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Economic Effects of the Proposed Australia-China Free Trade Agreement

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Abstract

The negotiation of Free Trade Agreements (FTAs) has become an integral part of Australia's current trade policy. Australia has signed FTAs with Singapore, Thailand and the United States. A similar agreement with China is being negotiated at present. This paper analyses the economic effects of the proposed FTA between Australia and China on both economies and on the trading partners, drawing lessons from simulations undertaken using the Global Trade Analysis Project (GTAP) model. By simulating the GTAP multi-country CGE model, the paper provides quantitative evidence concerning the welfare impact of the FTA with special reference to trade creation and trade diversion. Examining responses of various production sectors identifies the structural changes that may take place in the two economies over the long run. The findings may shed light on the debate over the potential incentives to participate in the agreement.

JEL classification: C68; F15

Keywords: Free Trade Agreement; Australia; China; GTAP Model

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I Introduction

Australia and China agreed to launch negotiations on a free trade agreement (FTA) between the two countries in April 2002[1]. Since then, there have been four rounds of negotiations to exchange information covering each country's trade and investment regimes and to examine areas of mutual interest to both countries in the proposed Australia-China FTA. The latest of these meetings was held in Canberra early March 2006 (DFAT, 2006). China is the world's fastest growing major economy with a population over 1.3 billion and a workforce of about 700 million people. The integration of China into the world economy is bound to have a significant impact irrespective of whether China negotiates FTAs with individual trading partners, regions or group of countries or not. China's exports grew from US$ 62.1 billion in 1990 to US$ 266.2 billion in 2001 while imports increased from US$ 53.3 billion to US$ 243.6 billion during the same period. As the Australian Trade Minister Mark Vaile put it "Whether you are a farmer battling against the forces of nature to get your livestock or grain to market, a worker on the factory line or an engineer designing a bridge, you will be affected by the rise and rise of China. I want to make sure Australians benefit from the Chinese boom" (DEFAT, 2006).

China's rapid economic growth and increasing competitiveness present a challenge for some Australian industries regardless of whether Australia has an FTA with China or not. Australia has already committed to low tariffs, and competition from low-cost producers such as China has become an important issue. As a trading partner, China has already had a strong presence in the Australian economy. In 2005, China has been

[1] Australia has signed FTAs with Singapore, Thailand, and the United States. Negotiations are under way to form agreements with Japan, ASEAN, Malaysia, India and the Middle East. For details see CIE, 2001; CIE, 2004; Siriwardana and Dollery, 2003; Siriwardana, 2005; and Siriwardana, 2006.

Australia's second largest trading partner in goods and services, accounting for 10 per cent of its exports and 13 per cent of its imports. Australia's trade in goods and services with China has increased on average by about 17 per cent per year during the last decade. It is anticipated that this trade will continue to grow further given that the Chinese economy is predicted to grow well above 8 per cent annually.

An FTA with China offers the opportunity for Australia to articulate terms that will govern future trade. The elimination of tariffs on merchandise trade and reducing restrictions on investment and service trade on bilateral basis would improve the competitive position of Australian exporters and investors relative to other foreign competitors in the Chinese market. An independent study on future Australia-China FTA (Yinhua et al., 2005) has concluded that both Australia and China would gain from a bilateral trade treaty. The existence of complementarities between the two countries would ensure that even without an FTA, the trade and investment relationships between China and Australia would continue to grow. Hence any preferential initiative with China needs to be fully analysed and debated.

This paper examines the long-run impact of the proposed Australia-China FTA using a computable general equilibrium (CGE) modeling approach. The Global Trade Analysis Project (GTAP) model (Hertel, 1996) is simulated to quantify the effects of the agreement. The GTAP model adopted in this study divides the world economy into 87 regions. The comprehensive nature of the GTAP database and the modeling framework allows us to make some projections that may complement the existing literature on this important free trade treaty.

