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Impacts of China-Australia Free Trade Agreement on Australian Agriproducts Trade[1]

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Abstract

The China-Australia Free Trade Agreement (ChAFTA) came into effect on the 20th December 2015 to strengthen the relationship between the two countries with a view to expanding their export and import industries. Specifically, ChAFTA includes the elimination or reduction of trade barriers between the countries in the form of tariffs or quotas. Removal of trade barriers will enable Australian industries to explore new markets and investment opportunities. This paper reviews the potential benefits of free trade with China in relation to major agricultural commodities and their possible impacts on the farm sector and regional Australia. The analysis shows ChAFTA will be beneficial to Australia but the impacts will vary across regions. Overall merchandise export trade is dominated by Western Australia which, together with a low proportion of import merchandise trade with China, shows Western Australia will take more advantage of ChAFTA compared to other States and Territories. However, benefits received by specific sectors will vary across the States and Territories. Victoria will benefit more from dairy, Queensland from beef, and New South Wales from summer crops, sheep meat, oilseed crops, and wool, compared to other States and Territories. This paper also analyses the possible impact of ChAFTA on an excluded commodity (wheat) using the Revealed Comparative Advantage (RCA) index. The result shows higher RCA on Australian wheat to trade with China compared to the world and other countries which have free trade agreements with Australia. In addition, South Australia has more RCA on wheat trade with China followed by Victoria, Western Australia, and New South Wales. This implies that, in the context of increasing population growth and growing demand for wheat in China, Australia has a good scope to increase its wheat exports to China. It would be worthwhile to start negotiations for a preferential FTA on wheat with China based on their requirements.

Key words: China-Australia Free Trade Agreement, trade barriers, agricultural exports, Revealed Comparative Advantage, regional Australia

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Introduction

Trade between Australia and China was not formally acknowledged before federation in 1901. During the Second World War, bilateral trade was evident but did not pick up significantly until 1946-47 (Au-Yeung et al., 2012). In 1972, Australia and China agreed on a closer diplomatic relationship to open both economies for trade. Although China had started major economic reforms in 1978, until 2001, Australia's trade with China had always been below 5 per cent of total world trade (Au-Yeung et al., 2012). But the process of economic reform in China gained impetus after the accession of China to the World Trade Organization (WTO) in 2001 (Keller, Li and Shiue, 2011; Tisdell, 2003). Au-Yeung et al. (2012) reported that China's share of Australia's total merchandise trade rose from 1 per cent in 1972 to almost 25 per cent in 2011-12. Further, Zhou et al. (2007) suggested that agricultural trade between Australia and China can increase in future since there is a high level of agricultural trade complementarity between the two countries. Increased agricultural trade between the two countries will not likely generate negative impacts on their agricultural sectors as a whole, but there may be adverse effects for some individual sectors.

In 2003, the Australia-China Trade and Economic Framework was signed after setting an agenda of a wide range of activities for expanding the bilateral trade and economic relationship (DFAT/MOC, 2005). As a part of the framework, both countries agreed to conduct a feasibility study of a bilateral Free Trade Agreement (FTA) before entering into FTA negotiations. They agreed on 18 April, 2005 to begin negotiations on such an Agreement. The China-Australia Free Trade Agreement (ChAFTA) came into force on 20 December, 2015 after a decade of 21 negotiation meetings on sensitive issues such as agricultural tariffs and quotas, manufactured goods, services, temporary entry for skilled workers and foreign investment (DFAT, 2016a; Au-Yeung et al., 2012). It is believed that ChAFTA will have a beneficial impact on the Gross Domestic Product (GDP) of both Australia and China. It is estimated that by 2030 Australia's GDP will be 0.7 per cent higher than otherwise and China's GDP will be 0.1 per cent higher than otherwise (CIE, 2009).

Currently, Australia has eleven FTAs in force, with New Zealand, Thailand, Singapore, Chile, the United States of America (USA), the Association of South East Asian Nations (ASEAN), South Korea, Malaysia, Japan, China and the Trans Pacific Partnership Agreement (TPP) (DFAT, 2016b, 2019), while negotiations for another six are now underway (Thurbon, 2015). Before Australia entered into the ChAFTA, the producers and exporters who traded with China had faced significant tariffs on agricultural products which put them at a competitive disadvantage to countries that already had an FTA with China. It is assumed that ChAFTA not only balances out pricing for those countries having an FTA with China but provides significant advantage to Australia over larger world players, such as Canada, the USA and European Union. In this context, this paper analyses the impacts of ChAFTA on regional (Australian States' and Territories') economies and Australian trade in agriproducts .

Section 2 provides a theoretical context for analysis of the welfare implications of a reduction of tariffs and the impacts of changes in relative prices on the production and consumption of agricultural commodities. Section 3 details Australian agricultural exports and the opportunities for different agricultural commodities under the ChAFTA. Section 4 elaborates the advantages of ChAFTA in relation to improving regional economies. Section 5 analyses the prospects for trading agricultural commodities that are currently excluded under the ChAFTA, specifically Australian wheat. The conclusion is given in Section 6.

Theoretical Context

An FTA is an international treaty that, ideally, eliminates barriers to trade and enables stronger trade and commercial ties, contributing to enlarged economic integration and cooperation between participating countries. It can cover entire regions with multiple countries or link just two countries (DFAT, 2016b). An FTA may not always benefit all parties equally. For example, ex-post evaluation of the India–ASEAN FTA concluded that ASEAN has benefitted more than India (Bhattacharyya and Mandal, 2016), whereas India gains more in terms of welfare and real GDP from the proposed FTA between India and Bangladesh (Kim et al., 2014). FTAs help to increase the competitive position through providing access to markets, improved technology and a free flow of investment (Islam, 2004).

Preferential FTAs with specific countries may increase the benefit to that particular country (Kim et al., 2014). Free trade encourages countries to specialise and benefit from the application of the principle of comparative advantage. It enhances the competition and lowers the prices through greater use of innovative technology and technology transfer between the paired nations. It will also help to breakdown domestic monopolies and provide greater choice for firms and consumers. It allows each country to obtain a higher level of production and consumption which cannot be obtained in isolation (Economics, 2016). However, the different and complex rules often involved in preferential trade agreements can impede competition and add to the costs of firms engaging in trade. Therefore, it has been suggested that the nature and scope of negotiations involved in preferential FTAs should be first assessed from a national structural reform perspective, before entry into negotiations, rather than primarily seeking export opportunities (Productivity Commission, 2016).

