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Balance of Trade Analysis Based on World Input-Output Database: Australian Economy 2000, 2005, 2010 and 2014

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Abstract:

Based on the World Input-Output Database, this paper calculates trade balance in Australian economy for the year 2000, 2005, 2010 and 2014. The results showed that, firstly, Australian export had increased significantly during 2000, 2005, 2010 and 2014. Secondly, Australian import had also increased significantly during the period. Important sectors and countries' trade partners of Australian export and import were indicated. Thirdly, trade balances in Australian economy were surpluses in all years of study. Sectors and countries in which trade balances were deficits and surpluses have also been clearly indicated. There were 7 countries and 7 sectors in which Australian had experienced trade surpluses in all years; there were 7 countries and 17 sectors in which Australian had experienced trade deficits in all years of study.

Keywords: balance of trade; export-import; world input-output database.

JEL Classification: C67; D57.

Introduction

The economy of Australia is highly developed and one of the largest mixed market economies in the world, with a GDP of AUD \$1.69 trillion as of 2017 (Australian Bureau of Statistics 2017). Australia is the second wealthiest nation in terms of wealth per adult after Switzerland (Department of Foreign Affairs and Trade 2017). Australia's total wealth was AUD \$8.9 trillion as of June 2016. In 2016, Australia was the 14th largest national economy by nominal GDP, 20th largest by PPP-adjusted GDP (World Bank 2017), and was the 25th-largest goods exporter and 20th-largest goods importer (CIA 2017). Australia took the record for the longest run of uninterrupted GDP growth in the developed world with the March 2017 financial quarter, the 103rd quarter and marked 26 years since the country had a technical recession (Bagshaw and Massola 2017).

East Asia (including ASEAN and other Northeast Asia Countries) is a top export destination, accounting by approximately 64% of exports in 2016 (Thirlwell 2017). Australia has the eighth highest total estimated value of natural resources, valued at US \$19.9 trillion in 2016 (Craig 2016). At the height of the mining boom in 2009–2010, the total value-added of the mining industry was 8.4% of GDP (Australian Bureau of Statistics, 2015). Despite of the recent decline in the mining sector, the Australian economy has remained hardy and stable (Reserve Bank of Australia 2017) and has not experienced a recession since July 1991.

1. Research background

One of the objectives of developing World Input-Output Database (WIOD) is to analyze the effect of globalization on trade pattern, environmental pressures and socio-economic development across a wide set of countries (Erumban *et al.* 2011, Timmer *et al.* 2012, Dietzenbacher *et al.* 2013, Timmer *et al.* 2015). WIOD 2016 release covers all trade between forty-three countries as well as with a rest-of-the-world region (Timmer *et al.* 2016). World Input-Output Database provides information on imported goods and services from another country. At the same time, it also explains information about exported goods and services to another country.

Export illustrates the goods and services that are produced in one country and sells to the citizens of another country. This does not matter what the good or service, how it is sent but the important things were produced by domestically and sold to someone from a foreign country. The seller of such goods and services is referred to as an exporter; the foreign buyer is referred to as an importer (Joshi 2005, 2009). Most countries would like to increase their exports and their companies want to sell more. If they have sold all they can to their own country's population, then they want to sell overseas as well. The more they export, the greater their competitive advantage. That is because they gain expertise in producing goods and services so that they gain knowledge about how to sell to foreign markets.

Imports consist of the transactions of goods and services to a resident of a jurisdiction such as a nation from non-residents (Lequiller and Blades 2006). An import of a good occurs when there is a change of ownership from a non-resident to a resident. Imports of services consist of all services rendered by non-residents to residents. In national accounts, import includes and excludes specific borderline cases. In macroeconomic theory, the value of imports can be modeled as a function of the domestic absorption and the real exchange rate Burda (2005). There are two basic types of import namely industrial and consumer goods and intermediate goods and services. The second, companies import goods and services to supply to the domestic market at affordable price and better quality than competing goods manufactured in the domestic market.

Trade balance is one important element in Balance of Payment, which is the record of all economic transactions between the residents of the country and of the world in a particular period (Levi 2009, Muchdie *et al.* 2018). Balance of trade is the difference between the monetary value of a nation's exports and imports over a certain period (O'Sullivan and Sheffrin 2003, Idrisov *et al.* 2016). If a country exports greater than it imports, it has a trade surplus. If a country imports greater than it exports, it has a trade deficit. The objective of this paper is to analysis balance of trade in Australian economy based on World Input-Output Database for the year 2000, 2005, 2010 and 2014.

2. Methodology

An input-output table is an excellent descriptive device and a powerful analytical technique (Jensen *et al.* 1979). It records the flows of products from each industrial sector considered as a producer to each of the sectors considered as consumers (Miller and Blair 1985). In the production process, each of these industries uses products that were produced by other industries and produces outputs that will be consumed by final users for private consumption, government consumption, investment and exports and also by other industries, as inputs for intermediate consumption (Oosterhaven and Stelder 2007, Timmer *et al.* 2015).

The columns of the input composition are the total supply of each product j (X_j); this is comprised by the national production and also by imported products. The value of domestic production consists of intermediate consumption of several industrial inputs i plus value added. The interindustry transactions table is a nuclear part of this table, in the sense that it provides a detailed portrait of how the different economic activities are interrelated. Since intermediate consumption is of the total-flow type, this implies that true technological relationships are being considered. In fact, each column of the intermediate consumption table describes the total amount of each input i consumed in the production of output j , regardless of the geographical origin of that input. A simplified national World Input-Output Table is depicted in Table 1.

Table 1 - A simplified national World Input-Output Table

Country A Intermediate Input (^{AA} X _{ij})	Output Exported to Country B (^{AB} X _j)	Output Exported to Country C (^{AC} X _j)	...	Output Exported to Country Z (^{AZ} X _j)	Other FD (^{AF} i)	Total Output (^A X _j)
Input Imported from Country B (^{BA} X _i)						
Input Imported from Country C (^{CA} X _i)						
..						
Input Imported from Country Z (^{ZA} X _i)						
Other VA (^{AVA} i)						
Total Input (^A X _i)						

Source: Modified from WIOT 2016.

The input-output interconnections can be translated analytically into accounting identities. On the demand perspective, if Z_{ij} denote the intermediate use of product i by industry j and y_i denote the final use of product i , we may write, to each of the n products:

$$X_i = Z_{i1} + Z_{i2} + \dots + Z_{in} + y_i \quad (1)$$

On the supply side, we know that:

$$X_j = Z_{1j} + Z_{2j} + \dots + Z_{nj} + w_j + m_j \quad (2)$$

in which w_j stands for value added in the production of j and m_j for total imports of product j . It is required that, for $i = j$, $x_i = x_j$, i.e., for one specific product, the total output obtained in the use or demand perspective must equal the total output achieved by the supply perspective. These two equations can be easily related to the National Accounts' identities. In general term, equation (1) can be written as:

$$x = Ax + y \text{ or } x = (I - A)^{-1}y \quad (3)$$

National Input-Output Table of Australia for the year of 2000, 2005, 2010 and 2014 are available from World Input-Output Data Base (Timmer *et al.* 2016, 2015). Calculation on total input, output exported to other-countries, imported input from other-countries, and multipliers were based on 30 sectors classification of Australian National Tables.

The column consists of intermediate input that domestically produced, imported and other value-added. The row consists of intermediate demand that locally consumed, export and other final demand. Export is calculated as summation of output distributed to other-countries (row operation) and import is calculated as summation of input come from other-countries (column operation). Balance of trade is calculated as the different between export and import. Sector classifications and country abbreviations are available in Appendix 1 and Appendix 2.