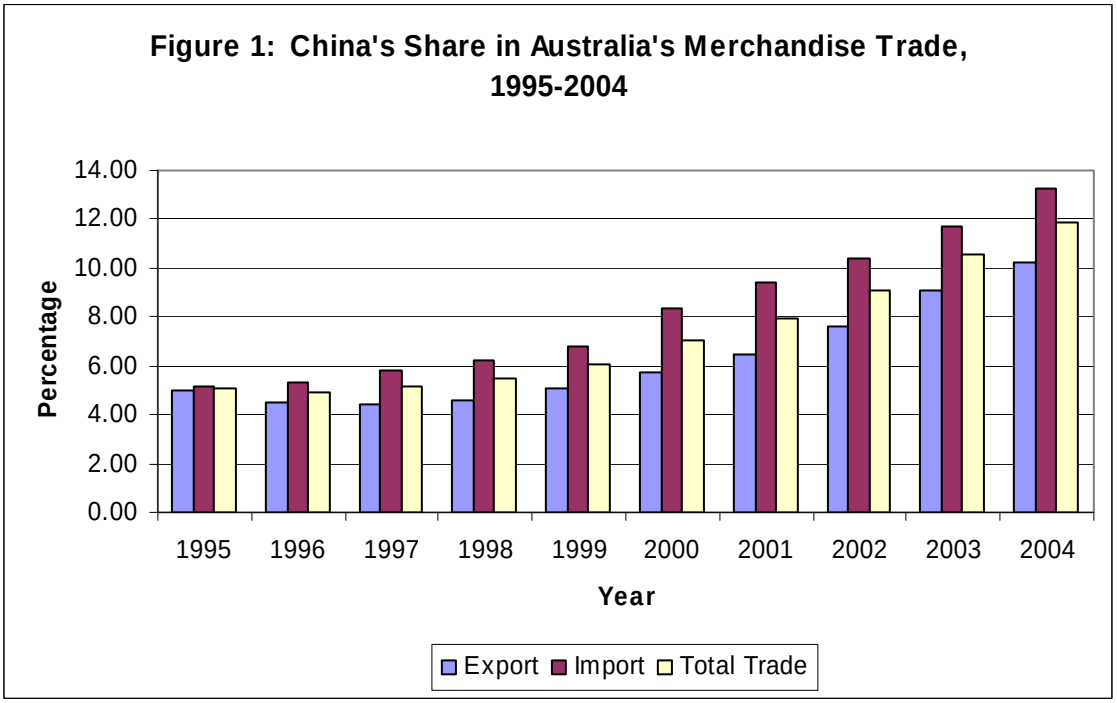
The paper is organised as follows: Section II highlights the Australia-China trade and investment relationships. Section III outlines the GTAP modeling framework and Section IV explains the design of the trade policy simulation. The results from the simulation are reported and discussed in Section V. The paper ends with a brief concluding remark in Section VI.

II Australia-China Trade and Economic Relations

The Australia-China trade relationship has grown substantially over the past decade, reflecting strong and consistent economic growth, trade complementarities, and increased bilateral investment. Both countries are open and dynamic economies which depend heavily on international trade to stimulate economic growth. China has recorded a GDP growth rate above 8 per cent on average during last decade. On the other hand, Australia is one of the most successful economies within the OECD having achieved GDP growth averaging 3 per cent over recent years.

According to recent statistics, China is Australia's second largest trading partner. Total exports grew to A$ 13 billion in 2004-05, representing 10.2 per cent of total merchandise exports and a 30.6 per cent growth from the previous year. Resources exports are the major component of these. Iron ore, alumina, crude petroleum, coal and aluminium lead the list. Similarly, merchandise imports from China in 2004-05 totalled A$ 19.8 billion which account for 13.3 per cent of aggregate imports. These include goods such as clothing, computers, footwear, toys, games and other manufactured goods. Figure 1 illustrates the growing importance of Australia-China bilateral merchandise trade. Between 1995 and 2004, the share of China in Australia's total merchandise trade

increased from 5 per cent to 12 per cent. In service trade, China is Australia's sixth largest export market (A$ 1.3 billion) and eighth largest source of service imports (A$ 1 billion) in 2004-05.



Source: Year Book Australia (various years).

Australia's relative position in China's trade during the past decade is fairly stable. In total merchandise trade, Australia represents eleventh largest trading partner for China by 2004; eleventh largest import source and thirteenth largest export destination. Figure 2 shows that the share of Australia in China's total merchandise trade has gradually increased from 1.5 per cent in 1995 to about 1.8 per cent in 2004. China's GDP is three times larger than Australia's GDP. There exists a considerable potential for Australia to increase its two-way trade, especially exports, allowing it to claim a larger market share in China.

Source: China Statistical Year Book (various years).

Bilateral investment between the two countries remains small but shows a growing trend. Australia's investment in China amounted to A$ 1.2 billion by 2004 making it 22nd largest destination. They were focused on manufacturing, mineral exploration, legal, banking, and educational services. On the other hand, China's investment in Australia by 2004 is reported to be A$ 2 billion gaining the rank of 17th largest investor in Australia. This investment is primarily concentrated in resources development, mineral processing, real estate and agricultural sectors.

Table 1 highlights the growth and the geographical concentration of Australia's two-way trade between 1992 and 2003. Among the single country export markets, Japan still occupies the highest position even though its relative significance has declined from

1992 to 2003. Interestingly, China as a buyer of Australian exports has shown a remarkable growth over the period (560 per cent) while it has also gained the status of second largest single destination for Australia's exports. By 2003, nearly 34 per cent of Australia's exports have gone to non-Japan Asian trading partners among whom China is the fastest growing market followed by South Korea, according to the data in Table 1.

