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AUSTRALIA-THAILAND TRADE: AN ANALYSIS OF COMPETITIVENESS AND THE EFFECTS OF THE BILATERAL FTA

by

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ABSTRACT

This paper analyses bilateral trade between Australia and Thailand over the period 1990-2011 with special emphasis on the trade competitiveness of these two nations and the possible role played by the Thailand-Australia Free Trade Agreement (TAFTA) that entered into force in 2005. Trade competitiveness is measured with the aid of standard techniques used in the literature such as the revealed comparative advantage index, the cosine index of trade similarity, net exports ratio and constant market share analysis (CMS), while the impact of TAFTA is estimated through an export-demand model. The findings of the paper suggest that the composition of bilateral trade has changed significantly since the 1990s. The changes reflect shifts in the production structures of each economy, which are indicative of long-term economic structural changes. It is evident that the Thai-Australian trade relationship has undergone further adjustment since the establishment of the TAFTA. However, the changes in trade patterns are not necessarily due to TAFTA but, rather, part of a long term trend. The export demand model finds a significant positive impact of the TAFTA only on Australian exports to Thailand, but not vice-versa. The strongest trade link between the two countries has been the export of automotive vehicles from Thailand to Australia. By CMS analysis the findings indicate that Thailand's export competitiveness significantly contributed to the remarkable growth of exports to Australia experienced over the period. On the other hand, Australia's exports competitiveness to Thailand has suffered; the main reason being that Australia enjoys competitiveness in commodities, which are not in big demand in Thailand.

Keywords: Trade competitiveness, revealed comparative advantage, constant market share analysis, Free Trade Agreement, export demand model.

JEL Classification: F14 and F15

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I. Background

Australia and Thailand began formal diplomatic relations in April 1952 when Mr. B.C. Ballard was named the Minister of the Australian Legation in Bangkok. By 1956 Australia and Thailand had each appointed ambassadors to strengthen ties to one another (DFAT, 2012a). The long-term culmination of these efforts was the establishment of the Thailand-Australia Free Trade Agreement (TAFTA) in 2005 (DFAT, 2011a). During 2011, Australia ranked as Thailand's 6th largest trading partner, while Thailand ranked as Australia's 9th largest trading partner (DFAT, 2012b), highlighting the importance of bilateral trade relations between these two countries.

Over the period 1990 to 2011, both Thailand and Australia have experienced annual GDP growth at significant levels; 3.13% for Australia and 4.18% for Thailand (Table 1). In terms of growth in per capita GDP, Thailand also outperformed Australia. Thailand's per capita income grew at an average rate of 3.49% compared to Australia's 1.77% (Table 1).

Table 1: Basic Economic Indicators of Australian and Thailand: 1990 and 2011

Indicator	Australia			Thailand		
	1990	2011	1990-2011 Growth*	1990	2011	1990-2011 Growth*
GDP (constant 2000 US\$ billions)	299.55	572.46	3.13%	79.36	187.64	4.18%
GDP per Capita (constant 2000 US\$)	17,553	25,307	1.77%	1,391	2,699	3.49%
Exports of goods and services (constant 2000 US\$ billion)	37.79	107.83	5.12%	29.87	146.11	7.85%

* Geometric average for years 1990 to 2011 inclusive used. Source: Estimated from World Bank (2012)

The remarkable success in economic growth of these two countries resulted from numerous factors, one of the most dominant being the opening up of the two economies through various trade and economic reforms and shifts in trade and industrial policies. Australia embarked on a movement towards free trade agreements in 1983 with the adoption of the Australia-New Zealand Closer Economic Relations (ANZCER) agreement. Australia is a founding member of the Asia-Pacific Economic Cooperation (APEC) forum, founded in

1989, and is also involved in international organisations including the G20 summit, OECD⁴ and WTO⁵. As of May 2013 Australia had 7 FTAs in force⁶, covering 28% of Australia's total trade, (DFAT, 2012c) with 9 more FTAs under consideration or negotiation.⁷

Thailand's shift towards bilateral liberalisation is a reflection of a broader regional trend. Prompted by the 1997 Asian Financial Crisis, governments began to look for alternative means to guarantee foreign exchange earnings through trade, resulting in a shift towards closer regional economic cooperation (Chirathivat and Mallikamas, 2004). However, the ASEAN Free Trade Area (AFTA) made little progress in breaking down commercial barriers in the region (Sally, 2007), and the ASEAN vision, to create an ASEAN Economic Community (AEC) by 2020, has fallen short on practical goals, methods, and deadlines (Sally and Sen, 2005). Furthermore, dissatisfaction with the slow pace of negotiations during the WTO Doha Round, which remains incomplete almost fifteen years since its launch in 2001, prompted the necessity of competitive liberalisation as a means to provide more markets for Thai exports (Chirathivat and Mallikamas, 2004).

While the Chuan government first considered FTAs in the late 1990s, they only became a serious policy consideration after the Thaksin government took office in 2001 (Nagai, 2002). Not wanting to be left behind by Singapore, one of the first ASEAN countries to embrace bilateralism with the consideration of FTAs as "WTO-plus" rather than "WTO-substitute" (Rajan, Sen and Siregar, 2001), Thailand had, by the end 2003, signed agreements with Bahrain, China, Peru and India (Chirathivat and Mallikamas, 2004). Agreements with Australia and New Zealand followed, with the Thailand-Australia Free Trade Agreement (TAFTA) and the Thailand-New Zealand Closer Economic Partnership Agreement (TNZCEP) both coming into force in 2005. As in the rest of the region, these agreements

⁴ Organisation for Economic Co-operation and Development

⁵ World Trade Organisation

⁶ ASEAN-New Zealand, Chile, New Zealand, the United States, Malaysia, Singapore and Thailand FTA.

⁷ Australia-China FTA, Australia-Gulf Cooperation Council (GCC) FTA, Australia-India Comprehensive Economic Cooperation Agreement, Australia-Japan FTA, Australia-Korea FTA, Indonesia-Australia Comprehensive Economic Partnership Agreement, Pacific Agreement on Closer Economic Relations (PACER) Plus, Regional Comprehensive Economic Partnership and Trans-Pacific Partnership Agreement

have been motivated by the desire to strengthen political and economic alliances. Prime Minister Thaksin, with his strong “CEO” style of leadership, has also been a driving force in Thailand’s FTA negotiations. FTAs fit into his “dual-track” policy, which emphasises “fiscal and industrial policies to boost demand and strengthen competitiveness in targeted sectors” in the domestic track, and the “aggressive pursuit of markets for Thai exports” in the external track (Sally, 2007: 1606).

Australia and Thailand are members of APEC and WTO, both of which assist towards the establishment of free trade agreements to varying degrees. The ties between Thailand and Australia were significantly strengthened with the signing of the TAFTA in 2005 and further multilateral collaboration in similar forums has enhanced a low-tariff environment with Australia and surrounding South-East Asian countries including Thailand (DFAT, 2012d). Australia presently has two working FTAs involving Thailand (bilateral TAFTA and the regional ASEAN-Australia-New Zealand FTA (AANZFTA), and is also part of negotiating a cross-regional Regional Comprehensive Economic Partnership (RCEP) involving AANZFTA members plus India, China, Japan and Korea by 2015.

The AANZFTA came into effect in 2010 and will result in the elimination of tariffs on 96% of Australia’s current exports to ASEAN nations by 2020. The agreement is most substantial in the goods area, while more modest in regards to services (DFAT, 2009).

