.14
Xinjiang	0.95	2.86	0.60	0.62	0.23	1.46	1.14

Source: calculate from 1997 Input-Output table.

Table 3 provides the provincial distribution of China's manufacturing products. Guangdong, Fujian, Shanghai are the important producers of labor intensive manufacturing products. Jiangsu is also an important producer of textile and clothing.

Machinery, transportation equipment, electric machine and electronics are adversely affected sectors. Jiangsu and Shanghai could be affected because of their high shares in the production of these sectors. Furthermore, the machinery sector in Liaoning and Shandong, the automobile sector in Jilin and Hubei, would also be adversely affected. Guangdong province accounts for a large share of electronic sector, but the negative impact for it would be small because the export orientation of its electronic sector.

Table 3 Regional Distribution of the Production of Manufacturing Products

Share of provincial value-added (%)			
Textile, Clothing & Social Articles	Machinery	Transportation Equipment	Electric Machine & Electronic

Beijing	2.0	2.5	5.4	4.7
Tianjin	1.9	2.6	4.5	6.5
Hebei	4.2	4.0	2.6	2.2
Shanxi	0.6	1.6	0.9	0.4
Imongolia	0.8	0.4	0.3	0.2
Liaoning	1.8	7.8	4.2	5.0
Jilin	0.4	0.8	9.4	0.3
Helongjiang	0.5	2.1	2.2	1.0
Shanghai	8.0	9.8	14.9	11.2
Jiangsu	20.8	17.5	10.0	13.2
Zhejiang	11.7	7.4	4.1	6.4
Anhui	2.7	3.1	1.5	1.7
Fujian	5.0	1.5	0.8	2.7
Jiangxi	0.9	1.2	2.0	0.9
Shandong	8.7	9.8	5.5	5.1
Henan	3.8	5.6	2.8	2.5
Hubei	4.7	4.0	6.9	1.6
Hunan	1.0	2.5	2.7	1.4
Guangdong	14.8	4.0	6.6	22.9
Guangxi	0.9	2.4	2.0	0.8
Hainan	0.1	0.0	0.5	0.1
Sichuan	1.5	4.7	5.8	4.3
Guizhou	0.2	0.5	1.3	0.3
Yunnan	0.4	1.0	0.5	0.4
Tibet	0.0	0.0	0.0	0.0
Shaanxi	0.9	1.5	2.5	3.7
Gansu	0.5	0.6	0.2	0.4
Qinghai	0.0	0.2	0.0	0.0
Ningxia	0.0	0.4	0.0	0.1
Xinjiang	1.0	0.3	0.1	0.1

Source: 1) *China Regional Economy: A Profile of 17 Years of Reform and Opening-up*, SSB, 1996

2) *The Data of the Third National Industrial Census of the People's Republic of China in 1995*,

Table 4 presents the regional distribution of the production of rice, wheat and cotton, and the per capita output of these agricultural products for each province. The per capita output of agricultural products could be an index of the level of interregional exports. We can find from table 4 shows that the Hebei, Shandong and Henan are important wheat producers in China. Some provinces in middle China which specialize on rice production, such as Hunan, Jiangxi and Hubei, could experience loss from the competition with foreign imports in coastal market. In the mean time, Xianjiang, Hubei, Henan and Jiangsu will also get slightly loss in the production of cotton, because they are important providers of cotton in China.

Table 4 Regional Distribution of the Production of Rice, Wheat and Cotton

	Rice		Wheat		Cotton	
	Share of provincial output, %	Per capita output (kg/person)	Share of provincial output, %	Per capita output (kg/person)	Share of provincial output, %	Per capita output (kg/person)
Beijing	0.1	13	1.0	80	0.1	0.2
Tianjin	0.2	43	0.6	73	0.2	1.3
Hebei	0.5	14	10.4	165	7.8	5.8
Shanxi	0.0	1	2.6	88	1.9	3.0
Imongolia	0.2	17	2.6	115	0.0	0.0
Liaoning	1.4	65	0.6	16	0.5	0.6

Jilin	1.6	116	0.2	7	0.0	0.0
Helongjiang	2.5	127	2.7	73	0.0	0.0
Shanghai	0.9	122	0.2	18	0.1	0.3
Jiangsu	9.7	255	8.7	126	11.8	7.9
Zhejiang	6.6	278	0.5	12	1.3	1.4
Anhui	6.9	212	6.8	117	6.3	5.0
Fujian	3.9	229	0.2	6	0.0	0.0
Jiangxi	8.0	366	0.1	2	2.5	2.9
Shandong	0.5	10	20.2	237	9.9	5.4
Henan	1.6	33	17.2	193	16.2	8.5
Hubei	9.3	300	3.6	63	12.3	10.2
Hunan	13.2	384	0.3	4	4.7	3.5
Guangdong	7.9	215	0.1	1	0.0	0.0
Guangxi	6.8	277	0.0	1	0.0	0.0
Hainan	0.9	222	0.0	0	0.0	0.0
Sichuan	11.3	188	7.2	65	2.4	1.0
Guizhou	2.3	124	1.1	32	0.0	0.0
Yunnan	2.8	128	1.3	34	0.0	0.0
Tibet	0.0	2	0.2	106	0.0	0.0
Shaanxi	0.3	18	4.0	117	0.8	1.1
Gansu	0.0	2	2.5	104	0.5	0.9
Qinghai	0.0	0	0.7	144	0.0	0.0
Ningxia	0.2	90	0.7	135	0.0	0.0
Xinjiang	0.3	28	3.9	237	20.8	59.8
Total	100.0	155	100.0	85	100.0	4.0

Source: *Rural Statistical Yearbook of China, 1996*, SSB

It can be shown from table 5 that the dependency ratio of external trade and export is very high in the Eastern region compared with the province of Central and Western region. It can be seen that dependency ratio of export of Guangdong province is more than seven times of that of provinces in Western region.

Table 5 External Trade Dependency Ratio of Different Region in 1999

	Dependency Ratio of Import and Export	Dependency Ratio of Export	Dependency Ratio of Import
Eastern			
Beijing	0.70	0.24	0.46
Tianjin	0.77	0.37	0.40
Hebei	0.08	0.05	0.03
Liaoning	0.29	0.16	0.13
Shanghai	0.78	0.38	0.41
Zhejiang	0.35	0.20	0.15
Jiangsu	0.31	0.21	0.10
Fujian	0.43	0.25	0.18
Shandong	0.23	0.13	0.09
Guangdong	1.41	0.77	0.63
Hainan	0.08	0.05	0.03
Guangxi	0.18	0.10	0.09
Central			
Shanxi	0.13	0.08	0.04
Inner Mongolia	0.08	0.04	0.04
Jilin	0.13	0.06	0.07
Heilongjiang	0.09	0.04	0.04

	Dependency Ratio of Import and Export	Dependency Ratio of Export	Dependency Ratio of Import
Anhui	0.08	0.05	0.03
Jiangxi	0.06	0.04	0.02
Henan	0.04	0.02	0.02
Hubei	0.07	0.03	0.03
Hunan	0.06	0.03	0.02
Western			
Chongqing	0.07	0.03	0.04
Sichuan	0.06	0.03	0.04
Guizhou	0.06	0.04	0.02
Yunnan	0.08	0.04	0.04
Tibet	0.13	0.06	0.06
Shaanxi	0.12	0.06	0.06
Gansu	0.05	0.03	0.02
Qinghai	0.07	0.04	0.02
Ningxia	0.14	0.10	0.04
Xinjiang	0.14	0.07	0.07

Source: China Statistical Yearbook, 2000.