Table 1: Australia's Merchandise Trade (A$ billion)

	1992		2003			
	Value of Exports	%	Value of Exports	%	Increase in Value	Percentage Increase in Value
USA	5.2	9.5	9.5	8.7	4.3	83
ASEAN (6)	7.1	12.9	12.0	11.0	4.9	69
China	1.5	2.7	9.9	9.1	8.4	560
Japan	14.6	26.5	19.7	18.1	5.1	35
South Korea	3.4	6.2	8.4	7.7	5.0	147
Taiwan	2.5	4.5	3.7	3.4	1.2	48
Hong Kong	2.1	3.8	2.7	2.5	0.6	29
Rest of World	18.6	33.9	43.0	39.5	20.9	112
World	55.0	100	108.9	100	53.9	98

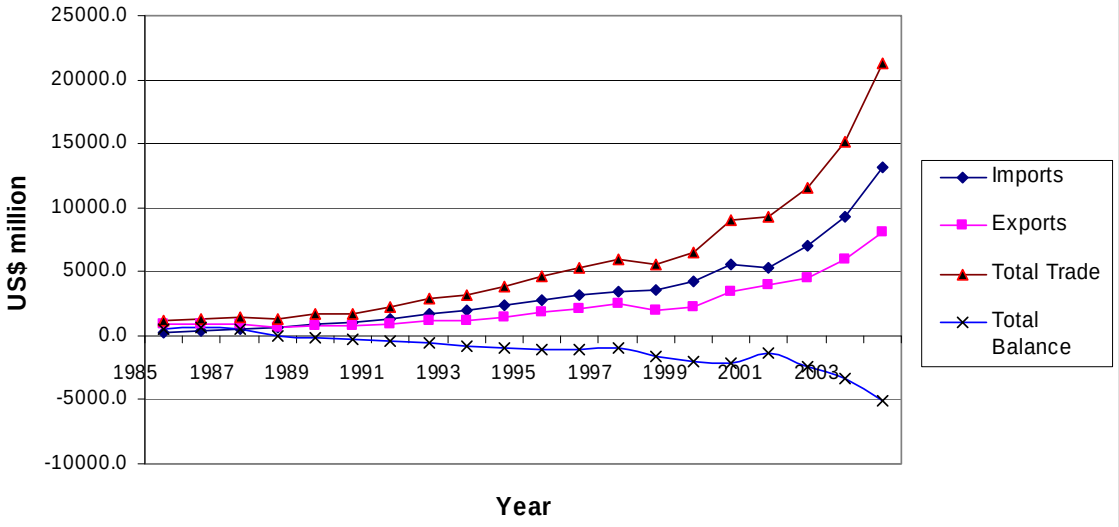
	1992		2003			
	Value of Imports	%	Value of Imports	%	Increase in Value	Percentage Increase in Value
USA	13.0	21.8	20.2	15.5	7.2	55
ASEAN (6)	4.9	8.2	20.1	15.3	15.2	310
China	2.6	4.4	15.3	11.7	12.7	488
Japan	11.1	18.6	16.1	12.3	5.0	45
South Korea	1.7	2.9	4.9	3.7	3.2	188
Taiwan	2.2	3.7	3.4	2.6	1.2	54
Hong Kong	0.8	1.3	1.2	0.9	0.4	50
Rest of World	23.3	39.1	49.8	38.0	26.5	114
World	59.6	100	131.0	100	71.4	120

Note: ASEAN(6) includes Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

Source: Australian Bureau of Statistics, *International Merchandise Trade*, (Cat. No. 5422)

Similar geographical changes are observed in the sources of imports to Australia over the period under consideration. In 2003 while China still remained as the third largest single source for Australian imports, its relative share has jumped from 4.4 per cent in 1992 to 11.7 per cent in 2003. This dramatic change in the importation of Chinese goods to Australia has occurred at the expense of the declining presence of goods from the US and Japan. Imports from China grew by 488 per cent in between 1992 and 2003. ASEAN countries also represent a potentially growing source for Australian imports accounting for 15 per cent of total imports in 2003 compared to 8 per cent in 1992.

Figure 3: Australia's Merchandise Trade with China, 1985-2004



Source: Comtrade database, UN Statistics Division.

Figure 3 illustrates Australia's trade with China from 1985 to 2004. A considerable growth in bilateral trade is apparent in these trends. After 1990, Australian imports from China exceeded its exports showing a significant and growing trade deficit with China over this period. Figure 3 clearly indicates that this trade gap is likely to

widen further unless Australia takes steps to develop sustainable trade policies that increase its exports to China. To this end, the FTA proposal appears to be promising.

Table 2 presents trade data pertaining to the composition of Australia's bilateral trade with China. It is apparent that about 60 per cent of Australian exports to China are primary goods with minerals and associated mining products representing the bulk of such exports. Manufactured goods account for 90 per cent of imports from China to Australia. Among these imports, 'Machinery and transport equipment' is the single dominant category after the 'Miscellaneous manufactures' which include a variety of goods. The trade balance by commodity in Table 2 indicates that all manufactured good categories have deficits against China and almost all primary good categories have trade surpluses. This trade pattern between the two countries confirms that Australia-China bilateral trade occurs according to their respective comparative advantage and the proposed free trade treaty may allow both countries to exploit further gains from trade.