The TAFTA resulted in the immediate removal of tariffs amounting to 78% of Thai imports from Australia and 47% of Australian imports from Thailand at the time of adoption in 2005 (DFAT, 2011b). In the 5 years since its adoption in January 2005, two-way trade doubled between Australia and Thailand, reaching AU\$20 billion in 2010 (DFAT, 2012b).

Like the disparity in the level of per capita income and economic growth between Australia and Thailand, the average tariff rates of these two countries also differ significantly. Thailand, especially, is lagging behind Australia in this regard. In 2013, Australia had an

applied tariff rate of 2.7% on all goods as opposed to Thailand's rate of 11.4% (WTO, 2014).

II. Motivation and Plan of the Study

Given the significant developments in trade relations between Australia and Thailand over the last two decades, an in-depth analysis of various aspects of the bilateral trade between these two nations warrants special attention. So far, as shown below, few studies have conducted a comprehensive analysis of trade between these two countries that utilises available measures for trade patterns and trade performance.

Athukorala and Kohpaiboon (2011) examined the effect of the TAFTA on bilateral trade with attention given to rules of origin, tariff preferences and the consequences of these factors in analysis of the effectiveness of the agreement. They note that trade has risen between Australia and Thailand since the FTA was signed, however the rise has been fuelled by the expansion of imports to Australia, these imports being dominated by the supply of motor vehicles from Thailand. They suggested that the preference rates which were officially declared, as well as supply side factors, were likely to overstate trade flow effects of FTAs in trade flow modeling, including in the TAFTA.

Other studies have focused on Thailand's recent worldwide FTA initiative, development and future challenges. Sally (2007) describes how FTAs have become integral to Thai trade policy and suggested that other forms of free(r) trade are being neglected. These include unilateral liberalisation available to Thailand through the World Trade Organisation (WTO) and the Association of South East Asian Nations (ASEAN), in addition to internal regulatory reform. Sally comments that the FTAs to which Thailand has agreed are weak and sector specific, which has reduced the potential of strong FTAs to create trade for Thailand.

Chirathivat and Mallikamas (2004) discuss Thailand's recent policy towards FTAs. Their paper generalises the implications of Thailand's emergence as a significant bilateral trade partner with other countries via FTAs. It was published before the TAFTA was adopted

and provides a discussion of the general benefits and concerns of Thailand's recent proliferation of FTAs.

Kunnoot (2011) uses computer-generated equilibrium (CGE) analysis to estimate the overall impact of the TAFTA on real GDP in Thailand. The author finds that overall change in trade flows as a result of the TAFTA have a contractionary impact on real Thai GDP. Alternatively, Chiasakul et al (2010) find that the TAFTA has benefited Thailand as a whole, with the benefit to Thailand, as expected, greater than to Australia in percentage terms due to Australia's relatively higher level of openness prior to the agreement. Benefits to Thai exporters have been heavily concentrated in the motor vehicle industry, with exports to Australia growing substantially, while few other Thai products have experienced faster growth (Chiasakul et al, 2010). Some Thai sectors, dairy and agriculture in particular, have been negatively affected by the agreement (Chiasakul et al, 2010).

The purpose of this paper is to contribute to the relatively limited literature through an in-depth analysis of bilateral trade between Australia and Thailand. It aims to examine various aspects of bilateral trade between Australia and Thailand from 1990 to 2011 with particular emphasis on the measurement of trade competitiveness of these two countries. The impact of the TAFTA is also considered by empirically estimating an export-demand model utilising interaction effects in presence of the trade agreement, which has not been attempted earlier in the empirical literature on Australia-Thailand trade. It is expected that the findings of the study will benefit trade policymakers in these two countries.

The paper is divided into 7 main sections. The next section (III) contains a brief description of the sources and classification of data used in this study. Section IV examines the patterns of bilateral trade between Australia and Thailand, followed by an analysis of the trade competitiveness of these two countries in section V. The impact of the TAFTA on bilateral export demand from Australia to Thailand and vice-versa is examined in section VI

with the aid of an export demand model. As usual, the last section deals with conclusions and policy implications in light of the major findings of the study.

III. Sources and Classification of Trade Data

This paper employs various quantitative and qualitative techniques which require the classification of trade data into several types of goods. Classification is based on the Standard International Trade Classification (SITC-revision 3) which classifies data on trade flows into 10 different categories ranging from 0-9 as shown in Table 5, for example. The figures are taken from relevant issues of Comtrade, from the United Nations Statistics Division. Most of the estimates are based on single digit SITC commodities, however SITC68, SITC74 and SITC78 were identified as important double-digit categories and analysed in some sections separately. Data from the IMF Direction of Trade Statistics (DOTS) database was also used to create the trade intensity indices in section V (v).

IV. Patterns of Bilateral Trade between Australia and Thailand

(i) Australia's Trade with Thailand and the World

Table 2 illustrates Australian trade with Thailand and the world. As of 2011, Australia's total trade with Thailand was valued at US\$15.25 billion, compared to US\$479.95 billion for the world. To give some perspective, trade with Thailand was just US\$0.82 billion in 1990, so it has risen 19-fold to 2011, whereas Australia's trade with the world has risen only 6-fold during the same period. Australia's imports and exports with Thailand have both grown considerably from 1990 to 2011 (Table 2). Australia was a net exporter to Thailand from 1990 until 1997 but has been a net importer each year since 1998. Australia has been a net importer to the world for 16 out of the 22 years under consideration⁸. Since 2000, Australia has mainly been a net importer. Therefore some of the Australian-Thai net import trends can be explained by Australia's general position as a net importer with the world.

⁸ For simplicity, Table 2 does not show all of the 22 years under consideration.

Table 2: Australian Trade with Thailand and the World: Selected Years, 1990-2011 (\$US billions) (Compact)⁹

Year	Exports		Imports		Total Trade	
	Thailand	World	Thailand	World	Thailand	World
1990	0.46	38.78	0.36	38.63	0.82	77.41
1995	1.22	53.00	0.72	57.42	1.94	110.42
2000	1.13	63.77	1.63	67.76	2.76	131.53
2005	3.15	105.75	3.68	118.92	6.82	224.67
2010	5.25	206.71	9.89	188.74	15.14	395.45
2011	6.52	245.63	8.71	234.32	15.24	479.95

Source: Estimated from UN Comtrade (2012)

Australia's share in Thailand's trade has increased from 1990 to 2011 (Table 3). The percentage of Australia's exports to Thailand's total exports has increased from 1.62% to 3.49% during this period. This peaked in 2010 when the proportion was 4.8%, but it has since decreased to 3.49% in 2011. Over the same time, the share of Australian imports to Thailand's total imports has increased from 1.68% to 3.48%. Interestingly, the year 2011 witnessed the largest increase in this ratio. Australia's share of Thailand's total trade increased considerably between 1990 and 2011 with some minor fluctuations (Table 3).

