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# Appendix A

## Specification of the Global Recursive Dynamic Computable General Equilibrium Model

The model is an extension of the computable general equilibrium (CGE) models used in China WTO accession studies by Wang (1997, 1999, 2003a, 2003b) 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. The model 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. The model is not designed to generate short-term macroeconomic forecasts. Rather, under exogenous assumptions on future world economic growth it generates the pattern of production and trade resulting from world economic adjustment to the shocks specified in the alternative policy scenarios using a recursive dynamic framework.

### Structure of the Model

The model has 20 fully endogenized regions and 32 production sectors in each region to represent the world economy.<sup>1</sup> There are six primary fac-

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1. See table B.1 in appendix B for the correspondence between regions in the model, GTAP regions, and country names. See table B.2 for the correspondence between sectors in the model, GTAP, and International Standard Industrial Classifications (ISIC).

tors of production: agricultural land, natural resources, capital, agricultural labor, unskilled labor, and skilled labor. Unskilled labor has a basic education, while skilled labor has more advanced training. Agricultural labor has little or no education and works only in the farm sector. Natural resources and agricultural land are sector-specific, while capital, unskilled labor, and skilled labor are assumed to be mobile across sectors, but immobile across regions. All commodity and factor markets are assumed to clear through market prices. The details of intraperiod equilibrium structure and interperiod linkages are similar with what is described in Wang (2003a, 2003b).<sup>2</sup>

## Gains from Trade

Three types of gains from trade liberalization are captured by the model:

1. the gains from more efficient utilization of resources leading to a one-time permanent increase in GDP and social welfare;
2. more rapid physical capital accumulation from a “medium-run growth bonus” that compounds the efficiency gain from trade liberalization and leads to higher saving and investment; and
3. (through capital and intermediate goods) technology transfer among regions, which links sector-specific TFP growth with each region’s imports of capital- and technology-intensive products.<sup>3</sup> Technology transfer is assumed to flow in one direction—from more-developed to less-developed regions.

## Savings and Capital Accumulation

Accumulation patterns for the capital stock in the model depend upon depreciation and gross real investment rates, which set exogenously based on forecasts from a world macroeconomic model.<sup>4</sup> However, household

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2. A detailed algebraic specification of the model is in appendix B. The structures of production and consumption as well as the price system in the model are illustrated in figures B.1–B.3.

3. Empirical evidence suggests that there is strong positive feedback between trade expansion and productivity growth. Trade liberalization increases the prevalence of technology transfer as trade barriers are reduced. Firms in the liberalized regions will import more capital- and technology-intensive goods as both investment and intermediate inputs from abroad at cheaper prices. Those goods are usually embodied with advanced technology from other countries, thus stimulating productivity growth for all production factors.

4. The macroeconomic assumptions for this exercise are taken from Economist Intelligence Unit country forecasts.

savings, government surplus (deficit), and foreign capital inflows (foreign savings) are assumed to be perfect substitutes, and collectively constitute the source of gross investment in each region. This means that changes in trade balance, which directly affect foreign saving, 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 saving rate, which partially offsets the change in foreign saving.

Household saving decisions are endogenous in the model. They represent future consumption goods for the household sector with zero subsistence quantity (by assuming intertemporal separable preferences, extended linear expenditure system [ELES] demand). Government surplus (deficit) is the difference between the government's tax revenues and its expenditures, the latter fixed as a percentage of each region's GDP based on forecasts from the Economist Intelligence Unit (EIU).

Foreign capital inflows or outflows are determined by the accumulation of the balance of trade, which is also fixed as a percentage of GDP in each region based on the macro model's projections, except for the old 15 EU member countries (which are fixed as an international numeraire). The model does not include financial markets or portfolio investment. The trade balance is the only source of foreign savings (as an inflow or outflow). There is no explicit specification of FDI. However, FDI is partially captured in trade flows, because in order to convert FDI (other than mergers of existing companies in the same region) into production capital, certain technology and equipment will be purchased via international trade.

## **Total Factor Productivity Growth**

Economywide and sector-specific TFP growth variables exist for each region in the model. The economywide TFP variable is solved endogenously in the baseline calibration to match a prespecified path of real GDP growth in each region based on forecasts from the EIU. Then the economywide TFP variable is fixed when alternative scenarios are simulated; in such a case, the growth rate of real GDP and the sector-specific TFP variables that link productivity growth and imports are solved endogenously.