Table 2: Australia's Bilateral Merchandise Trade with China by Commodity, 2003 (A$ million)

Commodity group	Exports to China	%	Imports from China	%	Trade balance by commodity
Food & live animals	497	5.7	238	1.8	259
Beverages & tobacco	3	0.0	28	0.2	-25
Crude materials, inedible, except fuel	3889	44.7	71	0.5	3818
Mineral fuels, lubricants & related materials	752	8.6	266	2.0	486
Animal & vegetable oils, fats & waxes	96	1.1	3	0.0	93
Chemical & related products	253	2.9	504	3.8	-251
Manufactured goods	785	9.0	2215	16.6	-1430
Machinery & transport equipment	331	3.8	4070	30.5	-3739
Miscellaneous manufactures	138	1.6	5707	42.8	-5569
Commodities not included elsewhere	1965	22.6	238	1.8	1727
Total	8709	100	13341	100	-4632

Source: Australian Bureau of Statistics, International Merchandise Trade (Cat. No. 5422)

III Model Structure and Data

This section describes the multi-country general equilibrium model and the database adopted for the analysis. We carry out simulations using the GTAP model (Hertel, 1996). It is a comparative static, multi-country CGE model of the Johansen type comprising a system of linear equations in percentage change of variables. The modeling of each region in GTAP is based on the ORANI model of the Australian economy (Dixon et al., 1982). This paper uses version 6 of the GTAP model and the database which recognizes 87 regions and 57 sectors in each region.

The GTAP model has a number of notable features which include product differentiation by country of origin, explicit recognition of savings by regional economies, a capital goods producing sector in each region to service investment, international mobility of capital, multiple trading regions, multiple goods and primary factors, empirically-based differences in production technology and consumer preferences across regions, and explicit recognition of a world transport sector. It also accommodates several policy variables, including taxes and subsidies on commodities and primary factors. This makes the model extremely attractive to policy economists.

In each region both factor and commodity markets are assumed to be perfectly competitive. Producers operate under constant returns to scale (CES), where the technology is described by the Leontief and CES functions. Two broad categories of inputs into production are identified; intermediate inputs and primary factors. Each regional sector is designated as choosing a mixture of inputs to minimise total cost for a given level of output. At the first level, producers use composite units of intermediate inputs and primary factors in fixed proportions according to a Leontief function. At the

second level of the production nest, intermediate input composites are obtained as combinations of imported bundles and domestic goods of the same input-output class, and primary factor input composites are created as combinations of skilled labour, unskilled labour, capital, land, and natural resources. A CES function is used in forming both types of composites. Finally, at the third level, imported bundles are created via a CES aggregation of imported goods of the same class from each region.

On the demand side, the GTAP model adopts a sophisticated specification of consumer behaviour that allows for differences in both price and income responsiveness of demand in different regions, depending on the level of development and regional specific demand patterns. Each region has a single representative household that receives all the income generated through payments to primary factors and net tax revenue. The representative household is governed by an aggregate utility function over private household consumption, government consumption and savings. The aggregate utility is modelled using a Cobb-Douglas function with constant expenditure shares. Government consumption is also described by a Cobb-Douglas function over composite commodities where the demand for the latter is a CES aggregation of imports and domestic goods. Private household consumption is explained by a CDE (Constant Difference of Elasticities) expenditure function. Households purchase bundles of commodities where the bundles are a CES aggregation of domestic goods and imported bundles. The imported bundles are then formed by a CES aggregation of imports from different regions.

Capital accumulation occurs in each region according to a technology that is similar to producing current goods, except that it requires only domestic and imported

intermediate inputs. This capital creation services the investment that is financed by a global pool of savings. Each region contributes a share of its income to a savings pool at a global bank that is designed to mediate world savings and investment. Two methods are available in the standard GTAP model for allocating global savings to investment in each region. In the first place, global savings are allocated across investment in a fixed proportion to the total savings, so that the regional composition of global investment remains unaltered. The second method allows investment to take place in each region according to the prevalent relative rates of return.

Version 6 of the GTAP database divides the world into 87 regions and each region has 57 sectors (commodities). Given the focus of this study, we aggregate the database into 10 regions and 20 sectors as shown in Appendix Table A1. Since our focus falls exclusively on the bilateral FTA between Australia and China, the regional aggregation is based upon the importance of other trading partners to Australia and China. The sectoral aggregation framework is governed by the need for distinguishing commodities (or sectors) that are important for this FTA.

VI Trade Liberalisation Scenario under the Australia-China FTA

When an FTA is formed between Australia and China, a number of changes are expected to occur within both economies as tariffs imposed against imports from each other are abolished. With the elimination of tariffs, prices of imports sourced from China will fall in Australia by approximately the amount of such import duties. Like wise, China will experience lower prices for goods imported from Australia. These changes in prices result in relative price effects that induce resource reallocation. In the FTA

scenario examined, both Australia and China are supposed to cut bilateral tariffs to zero while tariff imposed on imports sourced from other trading partners to Australia as well as to China remain unchanged. That means, discrimination against non-FTA countries exists.