Paired nations involved in free trade will receive higher levels of economic welfare compared to nations without trade (Figure 1 and 2).

Figure 1. Production and consumption possibilities without trade

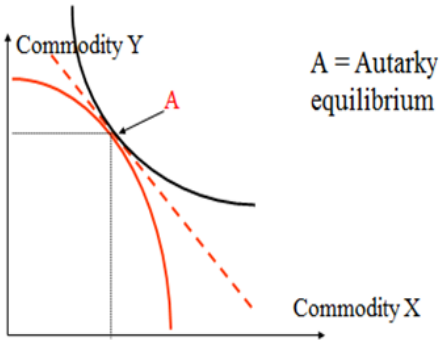
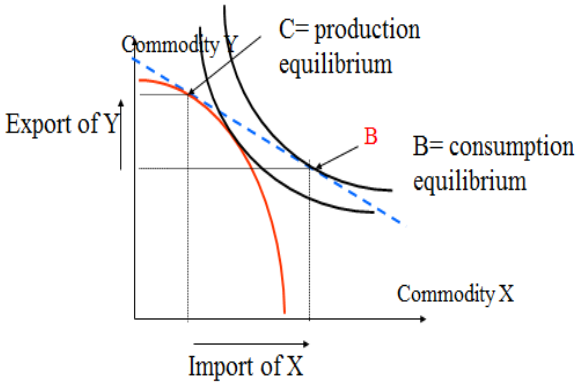


Figure 2. Production and consumption possibilities with trade



Welfare change is attributable to a change of relative prices when real expenditure is kept constant (Newbery, 1995). Figure 2 shows the shifts in relative price (where the relative price of commodity X is lower or the relative price of commodity Y is higher), where consumption and production are adjusted to new prices with a higher level of welfare. Consumers buy more when relative price is lower and producers sell more when relative price is higher and vice-versa. Welfare change is the net effect of trade creation (positive welfare) and trade diversion (negative welfare) caused by the free trade

agreements. Farajzadeh et al. (2012) reported reduction of tariffs raises economic welfare; however, higher income households will benefit more than others.

Trade creation occurs between member nations as cheaper imports from one member replace higher-cost local production whereas trade diversion occurs when lower-cost imports from a non-member are replaced with higher cost imports from member countries (Hodgkinson and Jordaan, 2006). Kennedy and Hilbun (2012) reported that the Australia-USA Free Trade Agreement (AUSFTA) has been a greater trade creation catalyst for Australia than for the USA. Market size and distance between the nation pairs affect the benefits of FTA. A positive correlation with the market sizes of nation pairs and a negative correlation with the distance between them has been observed (Gu and Shen, 2014). Kim et al. (2014) reported FTA generates substantial relative price shifts that arise mainly from lower import prices which can have larger sectoral impacts (Kim et al., 2014). Different sectors and commodities may experience positive and adverse effects of FTA in the same country (Hndi et al., 2016; Kim et al., 2014; Chandran and Sudarsan, 2012; Veeramani and Saini, 2011; Nagoor and Kumar, 2010; Sarker and Jayasinghe, 2007).

Trade barriers obstruct the equilibrium condition by creating discrepancies between the international and domestic prices of tradable goods (Franklin, 2000). There are two types of trade barriers: tariffs (which mean duties or taxes) on imported goods designed to increase the price to the same level or above the existing domestic price; and non-tariff barriers such as import quotas, subsidies, anti-dumping rules, technical standards and health regulations (Economics, 2016; Ma, 2011). Trade theorists claim that trade liberalisation by minimising non-tariff and tariff barriers increases efficiency, trade flows and scale economies that promote economic growth (Wacziarg, 1997; Barro and Sala-i-Martin, 1995). Through minimising trade barriers, local industries are enabled to explore new markets while expanding current business (Grimson, 2014). Non-tariff trade barriers have been becoming more effective in retarding trade compared to tariff trade barriers especially in industrialised countries (Ma, 2011).

Quotas on foreign competition generally increase the quality of the product traded but can reduce the domestic consumer surplus of the product traded (Lutz, 2005). Economics (2016) suggested that the welfare loss associated with quotas may be higher than with tariffs. Arguably, this is why quotas are used less frequently than tariffs. The imposition of tariffs leads to higher prices which result in consumer surplus losses (Figure 3). But there is a gain in domestic producer surplus as domestic producers receive a higher price than they would have without the tariff (Figure 4). In totality, the reduction in consumer surplus is higher than producer surplus which increases the welfare loss.

Shaikh (2009) reported an increment in Pakistani consumers' surplus after joining the South Asian Free Trade Agreement (SAFTA). Brox (2003) reported Canadian consumers have increased shares in consumption of all categories of goods and a significant decrease in the share of saving after formation of the free trade agreement of Canada with the USA. FTA will be beneficial for countries which have higher priority for tariff-elastic goods compared to countries that have priority for tariff-inelastic goods (Bhattacharyya and Mandal, 2016).

Applied General Equilibrium (AGE), Computable General Equilibrium (CGE) and gravity modeling have been used to analyse the effects of a wide range of trade policies. Using an AGE modeling approach, Adams et al. (1997) reported the welfare effect of trade policies on industries and consumers in response to changes in relative prices. Several studies have been conducted using CGE modelling to analyse the effect of bilateral and regional free trade agreements (for example, Kim et al., 2014; Shaikh, 2009; Raihan, 2009; Park, 2006).