Table 3: Australia's Share in Thailand's Trade: Selected Years, 1990-2011 (Compact)

Year	Exports	Imports	Total
1990	1.62%	1.68%	1.65%
1995	1.38%	1.87%	1.65%
2000	2.35%	1.88%	2.13%
2005	2.87%	2.75%	2.81%
2010	4.80%	3.23%	4.04%
2011	3.49%	3.48%	3.49%

Source: Estimated from UN Comtrade (2012)

Thailand's shares in Australia's exports, imports and total trade all began at close to 1% in 1990 (Table 4), but by 2011 they had grown to 2.66%, 3.72% and 3.18% (exports, imports and total trade respectively). Thailand's share of Australia's total imports increased impressively from 2.41% in 2000 to 5.24% in 2010, highlighting a particularly strong period for Thailand, which was close to the introduction of the TAFTA. However, this growth trend didn't continue beyond 2010 possibly due, in part, to a series of floods that hit major areas in Thailand inhibiting exports to Australia.

⁹ Complete tables are available from the author on request or from the Supporting Information available online.

Table 4: Thailand's Share in Australia's Trade: Selected Years, 1990-2011 (Compact)

Year	Exports	Imports	Total
1990	1.19%	0.94%	1.06%
1995	2.31%	1.26%	1.76%
2000	1.78%	2.41%	2.10%
2005	2.97%	3.09%	3.04%
2010	2.54%	5.24%	3.83%
2011	2.66%	3.72%	3.18%

Source: Estimated from UN Comtrade (2012)

Together, Tables 3 and 4 show that there has been growth across the board for Australian and Thai trade relative to the total trade in each country. Of particular note is the potential seen in the 2005 to 2010 period, for Thailand to become a major contributor of exportable goods to Australia. If it can increase these exports again, the importance of Thailand to Australia cannot be understated. The next section will examine the changes in composition of export trade between Australia and Thailand.

(ii) Changes in Composition of Trade

The composition of Australia-Thailand trade has evolved significantly over the period 1990 to 2011. However, it is evident that there is uncertainty as to what impact the TAFTA has had as a determinant of the recent changes in bilateral trade composition.

Table 5 shows that as of 2011, Australian exports to Thailand were surprisingly dominated by the commodity group SITC9 (otherwise not classified). Further breakdown reveals that this was mainly due to the exports of SITC97 (gold, nonmonetary, excluding gold ores and concentrates) which accounted for over 85% of SITC9 from 1990 to 2011 and was often much higher (Table 5). Two decades ago this was not the case; during 1990, exports of manufactured goods (SITC7) made up 43.5% of exports to Thailand. Thus, there have been long term structural changes which contributed to this significant shift in trade composition between these two countries. As is evident from Table 5, by 2011, the proportion of Australian manufactured goods exported to Thailand dramatically fell to 14%. This decrease in the share of Australian exports of manufactured goods to Thailand has been partially offset

by an increase in exports of mineral fuels (SITC3) from 7.5% in 1990 to 22.4% in 2011 and nonmonetary gold (SITC97), as previously mentioned.

Mineral fuels (SITC3) reached 33.3% of Australian exports to Thailand in 2010 but dropped in 2011 to 22.4%. Crude materials (SITC2) consisted of 7% of Australian exports to Thailand in 2011 but reached 22.7% in 2000 prior to the introduction of the TAFTA.

The remaining categories; Food and live animals (SITC0), beverages and tobacco (SITC1), animal and vegetable oils and fats (SITC4), chemicals (SITC5) and miscellaneous manufactured articles (SITC8) have fluctuated over the 1990-2011 period but have remained small proportions of Australian exports to Thailand.

Table 5: Australian Export Composition to Thailand: Selected Years, 1990-2011 (\$US Million)

Classification	Description	1990	1995	2000	2005	2010	2011	Average Growth*: 1990-2011
SITC0	Food and live animals	52.08 (11.3%)	112.85 (9.2%)	130.35 (12.5%)	178.07 (6.2%)	378.25 (7.3%)	486.31 (7.6%)	11.2%
SITC1	Beverages and tobacco	0.71 (0.2%)	2.30 (0.2%)	5.59 (0.5%)	6.27 (0.2%)	12.89 (0.2%)	17.15 (0.3%)	16.4%
SITC2	Crude materials, inedible, except	56.11 (12.2%)	142.65 (11.7%)	237.44 (22.7%)	216.00 (7.5%)	333.04 (6.4%)	442.66 (7.0%)	10.3%
SITC3	Mineral fuels, lubricants and	34.65 (7.5%)	29.84 (2.4%)	98.38 (9.4%)	442.81 (15.3%)	1717.78 (33.3%)	1425.26 (22.4%)	19.4%
SITC4	Animal and vegetable oils and fats	1.39 (0.3%)	1.62 (0.1%)	0.78 (0.1%)	1.07 (0.0%)	3.57 (0.1%)	4.34 (0.1%)	5.6%
SITC5	Chemicals	35.84 (7.8%)	77.69 (6.4%)	96.16 (9.2%)	207.38 (7.2%)	307.28 (5.9%)	343.28 (5.4%)	11.4%
SITC6	Manufactured goods	200.46 (43.5%)	403.80 (33.0%)	270.93 (26.0%)	753.40 (26.1%)	718.25 (13.9%)	887.46 (14.0%)	7.3%
SITC68 ^a	Non-ferrous metals	151.50 (75.6%)	293.89 (72.8%)	197.65 (73.0%)	675.69 (89.7%)	530.29 (73.8%)	638.49 (71.9%)	7.1%
SITC7	Machinery and transport equipment	51.82 (11.2%)	217.34 (17.8%)	93.60 (9.0%)	144.82 (5.0%)	182.86 (3.5%)	184.46 (2.9%)	6.2%
SITC74 ^a	Industrial machinery, equipment, parts	10.11 (19.5%)	29.31 (13.5%)	11.29 (12.1%)	33.26 (23.0%)	53.26 (29.1%)	46.70 (25.3%)	7.6%
SITC78 ^a	Road vehicles	6.60 (12.9%)	38.87 (18.1%)	24.82 (26.6%)	16.78 (11.6%)	14.49 (8.0%)	19.18 (10.4%)	5.2%
SITC8	Miscellaneous manufactured	19.96 (4.3%)	41.14 (3.4%)	26.15 (2.5%)	28.54 (1.0%)	49.01 (0.9%)	52.85 (0.8%)	4.8%
SITC9	Otherwise not classified	8.05 (1.7%)	193.24 (15.8%)	84.55 (8.1%)	907.30 (31.4%)	1462.88 (28.3%)	2517.22 (39.6%)	31.5%
SITC97 ^a	Gold, non-monetary	7.85 (97.4%)	184.57 (95.5%)	73.45 (86.9%)	774.23 (85.3%)	1453.44 (99.4%)	2506.38 (99.6%)	31.6%
Total		461.07 (100%)	1222.47 (100%)	1043.93 (100%)	2885.67 (100%)	5165.80 (100%)	6360.98 (100%)	13.3%

*Geometric Average Growth Rate, ^aCommodity percentages (for 2 digit commodities) are shown as a percentage of their relevant 1 digit commodity. Source: Estimated from UN Comtrade (2012)

Table 5 also exhibits the growth rates in each commodity group between 1990 and 2011. It is apparent that the growth rates in exports of SITC1 (16.4%), SITC3 (19.4%) and SITC9 (31.5%) were well above the overall growth rate (13.3%) of all the commodity groups. Growth in SITC9 was almost solely driven by the growth in SITC97. Of the three

groups, SITC3 and SITC9 held significant proportions of Australian exports to Thailand. It can be inferred that these were the most important commodity groups for Australia during that period as they contributed to over 60% of Australia's exports to Thailand in 2010 and 2011, and had the strongest growth from 1990 to 2011.