Table 3: Bilateral Import Tariffs of Australia-China Merchandise Trade (%)

	Australian Tariffs on Imports from China	Chinese Tariffs on Imports from Australia
Grains	0.0	89.9
Other crops	0.6	8.3
Animal products	0.0	3.3
Forestry and fishing	1.2	6.0
Mining and energy	2.4	0.4
Meat products	3.1	12.4
Other food products	3.1	23.2
Dairy	3.7	22.1
Sugar	0.0	19.5
Beverages and tobacco	19.0	57.3
Textiles	18.1	24.8
Wearing apparels	18.3	13.9
Wood and paper products, publishing	4.6	13.4
Chemicals, rubber and plastic	4.5	16.6
Ferrous metals	3.8	11.4
Metal products	5.7	12.0
Motor vehicles and parts	4.9	12.4
Machinery and equipment	2.6	13.3
Miscellaneous manufactures	3.7	18.8
Services	0.0	0.0

Source: GTAP database Version 6, 2005.

The bilateral tariff rates on merchandise trade of both countries that are estimated from the GTAP database are shown in Table 3. Australia already has below 5 per cent tariffs on most of the imports from China except for “Beverages and tobacco”, “Textiles, and “Wearing apparels”. On the other hand, China has higher tariff rates on most of the goods than Australia even though it has liberalised its imports since the early 1990s. China has the highest tariffs on “Grains” followed by “Beverages and tobacco”, and “Textiles”.

To capture the effects of tariff free merchandise trade, tariff rates that appear in Table 3 are reduced to zero in the simulation. The GTAP model allows different scenarios about factor markets and macroeconomic closures. The tariff policy simulation reported in the paper was conducted within the long-run framework of GTAP. Rates of returns are equalized across regions, with capital mobility taking place. Investment occurs in each region during the period of tariff cut with the effect that regional investment matches with the changes in global savings. The aggregate employment is fixed and the real wage adjusts to the new trade regime. It implies that any long-run effects of the FTA are realised in the labour market by solely adjusting the real wage, rather than the level of aggregate employment.

V. Simulation Results

Trade policy analysts are concerned with the overall benefits that the country will receive in the event that free trade treaties are successfully negotiated. On the basis of GTAP simulations, this section assesses the outcomes of the Australia-China FTA for

both economies. Reported are the important macroeconomic, trade and the welfare impacts together with industry output effects.

Table 4: Macroeconomic and Trade Performance under Australia-China FTA

	Real GDP	Export Volume	Import Volume	Terms of Trade	Trade Balance (US$ Million)	Equivalent Variation (EV) (US$ million)	Real Consumption Expenditure
AUS	0.58	2.57	2.92	0.77	354.43	2118.33	0.32
USA	-0.01	-0.01	-0.02	0.00	197.00	-818.50	0.00
ASEAN(6)	-0.05	-0.07	-0.09	-0.02	-31.83	-271.79	-0.06
CHI	0.15	0.72	1.09	-0.04	-392.98	1254.08	0.29
JPA	-0.02	-0.05	-0.04	-0.02	-161.82	-566.99	-0.01
KOR	-0.03	-0.07	-0.11	-0.02	-9.08	-109.69	-0.01
TWN	-0.03	-0.05	-0.07	-0.02	-12.64	-101.01	-0.02
KHG	-0.01	-0.01	-0.01	0.00	5.94	-5.19	0.01
EU	-0.01	-0.02	-0.02	0.00	33.30	-775.65	0.00
ROW	-0.02	-0.03	-0.05	-0.01	17.69	-871.78	-0.01

Source: Author's simulations of GTAP.
Note: All projections are percentage deviations from the base period except the trade balance and the equivalent variation (EV) which are in US$ million.

Table 4 shows macro aggregates and welfare changes after removing protection between Australia and China. It also reports what impact the FTA will have on non-members. According to the projections, both countries will experience an increase in real GDP; Australia's real GDP expands by 0.58 per cent which is much greater than the outcome for China (0.15 per cent). All non-member countries (regions) may be expected to have a fairly discernible effect from the free trade agreement. The removal of tariffs also improves bilateral trade volumes between Australia and China. The projections reported in Table 4 indicate that Australia's aggregate exports will rise by 2.5 per cent and imports by 2.9 per cent. This trade performance which is due to the FTA with China

improves the balance of trade by US$ 354 million. Similarly, China is projected to boost its trade but not as high as what Australia experiences from the FTA. Chinese exports expand by 0.7 per cent and imports by 1 per cent leading to a trade deficit. The improvement in the terms of trade could be one of the key factors that influences Australia's trade performance. There appears to be a negative effect on China's terms of trade.

We now turn to the estimated impact on welfare arising from the Australia-China FTA. There are two measures on welfare effects reported in Table 4; the equivalent variation (EV) and the real consumption. According to the model projections, Australia is expected to have a welfare gain which amounts to US$ 2118 million and an increase of real consumption in the order of 0.3 per cent. China is projected to realise US$ 1254 million worth of welfare gain accompanied by 0.3 per cent boost to its real consumption. The positive outcome on welfare for both partners is an indication that the benefits of trade creation overweigh the cost arising from trade diversion. However, the discriminatory nature of the preferential trade between Australia and China towards non-members triggers a reduction in their welfare as revealed by the EV projections (see Table 4). The trade diversion that stemmed from preferential trade treaty is the suspected cause for this effect.

