

Impact of regional trade agreements on commodity trade between China and Australia

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Abstract

This paper aims to analyse the impact of current regional trade agreements on commodity trade between China and Australia. The paper estimates data from 1992-2004, using China's commodity exports and imports to and from Australia as dependent variables to do a partial equilibrium analysis. Economic variables that explain the economic condition in China are estimated. Additional dummy variables that are related with China's membership in a regional trade agreement are introduced as dummy variables into the model. The regional trade agreements of EU, NAFTA, CER, ASEAN and APEC are estimated in the model. The results show that the inception of a regional trade agreement, especially NAFTA and APEC, has affected China's commodity trade with Australia to some extent.

Key words: Regional trade agreements, commodity trade, partial equilibrium analysis

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1. Introduction

Since the beginning of the twenty-first century many countries has tended to pursue regional or bilateral trade and economic cooperation with their major trading partners. China and Australia are also involved in this activity.

China has strengthened its trade and economic relationship with Australia since 1973 when the *Trade Agreement between the Government of Australia and the Government of the People's Republic of China* was carried out (Department of Foreign Affairs and Trade and Ministry of Commerce of China 2005). Further bilateral agreements including reciprocal encouragement and protection of investments, cooperation in customs, agricultural products trade, sanitary and phytosanitary regulations, services trade and energy resources have been signed and implemented in the last thirty-two years which enhance both countries' trade relationship. This relationship is further improved by two countries' commitment in regional trade and economic development in the Asia-Pacific Economic Cooperation (APEC). With China's accession to WTO in December 2001, China begins to pursue multilateral preferential trade as Australia, representing a further cooperation with Australia in the world level. Simultaneously bilateral trade and economic relationship between both countries has achieved great success when *Trade and Economic Framework between Australia and the People's Republic of China* was signed in 2003. The expected future success of negotiation on a bilateral free trade on the basis of this Framework will further push two countries' trade and economic cooperation to a summit.

As a result of the implementation of these agreements, the two way trade between China and Australia has increased rapidly in a large amount. China's total merchandise trade with Australia has increased from US\$1287 million in 1980 to US\$8453 million in 2000, averagely increasing 12.58 percent per annum. China's merchandise exports to Australia increase 15.78 percent annually from US\$224 million in 1980 to US\$3574 million in 2001; and its merchandise imports from Australia increase 11.80 percent per annum from US\$1063 million in 1980 to US\$5024 million in 2000. 1990s is the fastest growing period for two countries' trade, with an average annual increase in China's total merchandise trade, exports and imports with Australia larger than average per annum increase of those with the world. The great success in two countries merchandise trade improves both of them as a major trading partner to each other. In 2003 China has become Australia's third trading partner, second exports destination, and third imports source; and Australia is China's twelfth trading partner, twelfth exports destination and eleventh imports source.

It is important for both countries to make their merchandise trade a further success in the future. As China and Australia tends to develop regional trade and economic cooperation, this paper studies what is the impact of current regional trade agreements on merchandise trade between China and Australia. Section 2 explains a partial equilibrium model that is studied in this paper and its explainable variables. Section 3 explains regression results, and Section 4 concludes.

2. Theoretical analysis

2.1 Determined factors

Several factors reflecting a country's economic condition have been considered affecting trade value to some extent, including gross domestic product (GDP), total population, distance between two countries, and exchange rate changes.

As larger economies could trade more than smaller ones, trade flows are considered to be larger between countries with higher or increased gross domestic product and per capita GDP, as wealthier economies could produce and trade more than poorer ones. Hence GDP is a crucial determinant of a country's trade volume. It is considered positively impacted on trade, i.e. a large GDP will enable China to trade more with Australia.

An increase in population is expected to reduce trade due to a large domestic market that will enable the realization of production economies of scale. Thus population has a negative impact on trade, which indicates that a country tends to trade inside with a large population.

Physical distance between pairs of countries is considered another crucial factor affecting trade flows. The reason is that long distance incurred higher transportation cost will increase products' price that reduce their competitiveness, thus has a negative impact on trade volume. Frankel (1997) highlighted this problem in his study and discussed its impact in his model in analysing the impact of RTAs.