## **Baseline Calibration**

The model is calibrated around a 2004 world social accounting matrix (SAM) based on Version 7 of the GTAP database (Badri and Walmsley 2008). Details of this type of multiregional SAM and its construction from the GTAP database are described in Wang (1994). The model is implemented using the General Algebraic Modeling System and solved in levels.

Because the possible Taiwan-China agreement, like other FTAs in East Asia, will be phased in over a transition period, a baseline is established from 2005–20 using a reference growth path of the world economy with the implementation of already agreed-upon FTAs in East Asia without Taiwan’s participation. This calibrated baseline will serve as a basis of comparison for scenarios in which Taiwan and other East Asian economies adopt different trade policy measures. The difference between these policy simulation scenarios and the baseline is our estimate of the potential gains and losses for Taiwan and other economies resulting from the trade policy measure in question.

Table A.1 summarizes the major macroeconomic assumptions and results from the baseline calibration. It uses the economywide 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 macroeconomic variables (gross investment, government spending, and balance of trade) in the model. The baseline includes the termination of the Multi-Fiber Arrangement in 2005, the reimposition of quota restrictions for China’s textile and wearing apparel exports to the EU-15 countries and the United States during 2006–08, and EU enlargement in 2007 to include the 12 new member countries. It also incorporates the impact of the recent world economic crisis. Gross investment, government expenditure, and balance of trade for 2005–20 are specified as percentages of GDP and are based on EIU forecasts. The extent of China’s tariff reduction in its implementation of its WTO commitment is aggregated from the Harmonized Commodity Description and Coding System (HS) tariff schedules at the six-digit level based on China’s final official offer (November 2001) and weighted by 2000 import data from the World Bank. Taiwan’s tariff reduction in implementing its WTO commitment is based on Taiwan’s official WTO offer downloaded from the WTO website. It is also aggregated from the six-digit HS tariff schedules and weighted by Taiwan’s import data in 2001. All nontariff barriers of manufacturing products in both China and Taiwan are reduced by 10 percent each year from 2005 and stay at 50 percent in relation to the initial level after 2010.

Already agreed-upon FTAs in East Asia are implemented according to their established time schedule. Barriers to imports between China and ASEAN countries are assumed to be reduced according to the ASEAN plus China FTA and set to zero by 2010 (Vietnam by 2015). The sector structure of the protection reduction is based on what China and ASEAN countries reported to the WTO and aggregated from HS six-digit tariff lines. For all other already agreed-upon FTAs in East Asia, we assume there will be a 70 percent reduction in bilateral protection rates in the first year the agreement comes into force, then a reduction by 90 percent after five years of implementation and to zero in the final year of the implementation period. The East Asian FTAs included and the year of implementation are listed in table A.2. In all these FTAs, we assume three

agricultural sectors are not included in the import protection reduction: rice, other grains, and livestock.

China's tariff collection is significantly below its nominal tariff level because of a large share of processing trade in total trade and extensive import duty exemptions. By 2006, about 48 percent of all imports in China were inputs used in production of exports and were exempted from tariffs.

Several studies have shown that failing to account for the presence of duty exemptions in China's trade regime leads to a serious overestimate of the impact of China's WTO entry at both aggregate and sectoral levels (Ianchovichina, Martin, and Fukase 2000; Lejour 2000). By using China's 2004 custom statistics, we incorporated China's processing trade and duty exemption pattern by sectors and by import sources into the baseline calibration, which scales down China's tariff level by routine-specific information. The initial protection rate at 2010 for each of the economies in our model is listed in table A.3, which is the import protection level after all above-mentioned adjustments.

## Simulations

We conducted the following six simulations to assess the policy impact of likely trade liberalization scenarios in the East Asia region:

1. China-Taiwan ECFA (Taiwan WTO+) with an early harvest program in 2011, which starts extending to all products except agriculture in 2013;
2. Taiwan joins ASEAN+1 (China) in 2013;
3. ASEAN+3 (China, Japan, and South Korea) is formed in 2013 with no policy response from Taiwan;
4. China-Taiwan ECFA as in (1) while the region moves to form ASEAN+3 in 2013;
5. Taiwan joins ASEAN+1 in 2013 while the region moves to form ASEAN+3 in 2013; and
6. Taiwan joins the newly formed ASEAN+3 in 2013.