Table 5 reports the sectoral output changes in both Australia and China. The structural changes that accompany free trade are expected to evoke a varied response from different sectors in respect of price shifts stemming from lower import prices. Overall, the sectoral responses in Australia are more pronounced than in China even though the liberalisation is shown to have a somewhat mixed sectoral impact within the

Australian economy. In general, the free trade favours the sectors that are primary goods producers or sectors whose production is resource based. In Australia, half of the sectors experience an increase in outputs. The most significant gains in output are projected to be in "Grains", "Ferrous metals", and "Sugar". While manufacturing sectors in Australia are adversely affected in general, the worst hit sectors are "Wearing apparels" and "Textiles".

Table 5: Sectoral Output Changes Under the Australia-China FTA (percentage change)

	Australia	China
Grains	24.75	-4.11
Other crops	-2.09	0.24
Animal products	-1.45	0.32
Forestry and fishing	0.12	0.10
Mining and energy	-0.15	0.05
Meat products	-0.82	0.08
Other food products	0.04	0.19
Dairy	0.33	-4.17
Sugar	2.21	-3.53
Beverages and tobacco	-0.10	0.16
Textiles	-6.70	1.10
Wearing apparels	-9.92	1.04
Wood and paper products, publishing	0.31	0.11
Chemicals, rubber and plastic	1.92	0.02
Ferrous metals	5.49	-0.41
Metal products	-0.43	0.26
Motor vehicles and parts	-0.50	0.17
Machinery and equipment	1.19	0.12
Miscellaneous manufactures	-0.23	0.15
Services	0.47	0.14

Source: Author's simulation of GTAP.

As noted above, China's industry responses are smaller than that of Australia. This is because the Chinese economy is much larger than the Australian economy. Nevertheless, majority of the sectors in China show a positive output response even though the magnitudes are quite small. The most significant winners in China from the FTA are "Textiles" and "Wearing apparels". These sectors are highly labour intensive and Australia imports a fair proportion of these goods from China. Some of the agricultural sectors ("Grains" and "Sugar") and "Beverages and tobacco" in China appear to be affected negatively.

A common objection for trade liberalisation is that it causes resources (mainly the use of labour, capital and land) reallocations resulting in some structural adjustments in the factor markets that may lead to temporary uncertainties. Table 6 shows the influence of the proposed FTA on factor markets in Australia and China. In particular, these changes in demand for labour, capital and land are directly associated with the structural adjustments that take place at sectoral level as revealed by changes in outputs. Certainly, in Australia, the use of land by all the sectors except in "Grains" seems to decrease and the sectoral demand for capital tends to increase. The movement of skilled and unskilled labour between sectors is somewhat mixed according to the projections for Australia. The situation in China is remarkably different from the Australian experience. Consistent with the contraction in outputs, sectors such as "Grain", "Dairy", and "Sugar" demand less of all three factors. Except some minor negative adjustments in the use of skilled labour by some sectors of China, a majority of sectors tend to use more labour, capital and land in response to bilateral trade liberalisation with Australia.

Table 6: Changes in Demand for Key Primary Factors in Australia and China due to the FTA (percentage changes)

	Australia				China			
	Land	Unskilled Labour	Skilled Labour	Capital	Land	Unskilled Labour	Skilled Labour	Capital
Grains	17.94	26.7	26.73	27.05	-3.29	-4.44	-4.45	-4.4
Other crops	-3.96	-1.66	-1.64	-1.39	0.44	0.15	0.13	0.19
Animal products	-3.43	-0.99	-0.96	-0.72	0.51	0.24	0.22	0.28
Forestry and fishing	-2.19	0.12	0.15	0.36	0.38	0.13	0.12	0.16
Mining and energy	-5.69	-0.71	-0.64	0.02	0.65	0.00	-0.03	0.11
Meat products	-7.59	-1.08	-0.96	0.21	0.87	-0.01	-0.07	0.18
Other food products	-7.35	-0.55	-0.44	0.74	0.92	0.08	0.01	0.27
Dairy	-7.27	-0.38	-0.26	0.92	-1.17	-4.25	-4.32	-4.07
Sugar	-6.39	1.63	1.76	2.96	-0.87	-3.64	-3.70	-3.46
Beverages and tobacco	-7.55	-1.01	-0.89	0.28	0.91	0.06	0.00	0.25
Textiles	-10.46	-7.12	-6.99	-5.76	1.37	0.99	0.92	1.21
Wearing apparels	-11.80	-10.21	-10.09	-8.89	1.36	0.97	0.89	1.18
Wood and paper products, publishing	-7.62	-0.33	-0.19	1.13	0.94	0.03	-0.05	0.24
Chemicals, rubber and plastic	-6.99	1.20	1.34	2.69	0.89	-0.09	-0.16	0.13
Ferrous metals	-5.59	4.69	4.83	6.22	0.71	-0.48	-0.56	-0.27
Metal products	-7.85	-0.89	-0.76	0.56	1.01	0.18	0.10	0.39
Motor vehicles and parts	-7.96	-1.15	-1.02	0.30	0.96	0.07	-0.01	0.28
Machinery and equipment	-7.2	0.69	0.83	2.17	0.94	0.02	-0.05	0.23
Miscellaneous manufactures	-7.79	-0.73	-0.60	0.72	0.93	0.02	-0.06	0.23
Services	-7.84	-0.16	-0.02	1.44	0.99	0.06	-0.02	0.29

Source: Author's simulation of GTAP.