FDI flow to China is also unevenly distributed among provinces and autonomous regions of China.

Table 6 shows the pattern of regional distribution of FDI by the end of 1999.

Table 6 Pattern of Regional Distribution of FDI by the end of 1999

Region	No. Registered Enterprises and shares (U.S.D. 10000)		Registered capital (U.S.D. 10000)	Capital Invested by Foreign partner and shares		Order of rank
	Number	Share of Total %		Amount	Share of Total %	
Eastern						
Beijing	8621	4.1	2098591	1383035	4.37	6
Tianjin	9924	4.67	1696650	1284473	4.06	8
Hebei	34011	1.89	860228	467343	1.48	13
Liaoning	13825	6.51	2584599	1524605	4.81	5
Shanghai	15059	7.09	4940130	3453171	10.90	2
Zhejiang	9646	4.54	1602594	960244	3.03	10
Jiangsu	18843	8.87	4029616	2761820	8.72	3
Fujian	17965	8.46	3050255	2579989	8.15	4
Shandong	12358	5.82	2327187	1303472	4.12	7
Guangdong	53644	25.25	12893567	9593830	29.66	1
Guangxi	3018	1.42	640533	400820	1.27	15
Hainan	6993	3.29	1366865	1100250	3.47	9
Central						
Shanxi	1204	0.57	253339	127215	0.40	25
Inner Mongolia	919	0.43	157492	83686	0.26	27
Jilin	2931	1.38	506102	285978	0.90	21
Heilongjiang	3788	1.78	612968	351655	1.11	17
Anhui	2439	1.15	582506	320714	1.01	18
Jiangxi	2149	1.01	313552	199568	0.63	23
Henan	3772	1.78	790302	431165	1.36	14
Hubei	5407	2.55	1016187	603077	1.90	12
Hunan	2513	1.18	442332	266023	0.84	22
Western						
Chongqing	2150	1.01	498381	313228	0.99	19
Sichuan	3730	1.76	701051	357784	1.13	16

Region	No. Registered Enterprises and shares (U.S.D. 10000)		Registered capital (U.S.D. 10000)	Capital Invested by Foreign partner and shares		Order of rank
	Number	Share of Total %		Amount	Share of Total %	
Guizhou	947	0.45	153188	100574	0.32	26
Yunnan	1596	0.75	279746	160825	0.51	24
Tibet	70	0.03	11552	5839	0.02	32
Shaanxi	2604	1.23	471904	291090	0.92	20
Gansu	759	0.36	119222	64779	0.20	28
Qinghai	83	0.04	37805	19727	0.06	31
Ningxia	392	0.18	62402	32961	0.10	30
Xinjiang	447	0.21	83853	46796	0.15	29
State Administration for Industry and Commerce	629	0.30	1170239	792499	2.50	11
Total	212436	100	46354938	31668235	100	

Note: Derived from China's Statistical Yearbook 2000, China Statistics Press

Given the importance of Guangdong province in national economy and foreign trade, we split Guangdong province and the rest of China in our two-region model and base year SAMs. Guangdong province, which has taken a leading position in the reform and opening of China since 1978, has achieved as extraordinary economic performance from 1978. Its average growth rate of GDP from 1978-1997 is 14.2 percent annually, 4.4 percentage point higher than the national average of 9.8 percent. The share of GDP in the national economy is raised from 5.1 percent in 1978 to 9.8 percent in 1997, compared with the population share of 5.7 percent. The value of GDP is 731.6 billion yuan in 1997 ranked the first in China.

Due to the location advantage and its broad connection of overseas Chinese in business field, Guangdong province enjoyed a very high growth rate of external trade. The average annual growth rate of foreign trade in Guangdong is 24.6 percent from 1978-1997. The share of Guangdong's foreign trade in China is nearly 40 percent in the year of 1997. It should be pointed out that a large share of export in Guangdong is processing trade. The share of processing trade in total export is raised from 0.83 percent in 1978 to more than 70% in 1997. Guangdong accounted for more than 50 percent of China's processing trade in the year of 1997.

Table 7 summarizes the economic structure of Guangdong in the base year. The first four columns report the sectoral composition of output, employment and foreign trade. Column 5-7 reports the trade dependence of Guangdong, both foreign and interregional. The share of ordinary trade and net export are reported in the last four columns. In comparison with national economy, Guangdong is more specialized in service sector and export-oriented labor-intensive manufacturing sector. Agriculture is not important in Guangdong in terms of output and employment relative to the national average, but there is still more than 40 percent of labor force employed in agricultural sector.

Guangdong is an extremely open economy, 20 percent of its domestic use are import and 25 percent of its products are exported to oversea market. The dependency of Guangdong's economy on oversea market is higher than that on interregional domestic market. Only 17 percent of its domestic use are from rest of China and 11 percent of its products are sold at the market of rest of China. At industry level, textile, apparel, leather, social articles, electronics and electric machinery are important export sectors, they together contribute 64 percent of Guangdong's exports. Electronics, chemicals and textiles sectors are three largest import sectors, they account for 41 percent of total imports. The electronics, instruments, special equipment and textiles sectors have both high export and import dependency. Guangdong depends on interregional import for most of energy goods and primary metal, as well as electric machine and electronics. The electric machine and electronics sectors are also the largest sector in terms of interregional exports. Exports to the rest of China are also important for most chemical industries in Guangdong.

The data for trade balance show that the largest share of foreign trade surplus in Guangdong comes from apparel, textile, leather, electric machine and electronics. The electric machine sector in Guangdong also has large surplus from interregional trade. Guangdong is net importer of energy, chemicals and primary metal.

Table 7 Economic Structure in Guangdong, 1997 (%)