As part of the ECFA, both China and Taiwan published a list of products to be included in the early harvest program. Under this program, listed products, specified at the eight-digit HS level, will follow an expedited liberalization schedule with zero tariffs by 2013. We can represent only aggregate sector-level tariffs and not individual products in our model. So tariff reduction for early harvest products was approximated by reducing a fraction of the aggregate sector tariff, the fraction being

equal to early harvest products' share of imports in the sector.<sup>5</sup> The bilateral tariff reduction schedules for China and Taiwan under the ECFA are listed in table A.4.

For each of these policy simulation scenarios, we assume that participants reduce tariffs and nontariff barriers by 70 percent at the initial implementation year and to zero after five years, while maintaining their current levels of protection against imports from other regions (non-member countries). All the assumptions and model parameters are exactly the same as the baseline except for the relevant policy changes. Hence, the difference between the policy simulations and the baseline is attributable to policy changes in the particular scenario only.

For each of the six scenarios, the CGE model generates results on the impact of policy actions on social welfare, terms of trade, volume of trade, output, consumption, real wages, and changes in prices and resource allocation. The difference in results generated by the six policy-response scenarios and the baseline scenario provides estimates of the impact of each of the six alternative policy options. However, these are outcomes from conditional projections rather than forecasts. In reality, actual trade and output patterns are affected by many more factors than just trade liberalization, such as domestic macroeconomic and income tax policy changes, which are not taken into account in our analysis.

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5. The shares were calculated using 2009 trade data available at the eight-digit HS level from China Customs, <http://english.customs.gov.cn>. The implicit assumption is that the proportion of tariff cut for each individual product at the eight-digit HS level is the same within a GTAP goods-producing sector.

**Table A.1 Macroeconomic assumption for baseline calibration**

	China	Taiwan	Hong Kong	Singapore	Korea	Japan	Australia	United States	EU-15	EU-12
<b>Average annual growth rate, 2010–20 (percent)</b>										
<b>Real GDP</b>	<b>6.5</b>	<b>3.9</b>	<b>3.0</b>	<b>4.0</b>	<b>4.3</b>	<b>0.8</b>	<b>2.9</b>	<b>2.5</b>	<b>1.9</b>	<b>3.1</b>
<b>Labor force</b>	<b>0.3</b>	<b>1.2</b>	<b>0.5</b>	<b>1.1</b>	<b>0.3</b>	<b>-0.7</b>	<b>0.8</b>	<b>0.6</b>	<b>0</b>	<b>-0.6</b>
<b>Skilled labor</b>	<b>3.5</b>	<b>1.6</b>	<b>1.9</b>	<b>1.4</b>	<b>1.8</b>	<b>-0.5</b>	<b>1.0</b>	<b>0.8</b>	<b>0.2</b>	<b>-0.1</b>
Total factor productivity	2.6	1.5	1.1	1.0	2.6	0.8	0.6	1.6	1.3	2.1
Capital stock	9.4	5.4	2.2	4.1	3.7	1.4	3.7	2.1	1.5	3.2
Real gross investment	5.6	10.4	2.8	3.9	4.4	3.0	2.5	6.3	2.6	3.3
Government spending	8.3	1.7	1.3	0.4	1.2	-1.9	3.0	2.9	0.9	1.7
Real exports	6.1	5.9	2.0	2.9	6.4	3.2	1.0	4.1	3.5	3.4
Real imports	5.8	5.4	4.0	4.5	4.5	2.0	4.3	2.6	2.2	2.9
Household consumption	7.4	1.3	4.8	8.8	4.6	0.7	3.6	1.5	1.6	3.4
Total absorption	6.8	3.8	4.1	6.3	4.0	0.7	3.2	2.5	1.6	3.1
<b>Share of skilled labor (percent)</b>										
2010	<b>15.0</b>	<b>28.7</b>	<b>29.2</b>	<b>41.4</b>	<b>19.8</b>	<b>28.5</b>	<b>38.3</b>	<b>34.8</b>	<b>32.7</b>	<b>27.3</b>
2020	<b>20.6</b>	<b>29.8</b>	<b>33.7</b>	<b>42.3</b>	<b>22.9</b>	<b>29.2</b>	<b>39.0</b>	<b>35.5</b>	<b>33.4</b>	<b>28.6</b>
<b>Gross investment as percent of GDP</b>										
2010	<b>42.8</b>	<b>16.1</b>	<b>16.5</b>	<b>24.3</b>	<b>25.6</b>	<b>20.2</b>	<b>25.2</b>	<b>11.6</b>	<b>15.8</b>	<b>22.5</b>
2020	<b>39.3</b>	<b>29.7</b>	<b>16.1</b>	<b>24.0</b>	<b>26.1</b>	<b>24.9</b>	<b>24.3</b>	<b>16.6</b>	<b>17.0</b>	<b>22.9</b>
<b>Government spending as percent of GDP</b>										
2010	<b>15.2</b>	<b>15.0</b>	<b>9.1</b>	<b>12.5</b>	<b>19.8</b>	<b>20.1</b>	<b>19.8</b>	<b>21.4</b>	<b>21.7</b>	<b>14.7</b>
2020	<b>17.9</b>	<b>12.1</b>	<b>7.7</b>	<b>8.8</b>	<b>14.8</b>	<b>15.2</b>	<b>20.1</b>	<b>22.2</b>	<b>19.7</b>	<b>12.8</b>
<b>Balance of trade as percent of GDP</b>										
2010	<b>4.9</b>	<b>15.3</b>	<b>16.4</b>	<b>16.3</b>	<b>-1.4</b>	<b>-0.2</b>	<b>-0.9</b>	<b>-3.8</b>	<b>1.5</b>	<b>-1.9</b>
2020	<b>1.8</b>	<b>17.0</b>	<b>7.7</b>	<b>-4.8</b>	<b>1.3</b>	<b>1.1</b>	<b>-4.6</b>	<b>-2.8</b>	<b>3.6</b>	<b>-1.7</b>