3. Results and discussion

3.1. Australian export

Table 2 presents the result of calculation of Australian export to countries of destination in the year 2000, 2005, 2010 and 2014. In the year 2000, total Australian export was US\$ 68,886 million. If exports to the Rest of the World are ignored as no specific country was referred, the highest export was to Japan (US\$ 12,315 million; 17.88%) and the lowest exports were to Lithuania (US\$ 1 million; 0.01%), Bulgaria (US\$ 4 million; 0.01%), Croatia (US\$ 7 million; 0.01%), and Latvia (US\$ 7 million; 0.01%). Some other important countries in Australian export were Korea (US\$ 6,563 million; 9.53%), USA (US\$ 4,221 million; 6.13%), China (US\$ 4,199 million; 6.10%), Taiwan (US\$ 2,857 million; 4.15%), Great Britain (US\$ 2,343 million; 3.40%) and Indonesia (US\$ 2,231 million; 3.24%).

In the year 2005, total Australian export was US\$ 115,188 million; increased almost twice compared to that in the year 2000. The highest export was to Japan (US\$ 22,565 million; 19.59%) and the lowest exports were to Lithuania (US\$ 3 million; 0.00%), and Latvia (US\$ 4 million; 0.00%). Some other important countries in

Australian export were China (US\$ 15,414 million; 13.38%), Korea (US\$ 9,080 million; 7.88%), India (US\$ 7,189 million; 6.24%), USA (US\$ 3,982 million; 3.46%), Taiwan (US\$ 3,850 million; 3.34%), and Indonesia (US\$ 3,531 million; 3.07%).

In the year 2010, total Australian export was US\$ 233,549 million; increased almost four times compared to that in the year 2000. The highest export was to China (US\$ 53,881 million; 23.07%) and the lowest exports were to Estonia (US\$ 2 million; 0.00%), Latvia (US\$ 2 million; 0.00%), and Lithuania (US\$ 4 million; 0.00%). Some other important countries in Australian export were Japan (US\$ 39,819 million; 17.05%), India (US\$ 23,627 million; 10.12%), Korea (US\$ 17,543 million; 7.51%), and Taiwan (US\$ 15,685 million; 6.72%). Indonesian position ranked only in 6th (US\$ 4,496; 1.93%).

In the year 2014, total Australian export was US\$ 242,448 million; increased a little bit compared to that in the year 2010. The highest export was to China (US\$ 70,793 million; 29.20%) and the lowest exports were to Cyprus (US\$ 4 million; 0.00%), Croatia (US\$ 4 million; 0.00%), and Latvia (US\$ 4 million; 0.00%). Some other important countries in Australian export were Japan (US\$ 42,141 million; 17.38%), Korea (US\$ 14,547 million; 6.00%), Taiwan (US\$ 10,659 million; 4.40%), and India (US\$ 7,461 million; 3.08%). Indonesian position ranked only in 7th (US\$ 5,279; 2.18%).

During the year of study, it is interesting to note that the role of China in Australian import. Market share of China in Australian export was only 6.10% in 2000, increased to 13.38% in 2005, 23.07% in 2010 and 29.20% in 2014. Australian exports to Great Britain (3.40% in 2000, 2.68% in 2005, 1.91% in 2010 and 0.096% in 2014), Korea (9.53% in 2000, 7.88% in 2005, 7.51% in 2010 and 6.00% in 2014) and the USA (6.13% in 2000, 3.46% in 2005, 1.86% in 2010 and 2.18% in 2014) have decreased. Australian export to Japan (17.88% in 2000, 19.59% in 2005, 17.05% in 2010 and 17.38% in 2014) was relatively stable.

Table 2. Australian export to county of destination, 2000, 2005, 2010, and 2014

Country	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
AUT	34	0.05	103	0.09	135	0.06	157	0.06
BEL	233	0.34	501	0.43	651	0.28	592	0.24
BGR	4	0.01	60	0.05	7	0.00	185	0.08
BRA	395	0.57	761	0.66	2,256	0.97	1,533	0.63
CAN	1,098	1.59	1,749	1.52	1,105	0.47	798	0.33
CHE	124	0.18	253	0.22	706	0.30	785	0.32
CHN	4,199	6.10	15,414	13.38	53,881	23.07	70,793	29.20
CYP	10	0.01	5	0.00	11	0.00	4	0.00
CZE	66	0.10	86	0.07	93	0.04	128	0.05
DEU	966	1.40	1,295	1.12	1,861	0.80	1,067	0.44
DNK	432	0.63	339	0.29	337	0.14	251	0.10
ESP	310	0.45	668	0.58	740	0.32	511	0.21
EST	1	0.00	2	0.00	2	0.00	6	0.00
FIN	290	0.42	445	0.39	269	0.12	80	0.03
FRA	578	0.84	1,099	0.95	1,419	0.61	1,000	0.41
GBR	2,343	3.40	3,089	2.68	4,460	1.91	2,336	0.96
GRC	59	0.09	61	0.05	60	0.03	29	0.01
HRV	7	0.01	7	0.01	39	0.02	4	0.00
HUN	12	0.02	24	0.02	18	0.01	21	0.01
IDN	2,231	3.24	3,531	3.07	4,496	1.93	5,279	0.18
IND	861	1.25	7,189	6.24	23,627	10.12	7,461	3.08
IRL	79	0.11	130	0.11	275	0.12	179	0.07
ITA	1,541	2.24	1,591	1.38	967	0.41	667	0.28
JPN	12,315	17.88	22,565	19.59	39,819	17.05	42,141	17.38
KOR	6,563	9.53	9,080	7.88	17,543	7.51	14,547	6.00
LTU	1	0.00	3	0.00	4	0.00	6	0.00
LUX	9	0.01	23	0.02	23	0.01	63	0.03
LVA	7	0.01	4	0.00	2	0.00	4	0.00
MEX	223	0.32	786	0.68	463	0.20	352	0.15
MLT	44	0.06	42	0.04	14	0.01	2	0.00
NLD	238	0.34	1,007	0.87	1,297	0.56	619	0.26

Country	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
NOR	51	0.07	101	0.09	117	0.05	138	0.06
POL	30	0.04	56	0.05	72	0.03	389	0.16
PRT	23	0.03	15	0.01	14	0.01	14	0.01
ROU	72	0.10	38	0.03	11	0.00	10	0.00
RUS	113	0.16	193	0.17	243	0.10	159	0.07
SVK	10	0.02	19	0.02	37	0.02	38	0.02
SVN	8	0.01	7	0.01	12	0.00	28	0.01
SWE	151	0.22	398	0.35	472	0.20	292	0.12
TUR	245	0.36	444	0.39	434	0.19	634	0.26
TWN	2,857	4.15	3,850	3.34	15,685	6.72	10,659	4.40
USA	4,221	6.13	3,982	3.46	4,340	1.86	5,275	2.18
ROW	25,830	37.50	34,174	29.67	55,533	23.78	73,208	30.20
Total	68,886	100.00	115,188	100.00	233,549	100.0	242,448	100.00

Source: Calculated from WIOT 2016.