A relative change in exchange rate is thought to affect a country's import and export volumes because it can increase or decrease commodity prices counted in either national or foreign currency. Depreciation of a country's currency can enable this country to export more and import less; on the other hand, appreciation can enable a country to export less and import more. Furthermore, exchange rate can also be utilised to analyse a third country effect, which indicates that the competitiveness from a third country will put an additional effect on two countries' bilateral trade besides their economic situations (Bayoumi and Eichengreen, 1997). In this paper if the exchange rate is getting larger, it means Renminbi is depreciated compared with U.S. Dollars. Therefore it has a positive relationship with China's exports to Australia and negative relationship with China's imports from Australia.

Regional trade agreements tend to liberalize trade among their member countries, either cutting off or diminishing customs duties. They also pursue to formalize domestic regulations that protecting their trade from others and foreign direct investment. Thus it is understandable that trade between member countries in a RTA can be increased by the implementation of this RTA. Therefore RTAs are selected to put in the model as dummy variables to study their impact on changes of trade volume between their members and non-members since 1970s. Many researchers, such as Aitken

(1973) and Braga, Sadafi and Yeats (1994), Bayoumi and Eichengreen (1997), Frankel (1997), Soloaga and Winters (2001; 2004; 1986), have introduced RTAs in order to achieve this goal.

In this paper the RTA dummies of EU, CUSFTA, NAFTA, ASEAN and CER are considered to have a positive impact on China's trade with Australia, where member countries in these regions intend to trade within the region, while pushing China to trade more with other non-members. Therefore positive coefficients are expected for these RTAs. APEC's development will enable China trading more with other members; hence a positive coefficient is expected.

2.2 Model

The model estimated in this paper is partial equilibrium model, using logarithms of exports and imports as dependant variables in equation 1 and 2 respectively, and logarithms of GDP, distance, population and exchange rate as explainable variables, and RTAs including EU, CUSFTA, NAFTA, ASEAN, CER and APEC as dummy variables.

$$\ln(DEXP_{it}) = c_1 + c_2 \ln GDP_t + c_3 \ln distance + c_4 \ln population_t + c_5 \ln exchangerate_t + c_6 EU_t + c_7 CUSFTA_t + c_8 NAFTA_t + c_9 ASEAN_t + c_{10} CER_t + c_{11} APECP_t + \varepsilon \quad (1)$$

$$\ln(DIMP_{it}) = c_1 + c_2 \ln GDP_t + c_3 \ln distance + c_4 \ln population_t + c_5 \ln exchangerate_t + c_6 EU_t + c_7 CUSFTA_t + c_8 NAFTA_t + c_9 ASEAN_t + c_{10} CER_t + c_{11} APECP_t + \varepsilon \quad (2)$$

In these two equations DEXP and DIMP are China's exports and imports by commodity to and from Australia respectively (adjusted by GDP deflator). GDP is China's gross domestic products at constant 1990 price. Distance is the distance between capital cities of China and Australia. Population is China's population. Exchange rate is defined as one U.S. Dollar equals to a number of Renminbi. T is time period, and i stands for different classified commodities.

EU, CUSFTA, NAFTA, ASEAN and CER are regional economic integration excluding China as their member. They take the value of 1 when they form a regional economic agreement, indicating the impact of their aggregation on China's trade with Australia, and zero otherwise.

APEC is the only RTA China participates in. It is defined differently from other RTA dummies. As China became a member of APEC in 1991 and the available commodity trade data is from 1992, it is incredible to estimate the impact of APEC when it is defined the same as other RTA dummies. Therefore a substitute dummy definition is adopted here. Lu points out that APEC's development over these fifteen years (until 2004) can be separated into two periods: the first period is prosperous developing period from 1989 to 1997, and the second period is adjusting slow developing period from 1998 up to now. The 1997 Asian financial crisis is the separated year. During the first eight years, APEC actively promoted liberalizing trade and investment in Asia-Pacific region pushed by 1994 Bogor Goals, 1995 Osaka Action Agenda, and 1996 Manila Action

Plan. However as the 1997 Early Voluntary Sectoral Liberalization that tends to liberalize trade in sector level was negatively affected by the 1997 Asian financial crisis, APEC enters slowly developing period, slowing down its trade and investment liberalization progress. Up to now APEC has not yet come out of the low tide.

In regard to different developing period, I choose to separate APEC development into two periods as a dummy variable, i.e. 1992-1997, and 1998-2004. It takes the value of 1 for the former period and zero for the latter period, indicating the high speed development of APEC has a positively significant impact on China's trade with Australia. Thus a positive relationship is expected between the dummy and dependent variables.