Table 6 shows that since 2000, close to half (often more than half) of Australia's imports from Thailand (i.e. Thailand's export to Australia) have been machinery and transport equipment (SITC7). The underlying reason for this has been the expansion of Thailand's automotive imports to Australia. In 2011 no SITC category, other than SITC7, accounted for more than 10% of Thailand's exports to Australia. Looking at the proportions of imports in 1990, however, it is evident that much has changed since then. In 1990 food and live animals (SITC0), manufactured goods (SITC6) and miscellaneous manufactured articles (SITC8) shared a combine total of 82.3% of Thailand's exports to Australia, while in 2011 their total had fallen to 28.6%.

Table 6: Australian Import Composition from Thailand: Selected Years, 1990-2011 (\$US Million)

Classification	Description	1990	1995	2000	2005	2010	2011	Average Growth*: 1990-2011
SITC0	Food and live animals	117.96 (32.5%)	215.10 (29.8%)	227.50 (14.4%)	350.84 (9.7%)	653.95 (6.6%)	810.91 (9.6%)	9.6%
SITC1	Beverages and tobacco	1.91 (0.5%)	1.83 (0.3%)	2.88 (0.2%)	3.31 (0.1%)	6.04 (0.1%)	8.99 (0.1%)	7.7%
SITC2	Crude materials, inedible, except fuels	11.49 (3.2%)	17.33 (2.4%)	28.52 (1.8%)	33.54 (0.9%)	19.36 (0.2%)	23.12 (0.3%)	3.4%
SITC3	Mineral fuels, lubricants and related	0.33 (0.1%)	3.59 (0.5%)	123.30 (7.8%)	100.79 (2.8%)	137.41 (1.4%)	300.22 (3.6%)	54.0%
SITC4	Animal and vegetable oils and fats	1.07 (0.3%)	0.98 (0.1%)	1.11 (0.1%)	1.62 (0.0%)	11.94 (0.1%)	16.59 (0.2%)	14.0%
SITC5	Chemicals	12.81 (3.5%)	31.06 (4.3%)	64.66 (4.1%)	127.11 (3.5%)	391.26 (4.0%)	453.16 (5.4%)	18.5%
SITC6	Manufactured goods	86.73 (23.9%)	145.77 (20.2%)	195.41 (12.4%)	388.99 (10.8%)	759.27 (7.7%)	813.40 (9.7%)	11.3%
SITC68 ^a	Non-ferrous metals	0.15 (0.2%)	0.52 (0.3%)	7.09 (3.6%)	8.78 (2.3%)	32.10 (4.1%)	42.24 (4.7%)	30.6%
SITC7	Machinery and transport equipment	36.91 (10.2%)	189.13 (26.2%)	783.16 (49.6%)	2242.57 (62.1%)	5569.53 (56.3%)	4619.36 (54.9%)	25.9%
SITC74 ^a	Industrial machinery, equipment, parts	5.31 (14.4%)	44.23 (23.4%)	113.85 (14.5%)	333.04 (14.9%)	921.38 (16.5%)	554.76 (12.0%)	24.8%
SITC78 ^a	Road vehicles	0.96 (2.6%)	1.21 (0.6%)	447.90 (57.2%)	1429.06 (63.7%)	3639.75 (65.4%)	2988.93 (64.7%)	46.6%
SITC8	Miscellaneous manufactured	94.09 (25.9%)	114.85 (15.9%)	151.19 (9.6%)	268.18 (7.4%)	617.17 (6.2%)	780.47 (9.3%)	10.6%
SITC9	Otherwise not classified	0.00 (0.0%)	1.81 (0.3%)	0.02 (0.0%)	95.88 (2.7%)	1720.94 (17.4%)	590.40 (7.0%)	76.3%
Total		363.30 (100%)	721.45 (100%)	1577.75 (100%)	3612.84 (100%)	9886.86 (100%)	8416.63 (100%)	16.1%

*Geometric Average Growth Rate, ^aPercentages shown as percentage of the relevant level 1 commodity.
Source: Estimated from UN Comtrade (2012)

The export ratio of machinery and transport equipment (SITC7) from Thailand to Australia has risen considerably since the signing of TAFTA in 2005 with some fluctuations. In 1990 the proportion of SIT7 imports was 10.2%, which increased to 62.1% by 2005. It did decrease to 54.9% in 2011, but this is still significantly higher than its 1990 level.

SITC7 represented 54.9% of imports to Australia in 2011 (Table 6), however it is a sub-commodity of SITC7 that is the major interest. Road vehicles (SITC78) represented 64.7% of SITC7 in 2011 which translates to a proportion of over 35% of total imports to Australia from Thailand for this year. SITC78 has also had impressive growth, with an average growth rate of 46.7%. The growth and change in the proportion of SITC78 over the period indicates that it has been a major driver of the change in trade composition between Australia and Thailand in SITC7 and overall.

From the last column of Table 6, the commodities which have had growth above Thailand's average export growth to Australia (i.e. 16.1%), were SITC3 (54.0%), SITC5 (18.5%), SITC7 (25.9%) and SITC9 (76.31%). Of these only SITC7 held a large proportion of total exports in 2011 as discussed above. SITC9 had such a high growth rate because it started at close to 0 in 1990. SITC3 had exceptional growth but in 2011 was still only 3.6% of total Thai exports. If SITC3 continues to grow at high rates, it may drive increases in exports from Thailand to Australia in the future.

Overall Australia's imports from Thailand have had a much sharper increase than Australia's exports to Thailand. Australian imports from Thailand almost tripled in value from 2005 to 2010, whereas during the 5-year intervals before the introduction of the TAFTA it only doubled (1990-1995, 1995-2000 and 2000-2005). While a strong upward trend has continued in imports, the composition has not changed significantly since the introduction of the TAFTA. It can be seen in Table 6 that besides SITC9 and SITC7 no category has moved more than $\pm 2\%$ when comparing 2005 to 2011.

V. Trade Competitiveness

In this section, a number of measures of trade competitiveness, and the impact of the TAFTA upon these measures, are considered. These measures are complementary, with each providing a valuable insight into the various elements of trade competitiveness. Furthermore, each measure has its own strengths and weaknesses (explained in the Appendix), which render the comparison and consideration of a range of indicators of trade competitiveness necessary.

(i) Revealed Comparative Advantage Index

The revealed comparative advantage index (RCAI) was developed to determine and show the benefits of international specialisation and the associated economies of scale. Any revealed comparative advantage index greater than one implies that the country exports a particular good above what should be expected given its size, suggesting a competitive advantage in that commodity. A detailed explanation of the RCAI can be found in the Appendix. Australia's competitive RCAI categories (Table 7) are food and live animals (SITC0), crude materials (SITC2) and mineral fuels (SITC3), each with a RCAI well above unity; 1.55, 7.92 and 2.17 in 2011 respectively. Australia's export specialisation overwhelmingly lies in SITC2 which has been above 5 since 1990. As seen in Table 5, export composition from Australia to Thailand in SITC2 has been dropping. The reason for such a poor performance is that, despite being internationally competitive in this industry, Australia's exports have not aligned with Thailand's import needs. This point is revisited in Section V (ii) with regard to the cosine index of trade similarity.