Table 3. Australian export by sector 2000, 2005, 2010 and 2014

Sector	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
S-1	5,743	8.34	6,552	5.69	9,216	3.95	10,119	4.17
S-2	41	0.06	55	0.05	140	0.06	225	0.09
S-3	103	0.15	62	0.05	53	0.02	24	0.01
S-4	19,387	28.14	47,426	41.17	127,160	54.45	124,625	51.40
S-5	2,259	3.28	2,784	2.42	3,553	1.52	4,632	1.91
S-6	1,685	2.45	1,349	1.17	1,310	0.56	1,403	0.58
S-7	549	0.80	879	0.76	918	0.39	1,416	0.58
S-8	405	0.59	634	0.55	962	0.41	991	0.41
S-9	69	0.10	89	0.08	196	0.08	282	0.12
S-10	1,723	2.50	2,228	1.93	2,062	0.88	2,021	0.83
S-11	1,278	1.86	1,743	1.51	3,391	1.45	3,606	1.49
S-12	148	0.21	393	0.34	389	0.17	313	0.13
S-13	469	0.68	737	0.64	992	0.42	931	0.38
S-14	313	0.45	393	0.34	415	0.18	395	0.16
S-15	13,327	19.35	18,933	16.44	33,333	14.27	26,395	10.89
S-16	722	1.05	1,156	1.00	2,101	0.90	2,201	0.91
S-17	657	0.95	666	0.58	748	0.32	588	0.24
S-18	458	0.66	510	0.44	598	0.26	445	0.18
S-19	505	0.73	678	0.59	1,004	0.43	883	0.36
S-20	896	1.30	962	0.84	930	0.40	699	0.29
S-21	260	0.38	538	0.47	584	0.25	892	0.37
S-22	156	0.23	198	0.17	272	0.12	355	0.15
S-23	0	0.00	0	0.00	0	0.00	0	0.00
S-24	135	0.20	184	0.16	254	0.11	465	0.19
S-25	113	0.16	236	0.20	551	0.24	848	0.35
S-26	5,900	8.57	9,129	7.93	17,575	7.53	22,208	9.16
S-27	6,467	9.39	9,167	7.96	12,788	5.48	18,876	7.79
S-28	2,611	3.79	4,202	3.65	7,567	3.24	10,268	4.24
S-29	2,072	3.01	2,858	2.48	4,026	1.72	5,623	2.32
S-30	434	0.63	446	0.39	462	0.20	718	0.30
Total	68,886	100.00	115,188	100.00	233,549	100.00	242,448	100.00

Source: Calculated from WIOT, 2016.

Table 3 provides information about the results of calculation on Australian export by sector for the year 2000, 2005, 2010 and 2014. In the year 2000, the most important sectors in Australian export were Sector-4 (US\$ 19,387 million; 28.14%), Sector-15 (US\$ 13,327 million; 19.35%), Sector-27 (US\$ 6,467 million; 9.39%),

Sector-26 (US\$ 5,900 million; 8.57%), Sector-1 (US\$ 5,743 million; 8.34%), Sector-28 (US\$ 2,611 million; 3.79%), Sector-5 (US\$ 2,259 million; 3.28%) and Sector-29 (US\$ 2,072 million; 3.01%).

In the year 2005, the most important sectors in Australian export were Sector-4 (US\$ 47,426 million; 41.17%), Sector-15 (US\$ 18,933 million; 16.44%), Sector-27 (US\$ 9,167 million; 7.96%), Sector-26 (US\$ 9,129 million; 9.93%), and Sector-1 (US\$ 6,552 million; 5.69%). In the year 2010, the most important sectors in Australian export were Sector-4 (US\$ 127,160 million; 54.45%), Sector-15 (US\$ 33,333 million; 14.27%), Sector-26 (US\$ 17,575 million; 7.53%), Sector-1 (US\$ 9,216 million; 3.95%), and Sector-28 (US\$ 7,567 million; 3.24%). In the year 2014, the most important sectors in Australian export were Sector-4 (US\$ 124,625 million; 51.40%), Sector-15 (US\$ 26,395 million; 10.89%), Sector-26 (US\$ 22,208 million; 9.16%), Sector-27 (US\$ 18,876; 7.79%), Sector-28 (US\$ 10,268 million; 4.24%), and Sector-1 (US\$ 10,119 million; 4.82%).

During the period, the contributions of three sectors that tend to increase in Australian export namely Sector-4 (28.14% in 2000, 41.17% in 2005, 54.45% in 2010 and 51.40% in 2014), Sector-26 (8.57% in 2000, 7.93% in 2005, 7.53% in 2010 and 9.16% in 2014) and Sector-28 (3.79% in 2000, 3.65% in 2005, 3.24% in 2010 and 4.44% in 2014). The contributions of three sectors that tend to decrease in Australian export were Sector-1 (8.34% in 2000, 5.69% in 2005, 3.95% in 2010 and 4.17% in 2014), Sector-15 (19.35% in 2000, 16.44% in 2005, 14.27% in 2010 and 10.89% in 2014) and Sector-27 (9.39% in 2000, 7.96% in 2005, 5.48% in 2010 and 7.79% in 2014).

3.2. Australian Import

Table 4 presents the result of calculation of Australian import from countries of origin in the year 2000, 2005, 2010 and 2014. In the year 2000, total Australian import was US\$ 42,267 million. If import from the Rest of the World was ignored, the highest import was an import from the USA (US\$ 7,706 million; 16.30%) and the lowest import were from Bulgaria (US\$ 0 million; 0.00%), and Cyprus (US\$ 0 million; 0.00%). Some other important countries in Australian import were Japan (US\$ 3,482 million; 7.37%), Great Britain (US\$ 2,487 million; 5.26%), China (US\$ 2,006 million; 4.24%), Germany (US\$ 1,823; 3.86%), and Indonesia (US\$ 1,581 million; 3.35%).

In the year 2005, total Australian import was US\$ 80,358 million. The highest import was an import from the USA (US\$ 9,243 million; 11.50%) and the lowest import was from Cyprus (US\$ 1 million; 0.00%), and Latvia (US\$ 2 million; 0.00%). Some other important countries in Australian import were China (US\$ 6,379 million; 7.94%), Japan (US\$ 4,742 million; 5.90%), Great Britain (US\$ 3,521 million; 4.38%), Germany (US\$ 3,258; 4.05%), and Indonesia (US\$ 2,926 million; 3.64%).

In the year 2010, total Australian import was US\$ 130,290 million. The highest import was import from China (US\$ 16,548 million; 12.70%) and the lowest import was from Latvia (US\$ 2 million; 0.00%). Some other important countries in Australian import were Japan (US\$ 5,738 million; 4.40%), Germany (US\$ 4,920 million; 3.78%), Indonesia (US\$ 4,837 million; 3.71%), and Great Britain (US\$ 4,285 million; 3.29%). In the year 2014, total Australian import was US\$ 162,257 million. The highest import was import from China (US\$ 23,385 million; 14.41%) and the lowest import was from Latvia (US\$ 4 million; 0.00%) and Cyprus (US\$ 4 million; 0.00%). Some other important countries in Australian import were Korea (US\$ 6,746 million; 4.160%), Japan (US\$ 6,667 million; 4.11%), Germany (US\$ 5,264 million; 3.24%), Indonesia (US\$ 4,481 million; 2.76%) and Great Britain (US\$ 4,406 million; 2.72%).

During the year of study, the trends of Australian increasing import were import from China (4.24% in 2000, 7.94% in 2005, 12.70% in 2010 and 14.41% in 2014) and Korea (2.55% in 2000, 2.24% in 2005, 2.77% in 2010 and 4.16% in 2014). The trends of Australian decreasing import were import from Great Britain (5.26% in 2000, 4.38% in 2005, 3.29% in 2010 and 2.72% in 2014), and Japan (7.37% in 2000, 5.90% in 2005, 4.40% in 2010 and 4.11% in 2014), and the USA (16.30% in 2000, 11.50% in 2005, 9.26% in 2010 and 8.90% in 2014).