Figure 3. Consumer surplus loss due to imposed tariff

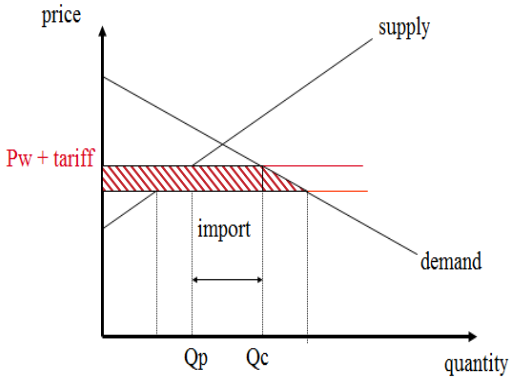
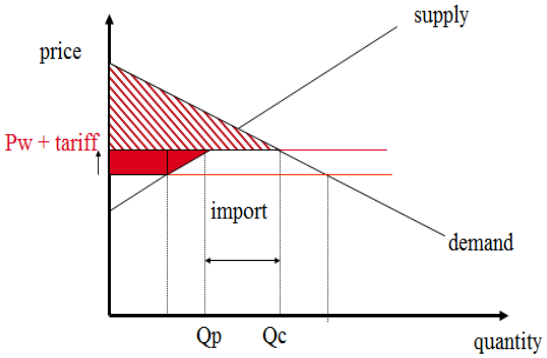


Figure 4. Producer surplus gain due to imposed tariff



The gravity model has also been extensively used to analyse the trade flows after its introduction by Timbergen (1962) and Linneman (1966). This model has become more transparent, better understood, and widely accepted for trade analysis (Sarker and Jayasinghe, 2007). Recently, this model has been used to analyse the impact of free trade agreements with agricultural trade flows in general and for selected agricultural commodities such as red meat, grains, vegetables, fruits, sugar, honey, oilseeds, dairy, and live animals (Hndi et al., 2016; Sarker and Jayasinghe, 2007).

Australian Agricultural Exports

ABARES (2015) reported that meat and live animals ranked first (32.6 per cent) in the value of Australian agricultural exports in 2014/15 followed by grains, oilseeds and pulses (28.2 per cent), industrial crops, cotton, sugar and wine (12.1 per cent), livestock and livestock products (7.9 per cent), wool (7.8 per cent), dairy (6.2 per cent) and horticulture (5.1 per cent). Of the total value of exported meat and live animals, 68 per cent was beef. Similarly, in the case of total value of grains, oilseeds and pulses exports, 59 per cent was wheat. The Australian agricultural export market is valued at more than A$41 billion per annum. With rising personal income, population growth and the emerging middle class, Asia offers the major market for over 60 per cent of Australian agricultural exports (Batt, 2015). Around 21 per cent of Australia's total agricultural exports are destined for China (Ziebell, 2014). Moreover, China is Australia's single most important market (29 per cent) among Asian countries including the Middle East (ABARES, 2015). CIE (2009) estimated that total agricultural sector exports of Australia will be increased by 14 per cent by the end of 2030 and that Australian exports to China can be increased by 84 per cent by this time, as a result of ChAFTA.

After the announcement of ChAFTA, there is a reduction in Chinese tariffs scheduled to be applied to a number of Australian agricultural imports. The FTA will reduce tariffs to a zero level from the baseline (2015) level for different products over an 11 year period. This includes products such as Australian dairy, live animals, barley, beef, lamb and mutton, edible fruits and vegetables, seafoods, hides skins and leather etc. But there are no changes to market access or tariffs for Australian wheat, maize, rice, sugar, cotton, and soybeans (Table 1). Products like cotton, wool, grains and beef, which comprised over 40 per cent of Australian agricultural export value to China, are not likely to see any great benefit from the deal (Ziebell, 2014). However, ChAFTA will provide an additional duty-free quota of 30,000 tonnes for Australian wool, though a quota of 287,000 tonnes is already in place which is provided at 1 per cent WTO's tariff rate to Australia. Moreover, China will increase this volume by 5 per cent per annum which will reach close to 63,500 tonnes of greasy wool by 2024, all at duty-free rates. This is

the best outcome China has given in any of its FTAs to date (DFAT, 2016a). However, if Australia exceeds the quotas, China may impose a tariff of 38 per cent (Ziebell, 2014). Beef and dairy gains are significant under the agreement, enjoying up to a 25 per cent tariff elimination within 4-11 years. But, China introduces certain barriers to agricultural trade through discretionary safeguards (which permit higher tariffs above a trigger level) for Australian whole milk powder exports and beef (Ziebell, 2014). In the case of all other dairy products, Australia will receive unrestricted preferential access (DFAT, 2016a). China has provided a quota of 170,000 tonnes of beef to Australia (DFAT, 2016a), which is 12.6 per cent of current beef production in Australia (ABARES, 2015). However, there is also a set of evaluation processes to consider removal of the safeguard (DFAT, 2016a). The tariff for Australian barley, currently at 3 per cent, will be cut to zero immediately and this will provide an immediate gain to Australian barley producers/exporters. The details of the baseline tariff level, new tariff level and the respective duration for the products are presented in Table 1.

Table 1. Chinese tariff reductions for Australian commodities (Base year = 2015)

Commodities	Baseline-tariff (%)	New-tariff (%)	Duration (Years)
Live animals	10	0	4
Lamb and mutton	12-23	0	8
Live fish	10.5 -17.5	0	4
Dairy produces**	12-25	0	4-11
Cut flower and flower buds	10-23	0	4
Edible vegetables	10-13	0	4
Edible fruits and nuts	10-25	0	4-8
Rye	3	0	Immediately
Barley	3	0	Immediately
Oats, Sorghum and Buckwheat	2	0	Immediately
Wool*	14-25	0	4
Wine	14-20	0	4
Beef**	12-25	0	9
Seafood	14-15	0	4
Hides, skins, etc.	5-14	0	2-7
Other oil seeds	10-20	0	4
Wheat	65	65	Not Included
Rice	65	65	Not Included
Maize	20-65	20-65	Not Included
Sugar	50	50	Not Included
Cotton, carded, not carded, comb	40	40	Not Included
Soybeans	3	3	Not Included