Australia's RCAI for non-specialised commodity groups (SITC1 and SITC4-8) remained below unity in each of the selected years between 1990 and 2011 (Table 7). In fact, the RCAI for most of these commodities failed to increase during this period, the exception being beverages and tobacco (SITC1). The RCAI for crude materials (SITC2) has increased significantly in each 5 year interval since 1995 possibly due to Australia's increased

specialisation in mining over the past decade which has obviously impacted Australian competitiveness in other industries.

Table 7: Australia's Revealed Comparative Advantage Index (RCAI): Selected Years, 1990-2011

Classification	Description	1990	1995	2000	2005	2010	2011
SITC0	Food and live animals	2.64	2.55	3.22	2.59	1.56	1.55
SITC1	Beverages and tobacco	0.45	0.70	1.78	2.62	1.34	1.07
SITC2	Crude materials, inedible, except fuels	5.76	5.05	5.98	6.49	7.77	7.92
SITC3	Mineral fuels, lubricants and related	3.09	2.98	2.06	2.06	2.14	2.17
SITC4	Animal and vegetable oils and fats	0.69	0.65	0.89	0.60	0.42	0.39
SITC5	Chemicals	0.27	0.42	0.47	0.44	0.31	0.27
SITC6	Manufactured goods	0.75	0.85	0.91	0.67	0.50	0.46
SITC68	Non-ferrous metals	4.12	3.64	4.35	3.21	2.03	1.82
SITC7	Machinery and transport equipment	0.21	0.32	0.28	0.25	0.15	0.14
SITC74	Industrial machinery, equipment, parts	0.22	0.35	0.29	0.29	0.22	0.18
SITC78	Road vehicles	0.16	0.17	0.33	0.35	0.17	0.12
SITC8	Miscellaneous manufactured articles	0.22	0.27	0.31	0.28	0.19	0.18
SITC9	Otherwise not classified	3.48	3.01	2.38	2.92	2.17	2.07

Source: Estimated from UN Comtrade (2012)

Of the 2 digit commodities in Table 7, only non-ferrous metals (SITC68) had a value above unity, contrary to its parent group, SITC6. Australia's advantage in SITC68 was highest in 1990 and 2000 ($RCAI > 4$) but has fallen in 2005, 2010 and 2011 ending at 1.82. This has happened concurrently to SITC2, which has been increasing steadily. Perhaps production of non-ferrous metals has fallen due to the strong emphasis on the production of crude materials (SITC2) in Australia. In any case, as seen in Table 5, given the large proportion SITC68 holds in SITC6 (71.9%) and in turn SITC6 holds overall (14.0%) , the decrease in specialisation of SITC68 by Australia may explain the below average growth of SITC68 which was 7.09% (Table 5).

Thailand's specialisation according to the RCAI (Table 8a) lies in food and live animals (SITC0), and crude materials (SITC2) with an RCAI of 2.18 and 1.67 respectively in 2011. Interestingly Thailand's biggest export to Australia, automobiles within SITC7, has only a slight advantage compared to other countries, with an RCAI of 1.21 in 2010 and 1.09 in 2011. Yet the composition of Thailand's exports (Table 6) to Australia shows clearly that machinery and transport equipment (SITC7) dominates these exports.

Table 8: Thailand's Revealed Comparative Advantage Index (RCAI): Selected Years, 1990-2011

Classification	Description	1990	1995	2000	2005	2010	2011
SITC0	Food and live animals	3.81	2.64	2.63	2.16	2.11	2.18
SITC1	Beverages and tobacco	0.31	0.22	0.28	0.28	0.44	0.49
SITC2	Crude materials, inedible, except fuels	1.22	1.43	1.28	1.59	1.38	1.67
SITC3	Mineral fuels, lubricants and related	0.13	0.13	0.32	0.35	0.37	0.44
SITC4	Animal and vegetable oils and fats	0.08	0.08	0.36	0.41	0.35	0.52
SITC5	Chemicals	0.21	0.45	0.66	0.76	0.77	0.88
SITC6	Manufactured goods	0.80	0.72	0.86	0.89	0.93	0.92
SITC68	Non-ferrous metals	0.27	0.10	0.31	0.36	0.34	0.33
SITC7	Machinery and transport equipment	0.55	0.85	1.06	1.17	1.21	1.09
SITC74	Industrial machinery, equipment, parts	0.54	0.76	0.89	1.07	1.20	1.06
SITC78	Road vehicles	0.10	0.14	0.41	0.83	1.29	1.00
SITC8	Miscellaneous manufactured articles	2.22	1.84	1.18	1.05	0.92	0.94
SITC9	Otherwise not classified	0.57	0.31	0.68	0.44	0.65	0.56

Source: Estimated from UN Comtrade (2012)

Transitions in Thailand's specialist exports have occurred over the period and include; the steady fall in food and live animals (SITC0) from 3.81 in 1990 to 2.18 in 2011, the rise in machinery and transport equipment (SITC7) from 0.55 in 1990 to 1.21 in 2010 and the fall in miscellaneous manufactured articles (SITC8) from 2.22 in 1990 to 0.94 in 2011. These movements in specialisation on a global level have in fact been reflected in the composition of Australian imports from Thailand (Table 6). Although each of the above categories has experienced growth, they have also gained or lost a proportion of total imports in line with the rise or fall of their RCAI.

Delving further into the most important commodities with respect to Thailand's exports to Australia, SITC74 and SITC78 have increased significantly from 0.54 and 0.1 in 1990 to 1.06 and 1.00 in 2011, respectively. The changes in the RCAI toward unity of these two categories are important in explaining the growth in SITC7. However, a value close to unity, does not explain the dominant growth in SITC7 well because it only implies that Thailand is about as good as the rest of the world in producing SITC7. This puts Thailand in a position to export these goods competitively but it is other economic factors that make Australia such a high importer of SITC78 (Road vehicles) and SITC7 as a whole. These factors may include the proximity of Australia and Thailand, for example. It is unlikely,

however, to be due to the TAFTA because of the small change in proportion of SITC78 from 2005 to 2010 and the general trend predating the TAFTA (Table 6).

RCAI based on Value-Added Trade

In recent years, trade in intermediate goods have grown more rapidly than trade in final goods, suggesting that estimates based on gross trade flows such as the standard RCAI index calculated above can be misleading to understand the extent to which countries participate in the global value chain of manufacturing trade, and thus a “value-added” approach to estimating trade competitiveness is more appropriate. In this context, OECD-WTO (2013) disaggregate RCAI index by selected industries for selected years over 1995-2009 based on domestic value added. These value added RCAI indices provide an insight as to how competitiveness of domestic Australian and Thai industries might have changed over this period in terms of their participation in global trade.

Figures 1 and 2 present the trends in value-added RCAI for Australia and Thailand in manufacturing industries over 1995, 2000, 2005 and 2009. The industry categories are more aggregated than the SITC 2 digit data analyzed earlier, but provides useful insights on the role of domestic value added embodied in gross exports of Australia and Thailand. This also holds important implications for FTAs as Rules of origin under trade agreements often involve preferential treatment in terms of value-added criterion.

It is observed that the only sector wherein Australia and Thailand’s domestic industries happen to be competitors are food products, beverages and tobacco industry, wherein both countries have not improved competitiveness in terms of domestic value added over the 1995-2009 period. Contrary to gross exports based RCAI, Thailand does not appear to be competitive in domestic value added exports of Transport equipment industry, and this suggests significant foreign value added in this industry in Thailand.