Table 4. Australian Import by country of origin 2000, 2005, 2010, and 2014

Country	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
AUT	169	0.36	307	0.38	481	0.37	553	0.34
BEL	251	0.53	470	0.59	736	0.56	1,686	1.04
BGR	0	0.00	7	0.01	8	0.01	18	0.01
BRA	190	0.40	460	0.57	698	0.54	697	0.43
CAN	908	1.92	1,346	1.67	1,287	0.99	1,295	0.80
CHE	550	1.16	794	0.99	1,353	1.04	1,446	0.89
CHN	2,006	4.24	6,379	7.94	16,548	12.70	23,385	14.41

Country	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
CYP	0	0.00	1	0.00	5	0.00	4	0.00
CZE	21	0.05	92	0.11	165	0.13	198	0.12
DEU	1,823	3.86	3,258	4.05	4,920	3.78	5,264	3.24
DNK	188	0.40	358	0.44	470	0.36	464	0.29
ESP	215	0.46	452	0.56	759	0.58	942	0.58
EST	1	0.00	12	0.01	46	0.04	79	0.05
FIN	281	0.59	353	0.44	642	0.49	517	0.32
FRA	816	1.73	1,404	1.75	1,773	1.36	2,040	1.26
GBR	2,487	5.26	3,521	4.38	4,285	3.29	4,406	2.72
GRC	32	0.07	50	0.06	44	0.03	63	0.04
HRV	1	0.00	5	0.01	4	0.00	20	0.01
HUN	18	0.04	80	0.10	121	0.09	165	0.10
IDN	1,581	3.35	2,926	3.64	4,837	3.71	4,481	2.76
IND	304	0.64	664	0.83	1,159	0.89	1,686	1.04
IRL	280	0.59	344	0.43	755	0.58	731	0.45
ITA	869	1.84	1,520	1.89	1,788	1.37	2,518	1.55
JPN	3,482	7.37	4,742	5.90	5,738	4.40	6,667	4.11
KOR	1,204	2.55	1,799	2.24	3,606	2.77	6,746	4.16
LTU	1	0.00	7	0.01	14	0.01	34	0.02
LUX	4	0.01	15	0.02	36	0.03	45	0.03
LVA	1	0.00	2	0.00	2	0.00	4	0.00
MEX	154	0.33	333	0.41	584	0.45	753	0.46
MLT	4	0.01	7	0.01	4	0.00	5	0.00
NLD	524	1.11	951	1.18	1,281	0.98	1,808	1.11
NOR	88	0.19	188	0.23	171	0.13	304	0.19
POL	22	0.05	59	0.07	163	0.13	361	0.22
PRT	66	0.14	91	0.11	76	0.06	124	0.08
ROU	5	0.01	12	0.01	20	0.02	43	0.03
RUS	6	0.01	26	0.03	315	0.24	1,042	0.64
SVK	5	0.01	12	0.01	23	0.02	196	0.12
SVN	7	0.01	25	0.03	22	0.02	50	0.03
SWE	475	1.01	861	1.07	1,230	0.94	1,122	0.69
TUR	76	0.16	145	0.18	224	0.17	512	0.32
TWN	1,373	2.91	2,167	2.70	2,467	1.89	3,630	2.24
USA	7,706	16.30	9,243	11.50	12,065	9.26	14,449	8.90
ROW	19,073	40.35	34,870	43.39	59,364	45.56	71,702	44.19
Total	47,267	100.00	80,358	100.00	130,290	100.00	162,257	100.0

Source: Calculated from WIOT 2016

Table 5 provides results of calculation on Australian import by sector for the year 2000, 2005, 2010 and 2014. In the year 2000, sectorally the most important sectors in Australian import were Sector-27 (US\$ 5,743 million; 12.15%), Sector-28 (US\$ 5,660 million; 11.97%), Sector-26 (US\$ 4,833 million; 10.22%), Sector-15 (US\$ 4,110 million; 8.70%), Sector-25 (US\$ 3,711 million; 7.13%), Sector-10 (US\$ 3,147 million; 6.66%), Sector-4 (US\$ 1,879 million; 3.98%), Sector-20 (US\$ 1,659 million; 3.51%) and Sector-5 (US\$ 1,458 million; 3.08%).

In the year 2005, the most important sectors in Australian import were Sector-27 (US\$ 9,713 million; 12.09%), Sector-28 (US\$ 9,529 million; 11.86%), Sector-26 (US\$ 7,859 million; 9.78%), Sector-25 (US\$ 7,691 million; 9.57%), Sector-15 (US\$ 7,204 million; 8.97%), Sector-4 (US\$ 5,228 million; 6.51%), Sector-10 (US\$ 5,093 million; 6.34%), Sector-29 (US\$ 3,195 million; 3.98%) and Sector-30 (US\$ 2,754 million; 3.43%). In the year 2010, the most important sectors in Australian import were Sector-25 (US\$ 18,955 million; 14.55%), Sector-28 (US\$ 14,541 million; 11.16%), Sector-27 (US\$ 13,933 million; 10.69%), Sector-4 (US\$ 13,047 million; 10.01%), Sector-26 (US\$ 11,970 million; 9.19%), Sector-15 (US\$ 10,781 million; 8.27%), Sector-29 (US\$ 5,948 million; 4.57%), Sector-10 (US\$ 4,465 million; 3.43%) and Sector-30 (US\$ 4,253 million; 3.26%).

Table 5. Australian import by sector 2000, 2005, 2010, and 2014

Sector	2000		2005		2010		2014	
	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%	US \$ (Million)	%
S-1	1,256	2.66	1,836	2.28	2,630	2.02	3,713	2.29
S-2	152	0.32	222	0.28	236	0.18	265	0.16
S-3	114	0.24	153	0.19	225	0.17	301	0.19
S-4	1,879	3.98	5,228	6.51	13,047	10.01	12,046	7.42
S-5	1,458	3.08	2,248	2.80	3,452	2.65	3,780	2.33
S-6	817	1.73	637	0.79	1,261	0.97	702	0.43
S-7	277	0.59	405	0.50	480	0.37	445	0.27
S-8	472	1.00	683	0.85	932	0.71	1,021	0.63
S-9	394	0.83	579	0.72	755	0.58	856	0.53
S-10	3,147	6.66	5,093	6.34	4,465	3.43	6,795	4.19
S-11	1,392	2.94	2,291	2.85	3,079	2.36	2,934	1.81
S-12	245	0.52	342	0.43	865	0.66	1,317	0.81
S-13	1,002	2.12	1,589	1.98	2,190	1.68	2,218	1.37
S-14	561	1.19	949	1.18	1,315	1.01	1,665	1.03
S-15	4,110	8.70	7,204	8.97	10,781	8.27	10,649	6.56
S-16	828	1.75	1,457	1.81	2,745	2.11	3,511	2.16
S-17	551	1.17	791	0.98	1,160	0.89	999	0.62
S-18	534	1.13	826	1.03	1,260	0.97	1,252	0.77
S-19	689	1.46	1,110	1.38	2,134	1.64	2,708	1.67
S-20	1,659	3.51	2,405	2.99	2,834	2.18	3,880	2.39
S-21	703	1.49	1,002	1.25	1,565	1.20	2,042	1.26
S-22	342	0.72	469	0.58	851	0.65	844	0.52
S-23	9	0.02	0	0.00	0	0.00	0	0.00
S-24	1,136	2.40	2,096	2.61	2,428	1.86	3,117	1.92
S-25	3,371	7.13	7,691	9.57	18,955	14.55	30,457	18.77
S-26	4,833	10.22	7,859	9.78	11,970	9.19	14,656	9.03
S-27	5,743	12.15	9,713	12.09	13,933	10.69	17,955	11.07
S-28	5,660	11.97	9,529	11.86	14,541	11.16	17,246	10.63
S-29	2,114	4.47	3,195	3.98	5,948	4.57	9,571	5.90
S-30	1,821	3.85	2,754	3.43	4,253	3.26	5,314	3.27
Total	47,267	100.00	80,358	100.00	130,290	100.00	162,257	100.00