The sectoral export performance after the free trade agreement between two countries is reported in Table 7. Almost all the sectors of Australia experience considerably large increases in export volumes to China. These changes do appear large but should be treated cautiously as some sectors have fairly low export base to begin with. The export performance from China's side is also very encouraging. The most significant positive change in exports from China to Australia is shown to be with "Textiles". The exports from other manufacturing sectors are also projected to grow fairly evenly with free trade.

Table 7: Changes in Bilateral Export Volumes under the Australia-China FTA (percentage changes)

	From Australia to China	From China to Australia
Grains	614.13	28.73
Other crops	33.68	8.34
Animal products	4.4	5.01
Forestry and fishing	22.85	5.27
Mining and energy	2.02	24.92
Meat products	112.51	38.62
Other food products	134.36	17.11
Dairy	203.26	36.36
Sugar	104.65	3.96
Beverages and tobacco	175.12	49.78
Textiles	416.65	116.68
Wearing apparels	207.11	72.71
Wood and paper products, publishing	114.41	32.00
Chemicals, rubber and plastic	166.93	33.91
Ferrous metals	101.20	32.80
Metal products	126.57	46.00
Motor vehicles and parts	107.09	36.49
Machinery and equipment	176.09	23.60
Miscellaneous manufactures	248.92	24.83
Services	-2.00	1.44

Source: Author's simulation of GTAP.

Table 8: Effects on Trade Flows of Australia-China FTA (US$ million)

	Australia's Exports to		Australian imports from								
	China	World	USA	ASEAN	CHI	JPA	KOR	TWN	HKG	EU	ROW
Grains	1318.2	797.8	0.3	0.1	0.1	0	0	0	0	0.1	0.9
Other crops	33	-178.9	3	3.9	2.1	0.1	0.1	0.1	0	2.8	9
Animal products	39.1	-97.7	0.5	0.2	0.5	0	0	0.1	0	0.5	2.3
Forestry and fishing	0.8	-3.2	0	0	0.1	0	0	0	0	0.1	0.2
Mining and energy	23.3	-284.8	0	-0.4	77.6	-0.1	0	0	0	0	-0.3
Meat products	234.4	-55.3	0.5	0.4	0.8	0	0	0.1	0	2.6	3.4
Other food products	83.8	19.2	2.3	4.9	13.7	0.6	0.3	0.2	0.2	5.5	6.6
Dairy	115.8	17.1	0.2	0.1	0.2	0	0	0	0	2.3	5.1
Sugar	57.4	30.4	0.1	0	0	0	0	0	0	0.2	0.2
Beverages and tobacco	8.0	-11.1	0.1	0	7.1	0	0	0	0	0.2	0.1
Textiles	142.1	144.9	-35.5	-63.4	675.3	-16.5	-41.3	-37	-4.3	-100	-148.9
Wearing apparels	92.9	173.5	-21.6	-78	1011.6	-1.5	-9.9	-7.9	-4.5	-120.3	-198.5
Wood and paper products, publishing	99.2	66.7	-1.1	-1	83.3	-0.2	-0.1	-0.1	0	-2.3	-1.5
Chemicals, rubber and plastic	404.1	338.7	3.5	1.1	178.8	1	0.5	0.5	0	5.3	1.9
Ferrous metals	1222.9	956.5	1.2	9.5	26.4	4.3	7.8	0.9	0.1	5.3	10.8
Metal products	13.4	0.6	-5.4	-3.4	110.3	-3.5	-1.4	-4.6	-0.5	-12.5	-6.3
Motor vehicles and parts	18.1	-55.5	11.9	0.9	33	21.2	2.6	0.6	0	12.5	3.7
Machinery and equipment	441.7	306.8	-10.8	-7.1	337.1	-6.6	-2	-1.3	-0.1	-12	-3.6
Miscellaneous manufactures	52.3	33.4	-12	-7.9	132.7	-5.1	-1.7	-3.5	-0.8	-17.4	-12.7
Services	-5.4	-317.6	46.1	9.7	3	4.4	3	2.4	15.4	90.4	40.7
Total	4395.2	1881.5	-16.5	-130.3	2693.6	-1.7	-42.2	-49.6	5.7	-136.8	-287

Source: Author's simulation of GTAP.