*(continued on next page)*

**Table A.1 Macroeconomic assumption for baseline calibration** (*continued*)

	Indonesia	Malaysia	Philippines	Thailand	Vietnam	Rest of East Asia	South Asia	Rest of the Americas	Rest of high-income countries	Rest of the world	World average
<b>Average annual growth rate, 2010–20 (percent)</b>											
<b>Real GDP</b>	<b>4.9</b>	<b>4.5</b>	<b>5.7</b>	<b>4.4</b>	<b>4.8</b>	<b>10.7</b>	<b>6.4</b>	<b>3.5</b>	<b>2.3</b>	<b>4.2</b>	<b>2.9</b>
<b>Labor force</b>	<b>1.4</b>	<b>2.0</b>	<b>2.2</b>	<b>0.3</b>	<b>1.4</b>	<b>1.5</b>	<b>1.9</b>	<b>1.5</b>	<b>0.5</b>	<b>1.9</b>	<b>1.2</b>
<b>Skilled labor</b>	<b>4.1</b>	<b>4.3</b>	<b>4.3</b>	<b>2.1</b>	<b>3.6</b>	<b>4.8</b>	<b>4.1</b>	<b>3.4</b>	<b>0.7</b>	<b>4.3</b>	<b>2.0</b>
Total factor productivity	1.2	2.0	3.0	3.6	1.2	6.4	1.7	0.7	0.6	-0.1	1.5
Capital stock	6.2	3.4	4.1	1.8	6.8	7.9	8.9	3.7	2.8	5.5	3.2
Real gross investment	7.2	6.4	9.5	9.2	4.8	11.2	6.9	5.2	3.5	5.2	4.7
Government spending	2.8	1.8	3.2	4.3	6.0	11.9	8.0	2.3	2.0	4.2	2.4
Real exports	3.8	4.4	7.3	5.7	5.7	10.6	5.8	2.8	1.4	1.0	3.8
Real imports	5.3	4.8	6.4	5.2	5.1	9.0	6.2	4.2	2.7	5.4	3.9
Household consumption	4.8	5.0	5.3	1.5	3.6	8.9	6.3	3.4	2.1	4.5	2.5
Total absorption	5.3	4.8	5.8	4.3	4.2	10.0	6.7	3.6	2.4	4.6	2.9
<b>Share of skilled labor (percent)</b>											
2010	<b>7.5</b>	<b>26.1</b>	<b>17.9</b>	<b>12.6</b>	<b>2.5</b>	<b>6.1</b>	<b>6.9</b>	<b>19.0</b>	<b>35.1</b>	<b>21.6</b>	<b>17.3</b>
2020	<b>9.8</b>	<b>32.7</b>	<b>21.9</b>	<b>14.9</b>	<b>3.0</b>	<b>8.4</b>	<b>8.6</b>	<b>23.0</b>	<b>35.8</b>	<b>27.3</b>	<b>20.7</b>
<b>Gross investment as percent of GDP</b>											
2010	<b>23.8</b>	<b>16.9</b>	<b>14.4</b>	<b>22.1</b>	<b>44.4</b>	<b>21.7</b>	<b>31.5</b>	<b>18.7</b>	<b>19.8</b>	<b>23.6</b>	
2020	<b>29.6</b>	<b>20.3</b>	<b>20.5</b>	<b>34.6</b>	<b>44.5</b>	<b>22.7</b>	<b>33.0</b>	<b>21.9</b>	<b>22.2</b>	<b>26.1</b>	
<b>Government spending as percent of GDP</b>											
2010	<b>9.1</b>	<b>15.8</b>	<b>10.5</b>	<b>14.1</b>	<b>6.0</b>	<b>10.4</b>	<b>11.0</b>	<b>14.9</b>	<b>19.6</b>	<b>18.1</b>	
2020	<b>7.5</b>	<b>12.2</b>	<b>8.3</b>	<b>14.0</b>	<b>6.7</b>	<b>11.7</b>	<b>12.8</b>	<b>13.3</b>	<b>19.0</b>	<b>18.1</b>	
<b>Balance of trade as percent of GDP</b>											
2010	<b>2.5</b>	<b>20.3</b>	<b>-1.0</b>	<b>7.0</b>	<b>-14.6</b>	<b>18.6</b>	<b>-5.8</b>	<b>-1.9</b>	<b>5.6</b>	<b>1.5</b>	
2020	<b>-2.3</b>	<b>19.2</b>	<b>-2.4</b>	<b>8.2</b>	<b>-9.0</b>	<b>23.5</b>	<b>-10.9</b>	<b>-2.5</b>	<b>5.0</b>	<b>-3.1</b>	