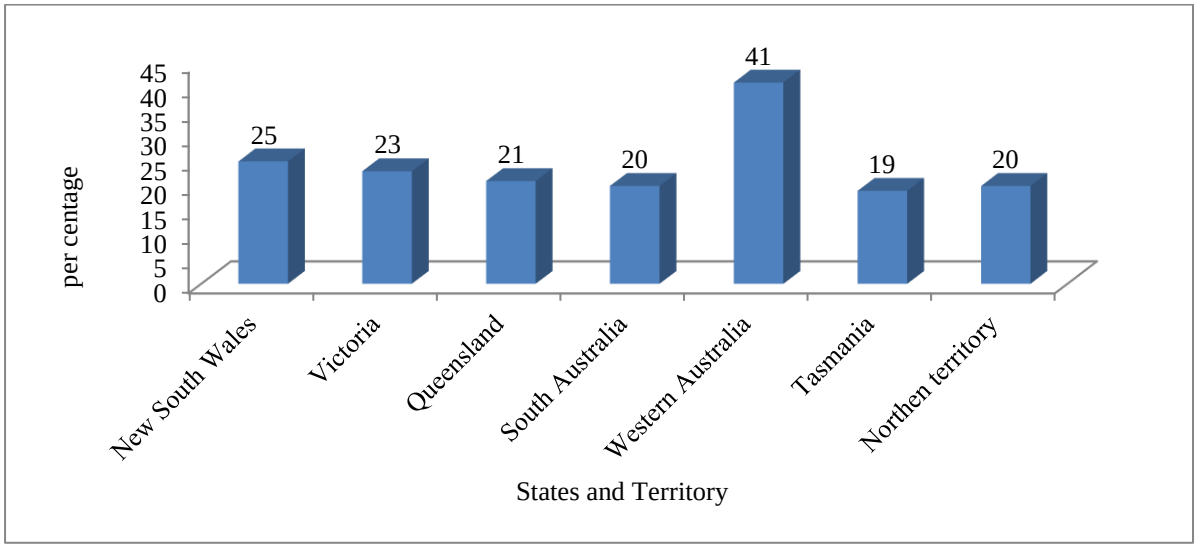
* Quotas ** discretionary safeguards. *Source*: DFAT (2015)

Benefit of ChAFTA on Australian Regional Economies

ChAFTA will help to benefit Australia by making Australian exports more competitive in the growing Chinese market. It will reduce the costs of importing from China and can improve consumer welfare (consumer surplus) in Australia. China is the largest export market for Australian commodities with a two-way trade value of A$150 billion in 2014-15 (DFAT, 2016c). This market is important across all Australian States and Territories.

Mai (2005) reported the expansion in Australian agriculture and food through the removal of border protection on merchandise trade between Australia and China, and that States and Territories which are over-represented in agriculture and mining tend to benefit more compared to States and Territories that are over-represented in clothing. Among the different States and Territories, of their total trade in 2014-15 (Figure 5), Western Australia had the most (41 per cent) with China followed by New South Wales (25 per cent), Victoria (23 per cent), Queensland (21 per cent), South Australia (20 per cent), Northern Territory (20 per cent) and Tasmania (19 per cent) (the Australian Capital Territory has minimal agricultural output and is often excluded from such calculations). China was top merchandise export trade destination for all Australian States whereas Northern Territory exported more to Japan than China (Appendix 1).

Figure 5. Percentage of different states/territory trade with China on their total trade in 2014-15

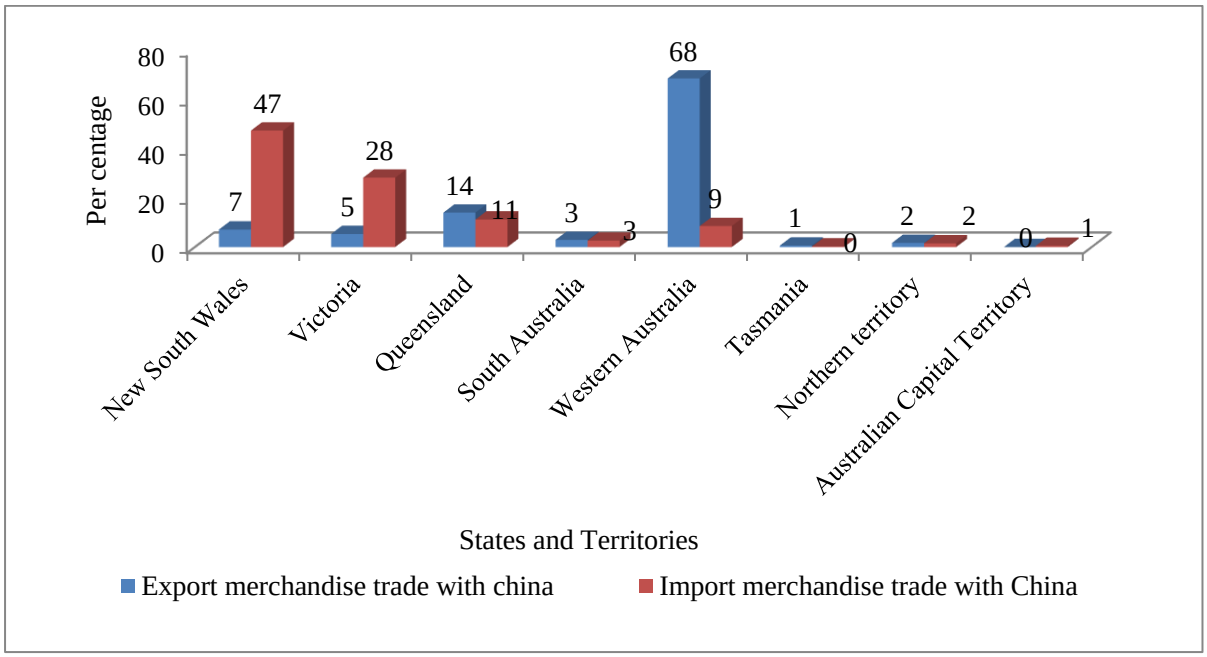


Source: DFAT (2016c)

The export share of total Australian merchandise exports to China was found to be the highest in Western Australia (68 per cent) followed by Queensland (14 per cent), New South Wales (7 per cent), Victoria (5 per cent), South Australia (3 per cent), and Tasmania (1 per cent) (Figure 6). Less than 1 per cent was found in the Australian Capital and Northern Territories (Appendix 2). The import merchandise trade from China was found to be the highest in New South Wales (47 per cent) followed by Victoria (28 per cent), Queensland (11 per cent), Western Australia (9 per cent), Northern Territory (2 per cent) and Australian Capital Territory (1 per cent) (Figure 6). Overall, merchandise export trade was dominated by Western Australia which, together with a low proportion of import merchandise trade with China, shows Western Australia will derive more advantage (in this sense) from ChAFTA compared to other States and Territories. Mai (2005) concluded that, from the removal of border

protection on merchandise trade with China, Western Australia will benefit more followed by New South Wales, Victoria, Queensland, South Australia, Tasmania, Northern Territory, and Australian Capital Territory.

Figure 6. Share of total merchandise trade of different states and territories on Australian merchandise trade with China in 2014-15



Source: Mai (2005)

Mai (2005) simulated three aspects of the FTA, i.e. removal of border protection on merchandise trade, trade liberalisation, and investment facilitation and services. She reported that all aspects would have a positive impact on the output of all Australian States and Territories. Among all States and Territories, New South Wales benefits more from an FTA followed by Victoria, Western Australia, Queensland, South Australia, Tasmania, Australian Capital Territory, and Northern Territory. Further, Si et al. (2013) studied the importance of a trilateral FTA between China, Japan and South Korea and its implications for Australian bilateral FTAs with the same countries. Their study highlighted that the trilateral FTA between China, Japan, and South Korea would have limited negative impacts on Australia's agricultural exports to these countries and that a bilateral FTA with China (such as ChAFTA) can provide a strong comparative advantage for Australia in relation to its land-intensive agricultural production and the exports.

No study on the potential regional impact of an FTA in Australia on a single agricultural commodity was found. So, we take production share of different exportable commodities by Australian States and Territories as a proxy to compare the potential benefits of an FTA among the Australian States and Territories. In total, States will benefit more than the Territories for all the exportable commodities. Among the States, Tasmania will benefit less than other States (Appendix 3).

In dairy (whole milk production), Victoria will benefit more followed by New South Wales, Tasmania, South Australia, and both Western Australia and Queensland (Appendix 3). In 2014-15, Australia had exported dairy worth A$295 million to China (DFAT, 2016a). However, Ziebell (2014) reported that to

fully exploit the benefits of ChAFTA, Australian dairy producers need further economies of scale in farming, investment in processing capacity and plans to mitigate the effects of future droughts.

Western Australia is the leading winter crops producer in Australia. Western Australia will benefit more from ChAFTA through producing winter crops (barley, canola, chickpeas, faba beans, field peas, lentils, linseed, lupins, oats, safflower, triticale and wheat) followed by New South Wales, South Australia, Victoria, Queensland, and Tasmania (Appendix 3). Among different winter crops, wheat, barley, and canola are the major exportable items in Australia. However, wheat is excluded in the current agreement (DFAT, 2015). IIT (2015) reported that New South Wales and Victoria have strong Revealed Comparative Advantage (RCA) in cereals trade with China compared to South Australia.

Queensland will benefit more from beef exports, followed by New South Wales, Western Australia/Australian Territories, South Australia, and Tasmania (Appendix 3). High-quality beef demand is growing rapidly in China. Australia had supplied about 40 per cent of imported beef to China in 2014/15, worth A$789 million. To capitalise on the growing demand for high-quality beef in China, the ChAFTA can provide competitive advantage over other large beef exporters (DFAT, 2016a).

New South Wales is the leading producer of summer crops (cottonseed, grain sorghum, maize, mung beans, navy beans, peanuts, rice, and sunflower), sheep meat, oilseed crops (linseed, safflower seed, sesame seed, soybeans, and sunflower seed) and wool in Australia. New South Wales will benefit more than other States and Territories from ChAFTA through producing and trading the above-mentioned summer crops (Appendix 3). There is no production of summer crops in South Australia and Tasmania and very minimal production in Western Australia. Therefore, those States will receive no or minimal benefits from ChAFTA through trading summer crops.

Australia is the second largest sheep meat supplier to China after New Zealand. In the then 12 to 23 per cent tariff regime, Australia exported sheep meat to China worth A$359 million in 2014-15. Therefore, after reduction of tariffs on sheep meat, Australian farmers can compete with New Zealand farmers to increase their trade and profitability (DFAT, 2016a). Similarly, Australian wool has a 63 per cent market share in China which is far higher than New Zealand (14 per cent) (DFAT, 2016a). Mai (2005) also reported that Tasmania can benefit further through expansion in wool production.

In the case of wine, China has been increasing its imports dramatically; doubling in size over five years, to reach A$2.1 billion in 2014-15. Australia is the third-largest exporter of wine to China, worth $269 million in 2014-15. It may take advantage of ChAFTA; however, Australia must compete with both Chile and New Zealand, which have preferential wine access to China under their FTAs (DFAT, 2016a). South Australia has strong RCA in beverages, spirits and vinegar trade with China compared to other States and Territories (IIT, 2015).

China has a rapidly growing demand for Australian horticultural products. In 2014-15, Australia exported horticultural products worth A$111 million whereas it was only worth A$14 million in 2009-10. So Australian farmers will enjoy more benefits after reduction of higher tariffs (up to 30 per cent) in horticultural products (DFAT, 2016a). However, IIT (2015) reported that South Australia has a comparative disadvantage in its trade of edible vegetables and certain roots and tubers with China.

Impact of ChAFTA on Excluded Commodities

Australian commodities such as wheat, maize, rice, sugar, cotton, soybeans, etc. are not included under ChAFTA for tariff elimination (DFAT, 2015). Among the different excluded commodities in ChAFTA, wheat and cotton were exported from Australia in 2014-15 (DFAT, 2016d). Cotton was exported only from New South Wales (A$676 million) and Queensland (A$738 million). So, we have chosen wheat as a major exportable commodity to explore the current situation of wheat production in Australia, its export scenarios, domestic use, comparative advantage and potential impact of ChAFTA.

The main reason behind the selection of wheat is that it was the major exportable commodity among the grains, oilseeds, pulses, and horticultural crops. Wheat export alone constitutes 63 per cent of total grains export, 49 per cent of the total for grains, oilseeds and pulses exports, and 41 per cent of the total for grains, oilseeds, pulses, and horticultural crops exports (ABARES, 2015). It is a major winter crop in Australia produced mainly in Western Australia, New South Wales, Victoria, South Australia, and Queensland (DAWR, 2016). Australia produced 25,303 kt of wheat from 12,613 thousand hectares (ha) with an average productivity of 2.01t/ha in 2013-14. This was 3.5 per cent of total world production. Out of total production in Australia, Western Australia produced the highest (39 per cent) followed by New South Wales (26 per cent), South Australia (17 per cent), Victoria (13 per cent), Queensland (4 per cent), and Tasmania (less than 1 per cent) (Appendix 3). DAF (2016) reported that wheat generates A$2-3 billion in the Western Australia economy per annum. Out of total Australian wheat production, about 69 per cent (22,057 kt) was exported to 31 countries and the remaining 31 per cent was used for domestic purposes in 2016-17. China was also the major importer (1,491 kt) of Australian wheat after Indonesia (4,833 kt), India (2,660 kt), Philippines (2,055 kt), and Vietnam (2,024 kt) in 2016-17 (ABARES, 2018).

Comparative advantage analysis of wheat

It has been difficult to use the theoretical concept of comparative advantage in empirical analyses, since the concept generally takes into account autarkic variables (autarkic relative prices and autarkic production costs) which are not observable (Sanidas and Shin, 2010). Autarky is a situation of a closed economy - a country not allowing any external trade. In practice, this is to have an economic policy to reduce the country's dependence on external trade. Whereas the concept of Revealed Comparative Advantage (RCA) has been used based on post-trade variables in order to identify the fundamental pattern of comparative advantage. Balassa (1965) coined the idea of how to measure RCA. He adopted Liesner's (1958) idea of using relative export performance and proposed using the ratio of export shares as an index for the RCA. The Balassa Index (BI) of the RCA can be written as:

$$BI_{ij} = \frac{X_{ij} / X_i}{X_{wj} / X_w} = \frac{X_{ij} / X_{wj}}{X_i / X_w}$$

It can be extended as $X_i = \sum_j X_{ij}$; $X_{wj} = \sum_i X_{ij}$; $X_w = \sum_i \sum_j X_{ij}$.

Where, X denote the exports, i a specific country, j a specific commodity, w the world or any reference group of countries taken into consideration. The BI method is basically comparing how a given sector's export performance of a given country and exports of the given sector are distributed among countries in proportion to their share of world exports (Bowen, 1983). It can be used to compare across sectors within a particular country or across countries with respect to a particular sector (IIT, 2015; Sanidas

and Shin, 2010). How much comparative advantage or disadvantage a particular country gained during the specific period of time can be measured directly by comparing the calculated index values. If the value of the RCA index is larger than 1, equal to 1 and less than 1, it is considered to be revealed comparative advantage, neutral and revealed comparative disadvantage, respectively, over world, particular countries or regions that are taken into consideration.

In our analysis, we examine Australia's RCA for wheat with the world, China, and other countries which have free trade agreements with Australia. In particular, we look at the RCA for wheat in different Australian States with the world, China, and other countries to identify the States RCA on wheat. We have used export data of 2014-2015 from different sources (DFAT, 2016d; WTO, 2016; Workman, 2016; Appendix 4) for calculating the RCA index. The result (Appendix 4) shows that Australia has a RCA on wheat trade with the world, China, and other countries (those involved in wheat export) which have free trade agreements with Australia. Among all, Australia has a stronger RCA on wheat trade with China (40232) followed by ASEAN (2056), the United States of America (5.70) and the world (4.08). IIT (2015) has also calculated the RCA index for South Australia (SA), using the definition as "the ratio of SA's share of the good in SA's total merchandise exports to the share of world exports of that same good in total world exports".

In our case of wheat, the RCA value is relatively high for China and ASEAN. For China, we have taken the ratio of the proportion of Australian wheat exports on total Australian merchandise exports to proportion of Chinese wheat exports on total Chinese merchandise exports. The higher RCA value for wheat exports to China is due to the reason that wheat is a major exportable commodity of Australia which has greater share of the total merchandise Australian exports (2.12 per cent), whereas in China wheat exports share on the total merchandise exports of China is almost negligible (0.0001). Similarly, the RCA for Australian wheat exports to the world market is only 4 because the share of the total wheat exports to the total world merchandise exports is 0.52. If the proportion of share of a particular commodity (or sector) on total merchandise exports of a particular country is less, there will be a higher RCA for those countries which are having higher shares of that particular commodity on the total merchandise exports. IIT (2015) also reported that SA had a RCA with the world and China collectively in only 22 of the 96 product classifications of the HS 2-digit level.

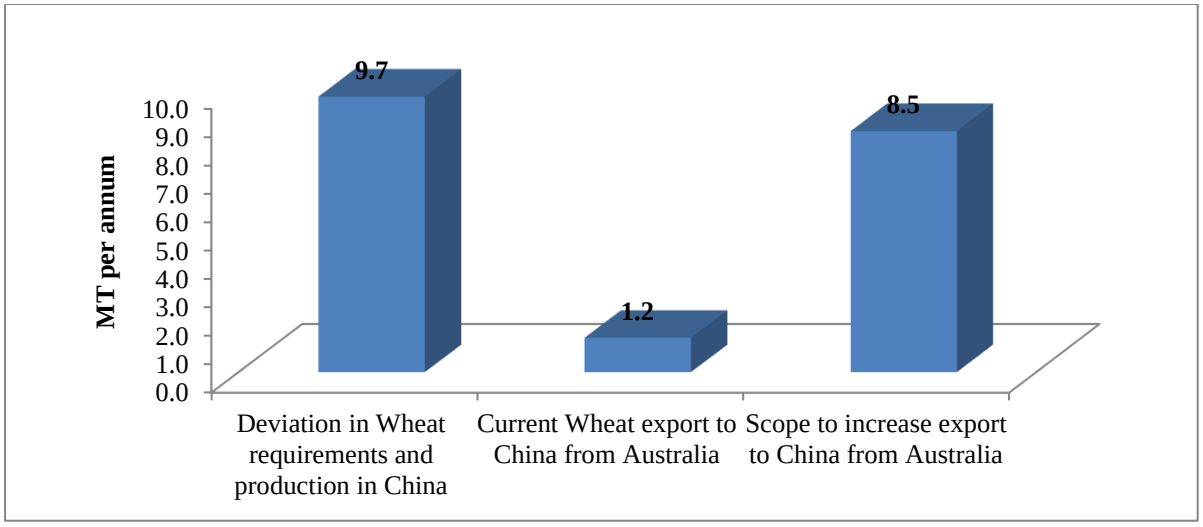
The results also reveal that the world, the USA and the ASEAN also have RCA of wheat trade with China; however, they all have lower RCA compared to Australia's RCA on wheat trade with China. Among different Australian States and Territories, only four states (New South Wales, Victoria, Western Australia, and South Australia) had exported wheat in 2014-2015, so we have considered only those States when calculating the RCA index. All exporting States have RCA on wheat trade with the world, the USA, the ASEAN, and China, but a higher RCA is found with China. IIT (2015) reported that South Australia has a higher RCA of cereals trade with the world compared to China. But in the case of wheat, South Australia has more RCA to trade with China compared to the world. Moreover the results show, among the different States, that South Australia has a higher RCA followed by Victoria, Western Australia, and New South Wales on wheat trade with China (Appendix 4). In 2014-15, Australia has exported about 48 per cent of wheat to the ASEAN countries (Appendix 5). These show that ChAFTA could be a facilitator to trade wheat by providing additional market access to China if existing tariffs were reduced.

Scope of wheat export increment from Australia to China

The Chinese population is projected to reach 1.38 billion by 2017 (CM, 2015). We have estimated wheat requirements for the Chinese population based on the projected population in 2017 and per capita consumption of wheat (Appendix 6). Three year (2012-13 to 2014-15) averages were used for calculating wheat production in China (MT), wheat export to China from Australia (MT), total wheat trade by Australia (MT), etc. The result shows that Chinese own wheat production is insufficient (9.7 MT) to meet the projected national requirement by 2017 (Appendix 6). China had imported 3.5MT of wheat in 2016 whereas the imported quantity was 6.77MT in 2013 (IM, 2016). Australia has been exporting on average 1.2 MT of wheat per annum to China, which is only 6.4 per cent of total Australian wheat export (ABARES, 2015).

Due to growing population and increasing demand for wheat in China, it seems that Australia has a good scope to increase (up to 8.5 MT per annum) wheat exports to China (Figure 7 and Appendix 6). Moreover, this quantity may increase in the future as the Chinese population continues to grow (SCMP, 2015). However, in the last two decades from 2000/01 to 2017/2018, Australian wheat exports to China never exceeded 1.9 Mt (ABARES, 2018). Therefore, it is important to know why Australian wheat exports to China are not increasing even though there is large scope.

Figure 7. Estimation of wheat requirements in China and supply situation from Australia in 2017



Both supply and demand side factors could be responsible. On the supply side, Australia is getting a higher price for wheat from most of the proximity countries compared to China (ITC, 2019). In contrast, the Chinese government has been supporting their farmers to increase wheat production through domestic support programs.

Moreover, in recent years, feed wheat in China has been competing with products like barley, sorghum, corn, and corn's ethanol by-product, distillers' dried grains with soluble (DDGS) (Barun, 2016). Therefore, China is demanding certain high quality and high protein wheat varieties that are not produced in China and that are required for some specific products like pastries (USTA 2018). RT (2016) reported that China has given priority to Russian wheat as it has an advantage of being higher quality and meeting the food safety standards. In this situation, Australia should maintain the quality

of wheat exported to China and should meet its food safety standards to take advantage of the current quota provided by China.

Conclusion

ChAFTA came into force on 20 December 2015. China was Australia's single most important market among Asian countries by that time. The total agricultural sector exports from Australia can be increased by 14 per cent by the end of 2030 and the Australian exports to China can be increased by 84 percent by this time as a result of the ChAFTA. This shows a good opportunity arising from the ChAFTA for both countries. Australia will benefit from reduced tariffs to Australian agricultural products from their baseline level tariffs to zero level tariffs within 11 years. The benefits from ChAFTA will not be equal across the Australian States and Territories.

Overall merchandise export trade is dominated by Western Australia, which along with a low proportion of import merchandise trade with China, shows Western Australia will benefit more from the ChAFTA compared to other States and Territories. However, the benefits received for specific sectors vary across the States and Territories. Victoria will benefit more from dairy (whole milk production); Queensland will benefit more from beef and New South Wales will benefit more from summer crops, sheep meat, oilseed crops, and wool compared to other States and Territories. However, there are no changes in the tariffs for Australian wheat, maize, rice, sugar, cotton, and soybeans (excluded commodities).

Australian wheat is a major exportable commodity and its higher RCA value shows it has the potential to increase exports of wheat in the world market. The higher RCA on Australian wheat was found with China compared to the world and other countries which have FTAs with Australia. Similarly, among the different States, South Australia has a higher RCA on wheat trade with China followed by Victoria, Western Australia, and New South Wales. Since wheat has a higher RCA, tariff elimination or reduction for this product can bring significant benefits to the rural areas (regional economies) of Australia (IIT, 2015).

Therefore, it is necessary to start negotiation to develop protocols with China for preferential FTA on wheat based on their requirements. The potential welfare gain from increasing export of wheat from Australia to China after reducing current tariffs (65 per cent) and import of other manufactured products from China to Australia could be an interesting area of future research. Moreover, agreements with other countries are also relevant, for example, South Korea has eliminated its 1.8 per cent tariff on wheat and 8 per cent tariff on wheat gluten (IIT, 2015). Therefore, the impact of different Australia's FTAs considering trade creation and export diversion effects of wheat exports could be another interesting area for future research.

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Appendix 1. Trading position of Australian states and territories with China in 2014-15

States and Territories	Total merchandise trade with China	Total export trade with China	Total import trade with China	Remarks
New South Wales	1	2	1	After Japan
Victoria	1	1	1	
Queensland	1	1	1	
South Australia	1	1	1	
Western Australia	1	1	1	
Tasmania	1	1	1	
Northern Territory	2	2	2	After Japan
Australian Capital Territory	7	7	7	

Source: DFAT (2016d)

Appendix 2. Details of total Australian merchandise export and import from China in 2014-15

States and Territories	Total merchandise export from Australia (A$ million)	Total export merchandise trade with China (A$ million)	Total import merchandise trade with China (A$ million)
New South Wales	37114	5717	27086
Victoria	23709	4258	16134
Queensland	46973	11241	6401
South Australia	11339	2337	1487
Western Australia	110696	55070	4888
Tasmania	2542	488	132
Northern Territory	6196	1354	865
Australian Capital Territory	6	0	291
Unallocated in Australia	17392	0	0
Total	255967	80465	57284

Source: DFAT (2016d)

Appendix 3. Selected indicators for regional comparison of major exportable agricultural commodities from Australia (2014/15)

Descriptions	NSW	VIC	QLD	SA	WA	TAS	ACT and NT	Total Production
Australian production of wholemilk (ML)	1160 (11.9)	6390 (65.7)	411 (4.2)	516 (5.3)	364 (3.7)	891 (9.2)	NA	9732 (100)
Winter crop production (Kt)	9230 (24.0)	5532 (14.4)	1417 (3.7)	7574 (19.7)	14551 (37.9)	78 (0.2)	NA	38382 (100)
Summer crop production (Kt)	2161 (53.5)	29 (0.7)	1841 (45.5)	0 (0.0)	11 (0.3)	0 (0.0)	NA	4042 (100)
Barley (Kt)	1184 (14.8)	1650 (20.6)	150 (1.9)	1931 (24.1)	3075 (38.4)	24 (0.3)	NA	8014 (100)
Total beef cattles and calves ('000)	5325 (20.3)	2428 (9.2)	12755 (48.5)	1110 (4.2)	1973 (7.5)	534 (2.0)	2171 (8.0)	26296 (100)
Total sheep and lambs (million)	26.71 (36.8)	15.36 (21.2)	2.34 (3.2)	10.971 (15.1)	14.406 (19.8)	2.77 (3.8)	0.04 (0.0)	72.61 (100)
Canola (Kt)*	922.4 (24.1)	710 (18.5)	0.9 (0.0)	419.4 (10.9)	1776.6 (46.4)	2.5 (0.1)	NA	3831.8 (100)
Other oilseeds (Kt)*	37 (59.1)	3.5 (5.6)	11.2 (17.9)	1.4 (2.2)	9 (14.4)	0.5 (0.8)	NA	62.6 (100)
Wheat production (Kt)*	6596 (26.1)	3396 (13.4)	1036 (4.1)	4254 (16.8)	9977 (39.4)	43 (0.2)	NA	25302 (100)
Shorn wool production (Kt-greasy)	130 (37.5)	72.6 (20.9)	9.1 (2.6)	57.1 (16.5)	67.2 (19.4)	10.8 (3.1)	NA	346.8 (100)

*2013/14. NA-Not available. Figures in parentheses indicates the per centage. *Source*: ABARES (2015)

Appendix 4. Revealed Comparative Advantage (RCA) analysis of Australian wheat export

Description	Total merchandise export trade	Total wheat export trade	% Sharing of wheat export trade to total merchandise export	RCA of wheat export to World	RCA of wheat export to China	RCA of wheat export to USA	RCA of wheat export to ASEAN
World (billion US$)	15983	83	0.51930	NA	9845.0958	1.3956	503.2899
China (billion US$)	2275	0.0012	0.00005	0.0001	NA	0.0001	0.05112
USA (billion US$)	1505	5.6	0.37209	0.7165	7054.26357	NA	360.6201
ASEAN (billion US$)	1163	0.012	0.00103	0.0019	19.56148	0.0027	NA
Australia (A$million)	255967	5432	2.12215	4.0865	40232.399	5.7032	2056.715
New South Wales (A$million)	37114	489	1.31756	2.5371	24978.78	3.5409	1276.937
Victoria (A$million)	23709	654	2.75845	5.3118	52295.541	7.4133	2673.394
Queensland (A$million)	46973	0	0	NA	NA	NA	NA
South Australia (A$million)	11339	1300	11.46486	22.07	217354.5	30.81	11111.3
Western Australia (A$million)	110696	2989	2.70019	5.199	51191.06	7.256	2616.93
Tasmania (A$million)	2542	0	0	NA	NA	NA	NA
Northern Territory (A$million)	6196	0	0	NA	NA	NA	NA
Australian Capital Territory (A$million)	6.0	0	0	NA	NA	NA	NA

ASEAN countries include Brunei, Cambodia, Indonesia Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam; NA means not applicable. *Source:* DFAT (2016d), WTO (2016) and Workman (2016)

Appendix 5. Quantity of wheat export in 2014-15 from Australia to different countries which having FTA with Australia

Description	Quantity (Kt)	% sharing
China	930	5.6
New Zealand	521	3.1
Thailand	466	2.8
Singapore	96	0.6
ASEAN+	6351	38.3
Korea	1048	6.3
Malaysia	906	5.5
Japan	904	5.5
Chile	NE	
USA	NE	
Total export from Australia	16571	100

+ includes Vietnam, Indonesia and Philippines (None of the wheat was exported from Australia to other ASEAN countries such as Brunei, Cambodia, Laos, Myanmar). NE-not exported. *Source*: ABARES (2015)

Appendix 6. Estimation of wheat requirements in China (based on per capita wheat consumption) and supply situation from Australia

Description	Quantity
Chinese population (Number)	1382494824
Average wheat consumption (Kg/person)*	96
Total wheat requirements in China per annum in 2017 (MT)	132.7
Total wheat production in China per annum (MT)*	123
Deviation in wheat requirements and production in China per annum (MT)	9.7
Total wheat trade by China per annum (MT)*	4.0
Wheat export to China from Australia per annum (MT)*	1.2
Total wheat trade from Australia per annum (MT)*	18.7

Note: * indicates 3 years (2012-13 to 2014-15) average. *Source*: CM (2015) and SCMP (2015)