Table 8 shows the effects on trade flows. Under the free trade treaty, many sectors are encouraged to export to China. The most significant growth in exports can be expected in sectors such as “Ferrous metals”, “Grains”, “Chemicals, rubber and plastic”, and “Metal products”. Trade creation and trade diversion are the two important features that dominate the welfare outcomes of free trade agreements (Viner, 1950). In comparison to decline in imports from different trading partners to Australia, imports sourced from China increase significantly replacing domestic inefficient production. This is the trade creation effect from the FTA. This trade creation is more prominent in manufacturing sectors. While such trade creation is welfare enhancing, it comes at a cost. Table 8 provides evidence to show that Australia will divert trade from non-members towards China, which may result in a welfare loss. The trade diversion is primarily associated with sectors such as “Textiles”, “Wearing apparels”, “Metal products”, and “Motor vehicles and parts”. The main countries (regions) that Australia diverts trade from are US, Japan, ASEAN(6), and EU.

VII Concluding Remarks

This paper has analysed the impact of the proposed Australia-China FTA using the simulations undertaken with the GTAP model. The results suggest that both Australia and China will gain by removing protection on trade bilaterally. The FTA tends to increase real GDP in both countries. Welfare improvements are likely as measured by the equivalent variation. The benefits are greater for Australia than for China. The free trade treaty appears to result in greater trade creation than trade diversion so that global welfare is not adversely affected.

Industry level results encourage both Australia and China to negotiate a free trade agreement as it will strengthen the already established trade according to their respective comparative advantage. Elimination of trade barriers particularly favours agricultural and resource based industries in Australia and the manufacturing industries in China. Even though the FTA can trigger displacement of manufacturing workers in sectors such as "Wearing apparels" and "Textiles" with the competition from relatively cheaper imports from China, the benefits to the Australian economy can be far greater and they may compensate sufficiently so that the adverse effects of such structural adjustments can be minimised.

Trade policy negotiators are mainly interested in the expansion of trade, particularly exports, and are keen to avoid cost of structural adjustments that can result from increased imports from the trading partner. The trade complementarities of the two countries means that the adjustments arising from import penetration will be small in the case of this FTA. The trade surplus projected for Australia in our simulation implies that the FTA boosts Australia's exports considerably by improving its competitive advantage. Australia's traditional exports coming from agricultural and resource-based sectors will experience increased market access in China as a direct consequence of the agreement. Conversely, China will find a substantial rise in its manufactured goods export to Australia. Associated with these trade flows will be the increased bilateral investment flows between the two countries that could set the platform for further growth in trade. Even though this study does not consider this aspect of the FTA explicitly due to difficulties in modeling, the intuition is that both countries are likely to experience positive gains from the stimulus provided by free trade.

The analysis presented in the paper is subject to some caveats. We have used the comparative static version of the GTAP model and therefore some dynamic effects of the trade liberalisation are not captured. The service trade liberalisation is another issue that has been omitted. Inclusion of bilateral investments into the analysis will be a major improvement even though it is difficult to model such issues with precision.

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Appendix Table A1: Regional and Commodity Aggregation

Aggregated Region	GTAP Region	Aggregated Commodity	GTAP Commodity
1. Australia (AUS)	Australia	1. Grains	Paddy rice; wheat; cereal grains nec
2. Unites States (US)	United States	2. Other crops	Vegetables, fruits, nuts; Oil seeds; Plant-based fibers; Crops nec Sugar cane, sugar beet,
		3. Animal products	Cattle, sheep, goat, horses; Animal products nec; Wool, silk-worm cocoons, Raw milk
3. ASEAN (6)	Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam	4. Forestry and fishing	Forestry, fishing
4. China (CHI)	China	5. Mining and energy	Coal; Oil; Gas; Minerals nec; petroleum and coal products
5. Japan (JPA)	Japan	6. Meat products	Meat: cattle, sheep, goats, horse; Meat products nec,
6. Korea (KOR)	Korea	7. Other food products	Vegetable oil and fats; processed rice; food products nec
7. Taiwan (TWN)	Taiwan	8. Dairy	Dairy products
8. Hong Kong (HKG)	Hong Kong	9. Sugar	Sugar
		10. Beverages and tobacco	Beverages and tobacco products
9. European Union (EU)	United Kingdom, Germany, Denmark, Sweden, Finland, Austria, Belgium, France, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Cyprus, Czech Republic, Hungary, Malta, Poland, Slovakia, Slovenia, Estonia, Latvia, Lithuania	11. Textiles	Textiles
		12. Wearing apparels	Wearing apparel; leather products
		13. Wood and paper products, publishing	Wood products; Paper products, publishing
10. Rest of Europe (RU)	All other regions	14. Chemicals, rubber and plastic	Chemical, rubber, plastic prods
		15. Ferrous metals	Ferrous metals; Metals nec
		16. Metal products	Metal products
		17. Motor vehicles and parts	Motor vehicles and parts; Transport equipment nec
		18. Machinery and equipment	Electronic equipment; Machinery and equipment nec
		19. Miscellaneous manufacturing	Manufacturing nec
		20. Services	Electricity; Gas manufacture and distribution; Water; construction; PublicAdministration/Defence/Health/ Education; Dwellings; Trade, Sea transport, Air transport, Communication; Financial services nec, Insurance, Business services nec, Recreation and other services

Source: GTAP Database, 2005.

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