Note: Data in boldface are set exogenously.

Sources: Real GDP growth rates are taken from the Economist Intelligence Unit; labor force projection is from the International Labor Organization; skilled labor growth rates for developed countries are based on years of schooling estimates from the World Bank, and rates for developing countries are based on projections of college enrollments made by the World Bank.



**Table A.2 Regional free trade agreements**

<b>Partner countries</b>	<b>Year of implementation</b>
South Korea, Singapore	2006
South Korea, United States	2011
South Korea, ASEAN	2007
Japan, Singapore	2007
Japan, Malaysia	2006
Japan, Thailand	2007
Japan, Indonesia	2008
Japan, Philippines	2008
Japan, ASEAN	2008
China, Hong Kong	2004
China, Singapore	2008
China, ASEAN	2005
China, Australia	2005
Australia, ASEAN	2010

ASEAN = Association of Southeast Asian Nations.

**Table A.3 Trade-weighted protection rate by sector and region, 2010**

Sector	China	Taiwan	Hong Kong	Singapore	Korea	Japan	Australia	United States	EU-15	EU-12
Rice	43.2	402.4	0	0	420.9	395.4	0	3.5	83.8	24.5
Other grains	38.7	1.5	0	0	3.9	51.8	0	0.1	12.7	14.1
Vegetables and fruits	11.2	25.6	0	0	80.2	6.8	0.9	0.5	14.7	6.9
Nongrain crops	7.3	1.7	0	0	54.0	1.3	0.1	7.4	4.4	1.8
Livestock	12.1	2.0	0	0	5.5	7.2	0	0.1	1.3	0.5
Meat and dairy products	10.5	28.2	0	0	31.3	53.4	0.5	5.0	29.8	6.4
Sugar	24.8	74.2	0	0	4.2	209.8	0	38.6	104.3	35.8
Other processed food	5.0	13.8	0	0	30.2	11.1	2.6	5.5	7.8	2.7
Beverages and tobacco	18.2	17.3	0	3	56.3	19.3	8.3	2.2	7.3	5.2
Forest and fishery products	1.2	12.4	0	0	8.5	2.2	0.2	0.1	2.0	1.7
Oil and gas	0.1	5.8	0	0	4.5	0	0	0.2	0	0.1
Coal and other minerals	0.6	0.1	0	0	1.2	0.1	0.1	0.1	0	0.2
Textiles	7.1	6.1	0	0	9.4	7.0	12.7	7.5	4.5	1.3
Wearing apparel	9.9	11.8	0	0	11.7	9.6	20.6	10.0	7.3	5.0
Leather products	4.8	4.2	0	0	8.0	12.6	9.5	11.8	5.2	2.7
Other light manufactures	8.2	2.4	0	0	8.7	0.9	3.6	1.1	1.2	0.9
Wood and paper products	2.7	1.6	0	0	3.2	1.0	3.5	0.2	0.2	0.2
Petroleum and coal products	6.3	5.4	0	0	5.1	2.0	0.6	1.3	1.3	0.7
Chemical, rubber, and plastic products	6.2	2.7	0	0	6.4	0.9	2.8	1.4	1.3	0.5
Mineral products	8.3	6.0	0	0	7.6	0.5	4.1	3.4	1.9	0.6
Metal and metal products	3.8	1.6	0	0	3.2	0.6	3.3	1.0	0.8	0.8
Motor vehicles and parts	16.1	23.4	0	0	8.0	0	8.5	1.1	3.2	0.7
Other transport equipment	2.8	1.6	0	0	2.0	0	0.8	0.5	1.1	0.6
Electronic equipment	1.3	0.2	0	0	1.1	0	0.8	0.3	1.3	0.5
Machinery and equipment	4.6	2.4	0	0	6.1	0.1	3.3	1.1	0.9	0.4