	Output	Employment	Imports	Exports	Import/ Domestic Use	Export/ Outputs	Inter- regional Import/Domestic Use	Inter- regional Export/ Outputs	Ordinary Exports/ Total	Ordinary Imports/ Total	Net Export (bn. Yuan)	Net Inter- regional Export (bn. Yuan)
Rice	0.9	7.2	0.2	0.0	3.5	0.0	23.3	8.1	100	89	-0.9	-4.2
Wheat	0.0	0.0	0.2	0.0	92.2	0.0	2.1	8.1	-	17	-0.9	0.0
Corn	0.0	0.0	0.0	0.0	100.0	-	0.0	-	100	0	-0.2	0.0
Cotton	0.0	0.0	0.2	0.0	99.1	-	0.9	-	100	11	-0.8	0.0
Other non-grain crops	2.5	19.9	0.2	0.5	1.7	5.1	23.7	8.1	100	37	1.9	-10.8
Forestry	0.3	1.5	0.3	0.1	15.3	6.2	5.0	0.0	84	32	-0.7	-0.4
Wool	0.0	0.0	0.1	0.0	99.9	-	0.1	-	100	5	-0.6	0.0
Other livestock	1.9	4.1	0.0	0.3	0.3	4.2	4.7	0.3	92	56	1.9	-1.9
Fishing	1.4	7.0	0.0	0.2	0.6	2.8	3.8	12.5	79	63	0.8	2.9
Other agriculture	0.5	2.5	0.0	0.0	0.0	2.7	1.4	0.2	58	21	0.3	-0.1
Coal mining	0.0	0.2	0.0	0.0	0.6	4.4	94.9	2.8	100	55	-0.1	-15.1
Crude oil and natural gas	0.9	0.0	1.9	1.4	42.8	42.6	0.2	0.0	100	48	0.4	0.0
Ferrous ore mining	0.1	0.1	0.1	0.0	16.8	0.5	37.6	27.4	100	29	-0.4	-0.5
Non-ferrous ore mining	0.1	0.1	0.1	0.0	9.1	8.9	54.1	26.3	100	68	-0.1	-1.4
Other mining	0.6	0.3	0.8	0.3	17.4	12.4	27.2	0.2	39	19	-1.5	-5.5
Vegetable Oil	0.3	0.1	1.1	0.4	49.4	28.4	7.2	12.7	3	23	-2.8	0.2
Grain mill and forage	0.9	0.2	0.4	0.2	8.4	6.2	12.7	12.7	31	81	-0.5	-0.1
Sugar	0.3	0.1	0.1	0.1	11.8	8.6	32.2	45.7	8	1	0.0	1.1
Processed food	1.7	0.8	0.8	1.4	12.3	21.0	17.5	26.6	49	30	5.2	5.1
Beverage	1.0	0.3	0.1	0.5	1.9	12.6	26.9	34.6	84	75	2.8	3.1
Tobacco	0.3	0.1	0.1	0.1	5.7	10.1	43.9	14.9	100	22	0.1	-3.0
Textile	4.0	1.5	9.9	11.3	48.4	66.5	26.8	8.6	50	0	26.0	-16.5
Apparel	3.5	2.4	0.6	8.7	8.6	54.2	4.0	9.9	38	1	50.9	6.5
Leather	2.7	1.5	2.5	6.8	32.4	61.4	9.9	5.0	18	1	30.8	-0.4
Sawmills and furniture	1.4	0.5	1.6	2.4	16.8	41.6	47.4	10.9	40	13	8.1	-16.1
Paper & printing	1.8	0.8	4.6	0.8	35.2	10.8	15.2	18.7	19	9	-15.2	-1.2
Social articles	3.5	1.3	0.9	10.1	14.7	69.5	0.7	2.6	17	4	58.4	1.8
Petroleum refining	0.7	0.2	4.2	0.5	36.6	18.0	53.9	51.6	52	58	-15.4	-19.0

	Output	Employment	Imports	Exports	Import/ Domestic Use	Export/ Outputs	Inter- regional Import/Do- mestic Use	Inter- regional Export/ Outputs	Ordinary Exports/ Total Exports	Ordinary Imports/ Total Imports	Net Export (bn. Yuan)	Net Inter- regional Export (bn. Yuan)
Chemicals	1.1	0.8	12.7	1.3	63.6	29.6	31.5	53.1	53	8	-47.7	-14.5
Medicine	0.7	0.3	0.1	0.2	5.6	5.8	32.7	52.9	87	71	0.4	4.9
Chemical fibers	0.7	0.2	1.1	0.3	27.6	10.1	30.0	43.5	24	3	-3.3	1.8
Rubber and plastics	4.0	1.2	3.1	6.2	19.6	41.3	15.5	7.5	20	5	24.8	-4.2
Build materials	3.0	1.8	1.0	1.9	7.0	15.2	17.7	11.8	69	7	7.1	-3.6
Primary iron and steel	0.5	0.3	5.3	0.3	41.0	15.2	45.4	11.9	35	9	-21.6	-24.5
Non-ferrous metals	0.7	0.2	4.8	0.4	42.5	17.2	40.8	29.4	32	9	-18.3	-15.6
Metal products	3.4	1.0	2.9	4.2	22.1	32.9	8.4	13.6	34	3	13.4	5.3
Machinery	0.8	0.6	3.6	0.9	49.2	28.1	19.5	15.9	29	18	-10.7	-3.4
Special equipment	0.3	0.5	5.3	0.6	89.8	56.3	7.9	35.4	20	7	-19.3	0.6
Automobile	0.5	0.1	0.4	0.3	14.8	14.6	33.1	29.0	24	67	-0.1	-0.7
Oth. Transport equipment	1.4	0.6	1.2	1.0	17.1	18.0	6.0	7.2	8	54	0.9	0.4
Electric machinery	5.9	1.7	5.3	9.2	34.4	41.7	35.3	42.5	13	8	33.4	31.7
Electronics	7.0	2.0	18.0	18.4	62.1	67.9	29.1	24.9	5	6	34.1	1.5
Instruments	1.1	0.4	1.5	3.8	84.3	84.9	3.9	11.1	7	8	16.6	2.3
Other manufacturing	1.2	0.9	0.5	1.3	8.4	26.3	19.4	7.6	12	1	5.7	-2.8
Utilities	2.8	0.5	0.0	0.6	0.0	6.1	2.3	3.6	100	-	3.8	0.9
Construction	7.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	100	100	0.0	0.0
Transportation	4.0	3.5	1.2	1.2	4.6	8.1	24.2	1.5	100	100	2.0	-25.7
Post and communication	1.5	0.5	0.0	0.2	0.0	3.2	0.0	0.0	100	100	1.0	0.0
Commerce	8.9	12.0	0.9	0.5	2.0	1.7	4.4	2.7	100	100	-0.6	-3.4
Finance	2.3	0.9	0.0	0.0	0.1	0.1	0.0	0.0	100	100	0.0	0.0
Social services	5.2	2.4	0.0	1.3	0.0	6.9	0.0	0.0	100	100	7.9	0.0
Education & health	2.8	5.0	0.0	0.0	0.0	0.0	0.0	0.0	100	100	0.0	0.0
Public administration	1.9	2.2	0.0	0.0	0.0	0.0	0.0	0.0	100	100	0.0	0.0
Total/Average	100.0	100.0	100.0	100.0	19.8	25.1	17.0	11.4	29	14	177.1	-124.5

Note: 1) Imports/Domestic use and Exports/output are at domestic price. The sectoral share of imports and exports are at world price.

2) The imports of rice, wheat, corn, cotton, grain mill & vegetable oil are average of 1993-97.

Source: Chinese Social Accounting Matrix, 1997, Development Research Center of the State Council

This SAM-based data analysis provides an overview of the characteristics of economy structure and market openness in China. It has important implications for the impact of trade liberalization and facilitates the understanding of simulation results reported later in this paper.

4. Base Case Projections and Simulations Design

The China's WTO accession includes a complex package of reform of trade and investment liberalization. Based on the final offer on market accession, this paper quantify the impact of the following four aspects: (1) tariff reduction on industrial products; (2) elimination of quotas on industrial products by 2005; (3) agricultural trade liberalization, i.e. tariff reduction for agricultural products, introduction of tariff rate quota system for agricultural goods; (4) the phase out of Multi-Fiber Arrangement (MFA) quota on textile and clothing under the WTO Agreement on Textiles and Clothing (ATC). Once China become member of WTO, China's exports in textile and apparel in North America and EU markets will be subjected to accelerate MFA quotas growth by 2004 similar with other developing countries, and the remaining export quota restrictions will be terminated in the year 2005. Therefore, the analysis at best captures only one part of the issue. It does not take into account other major aspects of WTO membership, such as reduction of barriers in service trade and foreign investment, protection of intellectual property rights, securing market access, enforcement of commitment, and cooperation in dispute settlement.

Since China's WTO accession schedule will be phased in over a transition period of 5-8 years, we utilized the recursive dynamic model to assess the impact of China's WTO membership. The dynamic model captures the changes of industrial structure, factor composition and comparative advantage of China in the next 10 years.