Source: Calculated from WIOT 2016

In the year 2014, the most important sectors in the USA import were Sector-25 (US\$ 30,457 million; 18.77%), Sector-27 (US\$ 17,955 million; 11.07%), Sector-28 (US\$ 17,246 million; 10.63%), Sector-26 (US\$ 14,656 million; 9.03%), Sector-4 (US\$ 12,046 million; 7.42%), Sector-15 (US\$ 10,649 million; 6.56%), Sector-29 (US\$ 9,571 million; 5.90%), Sector-10 (US\$ 6,795 million; 4.19%) and Sector-30 (US\$ 5,314 million; 3.27%).

During the years of research, the contribution of some sectors that tend to increase in Australian import namely Sector-4 (3.98% in 2000, 6.51% in 2005, 10.01% in 2010 and 7.42% in 2014), Sector-25 (7.13% in 2000, 9.57% in 2005, 14.55% in 2010 and 18.77% in 2014), and Sector-29 (4.47% in 2000, 3.98% in 2005, 4.57% in 2010 and 5.90% in 2014). Some sectors that tend to decrease in Australian import were Sector-5 (3.08% in 2000, 2.80% in 2005, 2.65% in 2010 and 2.33% in 2014), Sector-10 (6.66% in 2000, 6.34% in 2005, 3.43% in 2010 and 4.19% in 2014), Sector-15 (8.70% in 2000, 8.97% in 2005, 8.27% in 2010 and 6.56% in 2014), Sector-20 (3.51% in 2000, 2.99% in 2005, 2.18% in 2010 and 2.39% in 2014), Sector-26 (10.22% in 2000, 9.78% in 2005, 9.19% in 2010 and 9.03% in 2014), Sector-27 (12.15% in 2000, 12.09% in 2005, 10.69% in 2010 and 11.07% in 2014), and Sector-30 (3.85% in 2000, 3.43% in 2005, 3.26% in 2010 and 3.27% in 2014).

3.3. Australian Balance of Trade

Table 6 illustrates the results of calculation on balance of trade by country in Australian economy by country for the year 2000, 2005, 2010 and 2014. In all years, balance of trade in Australian economy was surpluses. In the year 2000, trade balance in Australian economy was surplus by US\$ 21,619 million. The highest trade surplus was trading with Japan (US\$ 8,833 million) and the smallest trade surplus was trading with Slovenia (US\$ 1

million). Some other countries in which Australia had significant surpluses balance of trade were in trading with Korea (US\$ 5,359 million), China (US\$ 2,193 million), Taiwan (US\$ 1,484 million), Italy (US\$ 672 million), Indonesia (US\$ 650 million), India (US\$ 557 million), Denmark (US\$ 244 million), and Brazil (US\$ 205 million). There were 13 countries in which Australia experienced trade balance deficits. The highest balance deficit was trading with the USA (US\$ -3,484 million) and the smallest trade balance deficit was trading with Hungary (US\$ -6 million). Some other countries in which Australia had significant trade deficit were Germany (US\$ -856 million), Switzerland (US\$ -426 million), Sweden (US\$ -324 million), the Netherlands (US\$ -286 million), France (US\$ -239 million), and Ireland (US\$ -201 million).

In the year 2005, trade balance in Australian economy was surplus by US\$ 34,830 million. The highest trade surplus was trading with Japan (US\$ 8,833 million) and the smallest trade surplus was trading with Slovenia (US\$ 1 million). Some other countries in which Australia had significant trade surpluses were China (US\$ 9,036 million), Korea (US\$ 7,281 million), India (US\$ 6,525 million), Taiwan (US\$ 1,683 million), Indonesia (US\$ 605 million), Mexico (US\$ 453 million), Canada (US\$ 404 million), Brazil (US\$ 301 million), Turkey (US\$ 298 million) and Spain (US\$ 216 million). There were 17 countries in which Australia experienced trade balance deficits. The highest trade deficit was trading with the USA (US\$ -5,260 million) and the smallest trade deficit was trading with Poland (US\$ -3 million). Some other countries in which Australia had significant trade deficit were Germany (US\$ -1,963 million), Switzerland (US\$ -541 million), Sweden (US\$ -463 million), Great Britain (US\$ -433 million), France (US\$ -305 million), Ireland (US\$ -215 million), and Austria (US\$ -204 million).

In the year 2010, trade balance in Australian economy was surplus by US\$ 103,259 million. The highest surplus was trading with China (US\$ 37,334 million) and the smallest surplus was trading with Cyprus (US\$ 6 million). Some other countries in which Australia had significant trade surpluses were Japan (US\$ 34,081 million), India (US\$ 22,468 million), Korea (US\$ 13,937 million), Taiwan (US\$ 13,217 million), Brazil (US\$ 1,558 million) and Turkey (US\$ 210 million). There were 26 countries in which Australia had trade balance deficits. The highest trade deficit was trading with the USA (US\$ -7,725 million) and the smallest trade deficit was trading with Bulgaria (US\$ -1 million). Some other countries in which Australia had significant trade deficits were Germany (US\$ -3,058 million), Italy (US\$ -821 million), Sweden (US\$ 758 million), Switzerland (US\$ -647 million), Ireland (US\$ -481 million), Finland (US\$ -374 million), France (US\$ -354 million) and Austria (US\$ -346 million).

In the year 2014, trade balance in the USA economy was surplus by US\$ 80,191 million. The highest surplus was trading with China (US\$ 47,407 million) and the smallest surplus was trading with Luxembourg (US\$ 18 million). Some other countries in which Australia had significant trade surpluses were Japan (US\$ 35,474 million), Korea (US\$ 7,801 million), Taiwan (US\$ 7,029 million), India (US\$ 5,776 million), Brazil (US\$ 836 million), and Indonesia (US\$ 798 million). There were 29 countries in which Australia had trade balance deficits. The highest deficit was trading with the USA (US\$ -9,173 million) and the smallest deficit was trading with Latvia (US\$ -1 million). Some other countries in which Australia had significant trade deficits were Germany (US\$ -4,197 million), Great Britain (US\$ -2,070 million), Italy (US\$ -1,852 million), the Netherlands (US\$ -1,189 million), Belgium (US\$ -1,095 million), France (US\$ -1,041 million), Russia (US\$ -884 million), Sweden (US\$ -830 million), Ireland (US\$ -552 million), Canada (US\$ -497 million), Finland (US\$ -437 million), Spain (US\$ -432 million), Mexico (US\$ -401 million), Austria (US\$ -395 million), and Denmark (US\$ -212 million).