2.3 Data source

China's merchandise trade with Australia data are obtained from SourceOECD International Trade by Commodities Statistics from 1992 to 2004 in thousand U.S. Dollars. The data are classified according to Standard International Trade Classification system Revision 2. In this paper 1-digit subheading including 10 broad classified commodities and 2-digit subheadings commodities are estimated in the model.

GDP and exchange rate data are collected from United Nations National Aggregate Database. The distance (measured in kilometres) between Beijing and Canberra is obtained from "Direct-Line Distances (International Edition)" of Fitzpatrick and Modlin. Exports, imports and GDP are deflated by GDP deflator which is obtained from United Nations database.

3. Empirical result

The data are estimated using pooled least squares method from 1992 to 2004. Both exports and imports are estimated as a whole and by commodity separately. In the model estimation, only five variables can be worked out, including GDP, population, exchange rate, NAFTA and APEC; other variables are finally excluded from final regression of the model. Consequently the results show only these five variables.

When regressions are made by using the whole pooled data, it is clear that there are no any particular factors that have any statistical significant impact on China's exports to and imports from Australia, including the formation of NAFTA and different development of APEC (Table 1 and Table 2). However when considering detailed classified commodity, the results can be shown and explained by the following.

3.1 Empirical results of China's exports to Australia

Generally speaking, the coefficients of GDP are found to have expected positive sign in nine out of ten 1-digit commodities, including classification 0 Food and live animals, classification 2 Crude materials, inedible, except fuels, classification 4 Animal and vegetable oils, fats and waxes, classification 5 Chemicals and related products, classification 6 Manufactured goods classified

chiefly by material, classification 7 Machinery and transport equipment, classification 8 Miscellaneous manufactured articles, and classification 9 Commodities and transactions not elsewhere classified; only the coefficient of classification 3 Mineral fuels, lubricants and related materials is negative. Except classifications 1 and 3, the coefficients of GDP of other classifications are statistically significant at 1 percent or 5 percent level. The results indicate that most of China's exports to Australia are highly related with China's GDP changes, i.e. a higher GDP in China pushes more exports to Australia.

However when considering regression results for impact of GDP on 2-digit commodities, not all detailed commodities are positively affected in China's exports to Australia. When China's GDP increases those commodities are intended to fulfill domestic demand and serve Chinese market first. They are goods of basic food for human being and animals and resources from classifications 0, 1 and 2, including meat, cereals, feeding stuff, tobacco, crude materials, pulp and waste paper; energy in classification 3, including coal and petroleum; medicines and dyeing materials in classification 5; and photographic apparatus and watches in classification 8. Most of these goods are inputs or semi-products in manufacturing process and are highly related with Chinese people's daily life. They will be in large demand when China's GDP is growing larger.

In the 1-digit commodity regression, the coefficients of population have expected negative sign in eight out of ten classified commodities; while the coefficients of classifications 1 and 3 show positive signs. The negative coefficients are statistically significant at 1 percent level except classification 2. The significant negative sign indicates that China intends to produce and exchange those goods inside the country instead of exporting them to Australia.

It is worth noting that regression results of some goods in 2-digit classification show that the pushing effect of population increases to China's exports to Australia is quite opposite to that of GDP growth. All the 2-digit classified goods which are negatively related with GDP growth are positively related with population increases, indicating China's increasing population does not block these goods from exporting outside China, especially for resources, crude materials and energy. This result is quite puzzling, totally opposite to common concept that China's large population consumes more resources, materials and energy goods.

In the 1-digit regression, most of the coefficients of exchange rate are statistically significant at 1 percent level and 10 percent level for classification 9. It is expected to see positive signed coefficients in classifications 7 and 8, which clearly supports the fact that when Renminbi is devalued, more machinery, transport and various manufactured goods are exported to Australia. However other classified goods are not positively affected and seem to export less when RMB is depreciated. This may indicate that those goods are in large demand in domestic market; thus they are lured to serve Chinese market instead of Australian market. Considering the 2-digit commodities, the only goods in the rest classifications that are positively related with exchange rate

are those commodities of fish and cereals in classification 0, crude rubber and pulp and waste paper in classification 2, dyeing materials, medicines, perfumes, manufactured fertilizers and plastic materials in classification 5, leather and rubber manufactured goods, and paper goods in classification 6.