The base case projection for next 10 years is established first, which determines a reference growth trajectory, in absence of trade or other reforms. It assumes that China will continue its grain self-sufficient policy, and import quota of agricultural goods will grow at 3 percent annually from 2000-2010. Then we consider four scenarios in reference to the baseline scenario. The first scenario considers the tariff reduction and quotas elimination on industrial products that China offered for the WTO accession. The sectoral reduction rates of import tariff are aggregated from Harmonized Commodity Description and Coding System (HS) tariff schedules for the period of 2000-2008 in China-US agreement and weighted by 1997 ordinary trade data. In this scenario, the growth rate of import quota for petroleum refining and automobiles will also be accelerated in 2000-2005 and the quantitative restriction will be eliminated in 2005. The second scenario focuses on the agricultural trade liberalization. The tariff rate quota (TRQ) system will be introduced to replace the current quota

system for rice, wheat, corn, cotton, wool, vegetable oil and sugar. Moreover, the tariff for other agricultural goods will also be reduced. The third scenario looks at the impact of MFA elimination. In this case, China faces accelerated quota growth rate for its textile and clothing export, and the quantitative restriction will be terminated in 2005. The last scenario combines all the three aspects of China's WTO accession. We want to see the whole effects of China's WTO accession. All the assumptions for baseline scenario and five policy scenarios are summarized in table 8.

Table 8 Summary of Simulations Design

<i>Experiment</i>	<i>Description</i>																								
E1	<p><u>Base case:</u></p> <ul style="list-style-type: none"> - real GDP and agricultural output exogenous - sectoral-specific TFP growth rate endogenous - 3% growth rate of import quota for goods subjected to quantitative restriction (rice, wheat, corn, cotton, wool, vegetable oil, sugar, petroleum refining, automobiles) - exogenous export quota growth for textile and apparel textile: 5.0% apparel: 6.2% (annual average) - All tax rates are fixed at its base year level. - Balance of payment gradually declines to 30% of its base year level in 2010. 																								
E2	<p><u>Tariff reduction and quotas elimination on industrial products</u></p> <ul style="list-style-type: none"> - an average 55% cut of 2000 tariff level from 2000-2008 - phased elimination of import quotas on petroleum refining and automobiles from 2000-2005 initial quota in 2000 - <i>petroleum refining</i>: 27.6 bn yuan <i>automobile</i>: 496.8 bn yuan annual growth rate of quota from 2000-2005 - <i>petroleum refining</i>: 15% <i>automobile</i>: 15% 																								
E3	<p><u>Agricultural trade liberalization</u></p> <ul style="list-style-type: none"> - introduction of TRQ system <table style="margin-left: 40px;"> <thead> <tr> <th></th> <th>initial quota in 2000</th> <th>annual growth rate of quota</th> </tr> </thead> <tbody> <tr> <td>rice</td> <td>0.857</td> <td>18.9%</td> </tr> <tr> <td>wheat</td> <td>1.158</td> <td>7.2%</td> </tr> <tr> <td>corn</td> <td>0.325</td> <td>12.5%</td> </tr> <tr> <td>cotton</td> <td>1.046</td> <td>4.7%</td> </tr> <tr> <td>wool</td> <td>0.635</td> <td>4.5%</td> </tr> <tr> <td>vegetable Oil</td> <td>5.471</td> <td>13.3%</td> </tr> <tr> <td>sugar</td> <td>0.387</td> <td>5.0%</td> </tr> </tbody> </table> <ul style="list-style-type: none"> - Tariff cut for other agricultural goods 		initial quota in 2000	annual growth rate of quota	rice	0.857	18.9%	wheat	1.158	7.2%	corn	0.325	12.5%	cotton	1.046	4.7%	wool	0.635	4.5%	vegetable Oil	5.471	13.3%	sugar	0.387	5.0%
	initial quota in 2000	annual growth rate of quota																							
rice	0.857	18.9%																							
wheat	1.158	7.2%																							
corn	0.325	12.5%																							
cotton	1.046	4.7%																							
wool	0.635	4.5%																							
vegetable Oil	5.471	13.3%																							
sugar	0.387	5.0%																							
E4	<p><u>Phase out of MFA</u></p> <ul style="list-style-type: none"> - acceleration of MFA quota growth rate from 2000-2004 - zero export tax of textile and apparel in 2005 																								
E5	<p><u>The whole WTO accession package</u></p> <ul style="list-style-type: none"> - E2, E3 and E4 combined 																								

5. Major Simulation Results

1) Aggregate Effects

Table 9 reports the main efficiency and other macroeconomic indicators under the four scenarios of China's WTO accession. They are deviations from base case in the year of 2010. The results show that China will benefit from its WTO accession in terms of real GDP and social welfare. In

2010, China's real GDP will increase 2.1 percent compared with base case. The welfare gains represented by Hicksian equivalent variations (EV), are smaller compare to GDP (1.89 percent of 2010 GDP), because of a 1.1 percent deterioration in terms of trade. Private consumption would increase 2.06 percent, indicating the benefits to consumers from the trade liberalization. Investment increases by 2.09 percent. China's trade expansion is significant when it become a member of WTO. Exports and imports would increase by 25.4 percent and 23.8 percent respectively. The real exchange rate will depreciate slightly because of the import increase due to reduction of import protection.

Table 9 Major Macroeconomic Results under China's WTO Accession Scenarios, 2010

(percentage change relative to base case, except *Grain self-sufficiency Rate*)

	Whole WTO accession package (E5)	Tariff and NTBs reduction on industrial products (E2)	Agricultural trade liberalization (E3)	MFA elimination (E4)
EV (% of GDP)	1.89	0.33	0.88	0.41
GDP	2.07	0.36	0.86	0.51
Consumption	2.06	0.51	0.88	0.43
Investment	2.09	0.15	1.05	0.48
Exports	25.43	8.84	2.90	7.77
Imports	23.81	8.40	2.78	7.18
Government Revenue	0.78	-2.34	0.12	1.84
Urban Households Income	2.63	0.51	1.56	0.40
Rural Households Income	1.59	0.54	0.25	0.47
Terms of Trade	-1.68	-0.56	-0.17	-0.68
Real Exchange Rate	0.71	2.57	1.20	-1.88
Grain self-sufficiency Rate	0.887	0.968	0.898	0.966

Note: The results of E5 do not equal to the sum of E2, E3 and E4 due to the interactive effects.

Source: simulation results.

Many factors are interacting to determine these general equilibrium results. Generally, the large gains in GDP results from the enhanced efficiency of resource allocation through increased specialization according to comparative advantage. But other two reasons also contribute the GDP growth: (1) Removal of high protection rates induces real depreciation, enhancing international competitiveness of China's industries; (2) Elimination of the MFA further increases competitiveness of China's textile and apparel, leading to export expansion of these sectors, while these sectors have comparative advantage in China.

A notable outcome is the significant expansion of foreign trade after China joins WTO. As we previously stressed, processing trade accounts for more than half of China's total trade. There are high import contents in its exports. Growth of exports will result in a corresponding growth of imports, increase the pressure of real depreciation, and contribute to further growth of exports. This factor

partly contributed the rapid increase of China's trade dependence in last 20 years, and explains the significant trade expansion effect of China's WTO accession.