Figure 1: Australia's RCAI based on Domestic Value-Added by Industry

Source: Calculated from OECD-WTO (2013)

Figure 2: Thailand's RCAI based on Domestic Value-Added in gross exports by Industry

Source: Calculated from OECD-WTO (2013)

Table 9 specifically disaggregates the shares of domestic value added in gross exports in the transport equipment and machinery and equipment, nec sectors over the same time periods to analyse this trend. The data suggests that Thailand's domestic industry have been contributing to its exports to a much lesser extent than as actually observed in its gross exports data in Tables 6 and 8a, and this reflects the increasing role of foreign firms and imported inputs in Thailand's machinery and transport equipment sector.

Table 9: Domestic value added share of gross exports by selected industries (%)

Transport Equipment					Machinery and Equipment, nec				
	1995	2000	2005	2009		1995	2000	2005	2009
Australia	72.32	68.51	74.3	79.86	Australia	80.78	77.24	79.54	75.81
Thailand	61.73	55.36	51.66	55.14	Thailand	65.94	57.19	53.86	55.96

(ii) Cosine Index of Trade Similarity

The cosine index of trade similarity (CITS) is employed to explain the discrepancies in the movement in composition of Thai-Australian exports and imports as compared to the changes in the RCAI based on gross exports. An outline of the methodology of this technique can be found in the Appendix.

The overall CITS reveals that Thailand is in a strong position to export to Australia. From 1990 to 1995, Thailand's CITS rose from 0.72 to 0.89 (Table 10) and has hovered above 0.94 since then. Thailand's CITS with Australia was consistently at a relatively higher level; it is easy to see why Thailand gained in export trade with Australia in the post-TAFTA period. Compatibility and reduced export restrictions have obviously helped Thailand enhance its exports to Australia. Australian exports have been getting less compatible with Thai imports since 2005, dropping from a high of 0.64 in 2005 to 0.48 in 2011, its lowest level in the past 22 years (Table 11). Even though exports are rising from Australia to Thailand it is not due to a well aligned need for goods from Thailand or availability of goods in Australia.

Table 10: Thailand Exports - Australia Imports Cosine Index of Trade Similarity: Selected Years, 1990-2011

Classification	Description	1990	1995	2000	2005	2010	2011	Average
	Total	0.72	0.89	0.97	0.97	0.96	0.94	0.92
SITC0	Food and live animals	0.82	0.77	0.78	0.81	0.77	0.75	0.79
SITC1	Beverages and tobacco	0.54	0.99	0.95	0.99	1.00	1.00	0.90
SITC2	Crude materials, inedible, except fuels	0.27	0.34	0.35	0.34	0.26	0.23	0.32
SITC3	Mineral fuels, lubricants and related	0.65	0.86	0.99	1.00	1.00	1.00	0.94
SITC4	Animal and vegetable oils and fats	1.00	0.76	0.88	0.92	0.96	1.00	0.93
SITC5	Chemicals	0.80	0.69	0.53	0.39	0.40	0.36	0.58
SITC6	Manufactured goods	0.79	0.82	0.92	0.92	0.90	0.89	0.88
SITC7	Machinery and transport equipment	0.68	0.75	0.73	0.80	0.89	0.90	0.77
SITC8	Miscellaneous manufactured articles	0.68	0.79	0.85	0.94	0.96	0.95	0.85

Source: Estimated from UN Comtrade (2012)

Table 11: Australia Exports - Thailand Imports Cosine Index of Trade Similarity: Selected Years, 1990-2011

Classification	Description	1990	1995	2000	2005	2010	2011	Average
	Total	0.53	0.60	0.61	0.64	0.49	0.48	0.59
SITC0	Food and live animals	0.28	0.48	0.49	0.37	0.40	0.41	0.40
SITC1	Beverages and tobacco	0.94	0.89	0.68	0.82	0.90	0.93	0.84
SITC2	Crude materials, inedible, except fuels	0.67	0.50	0.57	0.67	0.55	0.57	0.61
SITC3	Mineral fuels, lubricants and related	0.44	0.39	0.74	0.41	0.35	0.35	0.44
SITC4	Animal and vegetable oils and fats	0.52	0.29	0.40	0.47	0.47	0.43	0.42
SITC5	Chemicals	0.69	0.51	0.48	0.39	0.48	0.47	0.52
SITC6	Manufactured goods	0.47	0.63	0.52	0.47	0.61	0.59	0.56
SITC7	Machinery and transport equipment	0.90	0.87	0.62	0.65	0.75	0.81	0.74
SITC8	Miscellaneous manufactured articles	0.99	0.96	0.93	0.98	0.96	0.97	0.96

Source: Estimated from UN Comtrade (2012)

The CITS for Thailand's exports and Australia's imports of individual commodities, specifically the ones in which Thailand specialises, as determined by the RCAI, are food and live animals (SITC0), crude materials (SITC2) and, machinery and transport equipment (SITC7). SITC0 averaged 0.79 since 1990 which is below the overall average CITS for Thailand's exports to Australia (Table 10) but still indicates that Thailand is well positioned to export food and live animals to Australia. Thailand does in fact export relatively more of SITC0 to Australia as seen in Section V (iii). Crude materials (SITC2) had an average CITS of 0.32 explaining the low volumes of exports in SITC2 exported by Thailand to Australia. SITC7, driven by exports from Thailand's automotive industry, has performed well in its CITS value, growing from a CITS of 0.68 in 1990 to a high of 0.90 in 2010. Coupled with Thailand's specialisation in SITC7 (RCAI was 1.21 in 2010), and Australia's fall in specialisation of SITC7 over that period, it follows that Australia is not as competitive in this industry as it once was.

The CITS for Australia's exports and Thailand's imports of individual commodities in which Australia specialises are crude materials (SITC2) and mineral fuels (SITC3). SITC2 had an average index of 0.61 with only small fluctuations to this occurring and SITC3 averaged lower at 0.44, reaching 0.74 in 2000 but dropping to 0.35 by 2011 (Table 11).

The relatively low compatibility of the commodity groups that Australia usually specialises in for its export destinations and the fall in its CITS to its lowest level over the

past 22 years, explains why Australia's exports to Thailand have failed to grow at the same rate as Thailand's exports to Australia.

(iii) Net Exports Ratio

The net exports ratio reflects the magnitude of the trade balance between two nations for a given commodity and can be used as an approximation to identify which country has a comparative advantage in each industry (see Appendix for further details). A negative ratio indicates that a country is a net importer of a particular good, and a positive ratio a net exporter.

The net exports ratio is conducted from Australia's point of view and can be seen in Table 12. Figures in this table show that whilst some items have remained relatively stable, including food and live animals (SITC0), crude materials (SITC2) and miscellaneous manufactured articles (SITC8), most other items have varied significantly. Each of these stable items have averaged a net export ratio of -31.6%, 77.9% and -39.3% since 1990 respectively, revealing a comparative advantage in crude material for Australia and a comparative advantage in food and live animals and miscellaneous manufactured articles for Thailand.