In the 1-digit commodity regression, most of the coefficients of NAFTA are statistically significant at 1 percent level and 10 percent level for classifications 5 and 9. The coefficients show expected positive sign in classifications 0, 1, 2, 3, 4, 5, 6 and 9, while negative signed coefficients are found in classifications 7 and 8. As China is expected to become a 'world factory', its cheap and quality manufactured goods are quite competitive around world market. It is not a surprise that those products are hindered to North American market after NAFTA is formed and freely traded within the region, where Canada and USA can import from Mexico after cutting down their customs duties. This instead affects China exporting more to Australia, enlarging Australian market instead.

However in the above broad classifications there are some kinds of goods that China does not enlarge its exports to Australia when NAFTA market is not as easy to enter as before. These kinds of commodities focus on fish, cereals and sugar products in classification 0, pulp and waste paper in classification 2, dyeing materials, medicines, perfumes, manufactured fertilizers and plastic materials in classification 5, leather and paper goods in classification 6. They are either largely needed in Chinese domestic market or Australia has other better importing sources.

In the 1-digit regression, the expected positively signed coefficients for APEC dummy variable are found in classifications 0, 2, 3, 5, 8 and 9, while negative coefficients occur in the classified goods of classifications 1, 4, 6 and 7. The coefficients of classifications 1, 8 and 9 are not statistically significant; others are significant either at 1 percent or 5 percent level.

The results indicate that China intends to export more goods in broad classifications 0, 2, 3 and 5, and fewer goods in classifications 4, 6 and 7. Considering detailed 2-digit commodities, China exports fewer goods in tobacco, cork and wood, metalliferous ores and metal scraps in classifications 1 and 2, coal, coke and briquettes in classification 3, dyeing materials, manufactured fertilizers, explosives and pyrotechnic products in classification 5, apparel and clothing accessories in classification 8, arms of war in classification 9; while at the same period China enlarges its exports to Australia in goods of cork and wood manufactures, paper articles, manufactures of metal in classification 6, machinery specialized for particular industries, metalworking machinery, office machines and automatic data processing equipment, and road vehicles in classification 7.

3.2 Empirical results of China's imports from Australia

In the 1-digit commodity regression, positive coefficients of GDP are found expectedly in the first eight classified commodities, with classifications 8 and 9 negative coefficients. Most coefficients are statistically significant at 1 percent level; the coefficient of classification 3 is significant at 10 percent level. The results show that most goods China imports from Australia increase when

simultaneously China's consumption ability estimated by GDP increases, while some kinds of goods in classifications 8 and 9 decrease when China's GDP increases.

Considering regression results of GDP for 2-digit classification, some kinds of commodities show fewer imports from Australia, including dairy and fish, vegetables and fruit, sugar and feeding stuff in classification 0, oil seeds in classification 2, petroleum and gas in classification 3, animal-vegetable oils fats in classification 4, dyeing materials in classification 5, cork and wood manufacturers, paper and textile related products in classification 6; some of these goods like fish could be produced by China itself. China also imports a little more of goods of professional and scientific instruments in classification 8, and coin in classification 9.

In the 1-digit regression, the coefficients of population are statistically significant at either 1 percent or 5 percent level. They have expected negative sign in classifications 0, 1, 2, 4, 5, 6 and 7, and positive signs are found in classifications 3, 8 and 9. It indicates although China tends to import fewer goods from Australia when China can produce by itself, China needs more energy goods and electronic and military goods in classifications 8 and 9 to support its economic development.

In the detailed 2-digit classification, China tends to import more as larger population needs more goods to consume, including basic food for human and animals in classification 0, oils seeds, crude rubber and textile fibres in classification 2, petroleum and gas in classification 3, animal-vegetable oils in classification 4, inorganic chemicals, dyeing materials, medicines, perfumes in classification 5, cork and wood manufactures, paper, textile yarn, iron and steel in classification 6.

In the 1-digit regression, the expected negatively signed coefficients of exchange rate are found only in classifications 2, 3 and 6, which are also statistically significant at 1 percent level, indicating China tends to import fewer goods in these classifications when Renminbi is devalued. The coefficients of other classifications 0, 1, 4, 5, 7, 8 and 9 are all positively signed and statistically significant at either 1 percent or 5 percent level. This result shows that China does not decrease imports in these classifications from Australia although the imported cost in Renminbi increases.