Although China will benefit from its WTO accession, the overall gains are distributed unevenly. The results in Table 9 show that the income of urban households and rural households increase by 2.6 and 1.6 percent respectively in 2010. The slow growth of import quota for food and agricultural products results in high domestic cost of agricultural production, thus keep their domestic prices become higher and higher than their world market prices year by year. The introduction of TRQ for agricultural goods after China joins WTO would sharply decrease the domestic price of agricultural products, and decreasing the return of production factors in agriculture in turn. Obviously, rural households will loss during this process. The later the liberalization in agriculture, the higher the cost of protection, therefore the larger the welfare loss for rural households and the higher the political and budgetary cost for Chinese government.

There are great concerns on the harm of agricultural trade liberalization on China's food security. Our simulation results suggest that even the crops imports would increase significantly, near 200 percent relative to base case, China's grain self sufficiency rate will still be high at 89 percent in 2010. China's grain dependence on world market is still low when China opens its grain market. Moreover, given the fact of rapid increase in laid-off workers of state-owned enterprises and urban poverty, agricultural trade liberalization improve food security in the sense of the ability of urban poor to secure access to adequate food (Sen, 1981).

The decomposition of China's market accession package evaluated here helps understanding the roles of different trade reform measures. Given the scarcity of agricultural land and growing demand of food and agricultural products during China's industrialization and population growth in the next ten years, and the high import protection in its agricultural sector, it is not surprising that agricultural trade liberalization will bring significant welfare gain for China. As simulation results show, the elimination of import quota of food and agricultural products will rise China's real GDP by 166 billion yuan at 2010, which accounts 41 percent the gains that China would obtain from its WTO entry. However, agricultural trade liberalization induces adverse domestic terms of trade effect, urban households' income increases by 1.56 percent, while rural households' income increase only by 0.25 percent in the agricultural trade liberalization scenario.

Due to the low collection rate of tariff and relative opening policy adopted to processing trade, the gains from MFA quota elimination and reduction of tariff and non-tariff barriers in industrial goods are relatively small. Real GDP will increase by 97.9 billion yuan in the MFA elimination scenario, and 69.1 billion yuan in tariff reduction scenario, respectively. The welfare gains are smaller compared to real

GDP due to adverse terms of trade effects. Their effects on income distribution are relatively neutral. The gains of urban households are slightly smaller than rural households in these two scenarios, because urban laborers are mainly employed in industrial sector, and most labor-intensive manufactures such as apparel and shoe exports are produced by village and town enterprises.

2) Sectoral Adjustments

While the aggregate results of the WTO accession scenarios show the overall welfare gains resulting from lower price distortions and expanded trade, they reveal only part of the story. Because economy-wide efficiency gains are also not distributed uniformly across sectors, and the adversely affected sectors are likely to strongly oppose trade reform. It is necessary to investigate the adjustment in sectoral output, employment and trade induced by China's WTO accession

Table 10 shows that change in gross output and trade vary significantly across sectors. The output of agricultural and food sectors subjected to import quota restriction would fall from 1.5 percent (corn) to 25.1 percent (vegetable oil). The increase of imports for these sectors are dramatic, ranging from 18 percent (wool) to 969 percent (rice). A large portion of wool imports is not ordinary trade and not subjected to quota restriction, so the introduction of TRQ has relatively small effect on imports of wool. Because the amount of grain imports is very small in base case, the sharp increase of imports would not affect domestic production significantly. Due to slow growth of quota for wheat and cotton, their quotas would bind and it results in the smaller increases of their imports compared with rice and corn. While the highly protected agricultural sectors are contracted, the production and exports of livestock products (excluding wool), which are more labor intensive and less land intensive than grain productions, would increase. However, their exports are quite marginal in absolute terms because of high domestic demand of those products.

The contraction of agricultural production will divert agricultural labor forces and capital to non-agricultural sectors. Given the large share of agricultural employment in China's today, the most important adjustment will be the relocation of agricultural labor. The simulation results on change of employment suggest that around 6.0 million agricultural laborers will be transferred to manufacturing and service sectors after China entering the WTO. Undoubtedly, it will bring adjustment costs and challenges to both the central and local government to make such relocation possible.

The elimination of MFA quota enhances China's export competitiveness in textile and clothing significantly. Exports of textile and apparels would increase by 180 percent and 206 percent respectively. The production of textile and apparel would increase by 43 percent and 70 percent respectively, thus create about 6.2 million new jobs in these two sectors.

Table 10 Changes of Sectoral Output, Employment and Trade after China's WTO Accession

(E5)

	Output		Employment		Imports		Exports	
	Bn Yuan	%	10000 Person	%	Bn Yuan	%	Bn Yuan	%
Rice	-26.1	-8.7	-222.6	-8.4	32.6	969.3	0.0	7.2
Wheat	-9.4	-4.9	-73.2	-5.3	14.5	79.8	0.0	-
Corn	-1.9	-1.5	-22.1	-2.0	6.2	345.7	0.2	10.9
Cotton	12.7	11.5	101.3	10.8	19.3	169.6	0.0	21.0
Other non-grain crops	-34.8	-2.6	-410.9	-3.0	23.5	134.6	0.3	8.7
Forestry	-17.7	-11.2	-141.7	-11.3	15.6	32.6	-0.2	-7.5
Wool	-0.9	-13.7	-2.0	-14.1	2.0	18.1	0.0	2.3
Other livestock	70.6	3.5	137.2	3.0	0.0	-0.9	1.0	13.1
Fishing	12.3	1.8	28.6	1.6	0.2	9.0	-0.1	-0.6
Other agriculture	2.7	1.2	6.2	0.5	0.0	16.4	0.0	13.9
Coal mining	-3.3	-0.9	-12.4	-1.0	-0.2	-3.1	0.0	2.1
Crude oil and natural gas	-16.5	-7.1	-13.8	-6.9	3.7	1.8	-0.4	-1.6
Ferrous ore mining	-2.5	-3.8	-2.1	-2.9	-2.5	-4.3	0.0	-15.9
Non-ferrous ore mining	-6.8	-3.8	-4.3	-3.2	-0.9	-3.8	0.0	-4.4
Other mining	1.0	0.2	2.7	0.4	1.1	2.6	-0.2	-1.4
Vegetable Oil	-61.6	-25.1	-13.2	-19.5	66.6	187.9	5.7	29.6
Grain mill and forage	0.7	0.1	0.2	0.1	16.2	21.4	0.9	9.1
Sugar	-9.5	-13.6	-10.2	-13.4	7.2	154.9	-0.6	-8.6
Processed food	24.5	2.0	8.0	1.6	4.5	9.5	10.7	10.3
Beverage	-9.1	-1.5	-2.0	-0.7	16.8	239.2	0.3	2.7
Tobacco	-3.8	-1.2	-0.4	-0.9	9.3	81.1	0.3	5.0
Textile	873.9	43.2	355.5	30.2	340.0	144.8	581.5	179.5
Apparel	673.0	69.9	267.6	44.4	25.5	94.2	651.2	205.9
Leather	-16.9	-3.4	-7.0	-2.5	2.7	4.0	-15.2	-9.0
Sawmills and furniture	1.5	0.3	3.0	0.8	7.0	15.3	-1.5	-2.5
Paper & printing	-31.3	-3.9	-17.0	-3.0	25.6	16.7	-1.2	-7.1
Social articles	-20.7	-3.3	-5.0	-1.8	3.9	7.1	-23.4	-8.6
Petroleum refining	-29.0	-3.2	-9.7	-3.1	38.9	59.6	4.2	3.3
Chemicals	-46.8	-2.6	-16.4	-2.2	65.3	12.8	3.8	2.2
Medicine	2.0	0.4	1.3	0.6	3.4	32.4	1.2	3.8
Chemical fibers	47.9	16.4	12.2	13.5	81.4	112.3	1.8	4.5
Rubber and plastics	-45.1	-3.9	-18.2	-3.0	6.7	6.7	-13.4	-5.3
Build materials	6.8	0.3	3.3	0.2	4.2	9.8	-0.4	-0.6
Primary iron and steel	-67.5	-4.8	-32.3	-4.3	16.5	7.2	-0.8	-0.8
Non-ferrous metals	-20.6	-4.0	-7.3	-3.1	-3.3	-2.1	-0.7	-2.0
Metal products	-30.8	-2.6	-12.2	-2.0	15.7	9.3	-4.0	-2.9
Machinery	-69.0	-5.6	-38.5	-4.4	36.7	13.1	-3.6	-4.3
Special equipment	-22.2	-2.9	-12.6	-2.4	38.2	9.9	-0.9	-2.3
Automobile	-305.4	-34.2	-96.1	-28.9	154.2	679.7	-2.3	-13.5
Oth. Transport equipment	-1.5	-0.2	2.2	0.5	4.6	2.6	-4.5	-4.8
Electric machinery	-76.5	-4.5	-19.6	-3.1	35.8	14.9	-26.8	-7.3
Electronics	-164.3	-9.3	-39.1	-8.8	42.2	5.4	-60.1	-6.8
Instruments	-31.1	-12.7	-24.3	-11.7	15.7	11.8	-14.8	-10.5
Other manufacturing	-16.6	-3.8	-11.0	-2.2	3.8	21.0	-10.5	-16.3
Utilities	-0.5	0.0	-2.0	-0.5	0.0	-2.0	0.5	2.5
Construction	97.6	1.9	101.9	1.5	-0.4	-1.3	0.1	3.6
Transportation	16.5	1.1	25.7	0.8	2.0	5.7	3.5	2.2
Post and communication	8.4	1.2	3.2	1.0	-0.1	-1.7	1.3	1.7
Commerce	107.9	2.9	211.7	2.1	2.2	2.4	0.1	0.5
Finance	8.5	0.8	1.3	0.3	0.2	0.5	0.0	-1.1