During the year of study, there were 7 countries in which trade surpluses occurred in all years, namely Brazil (US\$ 205 million in 2000, US\$ 301 million in 2005, US\$ 1,558 million in 2010 and US\$ 836 million in 2014), China (US\$ 2,193 million in 2000, US\$ 9,036 million in 2005, US\$ 37,334 million in 2010, US\$ 47,407 million in 2014), India (US\$ 557 million in 2000, US\$ 6,525 million in 2005, US\$ 22,468 million in 2010 and US\$ 5,776 million in 2014), Japan (US\$ 8,833 million in 2000, US\$ 17,823 million in 2005, US\$ 34,081 million in 2010 and US\$ 35,474 million in 2014), Korea (US\$ 5,359 million in 2000, US\$ 7,281 million in 2005, US\$ 13,937 million in 2010 and US\$ 7,801 million in 2014), Turkey (US\$ 169 million in 2000, US\$ 298 million in 2005, US\$ 210 million in 2010 and US\$ 122 million in 2014), and Taiwan (US\$ 1,484 million in 2000, US\$ 1,683 million in 2005, US\$ 13,217 million in 2010 and US\$ 7,029 million in 2014). There were 7 countries as well in which Australian had trade deficits in all years of study, namely Austria (US\$ -135 million in 2000, US\$ -204 million in 2005, US\$ -346 million in 2010 and US\$ -395 million in 2014), Switzerland (US\$ -426 million in 2000, US\$ -541 million in 2005, US\$ -647 million in 2010 and US\$ -395 million in 2014), Germany (US\$ -856 million in 2000, US\$ -1,963 million in 2005, US\$ -3,058 million in 2010 and US\$ -4,197 million in 2014), Norway (US\$ -37 million in 2000, US\$ -86 million in 2005, US\$ -55 million in 2010 and US\$ -166 million in 2014), Portugal (US\$ -43 million in 2000, US\$ -77 million in 2005, US\$ -62 million in 2010 and US\$ -110 million in 2014), Sweden (US\$ -324 million in 2000, US\$ -463 million in 2005, US\$ -758 million in 2010 and US\$ -830 million in 2014), and the USA (US\$ -3,484 million in 2000, US\$ -5,260 million in 2005, US\$ -7,725 million in 2010 and US\$ -9,173 million in 2014).

Table 6. Australian balance of trade by country (US\$ million), 2000, 2005, 2010, 2014

Country	2000	2005	2010	2014	Remark
AUT	-135	-204	-346	-395	Deficits in all years
BEL	-18	30	-85	-1,095	
BGR	4	53	-1	167	
BRA	205	301	1,558	836	Surpluses in all years
CAN	190	404	-182	-497	
CHE	-426	-541	-647	-661	Deficits in all years
CHN	2,193	9,036	37,334	47,407	Surpluses in all years
CYP	9	5	6	0	
CZE	45	-6	-72	-69	
DEU	-856	-1,963	-3,058	-4,197	Deficit in all years
DNK	244	-19	-133	-212	
ESP	95	216	-19	-432	
EST	0	-10	-44	-73	
FIN	9	93	-374	-437	
FRA	-239	-305	-354	-1,041	
GBR	-144	-433	175	-2,070	
GRC	27	11	16	-34	
HRV	6	1	35	-16	
HUN	-6	-55	-103	-144	
IDN	650	605	-341	798	
IND	557	6,525	22,468	5,776	Surpluses in all years
IRL	-201	-215	-481	-552	
ITA	672	71	-821	-1,852	
JPN	8,833	17,823	34,081	35,474	Surpluses in all years
KOR	5,359	7,281	13,937	7,801	Surpluses in all years
LTU	0	-4	-10	-28	
LUX	5	8	-13	18	
LVA	7	2	0	-1	
MEX	69	453	-121	-401	
MLT	41	35	10	-3	
NLD	-286	56	16	-1,189	
NOR	-37	-86	-55	-166	Deficit in all years
POL	8	-3	-91	28	
PRT	-43	-77	-62	-110	Deficit in all years
ROU	67	26	-9	-33	
RUS	107	166	-72	-884	
SVK	6	7	14	-158	
SVN	1	-18	-10	-21	
SWE	-324	-463	-758	-830	Deficit in all years
TUR	169	298	210	122	Surpluses in all years
TWN	1,484	1,683	13,217	7,029	Surpluses in all years
USA	-3,484	-5,260	-7,725	-9,173	Deficit in all years
ROW	6,757	-697	-3,831	1,507	
Total	21,619	34,830	103,259	80,191	

Source: Calculated from WIOT, 2016.

Table 7 provides results of calculation on trade balance in Australian economy by sector for the year 2000, 2005, 2010 and 2014. In the year 2000, trade balance in Australian economy was surplus by US\$ 21,619 million. The highest trade surplus occurred in Sector-4 (US\$ 17,507 million) and the smallest trade surplus occurred in Sector-17 (US\$ 106 million). Some other significant sectors in which Australian trade surplus were Sector-15 (US\$ 9,217 million), Sector-1 (US\$ 4,487 million), Sector-26 (US\$ 1,068 million), Sector-6 (US\$ 867 million), Sector-5 (US\$ 801 million), Sector-27 (US\$ 724 million) and Sector-7 (US\$ 271 million). There were 21 sectors in which Australian trade deficits. The highest trade deficit in Australian economy was in Sector-25 (US\$ -3,257 million) and the smallest trade deficit was in Sector-23 (US\$ -9 million). Some other significant sectors in which Australia experienced trade deficit were Sector-28 (US\$ -3,050 million), Sector-10 (US\$ -1,424 million), Sector-30

(US\$ -1,387 million), Sector-24 (US\$ -1,001 million), Sector-20 (US\$ -762 million), Sector-13 (US\$ -533 million), Sector-21 (US\$ -443 million), Sector-9 (US\$ -325 million), and Sector-14 (US\$ -248 million).

Table 7. Australian balance of trade by sector (US\$ million), 2000, 2005, 2010, 2014

Sector	2000	2005	2010	2014	Remarks
S-1	4,487	4,716	6,586	6,406	Surpluses in all years
S-2	-110	-167	-96	-40	Deficits in all years
S-3	-11	-92	-172	-276	Deficits in all years
S-4	17,507	42,198	114,113	112,578	Surpluses in all years
S-5	801	537	102	852	Surpluses in all years
S-6	867	712	49	701	Surpluses in all years
S-7	271	474	438	971	Surpluses in all years
S-8	-67	-49	31	-31	
S-9	-325	-490	-559	-574	Deficits in all years
S-10	-1,424	-2,865	-2,402	-4,774	Deficits in all years
S-11	-113	-548	312	673	
S-12	-97	51	-477	-1,004	
S-13	-533	-852	-1,198	-1,286	Deficits in all years
S-14	-248	-556	-901	-1,270	Deficits in all years
S-15	9,217	11,729	22,552	15,746	Surpluses in all years
S-16	-106	-301	-645	-1,310	Deficits in all years
S-17	106	-125	-413	-411	
S-18	-77	-316	-662	-806	Deficits in all years
S-19	-183	-432	-1,129	-1,825	Deficits in all years
S-20	-762	-1,443	-1,904	-3,181	Deficits in all years
S-21	-443	-464	-981	-1,150	Deficits in all years
S-22	-185	-271	-579	-489	Deficits in all years
S-23	-9	0	0	0	
S-24	-1,001	-1,912	-2,174	-2,652	Deficits in all years
S-25	-3,257	-7,455	-18,404	-29,608	Deficits in all years
S-26	1,068	1,270	5,605	7,552	Surpluses in all years
S-27	724	-546	-1,145	921	
S-28	-3,050	-5,327	-6,974	-6,978	Deficits in all years
S-29	-43	-336	-1,922	-3,948	Deficits in all years
S-30	-1,387	-2,309	-3,791	-4,595	Deficits in all years
Total	21,619	34,830	103,259	80,191	Surpluses in all years