Considering detailed 2-digit commodities after the price of Renminbi changes, China imports more goods of oil seeds, crude rubber, pulp and waste paper in classification 2, leather and leather manufactures, cork and wood manufactures, paper and paper articles, non-metallic mineral manufactures, iron and steel in classification 6. While China imports fewer goods of meat, vegetables and fruit, feeding stuff in classification 0, fixed vegetable oils and fats in classification 4, organic and inorganic chemicals, perfumes, manufactured fertilizers, explosives and pyrotechnic products, chemical materials and products in classification 5, power generating machinery, office machines and automatic data processing equipment in classification 7, sanitary, plumbing, heating and lighting fixtures in classification 8.

In the 1-digit commodity regression, it is expectedly to find positive coefficients of NAFTA in classifications 2, 3 and 6, while negative ones are found in classifications 0, 1, 4, 5, 7, 8 and 9. It indicates that under the influence of NAFTA's implementation, China begins to import more from Australia in crude materials, mineral fuels and material manufactured goods.

Considering detailed 2-digit commodities after NAFTA is formed, China imports more goods of meat, vegetables and fruit, feeding stuff in classification 0, hides and skins, cork and wood, crude fertilizers, metalliferous ores and metal scrap, crude animal and vegetable materials in classification 2, coal, petroleum and gas in classification 3, fixed vegetable oils in classification 4, organic and inorganic chemicals, perfumes, manufactured fertilizers, chemical materials and products in classification 5, textile yarn, non-ferrous metals, and metal manufactures in classification 6, power generating machinery, office machines and automatic data processing equipment in classification 7, sanitary, plumbing products in classification 8.

In the 1-digit regression, most of the coefficients of APEC are found expectedly positively signed and statistically significant at 1 percent level, while the coefficient of classification 5 is negative and significant at 5 percent level. The results indicate clearly that the quick and prosperous development of APEC enables China importing more goods from Australia.

Only imports of the following goods in detailed 2-digit classification are not growing as expected in APEC's fast development: live animals chiefly for food, feeding stuff in classification 0, oil seeds, crude fertilizers and crude materials in classification 2, non-ferrous metals in classification 6, power generating machinery, metalworking machinery, office machines, telecommunications and sound recording apparatus, electrical machinery, road vehicles in classification 7, footwear in classification 8. In classification 5, some goods are imported more although the whole classification is not. They are manufactured fertilizers, explosives and pyrotechnic products.

3.3 Major regression conclusion

- ◇ China's large GDP and its dramatic growth pushes China's trade with Australia, both in exports and imports. It is a crucial determined factor in improving trade between two countries.
- ◇ Although China's large population promotes China's trade with Australia in some detailed 2-digit commodities, it traps manufactured goods exported to Australia in 2-digit classifications 6, 7 and 8.
- ◇ Generally speaking exchange rate does not have a positive effect on China's trade with Australia. However when considering detailed classified commodities, the depreciation of Renminbi pushes China's exports to Australia in chemical goods, machinery and transport equipment and miscellaneous manufactured articles, including clothing and footwear.
- ◇ RTA variables are found positively affected China's trade with Australia. The formation of North American Free Trade Area and its trade liberalization development tends to exclude China's goods outside North American market, especially USA and Canada markets. Therefore it indirectly pushes China's exports to Australia and imports from Australia.

- ✧ The quick development of APEC before 1997 pushes China's exports to Australia in resources, energy, animals and chemicals, and imports from Australia in most goods except chemicals.

3.4 Modeling issues

The trade data time series are only from 1992 to 2004, which are not reflected the development of the two countries' trade before and after 1991 when China participated in APEC for the first time. The data also could not reflect the conditions before and after EU, ASEAN and CER's establishment. Therefore the impact of these regional trade agreements could not be estimated in the pooled model. The positive and negative effect from NAFTA and APEC on China's trade with Australia could not reflect thoroughly if all RTAs have a definite impact.

4. Conclusion

This paper studies the impact of regional trade agreements on China's commodity trade with Australia in discussing current China's exports to and imports from Australia in SITC listed commodities. The paper uses partial equilibrium model to estimate the relationship between China's trade with Australia and other determined factors, including China's GDP changes, population changes, changes of Renminbi prices, the formation of NAFTA and the development of APEC.