	Output		Employment		Imports		Exports	
	Bn Yuan	%	10000 Person	%	Bn Yuan	%	Bn Yuan	%
Social services	39.3	1.7	20.9	1.3	-2.5	-1.5	5.2	2.6
Education & health	3.7	0.2	1.3	0.0	0.1	0.3	0.0	-0.7
Public administration	3.4	0.3	4.1	0.2	-0.1	-0.4	0.0	0.6

Source: simulation results.

Some food sectors would also increase their output and exports, which benefit from reduction of cost of imported agricultural intermediate inputs. However, those sectors with high protection, such as automobile, petroleum refining and beverage, would experience a sharp increase in import. The lower import prices induce consumers to substitute imports for domestic products, resulting in dramatic decline in outputs.

The removal of tariff and non-tariff barriers is only one factor that contributes to the significant surge in imports after China joining the WTO, the export growth due to further realization of China's comparative advantage in labor-intensive products also contributes to the increase of imports. The expansion of labor-intensive production driven up the demand for capital and technology intensive equipment on one hand, and increase the demand for semi-processed products and intermediate inputs on the other hand. As we pointed out earlier, there is a large proportion of processing exports in China's total exports. This structural feature of China's foreign trade makes export growth particularly important in China's import growth. Its effects are shown clearly from the sharp increase of import of textile, apparel, chemical fibers sectors, since processing imports account for more than 90 percent of total imports in these industries.

All capital-intensive sectors, even those are not highly protected, such as machinery, electronics and instruments, would experience relatively large contract of production because of higher capital cost. The rapid expansion of labor-intensive sectors, especially textile and apparel, bid capital away from other manufacturing industries, and the large amount of labor released from previously highly protected agricultural sectors jointly push up the rental price of capital relative to labor.

3) Regional Effects

Due to different factor endowments, industrial structure and comparative advantage across provinces in China, the impacts of WTO accession on Chinese provincial economies would be different. The benefits of the trade liberalization would also be spread unevenly across regions. In general, the greater are the shares of a provincial output of industries which are relatively favored by China's WTO accession, the greater will be the benefits for the province. Conversely, the greater are the shares of a provincial output of industries which are relatively disadvantaged by China's WTO accession, the smaller will be the benefits for the province. Moreover, the more dependence of

provinces on foreign trade, the more the provinces would gain from China's WTO accession, especially for the provinces whose foreign trade mostly operated under ordinary trade regime.

The uneven distribution of benefits from China's WTO accession is confirmed in Table 6. The simulation results show that the real GDP of Guangdong will increase by 8.9 percent in 2010 relative to base case, while the real GDP in rest of China will only increase by 1.24 percent. The increase of GDP in Guangdong is around 187 billion yuan, accounts for 47 percent of national GDP gain.

If China joins WTO, the growth of investment in Guangdong is higher than private consumption, while in rest of China, the increase of investment due to China's WTO accession is almost zero. The different pattern of investment growth between Guangdong and rest of China are results from changes in domestic capital flows, which is driven by relative rental rate of capital among regions. The more rapid economic growth and expansion of export sectors in Guangdong after China joins WTO will raise the local return of production factors, drives more inflow of capital. On the contrary, the rest of China would experience more capital net outflow. As a result of increased capital outflow, the trade surplus of rest of China in 2010 will decline by 159 percent but its investment ratio to GDP will decline.

Expansion of foreign trade is significant for both economies. The increase of exports and imports in Guangdong are smaller than the rest of China. Two factors account for it. Firstly, the share of agricultural imports in total import in Guangdong is much smaller than national average. Agricultural trade liberalization under WTO accession framework will not result in dramatic increase of agricultural imports for Guangdong. Secondly, the export dependency of Guangdong is higher than rest of China. Even small expansion of export could induce a large increase of factor prices in Guangdong. Due to the imperfect factor mobility across regions, the relatively rapid growth of factor costs would weaken the competitiveness of Guangdong's products, result in relatively small expansion of its exports.

The changes in interregional trade and trade surplus are driven by interregional capital flows. The increased capital inflow to Guangdong will reduce the export of Guangdong to rest of China, and increase its import from rest of China. The trade surplus of Guangdong will decline by 24 percent. Because of the high share of processing exports in total exports, the dependency of exports on intermediate inputs from interregional imports is small. As suggested by the simulation results, it is likely that expansion of foreign trade after China's WTO accession would not induce the large increase of interregional trade.

More rapid economic growth increases the demands of labor force. The rising wage in Guangdong will divert labor force from rest of China to Guangdong. Labor force and population of Guangdong will increase by 3.3 percent in 2010, due to migration from rest of China. The labor force in rest of China will decline by 0.23 percent.