<b>Sector</b>	<b>Indonesia</b>	<b>Malaysia</b>	<b>Philippines</b>	<b>Thailand</b>	<b>Vietnam</b>	<b>Rest of East Asia</b>	<b>South Asia</b>	<b>Rest of the Americas</b>	<b>Rest of high-income countries</b>	<b>Rest of world</b>
Rice	16.4	0	49.8	22.9	19.0	3.4	20.6	13.9	3.4	14.9
Other grains	1.5	0	5.3	27.3	2.7	11.3	12.0	7.5	51.9	16.8
Vegetables and fruits	4.8	4.9	14.5	34.0	26.1	12.2	29.2	8.8	7.0	12.8
Nongrain crops	1.0	30.7	5.0	21.9	5.1	4.0	11.6	2.7	22.0	8.1
Livestock	2.2	0.4	8.0	3.8	3.3	7.2	11.4	4.1	14.7	6.0
Meat and dairy products	2.6	0.4	14.2	37.1	19.1	10.7	16.6	4.5	90.3	17.1
Sugar	34.0	0	26.1	23.5	9.3	14.7	54.3	13.1	11.5	16.1
Other processed food	4.6	2.6	4.3	29.5	14.7	9.6	52.9	10.3	18.3	12.8
Beverages and tobacco	32.1	215	6.5	53.3	65.8	32.2	113.4	18.2	15.6	37.0
Forest and fishery products	1.9	1.3	1.5	8.3	3.3	6.1	5.8	8.3	1.1	12.4
Oil and gas	0	2.5	3.0	0	2.0	0.1	9.6	3.2	0	0.5
Coal and other minerals	1.7	0.1	3.3	1.1	2.5	5.4	15.2	2.0	0	1.4
Textiles	7.8	13.3	6.3	19.8	30.7	14.1	16.8	8.3	3.9	13.8
Wearing apparel	10.1	16.5	14.2	35.4	44.8	24.9	17.4	14.2	6.8	17.1
Leather products	4.2	10.0	10.5	9.4	18.3	18.4	14.2	12.1	4.5	14.6
Other light manufactures	9.0	6.6	7.6	6.2	22.1	13.4	15.2	15.0	0.5	7.4
Wood and paper products	3.4	6.4	5.6	15.7	11.0	11.9	14.4	5.5	0.3	9.7
Petroleum and coal products	2.0	6.8	2.4	1.1	14.5	8.9	16.7	6.7	0.4	10.0
Chemical, rubber, and plastic products	4.3	4.0	4.7	10.7	4.3	6.1	13.7	5.3	0.4	7.0
Mineral products	5.0	10.6	6.5	13.3	15.7	11.1	17.9	8.6	0.5	10.9
Metal and metal products	4.9	6.0	3.9	7.6	4.5	8.9	15.4	5.2	0.2	7.5
Motor vehicles and parts	13.2	45.5	10.1	27.7	33.3	30.5	34.5	8.7	0.7	10.6
Other transport equipment	4.4	3.4	6.5	4.4	13.6	9.9	9.9	8.0	0.5	5.1
Electronic equipment	1.8	1.0	0.3	4.2	7.6	9.3	4.8	4.4	0	5.5
Machinery and equipment	3.3	4.4	3.2	7.5	6.4	11.1	13.2	6.0	0.3	6.4

Source: Global Trade Analysis Project Version 7 database; and authors' calculations.