Source: Calculated from WIOT, 2016

In the year 2005, trade balance in Australian economy was surplus by approximately US\$ 34,830 million. The highest trade surplus occurred in Sector-4 (US\$ 42,198 million) and the smallest trade surplus occurred in Sector-12 (US\$ 51 million). Some other significant sectors in which Australian trade surplus were Sector-15 (US\$ 11,729 million), Sector-1 (US\$ 4,716 million), Sector-26 (US\$ 1,270 million), Sector-6 (US\$ 712 million), Sector-5 (US\$ 537 million), and Sector-7 (US\$ 474 million). There were 20 sectors in which Australian had trade deficits. The highest trade deficit in Australian economy was in Sector-25 (US\$ -7,455 million) and the smallest trade deficit was in Sector-8 (US\$ -49 million). Some other significant sectors in which Australia experienced trade deficit were Sector-28 (US\$ -5,327 million), Sector-10 (US\$ -2,865 million), Sector-30 (US\$ -2,309 million), Sector-24 (US\$ -1,912 million), Sector-20 (US\$ -1,433 million), Sector-13 (US\$ -552 million), Sector-14 (US\$ -556 million), Sector-11 (US\$ -548 million), Sector-10 (US\$ -546 million), Sector-9 (US\$ -490 million), Sector-21 (US\$ -464 million), Sector-29 (US\$ -336 million), Sector-18 (US\$ -316 million), Sector-16 (US\$ -301 million), and Sector-22 (US\$ -271 million).

In the year 2010, trade balance in Australian economy was surplus by US\$ 103,259 million. The highest trade surplus occurred in Sector-4 (US\$ 114,113 million) and the smallest trade surplus occurred in Sector-8 (US\$ 31 million). Some other significant sectors in which Australian trade surplus were Sector-15 (US\$ 22,552 million), Sector-1 (US\$ 6,586 million), Sector-26 (US\$ 5,605 million), Sector-7 (US\$ 438 million), and Sector-11 (US\$ 312 million). There were 19 sectors in which Australian had trade deficits. The highest trade deficit in Australian economy was in Sector-25 (US\$ -18,404 million) and the smallest trade deficit was in Sector-2 (US\$ -96 million). Some other significant sectors in which Australia experienced trade deficit were Sector-28 (US\$ -

6,974 million), Sector-30 (US\$ -3,791 million), Sector-10 (US\$ -2,402 million), Sector-24 (US\$ -2,174 million), Sector-29 (US\$ -1,922 million), Sector-20 (US\$ -1,904 million), Sector-13 (US\$ -1,198 million), Sector-19 (US\$ -1,129 million), Sector-27 (US\$ -1,145 million), Sector-21 (US\$ -981 million), Sector-21 (US\$ -464 million), Sector-18 (US\$ -662 million), Sector-16 (US\$ -645 million), Sector-22 (US\$ -579 million), Sector-9 (US\$ -559 million), Sector-12 (US\$ -477 million), and Sector-17 (US\$ -413 million).

In the year 2014, trade balance in Australian economy was surplus by US\$ 80,191 million. The highest trade surplus occurred in Sector-4 (US\$ 112,578 million) and the smallest trade surplus occurred in Sector-11 (US\$ 673 million). Some other significant sectors in which Australian trade surplus were Sector-15 (US\$ 15,746 million), Sector-26 (US\$ 7,552 million), Sector-1 (US\$ 6,406 million), Sector-7 (US\$ 971 million), Sector-6 (US\$ 701 million) and Sector-11 (US\$ 673 million). There were 20 sectors in which Australian had trade deficits. The highest trade deficit in Australian economy was in Sector-25 (US\$ -29,608 million) and the smallest trade deficit was in Sector-8 (US\$ -31 million). Some other significant sectors in which Australia experienced trade deficit were Sector-28 (US\$ -6,978 million), Sector-30 (US\$ -4,595 million), Sector-10 (US\$ -4,774 million), Sector-29 (US\$ -3,948 million), Sector-20 (US\$ -3,181 million), Sector-24 (US\$ -2,652 million), Sector-19 (US\$ -1,825 million), Sector-16 (US\$ -1,310 million), Sector-13 (US\$ -1,286 million), Sector-14 (US\$ -1,270 million), Sector-21 (US\$ -1,150 million), Sector-12 (US\$ -1,004 million), Sector-18 (US\$ -806 million), Sector-9 (US\$ -574 million), Sector-22 (US\$ -489 million), Sector-17 (US\$ -411 million), and Sector-18 (US\$ -276 million).

During the year of study, there were 7 sectors in which trade surpluses occurred in all years, namely Sector-1 (US\$ 4,487 million in 2000, US\$ 4,716 million in 2005, US\$ 6,586 in 2010 and US\$ 6,406 million in 2014), Sector-4 (US\$ 17,507 million in 2000, US\$ 42,198 million in 2005, US\$ 11,113 million in 2010 and US\$ 112, 578 million in 2014), Sector-5 (US\$ 801 million in 2000, US\$ 537 million in 2005, US\$ 102 million in 2010 and US\$ 852 million in 2014), Sector-6 (US\$ 867 million in 2000, US\$ 712 million in 2005, US\$ 49 million in 2010 and US\$ 701 million in 2014), Sector-7 (US\$ 271 million in 2000, US\$ 474 million in 2005, US\$ 438 million in 2010 and US\$ 971 million in 2014), Sector-15 (US\$ 9,217 million in 2000, US\$ 11,729 million in 2005, US\$ 22,552 million in 2010 and US\$ 15,746 million in 2014), and Sector-26 (US\$ 1,068 million in 2000, US\$ 1,270 million in 2005, US\$ 5,605 million in 2010 and US\$ 7,552 million in 2014). There were 17 sectors in which Australian had trade deficits in all years of study, namely Sector-2 (US\$ -110 million in 2000, US\$ -167 million in 2005, US\$ -96 million in 2010 and US\$ -40 in 2014), Sector-3 (US\$ -11 million in 2000, US\$ -92 million in 2005, US\$ -172 million in 2010 and US\$ -276 million in 2014), Sector-9 (US\$ -325 million in 2000, US\$ -490 million in 2005, US\$ -559 million in 2010, US\$ -574 million in 2014), Sector-10 (US\$ -1,424 million in 2000, US\$ -2,865 million in 2005, US\$ -2,402 million in 2010, and US\$ -4,774 million in 2014), Sector-13 (US\$ -533 million in 2000, US\$ -852 in 2005, US\$ -1,198 million in 2010 and US\$ -1,286 in 2014), Sector-14 (US\$ -248 million in 2000, US\$ -556 million in 2005, US\$ -901 million in 2010 and US\$ -1,270 million in 2014), Sector-16 (US\$ -106 million in 2000, US\$ -301 million in 2005, US\$ -645 million in 2010 and US\$ -1,310 in 2014), Sector-18 (US\$ -77 million in 2000, US\$ -316 million in 2005, US\$ -662 million in 2010, and US\$ -806 million in 2014), Sector-19 (US\$ -183 million in 2000, US\$ -432 million in 2010, US\$ -1,129 million in 2010 and US\$ -1,825 million in 2014), Sector-20 (US\$ -762 million in 2000, US\$ -1,143 million in 2005, US\$ -1,904 million in 2010 and US\$ -3,181 million in 2014), Sector-21 (US\$ -443 million in 2000, US\$ -464 million in 2005, US\$ -981 million in 2010 and US\$ -1,150 million in 2014), Sector-22 (US\$ -185 million in 2000, US\$ -271 million in 2005, US\$ -579 million in 2010 and US\$ -489 million in 2014), Sector-24 (US\$ -1,001 million in 2000, US\$ -1,912 million in 2005, US\$ -2,174 million in 2010 and US\$ -2,652 million in 2014), Sector-25 (US\$ -3,257 million in 2000, US\$ -7,455 million in 2005, US\$ -18,404 million in 2010 and US\$ -29,608 million in 2014), Sector-28 (US\$ -3,050 million in 2000, US\$ -5,327 million in 2005, US\$ -6,974 million in 2010 and US\$ -6,978 million in 2014), Sector-29 (US\$ -43 million in 2000, US\$ -336 million in 2005, US\$ -1,922 million in 2010 and US\$ -3,948 million in 2014) and Sector-30 (US\$ -1,387 million in 2000, US\$ -2,309 million in 2005, US\$ -3,791 million in 2010 and US\$ -4,595 million in 2014).