Table 11 Major Macroeconomic Effects on Guangdong and Rest of China, 2010
(percentage change relative to base case)

	Whole WTO accession package (E5)	Tariff and NTBs reduction on industrial products (E2)	Agricultural trade liberalization (E3)	MFA elimination (E4)
Guangdong				
EV (% of GDP)	9.14	3.17	0.79	2.26
GDP	8.86	2.77	0.60	2.85
Consumption	8.23	3.47	1.04	1.94
Investment	14.06	4.21	0.66	3.44
Exports	19.01	7.45	2.12	4.86
Imports	16.64	7.75	1.79	3.14
Interregional Exports	-9.47	-4.19	-0.15	-2.87
Interregional Imports	3.33	-0.63	1.43	1.15
Trade Surplus	-23.83	-5.72	1.26	-3.83
GDP Deflator	-0.58	-2.04	-0.72	1.35
Per Capita Households Income				
Urban	2.76	1.12	1.37	0.13
Rural	4.45	2.22	0.40	0.69
Labor force	3.34	1.31	0.13	1.11
Rest of China				
EV (% of GDP)	1.00	-0.02	0.89	0.18
GDP	1.24	0.06	0.89	0.22
Consumption	1.41	0.20	0.87	0.27
Investment	0.67	-0.34	1.10	0.13
Exports	30.07	9.85	3.46	9.88
Imports	27.58	8.74	3.30	9.31
Interregional Exports	3.33	-0.63	1.43	1.15
Interregional Imports	-9.47	-4.19	-0.15	-2.87
Trade Surplus	-159.55	-38.35	8.43	-25.69
GDP Deflator	-1.18	-2.72	-1.21	1.77
Per Capita Households Income				
Urban	2.23	0.29	1.56	0.31
Rural	1.27	0.35	0.23	0.44
Labor force	-0.23	-0.09	-0.01	-0.07

Source: simulation results.

The different components of WTO accession package result in quite different regional impacts. Guangdong will get loss in agricultural trade liberalization solely scenario, because unlike rest of China, agricultural imports play an unimportant role in Guangdong. Guangdong would not benefit much from cheaper imports of agricultural goods and the shifts of agricultural labor forces to industry and service

sector. Furthermore, due to more rapid growth in rest of China, more labor and capital will be diverted to it.

The aggregate effects on efficiency and welfare of rest of China in MFA quota elimination and trade liberalization on industrial product scenarios (E2 and E4) are limited. Although the increase of foreign trade in Guangdong is smaller than that in rest of China in these two cases, the Guangdong accounts for almost all benefits because Guangdong's share of foreign trade in China's total foreign trade is large, especially for the foreign trade in manufacturing sectors.

Table 12 provides the simulations results on sectoral production and employment for Guangdong and rest of China. The sectoral impacts on the two regions within China are quite similar to that on whole country. Because Guangdong's foreign trade ratio to GDP is higher than rest of China, the impacts on production of Guangdong are larger than rest of China for most sectors.

Table 12 Changes of Sectoral Output and Employment for Guangdong and Rest of China, (E5)

	Output				Employment			
	Guangdong		Rest of China		Guangdong		Rest of China	
	Bn Yuan	%	Bn Yuan	%	10000 Person	%	10000 Person	%
Rice	-7.5	-24.9	-18.6	-6.9	-38.7	-26.1	-183.9	-7.3
Wheat	0.0	-21.3	-9.3	-4.8	-0.1	-22.8	-73.1	-5.3
Corn	0.0	-	-1.9	-1.5	0.0	-	-22.1	-2.0
Cotton	0.0	-	12.7	11.5	0.0	-	101.3	10.8
Other non-grain crops	-4.3	-4.3	-30.5	-2.4	-30.8	-6.0	-380.1	-2.9
Forestry	-1.2	-10.5	-16.4	-11.3	-3.4	-10.9	-138.3	-11.3
Wool	0.0	-	-0.9	-13.7	0.0	-	-2.0	-14.1
Other livestock	9.5	8.7	61.1	3.2	10.1	7.0	127.1	2.9
Fishing	2.3	2.4	10.0	1.7	4.1	1.8	24.6	1.6
Other agriculture	0.6	2.7	2.2	1.1	1.3	1.4	4.9	0.4
Coal mining	-0.3	-22.3	-3.0	-0.8	-3.1	-22.4	-9.3	-0.8
Crude oil and natural gas	-2.4	-7.6	-14.1	-7.0	-0.2	-7.6	-13.6	-6.9
Ferrous ore mining	-0.4	-16.2	-2.2	-3.4	-0.3	-14.8	-1.9	-2.6
Non-ferrous ore mining	-1.2	-14.8	-5.6	-3.3	-1.1	-15.0	-3.1	-2.5
Other mining	0.1	0.4	0.9	0.2	0.0	-0.3	2.7	0.4
Vegetable Oil	-3.3	-16.3	-58.3	-25.9	-0.8	-24.0	-12.5	-19.3
Grain mill and forage	0.6	1.4	0.1	0.0	0.0	-0.6	0.3	0.2
Sugar	-2.0	-13.7	-7.4	-13.6	-1.2	-14.2	-9.0	-13.3
Processed food	-1.9	-2.2	26.4	2.3	-1.3	-3.7	9.3	2.1
Beverage	-8.2	-12.9	-1.0	-0.2	-2.1	-12.7	0.2	0.1
Tobacco	-1.7	-17.1	-2.1	-0.7	-0.3	-15.2	-0.1	-0.3
Textile	258.6	120.8	615.3	34.0	56.2	91.7	299.3	26.8
Apparel	192.4	102.8	480.6	61.9	100.6	82.2	166.9	34.8
Leather	-15.3	-11.7	-1.6	-0.4	-8.3	-11.3	1.3	0.6
Sawmills and furniture	-2.9	-4.0	4.4	0.9	-1.0	-4.4	3.9	1.1
Paper & printing	-10.1	-8.2	-21.2	-3.1	-4.2	-8.8	-12.8	-2.5
Social articles	-16.7	-7.0	-4.0	-1.0	-4.7	-6.2	-0.2	-0.1
Petroleum refining	-2.3	-2.7	-26.8	-3.3	-1.0	-3.1	-8.7	-3.1
Chemicals	0.1	0.2	-46.9	-2.7	-0.8	-2.2	-15.7	-2.2

	Output				Employment			
	Guangdong		Rest of China		Guangdong		Rest of China	
	Bn Yuan	%	Bn Yuan	%	10000 Person	%	10000 Person	%
Medicine	-1.2	-3.9	3.3	0.7	-0.5	-4.6	1.8	0.9
Chemical fibers	8.0	19.6	39.9	15.9	1.3	14.6	10.9	13.4
Rubber and plastics	-17.1	-5.8	-28.1	-3.3	-5.1	-6.6	-13.1	-2.5
Build materials	9.1	4.4	-2.3	-0.1	2.1	2.0	1.2	0.1
Primary iron and steel	-1.2	-4.9	-66.3	-4.8	-0.9	-5.7	-31.4	-4.3
Non-ferrous metals	-2.5	-9.9	-18.0	-3.7	-0.8	-9.7	-6.4	-2.9
Metal products	-7.8	-4.1	-23.0	-2.3	-2.4	-4.6	-9.8	-1.8
Machinery	-4.2	-11.4	-64.8	-5.4	-2.6	-10.6	-35.9	-4.2
Special equipment	-1.3	-8.2	-20.9	-2.8	-1.8	-8.0	-10.9	-2.2
Automobile	-14.6	-57.4	-290.8	-33.5	-3.2	-53.8	-92.9	-28.5
Oth. Transport equipment	-3.2	-4.3	1.6	0.3	-1.4	-4.7	3.6	0.9
Electric machinery	-49.1	-9.3	-27.4	-2.4	-11.8	-9.6	-7.8	-1.6
Electronics	-53.0	-8.3	-111.2	-9.9	-12.9	-8.2	-26.2	-9.2
Instruments	-9.0	-12.3	-22.0	-12.9	-2.7	-11.5	-21.6	-11.7
Other manufacturing	-9.1	-8.0	-7.5	-2.3	-5.1	-8.2	-5.9	-1.3
Utilities	8.7	4.4	-9.2	-0.9	0.1	0.4	-2.1	-0.5
Construction	67.9	13.3	29.7	0.7	60.0	10.8	41.9	0.7
Transportation	8.9	3.8	7.6	0.6	3.4	1.9	22.3	0.7
Post and communication	8.0	6.4	0.4	0.1	1.2	3.7	2.0	0.7
Commerce	56.5	9.6	51.4	1.6	55.8	7.3	155.9	1.7
Finance	10.4	6.1	-1.9	-0.2	1.7	3.6	-0.4	-0.1
Social services	23.2	5.8	16.1	0.8	4.7	3.4	16.2	1.1
Education & health	5.3	3.0	-1.6	-0.1	5.2	1.8	-3.9	-0.1
Public administration	3.2	2.7	0.2	0.0	1.8	1.3	2.3	0.1