Table 12: Australia's Net Exports Ratio with Thailand: 1990-2011 (Compact)

Classification	Description	1990	1995	2000	2005	2010	2011	Average
SITC0	Food and live animals	-38.7%	-31.2%	-27.1%	-32.7%	-26.7%	-25.0%	-31.6%
SITC1	Beverages and tobacco	-46.0%	11.4%	32.1%	30.8%	36.2%	31.2%	1.8%
SITC2	Crude materials, inedible, except fuels	66.0%	78.3%	78.6%	73.1%	89.0%	90.1%	77.9%
SITC3	Mineral fuels, lubricants and related	98.1%	78.5%	-11.2%	62.9%	85.2%	65.2%	42.3%
SITC4	Animal and vegetable oils and fats	13.1%	25.0%	-17.4%	-20.2%	-54.0%	-58.6%	-4.2%
SITC5	Chemicals	47.4%	42.9%	19.6%	24.0%	-12.0%	-13.8%	22.5%
SITC6	Manufactured goods	39.6%	47.0%	16.2%	31.9%	-2.8%	4.4%	24.8%
SITC68	Non-ferrous metals	99.8%	99.7%	93.1%	97.4%	88.6%	88.5%	94.7%
SITC7	Machinery and transport equipment	16.8%	6.9%	-78.6%	-87.9%	-93.6%	-92.3%	-52.3%
SITC74	Industrial machinery, equipment, parts	31.1%	-20.3%	-82.0%	-81.8%	-89.1%	-82.7%	-48.0%
SITC78	Road vehicles	74.5%	94.0%	-89.5%	-97.7%	-99.2%	-98.6%	-39.3%
SITC8	Miscellaneous manufactured articles	16.8%	6.9%	-78.6%	-87.9%	-93.6%	-92.3%	-52.3%
SITC9	Otherwise not classified	-65.0%	-47.3%	-70.5%	-80.8%	-85.3%	-87.3%	-64.5%

Source: Estimated from UN Comtrade (2012)

There has been a definite downward trend in Australia's net exports ratio for machinery and transport equipment (SITC7) to Thailand. The net export ratio for this

commodity group decreased from 16.8% in 1990 to -92.3% in 2011. There was rapid decrease over ten years, from 1990 to 2000 when SITC7 saw a drop from 16.8% to -78.6%. Since 2000, this ratio for SITC7 continued to decrease but at a much slower rate, ending at -92.3% in 2011. It does not appear that the TAFTA has affected this industry at all, given that since its introduction in 2005 the net export ratio for this commodity group has remained more or less stable. The transport industry was already heavily weighted in Thailand's favour due to the factors that existed prior to the signing of the TAFTA in 2005. So the apparent comparative advantage Thailand has in SITC7 is not due to the TAFTA; in fact, it has been affected by it very little.

Net export ratios estimated by classifying the SITC7 group of commodities at the 2 digit level demonstrate that the large swing in SITC7 was replicated in both SITC74 and SITC78. SITC78 in particular swung from 74.5% in 1990 to a high of -99.2% in 2010. Given these hold a large proportion of SITC7, particularly in imports, these two commodities were the main driver of the overall trend in SITC7. The net export ratio for SITC78 has been below -95% since 2002 which reveals the importance of Thailand's automotive industry to Australia, even if Thailand doesn't have the greatest specialisation advantage, as shown by the RCAI in Section V (i). Other areas of interest include mineral fuels (SITC3), which dipped negatively in 2000 (-11.2%). At other times, SITC remained significantly higher in Australia's favour, averaging 42.3% since 1990.

(iv) Constant Market Share Analysis

Constant market share (CMS) analysis was developed to decompose export growth into its various sources, namely standard growth, the commodity composition effect and the competitiveness residual. A complete discussion of the construction of the index can be found in the Appendix. Discrepancies between world export growth (standard growth) and bilateral export growth can be attributed to the commodity composition effect, which shows the extent to which the country is exporting commodities in high demand to its bilateral partner, and the

competitiveness residual, the change in export performance caused by a change in the competitiveness of particular country's export industry. A positive competitiveness residual suggests the particular country's export growth to its bilateral partner exceeds world growth for most commodities.

Australia's exports to Thailand

Over the study period, 1990 – 2011, Australia's exports to Thailand grew at an average¹⁰ of 13.16% per year (see Table 13). Meanwhile, Thailand's standard import growth from the world averaged less than this - increasing by only 10.43% per year. By CMS analysis, this disparity between Australia's export growth and standard growth is accounted for by a commodity composition effect and competitiveness residual.

The commodity composition effect increased on average by 1.40% per year, and has fluctuated from a low of -9.42% in 2000 to a high of 26.50% in 2011. This fluctuation means that in some years, commodity composition can play a significant role and that Thailand's demand for Australia's exports is quite volatile.

Table 13: Constant Market Share Analysis for Australia's Exports to Thailand (Compact)

Year	Australia – Thailand Export Growth	Standard Growth (in world exports to Thailand)	Commodity composition	Competitiveness
1990	10.09%	29.53%	-5.98%	-13.46%
1992	48.70%	8.24%	-2.94%	43.39%
1994	19.16%	17.73%	-8.85%	10.28%
1996	-0.25%	2.17%	2.96%	-5.38%
1998	-35.57%	-32.17%	3.30%	-6.70%
2000	21.29%	23.08%	-9.42%	7.62%
2002	13.48%	4.33%	1.33%	7.81%
2004	56.29%	24.50%	3.48%	28.32%
2006	4.70%	8.82%	-3.79%	-0.32%
2008	24.97%	24.24%	16.99%	-16.26%
2010	58.19%	36.35%	19.31%	2.53%
2011	23.14%	25.27%	26.50%	-28.64%
Average	13.16%	10.43%	1.40%	0.84%

Source: Estimated from UN Comtrade (2012)

The competitiveness residual has increased on average by 0.84% per year, and has fluctuated from a low of -28.64% in 2011 to a high of 43.39% in 1992. Similar to commodity composition, it is clear there is a large volatility in competitiveness that can play a significant

role in Australia's exports to Thailand. For example, the competitiveness level of -13.64% in 2003 explains the fall in export growth from 2002 to 2003.

Thailand's exports to Australia

Over the sample period 1990-2011, Thailand's exports to Australia grew on average by 17.0% per year (see Table 14). This far surpassed Australia's total import growth average of 9.3% per year. This discrepancy is significant because it indicates Thailand's continual rise as an important exporting partner to Australia.

Table 14: Constant Market Share Analysis for Thailand's Exports to Australia (Compact)

Year	Australia – Thailand Export Growth	Standard Growth (in exports to Thailand)	Commodity composition	Competitiveness
1990	-0.6%	-3.0%	0.1%	2.3%
1992	15.3%	5.6%	-0.4%	10.1%
1994	24.9%	17.8%	-0.5%	7.7%
1996	13.1%	6.9%	-2.4%	8.6%
1998	5.0%	-1.7%	-1.7%	8.4%
2000	14.5%	3.9%	-2.4%	13.0%
2002	24.5%	14.2%	0.2%	10.2%
2004	18.1%	22.3%	-1.6%	-2.6%
2006	26.8%	11.5%	-1.5%	16.7%
2008	30.4%	23.1%	-1.0%	8.2%
2010	10.0%	18.7%	-3.4%	-5.4%
2011	-14.9%	24.1%	-5.0%	-34.0%
Average	17.0%	9.3%	-0.8%	7.9%

Source: Estimated from UN Comtrade (2012)

The commodity composition effect has fallen on average by 0.8% per year, and has fluctuated from a low of -2.4% in 2000 to a high of 4.1% in 2009. This fluctuation is of small magnitude relative to the competitiveness residual, which has risen on average by 7.9% per year. The positive rate suggests Thailand's exports to Australia are growing at a rate higher than world exports for the majority of commodities. In aggregate terms, the competitiveness effect matches the standard growth component, and is important in explaining large swings in export growth in 2000-2001, 2003-2004 and 2010-2011¹¹.