The increases of China's GDP enable Chinese consuming more goods from Australia and producing and exporting more to Australia. However the large population of China discourages China's trade with Australia to some extent, which indicates that China has the tendency of trading inside the country if more population is expected in the future. The devaluation of RMB does not bring more trade to China from Australia as expected, while decreasing trade between two countries to some extent. It might indicate that China's currency depreciation policy does not reflect correspondent effect.

The inception and implementation of regional trade agreements have a crucial impact on China's commodity trade with Australia. The North American market is integrated by NAFTA in 1990s, where Canada and USA can import cheaper manufactured goods from Mexico. China as a major exporter to USA is severely impacted by this activity. Thus China diverts to other countries to enlarge its exports and imports, making Australia become China's third major trading partner in 2003. At the same time the quick development of APEC has pushed both countries' commodity trade to some extent as well. Therefore under the development of regional economic integration around the world, it is possible and necessary for China and Australia to involve in bilateral free trade, which in turn encourages trade between the two countries.

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Appendix Impact of determined factors on China's trade with Australia

Table 1 China's trade with Australia – 1-digit commodity total trade

Variable	China's exports to Australia		China's imports from Australia	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	810.9909	0.2075	-1141.5820	-0.3770
LNGDP	5.7957	0.3215	-2.0370	-0.1459
LNPOPULATION	-41.5385	-0.2101	55.6521	0.3634
LNEXC	-6.1032	-0.2753	9.4053	0.5475
NAFTA	2.5870	0.2890	-3.9954	-0.5761
APECP	0.0421	0.0291	0.5487	0.4897
R-squared	0.0481		0.1135	
Adjusted R-squared	0.0097		0.0778	
F-statistic	1.2524		3.1751	
Prob (F-statistic)	0.2889		0.0099	
Included observations	13		13	

Table 2 China's trade with Australia – 2-digit commodity total trade

Variable	China's exports to Australia		China's imports from Australia	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	1245.7430	0.7754	-1353.1480	-0.9253
LNGDP	7.7102	1.0417	-3.6633	-0.5433
LNPOPULATION	-63.5340	-0.7819	67.0789	0.9069
LNEXC	-7.2802	-0.7917	4.6711	0.5550
NAFTA	2.8321	0.7629	-2.1301	-0.6268
APECP	-0.3771	-0.6333	0.5748	1.0633
R-squared	0.0523		0.0509	
Adjusted R-squared	0.0462		0.0451	
F-statistic	8.6000		8.7607	
Prob(F-statistic)	0.0000		0.0000	
Total panel (unbalanced) observations	785		822	

Table 3 China's exports to and imports from Australia -- 1 digit commodity

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
0 Food and live animals	Y	Y	N	N	N	Y	Y	N	Y	Y
1 Beverages and tobacco	—	Y	—	N	N	Y	Y	N	—	—
2 Crude materials, inedible, except fuels	Y	Y	—	N	N	N	Y	Y	Y	Y
3 Mineral fuels, lubricants and related materials	—	Y	Y	Y	N	N	Y	Y	Y	Y
4 Animal and vegetable oils, fats and waxes	Y	Y	N	N	N	Y	Y	N	N	Y
5 Chemicals and related products, n.e.s.	Y	Y	N	N	N	Y	Y	N	Y	N
6 Manufactured goods classified chiefly by material	Y	Y	N	N	N	N	Y	Y	N	Y
7 Machinery and transport equipment	Y	Y	N	N	Y	Y	N	N	N	—
8 Miscellaneous manufactured articles	Y	N	N	Y	Y	Y	N	N	—	Y
9 Commodities and transactions not elsewhere classified	Y	N	N	Y	N	Y	Y	N	—	Y
<p>Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia N means increasing changes of explainable variables decreases China's exports to or imports from Australia -- means no result or not statistically significant at all</p>										

Table 4 China's exports to and imports from Australia -- 2 digit commodity for classification 0

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
00 Live animals chiefly for food	—	Y	—	N	—	Y	—	N	—	N
01 Meat and meat preparations	N	—	Y	Y	N	N	Y	Y	Y	Y
02 Dairy products and birds' eggs	N	N	Y	Y	—	Y	—	N	Y	Y
03 Fish, crustaceans, molluscs, preparations thereof	Y	N	N	Y	Y	Y	N	N	Y	Y
04 Cereals and cereal preparations	N	Y	Y	N	Y	Y	N	N	Y	Y
05 Vegetables and fruit	Y	N	N	Y	N	N	Y	Y	Y	Y
06 Sugar, sugar preparations and honey	Y	N	N	Y	—	Y	N	N	Y	Y
07 Coffee, tea, cocoa, spices, manufactures thereof	Y	Y	N	N	N	Y	Y	N	Y	Y
08 Feeding stuff for animals, not including unmilled cereals	N	N	Y	Y	N	N	Y	Y	—	N
09 Miscellaneous edible products and preparations	Y	N	N	Y	—	Y	Y	N	N	Y

Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia
N means increasing changes of explainable variables decreases China's exports to or imports from Australia
-- means no result or not statistically significant at all

Table 5 China's exports to and imports from Australia -- 2 digit commodity for classifications 1 & 2

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
11 Beverages	Y	Y	N	N	N	Y	Y	N	—	Y
12 Tobacco and tobacco manufactures	N	—	Y	—	N	—	Y	—	N	—
21 Hides, skins and furskins, raw	—	Y	—	N	—	N	—	Y	—	Y
22 Oil seeds and oleaginous fruit	Y	N	N	Y	N	Y	Y	N	Y	N
23 Crude rubber (including synthetic and reclaimed)	N	—	Y	Y	Y	Y	—	N	Y	Y
24 Cork and wood	Y	Y	N	N	N	N	—	Y	N	—
25 Pulp and waste paper	N	Y	Y	N	Y	Y	N	N	Y	—
26 Textile fibres (except wool tops) and their wastes	Y	Y	N	Y	N	—	Y	N	—	Y
27 Crude fertilizers and crude materials (excluding coal)	N	Y	Y	N	N	N	—	Y	Y	N
28 Metalliferous ores and metal scrap	Y	Y	N	N	N	N	Y	Y	N	Y
29 Crude animal and vegetable materials, n.e.s.	Y	Y	—	N	—	N	—	Y	Y	Y
<p>Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia N means increasing changes of explainable variables decreases China's exports to or imports from Australia -- means no result or not statistically significant at all</p>										

Table 6 China's exports to and imports from Australia -- 2 digit commodity for classifications 3 & 4

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
32 Coal, coke and briquettes	N	Y	Y	N	N	N	Y	Y	N	Y
33 Petroleum, petroleum products and related materials	N	N	Y	Y	N	N	Y	Y	Y	Y
34 Gas, natural and manufactured	—	N	—	Y	—	N	—	Y	—	Y
35 Electric current	—	—	—	—	—	—	—	—	—	—
41 Animal oils and fats	Y	Y	N	N	N	Y	Y	N	N	Y
42 Fixed vegetable oils and fats	—	Y	—	N	N	N	Y	Y	N	Y
43 Animal-vegetable oils-fats, processed, and waxes	Y	N	N	Y	N	Y	Y	N	N	—

Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia
N means increasing changes of explainable variables decreases China's exports to or imports from Australia
-- means no result or not statistically significant at all

Table 7 China's exports to and imports from Australia -- 2 digit commodity for classification 5

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
51 Organic chemicals	Y	—	N	—	N	N	Y	Y	Y	N
52 Inorganic chemicals	Y	Y	N	Y	N	N	Y	Y	Y	N
53 Dyeing, tanning and colouring materials	N	N	Y	Y	Y	Y	N	N	N	N
54 Medicinal and pharmaceutical products	N	—	Y	Y	Y	Y	N	N	Y	—
55 Essential oils & perfume materials; toilet polishing and cleansing preparations	Y	Y	—	Y	Y	N	N	Y	Y	N
56 Fertilizers, manufactured	Y	Y	N	N	Y	N	N	Y	N	Y
57 Explosives and pyrotechnic products	—	Y	Y	N	N	N	Y	—	N	Y
58 Artificial resins, plastic materials, cellulose esters and ethers	Y	Y	N	N	Y	Y	N	N	Y	N
59 Chemical materials and products, n.e.s.	Y	Y	N	N	N	N	Y	Y	Y	N

Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia
N means increasing changes of explainable variables decreases China's exports to or imports from Australia
-- means no result or not statistically significant at all

Table 8 China's exports to and imports from Australia -- 2 digit commodity for classification 6

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
61 Leather, leather manufactures, n.e.s. and dressed furskiskg	Y	Y	N	N	Y	Y	N	N	N	Y
62 Rubber manufactures, n.e.s.	Y	Y	N	N	Y	--	--	N	N	Y
63 Cork and wood manufactures (excluding furniture)	Y	N	N	Y	N	Y	--	N	Y	Y
64 Paper, paperboard, articles of paper, paper-pulp/board	Y	N	Y	Y	Y	Y	N	N	Y	Y
65 Textile yarn, fabrics, made-up articles, related products	Y	N	N	Y	N	N	Y	Y	N	Y
66 Non-metallic mineral manufactures, n.e.s.	Y	Y	N	N	N	Y	--	N	N	Y
67 Iron and steel	Y	Y	N	Y	N	Y	Y	N	N	Y
68 Non-ferrous metals	Y	Y	N	N	N	N	Y	Y	N	N
69 Manufactures of metal, n.e.s.	Y	Y	N	N	N	N	Y	Y	Y	Y
<p>Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia N means increasing changes of explainable variables decreases China's exports to or imports from Australia -- means no result or not statistically significant at all</p>										

Table 9 China's exports to and imports from Australia -- 2 digit commodity for classification 7

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
71 Power generating machinery and equipment	Y	Y	N	N	Y	N	N	Y	N	N
72 Machinery specialized for particular industries	Y	Y	N	N	Y	Y	N	N	Y	Y
73 Metalworking machinery	Y	—	N	—	Y	Y	N	N	Y	N
74 General industrial machinery & equipment, and parts	Y	Y	N	N	Y	Y	N	N	N	Y
75 Office machines & automatic data processing equipment	Y	Y	N	N	N	N	Y	Y	Y	N
76 Telecommunications & sound recording apparatus	Y	Y	N	N	Y	Y	N	N	N	N
77 Electrical machinery, apparatus & appliances n.e.s.	Y	Y	N	N	Y	Y	N	N	N	N
78 Road vehicles (including air-cushion vehicles)	Y	Y	N	N	Y	Y	N	N	Y	N
79 Other transport equipment	Y	Y	N	N	N	Y	Y	N	N	Y
<p>Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia N means increasing changes of explainable variables decreases China's exports to or imports from Australia -- means no result or not statistically significant at all</p>										

Table 10 China's exports to and imports from Australia -- 2 digit commodity for classification 8

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
81 Sanitary, plumbing, heating and lighting fixtures	Y	—	N	Y	Y	N	N	Y	Y	Y
82 Furniture and parts thereof	Y	N	N	Y	Y	Y	N	N	—	—
83 Travel goods, handbags and similar containers	Y	N	N	Y	Y	Y	N	N	Y	Y
84 Articles of apparel and clothing accessories	Y	N	N	Y	Y	Y	N	N	N	Y
85 Footwear	Y	—	N	N	Y	Y	N	—	Y	N
87 Professional, scientific & controlling instruments	Y	Y	—	N	Y	Y	N	N	Y	—
88 Photographic apparatus, optical goods, watches	N	N	N	Y	Y	Y	N	N	Y	Y
89 Miscellaneous manufactured articles, n.e.s.	Y	Y	N	N	Y	Y	N	N	Y	Y

Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia
N means increasing changes of explainable variables decreases China's exports to or imports from Australia
-- means no result or not statistically significant at all

Table 11 China's exports to and imports from Australia -- 2 digit commodity for classification 9

	GDP		Population		Exchange rate		NAFTA		APEC	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
91 Postal packages not classified according to kind	—	—	—	—	—	—	—	—	—	—
93 Special transactions not classified according to kind	—	N	N	Y	N	Y	Y	N	Y	N
94 Animals, live, zoo animals, dogs, cats etc.	—	N	—	Y	—	Y	—	N	—	Y
95 Arms, of war and ammunition therefor	Y	—	N	—	N	—	Y	—	N	—
96 Coin (other than gold) , not being legal tender	—	Y	—	N	—	Y	—	—	—	Y
97 Gold, non-monetary	—	—	—	—	—	—	—	—	—	—
<p>Note: Y means increasing changes of explainable variables improves China's exports to or imports from Australia N means increasing changes of explainable variables decreases China's exports to or imports from Australia -- means no result or not statistically significant at all</p>										