Source: simulation results.

Grain are the most seriously affected agricultural products in China from its entry to the WTO. The provinces which specialize on the production of these products would get loss from China's WTO accession, especially the farmers in these provinces. The per capita output of agricultural products could be an index of the level of interregional exports. Generally, provinces with higher per capita output would be the net exporters to other provinces or the world market. After China becomes a member of WTO, the provinces with net outflows of these agricultural products would have negative impact, while the provinces with net inflows of these agricultural products would be benefited. Hebei, Shandong and Henan are important wheat producers in China, the three provinces also have high per capita output of wheat, their wheat production would be adversely affected due to China's WTO accession. Some provinces in middle China which specialize on rice production, such as Hunan, Jiangxi and Hubei, could experience loss from the competition with foreign imports in coastal market. In the mean time, Xianjiang, Hubei, Henan and Jiangsu will also get slightly loss in the production of cotton, because they are important providers of cotton in China.

It should be pointed out that the crop sector of China would experience the decline of production as a whole after China's entering WTO, but the livestock sector would expand. Although the major

grain producing provinces would get loss in the production of grain, they can be benefited from the expansion of livestock sector if they actively prompt the structural transfer from crop to livestock sector, because these provinces have relative cheaper labor force and feed supply.

As the important producers of labor intensive manufacturing products and the most export oriented provinces, Guandong, Fujian, Shanghai would be major beneficiaries from China's WTO accession and the possible further expansion of China's labor intensive sectors. Jiangsu is also an important producer of textile and clothing, but it is less export oriented, so its gain from China's WTO accession would be relative smaller than Guandong and Fujian.

Machinery, transportation equipment, electric machine and electronics are adversely affected sectors. Jiangshu and Shanghai could be affected because of their high shares in the production of these sectors. Furthermore, the machinery sector in Liaoning and Shandong, the automobile sector in Jilin and Hubei, would also be adversely affected. Guandong province accounts for a large share of electronic sector, but the negative impact for it would be small because the export orientation of its electronic sector.

7. Conclusion and Policy Implications

This paper analyzes the impacts of China's WTO accession using a two-region Chinese CGE model. The results of simulation show that China would gain significantly in economic efficiency when China becomes a member of WTO. If China enters the WTO and fully implements its commitment on market access at 2010, its real GDP and welfare measured in Hicks equivalent variations (EV) would be increased by 2.1% and 1.89% of real GDP of 2010 respectively. The large gains in real GDP mainly results from the enhanced efficiency of resource allocation through increased specialization in accordance with China's comparative advantage, but elimination of the MFA strengthens competitiveness of China's textile and apparel, leading to export expansion of these products, also contributes to the real GDP growth. If the gains to TFP improvement and economic growth from trade liberalization are taken into account, China's efficiency gain will be even larger.

But the gains are not evenly distributed among either sectors or provinces. Accession to the WTO also implies a relatively dramatic economic structural adjustment. Output of highly protected agricultural and some of the capital intensive industrial sectors such as automobile, instruments, cotton, wheat, etc., would contract significantly, while the labor intensive sectors such as textile and clothing would be the main beneficiaries. In regional level, the coastal area will gain more from trade expansion and the increased export of labor intensive goods, but the provinces in inland area, especially the provinces which specialize on agricultural production, could experience loss.

Structural adjustment involves adjustment cost. Structural unemployment may rise following China's accession to the WTO. Millions of farmers would have to transfer to non-agricultural sector. Although expansion of the textile and service industries should open up a large number of positions for rural migrants, the transition could be painful in the short term. Undoubtedly, the role of government would be crucial in the process of structural adjustment.

These results have an important implication for China's WTO accession. First, accession to the WTO is one challenge to China, but it also means a great opportunity. Shortage of arable land and capital and existence of large amount of unskilled labor force are the basic national condition of China. This situation can not be changed fundamentally within the near future. This basic national condition will be the major decisive factor in the identification and choice of China's development strategy. Joining WTO will integrate China into the world economy more deeply. China will be benefited from its participation of the international division. Therefore, China's WTO membership is consistent with its medium and long term development strategy.

Second, the overall income distribution would deteriorate after China entering WTO in terms of either rural-urban or coastal-inland gap. But the rise of rural-urban income disparity is due largely to the food self-sufficiency policy that would continue in the future, rather than to trade liberalization. Protection in agriculture can improve the farmer's income temporally, but not sustainably. The cost of agricultural protection will grow during China's industrialization. The later the reform, the larger distortion and the more serious the problem on income distribution. The appropriate strategy for China's WTO accession is to open its agricultural and food market to exchange the developed countries to lift their limits on labor-intensive products from China, phase in cutting the protection of manufacturing sectors over a period of time, and create necessary economic and social conditions for the shift of agricultural labor force. It will benefit both the efficiency and equality in China.

The enlarged regional disparity between coastal and inland area induced by China's WTO accession is mainly due to low degree of domestic regional integration and the structural features of China's foreign trade. Because of high proportion of processing trade, the linkage between foreign trade and domestic economy is weak in China. Export sector in coastal area depends on labor migration from inland area more than intermediate inputs from inland area. Therefore, the export expansion in coastal area would not increase the demand of interregional import, but divert labor force from inland area to coastal area. Although imposing limitations on labor mobility within region would reduce the regional disparity probably induced by China's WTO accession, it would be harmful to economic efficiency. Instead of putting more distortion on factor market, the central government should improve the domestic regional integration in commodity market through infrastructure creation

in transportation, communication, etc., and reduce the institutional separation between export sector and domestic economy. It will make the efficiency gains from trade liberalization to spread evenly across regions in China without hurting economy efficiency.

Third, it is urgent for China to create a social security system that will facilitate a smooth transition of labor force. The State Council issued a series of directives in the 1990s that aim to establish a nationwide three-pillar social security system. However, the current social security system is far from ready for the structural change in employment that would be brought about by WTO accession. (World Bank, 1997b)

Forth, the domestic taxation policy should perform a stronger function on redistribution of income to reduce the impact of income inequality resulted from the accession to WTO. One of our previous studies has investigated the welfare and distributional effects of tariff reduction under alternative tax replacement assumptions (Wang and Zhai, 1998). This study suggested that imposing a progressive households income tax seems to be an appropriate policy choice to replace the lost tariff revenue, it reduces the Gini coefficient and retains most of the efficiency gains.

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