Shortly after the introduction of the TAFTA, Thailand's competitiveness was strong with Australia; above 15% except in 2008 (8.2%). More recently, however, it has worsened. In 2010 it was -5.4% and in 2011 it fell to its lowest level of the period, -34.0%. Such a

¹⁰ The average quoted in the CMS analysis is a geometric average.

significant drop, considering the strength of Thailand's competitiveness before 2010, may be related to an exogenous event such as the Thailand flooding which coincided with the first fall in Thailand's competitiveness in 2010.

(v) Trade Intensity Indices

Trade intensity indices (TII) are a measure of the relative importance of a particular bilateral trading relationship relative to their trade with the rest of the world. A TII or XII (export intensity index) with a value greater than 1 suggests that the countries have a preference for or bias towards trading with one another. Further details of the construction and calculation of the indices are located in the Appendix.

Over the period 1980 to 2014, Thai and Australian trade and export intensity indices have significantly changed (see Figure 3).

Figure 3: Trade and Export Intensity Indices: 1980 to 2014

Source: Estimated from IMF DOTS (2015)

The trade intensity index (TII) for Australia and Thailand indicates that prior to 2000 the countries were relatively minor trading partners, given the TII was less than 1. After 2000, the TII grew to greater than 1, suggesting an increased preference for bilateral trade between the countries, which peaked around 2010. In terms of export intensities, Australia

¹¹ For the sake of precision, the figures for 2001 and 2003 are not shown in the table.

has continued to be an important export destination for Thailand since 1980, although it appears this importance grew significantly after TAFTA implementation in 2005. In contrast, the relative importance of Thailand for Australian exporters (indicated by red line – Au-Th XII) appears to have diminished since 2005, although the bilateral relationship remains important as the XII is greater than 1.

VI. Effects of the TAFTA: Export Demand Model

Empirical studies on the impact of trade agreements on member countries have utilized three different approaches. These include computable general equilibrium (CGE) models, the gravity models of trade and export and import demand models.

This study chooses to employ export demand functions to study the impacts of TAFTA as it is firmly based on fundamental economic theories, and is more appropriate to conduct an ex-post analysis of the impact of bilateral FTAs specifically in the Australia – Thailand context. While CGE and gravity models have been applied extensively in the empirical literature, the former is more suitable for a priori predictions before a FTA is implemented, and hence not considered for this paper. A gravity model is not chosen as studies have found that gravity models tend to over-estimate the trade flow impacts of FTAs (DeRosa & Gilbert, 2005), and there have been methodological issues identified with this modelling involving endogeneity issues.

The basic export demand model (Dornbusch, 1988; and Hooper and Marquez, 1995) uses bilateral exports as the dependent variable, and foreign income (trading partner's GDP) and bilateral real exchange rate of domestic to the foreign country (capturing the relative price effect) as independent variables, as analysed in the empirical literature. Apart from price and income effects, exchange rate volatility has also often been taken into account as another explanatory variable in the export demand function (See Chowdhury, 1993; Chou, 2000; Daly, 1998; and McKenzie, 1998; Rajan et.al (2003)). We therefore estimate a set of

merchandise export demand functions so as to ascertain whether foreign (e.g. Thai) incomes and prices (competitiveness factor) and exchange rate volatility are statistically significant variables impacting Australia's exports to Thailand, and also vice-versa.

The general specification of the estimated equation¹² is:

$$\begin{aligned}\Delta \ln X_t = & \alpha_0 + \sum_{i=1}^h \alpha_i \Delta \ln X_{t-i} + \sum_{i=0}^k \beta_i \Delta \ln Y_{t-i}^f + \sum_{i=0}^n \gamma_i \Delta \ln RER_{t-i} + \theta_1 \ln X_{t-1} + \theta_2 \ln Y_{t-1}^f \\ & + \theta_3 \ln RER_{t-1} + T_t + \mu_1 FTA_t + \mu_2 (FTA_t * \ln Y_{t-1}^f) + \mu_3 (FTA_t * \ln RER_{t-1}) \\ & + u_t\end{aligned}$$

Wherein X_t = *Bilateral exports from country A to B at time t*

Y_t^f = *Trading partner's (foreign country B's) GDP at time t*

RER_t = *Real exchange rate of country A to country B at time t*

We estimate 2 set of the export-demand equations for Thailand-Australia, and Australia-Thailand respectively. We use Country A as Thailand and Country B as Australia in the first equation, and Country A as Australia and Country B as Thailand in the next equation estimated in the results displayed in Table 15.

Our observation period covers the time 1993Q1 to 2012 Q4. All variables are in real and converted to log terms, the base year of the deflator being 2005. The TAFTA is a dummy variable capturing the effect of TAFTA, and given a value of 1 from the period of signing (2005 Q1 for TAFTA). Following Santos-Paulino (2002) and Toh and Khine (2009), bilateral FTAs can also affect price and income elasticities of export demand, and therefore we add two interaction variables of TAFTA with foreign income and price elasticity as explanatory variables in the model.

¹² Exchange rate volatility was found to be statistically insignificant in explaining bilateral export demand of both Australia to Thailand and vice, versa, and was thus dropped from the general specification used in the estimation process.

Time series properties confirm that bilateral exports from Thailand to Australia and vice-versa, and Foreign income variables are non-stationary and $I(1)$ processes, whereas the real exchange rate between Thailand and Australia (and vice-versa) was observed to be stationary. This is confirmed through conducting a series of unit root tests utilizing both ADF and Phillip-Perron (PP) tests¹³. There is thus no evidence of cointegration or a long-run relationship between the three variables. Thus, an ARDL (Autoregressive distributed lag) model was run for analysing the short-run dynamics. Following the commonly used process of general to- specific methodology (Hendry, 1974 and 1977), we include four-quarter lags ($t - 4$) of the key explanatory variables in the first stage of the OLS test. On the next sequential stages, we drop all the insignificant lags and only consider the significant ones for the final stage of the estimating equation.

A priori, theoretically the coefficient of lagged differenced bilateral exports are expected to be negative as high growth in export demands during the period $(t - i)$ will, in all likelihood, lead to weaker export demand at period (t) . The coefficient estimates for lagged foreign income is expected to be positive, as rising aggregate demand (income) in Australia ought to stimulate Thailand's exports to Australia, and vice-versa. Finally, a rise in the price of the domestic good relative to the foreign good is expected to worsen the competitiveness of, and therefore the demand for, the local good in the foreign markets.

In the case of Thai exports to Australia, a statistically significant positive impact is observed for the income elasticity effect, the income effect, and time effect, while the lagged export growth effect is insignificant, as is the price effect. The results suggest that increase in lagged aggregate demand (income) in Australia by 1% is likely to stimulate an average increase of 1.5% in Thailand's exports to Australia, *ceteris paribus*.

In contrast, a statistically significant negative impact is observed for Thai exports to Australia for the price elasticity effect, past exports (previous quarter exports), and the

¹³ The detailed results of the unit root tests are not reported here, and are available from the authors on request.

interaction between the TAFTA and price elasticity. The results suggest that an increase in lagged RER growth not only reduces Thai exports to Australia by an average of 0.8% ceteris paribus, but that the negative price effect is stronger in the presence of the TAFTA than without it.

Table 15. