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## Impact of Sino-Australia free trade Agreement's talks on China's dairy industry

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### Abstract

China dairy industry has made a great progress, but with urbanization, people's consumption patterns changing, and income levels increasing, China's dairy production is facing various challenges. China has established free trade agreement (FTA) with New Zealand, and at present, Australia intends to establish a free trade zone with China. However, what is the impact on dairy industry in China by Sino-Australia FTA? This paper will use the GTAP model to simulate a variety of scenarios of free trade between China and Australia, and evaluate the impact on domestic production, dairy trade, production and etc. The findings of the paper will offer the significant decision-making references for policy makers.

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Keywords: Dairy Industry; FTA; GTAP model; China; Australia

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### 1. INTRODUCTION

In the world trading system, the progress of free trade negotiations is difficult. Since 2001, there are differences between the developed and developing countries in the Doha Round negotiations about the critical fields, such as agricultural and non-agricultural market access, agricultural subsidies, tariffs on industrial imports and other issues, as makes the global trade difficult to develop further more.

Anymore, the regional free trade has important practical significance. With regional trade liberalization development, China has actively participated in multilateral and bilateral free trade negotiations. As to the role of bilateral free trade agreements, all possible schemes on free trade agreements are in a positive discussion (Yang Jun, etc., 2005; Li Zhongmin, 2007). Up to now, China has signed regional free trade agreements with the Association of Southeast Asian Nations, Pakistan, Chile, New Zealand, Singapore, Peru and so on. Some free trade agreements are being negotiated with the GCC, Australia, Iceland, Norway, the Southern African Customs Union, and Costa Rica FTA Area. And some agreements are in the research phase with India and South Korea free trade agreement.

In fact, many researchers have analyzed the economic impact on different sections, goods and gains. Based on a general equilibrium model of GTAP, Jun Y. et al.(2006) gives the conclusion that China and World will

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significantly benefit from further trade liberalization; With GTAP and IMAGE model, van Meijl H. et al.(2006) show that agricultural land would not decrease drastically in EU25 over the next 30 years because the global food market will experience a progress of demand increasing due to expected growth in GDP and population in many developing countries; Anderson K. et al.(2005) concluded that China's WTO membership would add 30 per cent to estimated global gains from the Uruguay Round, but also its WTO accession is projected to boost exports of manufactures and increase food import demand.

Zhongmin L. (2007) thought that China should make free trade agreements with six major countries or regions which were Australia, New Zealand, India, South Korea, Japan and South Africa. Anyway, from short-term and long-term, from complementary and competitive perspective, China should be priority to improve the trade relations with Australia.

Ended in March 2010, the FTA negotiation between China and Australia has taken in 14 rounds. Agricultural problems remain the important obstacles in the talks and the opening degree of China's agricultural products market for Australia will be a focus during the negotiation (Dejin Z., 2010). To analyze the impacts of the establishment of a free trade area between Australia and China on the Australian economy, Jun Y. et al (2005) use the GTAP model, which has been widely applied, and the analysis results show that after the establishment of China-Australia free trade area, the industry sector of both sides will adjust their direction by their respective comparative advantages. Australia has clear comparative advantages in land-intensive agricultural and livestock products. After the establishment of China-Australia FTA, the production of the Australian land-intensive agricultural products (such as wheat, grain, oil crops and sugar, etc.) and animals are greatly increased while the increase in Australian dairy exports to China will reduce China's dairy production by 0.49%. However, through a world dairy model incorporating both vertical and spatial characteristics of the world dairy sector, Tingjun P.,(2006) analyzed the economic impacts of further trade liberalization scenarios on Asian dairy markets, found that China is the potential competitive exporter under global free trade, and China consumers would lose from world trade liberalization.

According to different simulation scenarios of different import tariffs on agricultural products, Xudong Z. et al (2006) thought different depth of tariff cut would have different influences in the world trade including China. The changes of import and export will inevitably affect China's domestic agricultural production. The results also show that domestic agricultural production sectors will reallocate the resources and the agricultural structure will be changed with the comparative advantage changing. In the Doha Round negotiations, under the background of tariffs reduction on agricultural products, controlling on sensitive agricultural products and high tariffs, the simulation results show that the output of rice, vegetable and fruit will grow, and the production of wheat, live animals, beef and mutton, vegetable oil, and dairy products will be certain shocks. Xudong Z. et al (2006) used the GTAP model to simulate the economic impact of China - Australia FTA and the simulation results show that the challenges faced by China's agriculture are greater than the opportunities. From the agricultural perspective, Australia's dairy export competitiveness is stronger than China. The establishment of the free trade area will inevitably has the trade transfer effect, especially on New Zealand, which will make China's dairy export decrease by 14% from New Zealand and the EU.

The total output of milk has increased more than 5 times from 1995 to 2008 in China, and the net import volume increased by the same times(see Table 1 and Figure 1); It means that the dairy industry has made a great progress in China, and the domestic output of milk could not meet consumer demand.

Generally, the imports of dairy products from New Zealand to China are one time more than that of Australia (see Figure 2). Due to the FTA between New Zealand and China, the import price of dairy from New Zealand is lower, so China's dairy imports from New Zealand are much more.

Worried about the impact of Sino-Australia FTA's talks on China's dairy industry, we suppose China's import tariffs from Australia to be retained. The impacts also involved trade, resources and prices related to dairy industry, and in this paper, we have considered the FTA between China and New Zealand, so the results of GTAP model basically respect the actual situation in the near future between China and Australia, because after 2012, dairy tariff will almost decrease to zero according to the FTA between China and New Zealand.

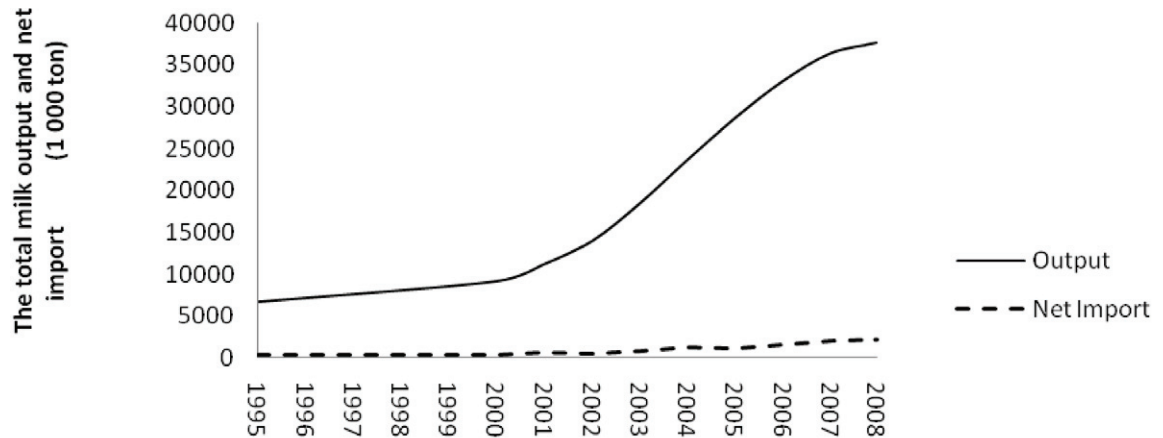


Figure 1. The total milk output and net import volume in China from 1995-2008

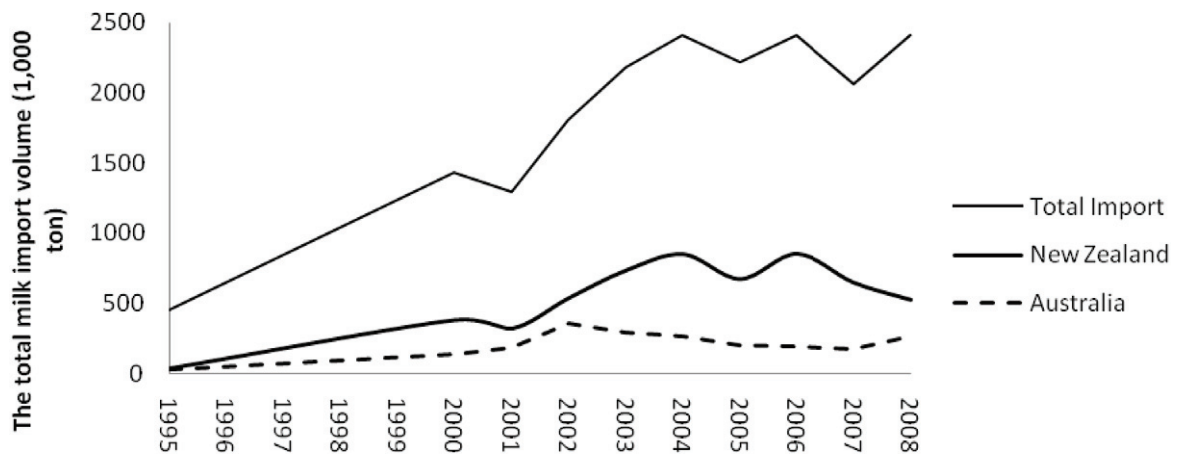


Figure 2. The total milk import volume in China from 1995-2008

Table 1 Domestic Output of Raw Milk and Imports in China

Year	Output (1)	Net Import (2)	Ratio (%) (3)=(2)/(1)	Total Import (4)	New Zealand		Australia	
					import (5)	ratio (6)=(5)/(4)	import (7)	ratio (8)=(7)/(4)
1995	6728.0	393	5.84	453	39	9%	28	6%
2000	9189.0	432	4.70	1427	384	27%	136	10%
2001	11226.0	620	5.52	1294	323	25%	184	14%
2002	14004.0	606	4.33	1808	541	30%	358	20%
2003	18486.3	910	4.92	2185	738	34%	296	14%
2004	23683.6	1269	5.36	2409	853	35%	262	11%
2005	28648.3	1154	4.03	2215	677	31%	199	9%
2006	33024.6	1618	4.90	2407	856	36%	188	8%
2007	36333.8	2008	5.53	2061	651	32%	176	9%
2008	37600.0	2177	5.79	2406	528	22%	266	11%

Source: China Dairy Yearbook (1995-2008), China Dairy Statistical Summary (2009)

## 2. SCENARIO DESIGNS

The analyses in this paper are based on the comparative static multi regional general equilibrium GTAP (Global Trade Analysis Project) model, which is developed by Purdue University, USA, and widely applied in trade and policy analysis. Through the model, we could establish production, consumption sub-models for each country or region; and link these sub-models into a multi-country and sectors general equilibrium model. The standard GTAP model is a multi-region, computable general equilibrium model with the assumption of the perfect competition market, constant returns to scale production, producers seeking to minimize production costs, consumers seeking maximum utility, all products and all input factors clearing. This paper used the full GTAP Version 7 database covering around 57 commodities and 113 regions in 2004.

In light of our interest in raw milk and dairy products, we aggregate these data into 6 regions and 8 commodities. The 6 regions includes AUS (Australia), CHN(China), NZL(New Zealand), USA, EU\_25(25 Europe countries) and Row (rest of world). These regions are very important for China to import dairy products. The 57 commodities in the version 7 GTAP database have been aggregated into 8 sectors, of which includes GrainsCrops(grains and crops), milk(raw milk and dairy products), meat(meat and meat products), extraction(mining and extraction), Procesfood(processed food), TextWapp(Textiles and clothing), Manufacture and others.

In this model framework, through the policy emulation, we would find that policy adjustment influences the change of production, import and export, commodity prices, factor supply and demand, GDP and the level of social welfare.

This paper adopts the GTAP model to simulate the effects of China - Australia Free Trade policy. We mainly consider the tariff factor that influences trade. The assumptions of scenarios are based on Free trade agreement (FTA) between China and New Zealand. We define three scenarios. The first scenario is based on the present phase, which is to maintain the present situation between China and Australia; the 2nd scenario tries to simulate the transition phase, and the import tariff level from Australia decrease by 50 percent; the 3rd is co-integrated phase, which means the bilateral tariff decrease to zero. All these scenarios are based on the assumption of the Sino-NZL FTA.

## 3. GTAP MODEL AND ECONOMIC ANALYZING

### 3.1 the Impact of Sino-Australia FTA on Domestic Production

Sino-Australia FTA will help to adjust effectively the domestic industrial structure. From China side, different scenario designs have different degree of industrial structural adjustment (see Table 2). All the supposes are based on the tariff of meat and milk changing and that of other goods or services unchanged.

Scenario1: under the zero tariff between China and New Zealand, and suppose that China's import tariffs from Australia remain unchanged.

China's output value of grain crops and processing food decrease weakly, where, the value of meat decreases by 0.19% and dairy products decreases by 3.07%; but as benefits clothing and manufacturing.

In the side of New Zealand, grain crops, mining and extraction, clothing and manufacturing would get loss; anyway, dairy products, meat and processed food are more competitive in exports. In this situation, as is detrimental to Australia's dairy and meat exports.

Scenario2: under the zero tariff between China and New Zealand, and suppose that the import tariff decreases 50% from Australia to China.

For Australia, the production of milk and dairy products, meat and products, processed food would increase, the value of clothing, manufacturing, minerals production will decrease. For China, the value of dairy products, grain crops, meat products and processed food will decrease 3.28%; anyway, clothing and manufacturing will increase.

Compared with Scenario 1, all the product value of New Zealand will decline, most likely due to similarity of industrial structure as Australian. With the tariffs decreasing gradually, China will increase imports from Australia, to some extent, as reduced imports from New Zealand; but, Australia, the change of the product value proportion is not large.

Scenario 3: under the zero tariff between China and New Zealand, suppose China and Australia is to be one co-integrated market. We could get the results in the following table 2.

For China, food crops, dairy products, meat products, processed food production decreased by 0.01%, 3.60%, 0.45% and 0.03%; clothing and silk products, manufactured goods, mineral production was increased by 0.02% , 0.02%, 0.01%. While for Australia, the output value of dairy products, meat products and processed food will increase by 0.41%, 0.81% and 0.10%, respectively; food crops, clothing and silk products, manufactured goods, mineral production will decrease by 0.03%, 0.06%, 0.06 % and 0.03%.

For Australia, the total value of dairy products, meat products and processed food would increase, grain crops, clothing, manufacturing, and mining and extracting will decrease; for China, the value of dairy products will decrease 3.60%, the value of grain crops, meat products and processed food will decrease, clothing and manufacturing will increase.

Comparing scenario 1 with scenario 2, all product value in New Zealand will decline. With Sino-Australia 0 tariff, livestock value will increase, and dairy products will increase 0.41%.

Table 2 Sino-Australia FTA leads to GDP Change (%)

	Scenario1			Scenario2			Scenario3		
	China	New Zealand	Australia	China	New Zealand	Australia	China	New Zealand	Australia
GrainsCrops	-0.01	-0.36	0.00	-0.01	-0.34	-0.01	-0.01	-0.32	-0.03
milk	-3.07	2.40	-0.11	-3.28	2.31	0.09	-3.60	2.17	0.41
meat	-0.19	0.95	-0.05	-0.30	0.88	0.30	-0.45	0.78	0.81
Processed food	-0.02	0.08	0.00	-0.03	0.07	0.04	-0.03	0.05	0.10
clothing	0.01	-0.59	0.01	0.02	-0.56	-0.02	0.02	-0.52	-0.06
Manufacture	0.01	-0.43	0.01	0.01	-0.41	-0.02	0.02	-0.37	-0.06
Mining	0.00	-0.18	0.00	0.00	-0.17	-0.01	0.01	-0.16	-0.03
Other	0.00	-0.03	0.00	0.00	-0.03	0.00	0.00	-0.02	0.00

Source: Simulation Results of GTAP Model

### 3.2 the Impact of Sino-Australia FTA on Dairy Products' Trade between Main Stakeholders

Table 3 lists the trade changes of dairy products in China. From the GTAP results, we could found that from 1st scenario, 2nd scenario to 3rd scenario, the imports of dairy products increase gradually. These commodities are mainly imported from Australia, New Zealand, USA, Europe Union and other regions.

Table 3 China's trade change of raw milk and dairy product from different scenarios

	Region	Scenario1		Scenario2		Scenario3	
		(%)	Value(million US\$)	(%)	(million US\$)	(%)	(million US\$)
Export	AUS	2.25	0.13	2.46	0.14	2.78	0.16
	NZL	2.96	0.01	3.08	0.01	3.27	0.01
	USA	2.02	0.18	2.15	0.19	2.35	0.20
	EU_25	1.88	0.34	2.02	0.37	2.23	0.41
	Other	1.98	1.04	2.11	1.11	2.32	1.21
	Total			1.70	1.82		1.99
Import	AUS	-27.62	-12.63	9.57	4.38	68.60	31.38
	NZL	98.57	180.15	94.56	172.82	88.64	162.00
	USA	-27.62	-14.05	-29.14	-14.82	-31.37	-15.96
	EU_25	-27.62	-39.86	-29.14	-42.05	-31.37	-45.28
	Other	-27.62	-12.50	-29.14	-13.19	-31.38	-14.20
	Total		101.11		107.14		117.94

Source: Simulation Results of GTAP Model

Table 3 shows the GTAP simulation results. According to the three scenarios, import value of dairy products are 101.11 million US\$, 107.14 million US\$ and 117.94 million US\$. After the Sino-New Zealand FTA, the related trading partners would decrease 27.62% of import value of dairy products about 1263 million US\$ from Australia;

If China decrease the import tariff of dairy products from Australia by 50%, the import value would increase by 9.57%, which is about 4.38 million US\$; if China and Australia reached a free trade agreement, the import value of dairy products would raise by 68.6%, which is about 31.38 million US\$ from Australia to China.

Anyway, with the reach of Sino-Australia FTA, China's import value of dairy products would decrease 180.15 million US\$, 172.82 million US\$, and 162 million US\$ from New Zealand; And the import value would also decrease about by 30% from USA, Europe Union and other countries.

### 3.3 the Impact of Sino-Australia FTA on Factor Market

From simulation results, FTA zone will bring bilateral trade changes and influences the growth of both sides' GDP. In some extent, GDP changes will make demand of production factors change, and it shows factor changing. From Table 4, we could see, with the import increasing, China's land price will decrease, while Australia's land price is relatively increased and that of New Zealand is slightly down. For China, the demand of labors and capital in dairy industry shows a downward trend because the increasing dairy import from New Zealand and Australian makes the scale of domestic dairy industry decline.

Table 4 different Scenarios lead to change of Factor demand and Price (%)

	Scenario	Change by Factor demand(%)			Change by Factor Price(%)		
		China	New Zealand	Australia	China	New Zealand	Australia
Land	1	-1.93	0.88	-0.06	-0.11	1.46	-0.01
	2	-2.06	0.85	0.05	-0.12	1.40	0.03
	3	-2.25	0.80	0.22	-0.14	1.31	0.08
Un-Skill-Labor	1	-3.48	2.53	-0.11	0.00	0.26	0.00
	2	-3.72	2.43	0.09	-0.01	0.24	0.02
	3	-4.09	2.28	0.42	-0.01	0.23	0.04
Skill-Labor	1	-3.49	2.58	-0.11	0.00	0.19	0.00
	2	-3.73	2.48	0.09	0.00	0.18	0.02
	3	-4.09	2.33	0.42	0.00	0.17	0.04
Capital	1	-3.49	2.57	-0.11	0.00	0.21	0.00
	2	-3.73	2.47	0.09	0.00	0.20	0.02
	3	-4.09	2.32	0.43	0.00	0.18	0.04
Natural Resource	1	0.00	0.00	0.00	0.02	-0.99	0.00
	2	0.00	0.00	0.00	0.03	-0.95	-0.06
	3	-0.01	0.00	0.00	0.04	-0.89	-0.15

Source: Simulation Results of GTAP Model

## 4. Summary

Using GTAP model in this study, we analysis the economic impact of Sino-Australia FTA, and get the simulation results as follows. (i) The establishment of Sino-Australia FTA will promote both sides to adjust their production structure and realize their own Comparative Advantage. Overall, China and Australia are complementary in industrial structure. Sino-Australia FTA will improve their industrial restructures. Among them, the Chinese dairy industry will contract, while the Australian dairy industry will be expanded; (ii) Sino-Australia FTA will promote the increase of China's dairy trade. For China, dairy exports will increase 0.29 million US dollars, and dairy imports will increase 16.83 million U.S. dollars, 26.61% of which is from Australia; (iii) Effect of Sino-Australia FTA will effectively adjust the demand and prices of production factors; (iv) through transferring effect, FTA will have

certain negative effects in dairy industry on some other countries, especially New Zealand, because it has the same production structure as Australia.

In one word, Sino-Australia FTA will have great influences in China's domestic dairy industry, and gradual openness of dairy market will be helpful to relieve rigid shock from Sino-Australia FTA.

Anyway, if China strengthens technical improvement and provides substantial subsidies for dairy production, it will promote domestic dairy development.

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### Appendix -----The Shock Statements of GTAP Modeling in Three Scenarios

Scenario1: *under the zero tariff between China and New Zealand, and suppose that China's import tariffs from Australia remain unchanged*

Shock tms("milk","NZL","CHN") = -13.1454;

Shock tms("meat","NZL","CHN") = -10.5183;

Scenario2: *under the zero tariff between China and New Zealand, and suppose that the import tariff decreases 50% from Australia to China*

Shock tms("milk","NZL","CHN") = -13.1454;

Shock tms("meat","NZL","CHN") = -10.5183;

Shock tms("milk","AUS","CHN") = -5.8120;

Shock tms("meat","AUS","CHN") = -4.5492;

Scenario 3: *under the zero tariff between China and New Zealand, suppose China and Australia is to be one co-integrated market with the zero tariff*

Shock tms("milk","NZL","CHN") = -13.1454;

Shock tms("meat","NZL","CHN") = -10.5183;

Shock tms("milk","AUS","CHN") = -11.6240;

Shock tms("meat","AUS","CHN") = -9.0985;