4. Discussion

This section highlights some important findings.

Firstly, Australian export had increased significantly from US\$ 68,886 million in the year of 2000 to US\$ 115,188 million in the year of 2005 to US\$ 233,549 million in the year of 2010 and to US\$ 242,448 million in the year of 2014. Spatially, in the year 2000, some important countries of destinations in Australian export included Japan, China, Korea, the USA, India, Taiwan, and Indonesia. The role of China in Australian export has increased significantly; ranked fourth in 2000, second in 2005, first in 2010 and 2014. Sectorally, some important sectors in Australian export were Sector-4, Sector-15, Sector-26, Sector-27, and Sector-1.

Secondly, Australian import had also increased during the year of study from US\$ 47,267 million in 2000 to US\$ 80,358 million in 2005 to US\$ 130,290 million in 2010 and to US\$ 162,257 million in the year of 2014. Spatially, some important countries in Australian import were the USA, China, Japan, Germany, Great Britain, and Indonesia. The role of China as an important country in Australian import ranked only fourth in 2000, second in 2005 and first in 2010 and 2014. The role of the USA and Great Britain tended to decrease in Australian import during the year of study. Sectorally, some important sectors in Australian import were Sector-27, Sector-25, Sector-28, and Sector-26.

Thirdly, trade balances in Australian economy were surpluses in all years of study. No specific pattern in the USA trade deficit during the year of study. Trade surplus in the year 2000 was US\$ 21,619 million, then increased to US\$ 34,830 million in the year 2005, to US\$ 103,259 million, then decreased to US\$ 80,191 million in the year 2014. There were 7 countries in which trade surpluses occurred in all years, namely Brazil, China, India, Japan, Korea, Turkey, and Taiwan. There were 7 countries as well in which Australian had trade deficits in all years of study, namely Austria, Switzerland, Germany, Norway, Portugal, Sweden, and the USA. Sectorally, there were 7 sectors in which trade surpluses occurred in all years, namely Sector-1, Sector-4, Sector-5, Sector-6, Sector-7, Sector-15, and Sector-26. There were 17 sectors in which Australian had trade deficits in all years of study, namely Sector-2, Sector-3, Sector-9, Sector-10, Sector-13, Sector-14, Sector-16, Sector-18, Sector-19, Sector-20, Sector-21, Sector-22, Sector-24, Sector-25, Sector-28, Sector-29, and Sector-30.

Conclusion

World input-output database was very useful in providing export, import, and trade balance data. Three conclusions could be drawn from this study. Firstly, Australian export to other countries tends to increase during the year of study. Three important countries in Australian export were Japan, China, Korea, the USA, India, Taiwan, and Indonesia.

The role of China in Australian export has increased significantly. Sectorally, some important sectors in Australian export were Sector-4, Sector-15, Sector-26, Sector-27, and Sector-1. Australian import had also increased during the year of study. Spatially, some important countries in Australian import were the USA, China, Japan, Germany, Great Britain, and Indonesia. The role of China as an important country in Australian import increased significantly. The role of the USA and Great Britain tended to decrease in Australian import during the year of study. Sectorally, some important sectors in Australian import were Sector-27, Sector-25, Sector-28, and Sector-26. Thirdly, trade balances in the Australian economy were surpluses in all years of study. No specific pattern in the USA trade deficit during the year of study. There were 7 countries in which trade surpluses occurred in all years, and there were 17 sectors in which Australian had trade deficits in all years of study.

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Appendix 1. Sector classifications

Sector Code	Descriptions
Sector-1	Crop and animal production, forestry, fishing and aquaculture
Sector-2	Forestry and logging activities
Sector-3	Fishing and aquaculture
Sector-4	Mining and quarrying
Sector-5	Manufacture of wood and of products of wood and cork, except furniture
Sector-6	Manufacture of paper and paper products
Sector-7	Printing and reproduction of recorded media
Sector-8	Manufacture of coke and refined petroleum products
Sector-9	Manufacture of chemicals and chemical products
Sector-10	Manufacture of basic pharmaceutical products and pharmaceutical preparations
Sector-11	Manufacture of rubber and plastic products
Sector-12	Manufacture of other non-metallic mineral products
Sector-13	Manufacture of basic metals
Sector-14	Manufacture of fabricated metal products, except machinery and equipment
Sector-15	Manufacture of computer, electronic and optical products
Sector-16	Manufacture of electrical equipment
Sector-17	Manufacture of machinery and equipment n.e.c.,
Sector-18	Manufacture of motor vehicles, trailers and semi-trailers
Sector-19	Manufacture of other transport equipment
Sector-20	Manufacture of furniture; other manufacturing
Sector-21	Repair and installation of machinery and equipment
Sector-22	Electricity, gas, steam and air conditioning supply
Sector-23	Water collection, treatment and supply; Sewerage & waste: collection, treatment and disposal
Sector-24	Electricity, gas and drinking water
Sector-25	Construction
Sector-26	Wholesale and retail trade and repair, accommodation and food service activities
Sector-27	Transportation, telecommunication, information and publication
Sector-28	Real estate, financial and corporate services
Sector-29	Legal & management consultancy, architectures & engineering, scientific research & development
Sector-30	Other service activities

Source: Aggregated from WIOT, 2016.

Appendix 2. Country abbreviations

No.	Acronym	Country included	No.	Acronym	Country included
1.	AUS	Australia	23.	IRL	Ireland
2.	AUT	Austria	24.	ITA	Italy
3.	BEL	Belgium	25.	JPN	Japan
4.	BGR	Bulgaria	26.	KOR	Korea
5.	BRA	Brazil	27.	LTU	Lithuania
6.	CAN	Canada	28.	LUX	Luxembourg
7.	CHE	Switzerland	29.	LVA	Latvia
8.	CHN	China	30.	MEX	Mexico
9.	CYP	Cyprus	31.	MLT	Malta
10.	CZE	Czech Republic	32.	NLD	Netherlands
11.	DEU	Germany	33.	NOR	Norway
12.	DNK	Denmark	34.	POL	Poland
13.	ESP	Spain	35.	PRT	Portugal
14.	EST	Estonia	36.	ROU	Romania
15.	FIN	Finland	37.	RUS	Russia
16.	FRA	France	38.	SVK	Slovak Republic
17.	GBR	United Kingdom	39.	SVN	Slovenia
18.	GRC	Greece	40.	SWE	Sweden
19.	HRV	Croatia	41.	TUR	Turkey
20.	HUN	Hungary	42.	TWN	Taiwan
21.	IDN	Indonesia	43.	USA	United States
22.	IND	India	44.	ROW	Rest of the World

Source: Processed from WIOT, 2016.