**Table A.4 Percent reduction from 2010 tariff levels**

	2011	2012	2013	2014	2015	2016	2017
<b>China's ECFA schedule</b>							
Rice							
Other grains							
Fruits and vegetables	5.8	11.7	75.3	81.4	87.6	93.8	100.0
Nongrain crops	0	0	70.0	77.5	85.0	92.5	100.0
Livestock							
Meat and milk products	0	0	70.0	77.5	85.0	92.5	100.0
Sugar	0	0	70.0	77.5	85.0	92.5	100.0
Other processed food products	4.8	9.5	72.9	79.6	86.4	93.2	100.0
Tobacco and beverages	0	0	70.0	77.5	85.0	92.5	100.0
Forest and fishery products	0	0	70.0	77.5	85.0	92.5	100.0
Oil and gas	0	0	70.0	77.5	85.0	92.5	100.0
Coal and other mineral products	0	0	70.0	77.5	85.0	92.5	100.0
Textile	33.8	67.7	90.3	92.7	95.2	97.6	100.0
Wearing apparel	34.3	68.6	90.6	92.9	95.3	97.6	100.0
Leather and sporting goods	1.7	3.4	71.5	78.6	85.7	92.9	100.0
Other light manufactures	14.5	29.0	78.7	84.0	89.4	94.7	100.0
Wood and paper products	0	0	70.0	77.5	85.0	92.5	100.0
Petroleum, coal, and other mineral products	33.5	67.0	90.1	92.6	95.0	97.5	100.0
Chemical, rubber, and plastic products	16.5	32.9	79.9	84.9	89.9	95.0	100.0
Mineral products	8.7	17.4	77.8	83.4	88.9	94.5	100.0
Metal and metal products	0	0	70.0	77.5	85.0	92.5	100.0
Motor vehicles and parts	30.8	61.5	88.5	91.3	94.2	97.1	100.0
Transport equipment	24.5	49.1	84.7	88.5	92.4	96.2	100.0
Electronic equipment	0.3	0.3	70.0	77.6	85.1	92.4	100.0
Machinery and equipment	5.8	11.6	73.5	80.1	86.7	93.4	100.0
<b>Taiwan's ECFA schedule</b>							
Rice							
Other grains							
Fruits and vegetables							
Nongrain crops							
Livestock							
Meat and milk products	0	0	70.0	77.5	85.0	92.5	100.0
Sugar	0	0	70.0	77.5	85.0	92.5	100.0
Other processed food products	0	0	70.0	77.5	85.0	92.5	100.0
Tobacco and beverages	0	0	70.0	77.5	85.0	92.5	100.0
Forest and fishery products	0	0	70.0	77.5	85.0	92.5	100.0
Oil and gas	0	0	70.0	77.5	85.0	92.5	100.0
Coal and other mineral products	0	0	70.0	77.5	85.0	92.5	100.0
Textiles	12.5	25.0	77.5	83.1	88.8	94.4	100.0
Wearing apparel	0	0	70.0	77.5	85.0	92.5	100.0
Leather and sporting goods	0	0	70.0	77.5	85.0	92.5	100.0
Other light manufactures	10.7	21.0	76.3	82.3	88.0	94.0	100.0
Wood and paper products	0	0	70.0	77.5	85.0	92.5	100.0
Petroleum, coal, and other mineral products	26.7	53.5	86.0	89.5	93.0	96.5	100.0
Chemical, rubber, and plastic products	12.1	24.1	77.2	83.0	88.8	94.2	100.0

**Table A.4 Percent reduction from 2010 tariff levels** *(continued)*

	2011	2012	2013	2014	2015	2016	2017
<b>Taiwan's ECFA schedule</b>							
Mineral products	3.8	7.8	72.3	79.2	86.2	93.1	100.0
Metal and metal products	0	0	70.0	77.5	85.0	92.5	100.0
Motor vehicles and parts	0	0	70.0	77.5	85.0	92.5	100.0
Transport equipment	49.9	100.0	100.0	100.0	100.0	100.0	100.0
Electronic equipment	2.4	2.4	70.7	78.0	85.4	92.7	100.0
Machinery and equipment	13.9	28.1	78.5	83.8	89.1	94.7	100.0

ECFA = Economic Cooperation Framework Agreement; FTA = free trade agreement.

Source: Authors' calculations.

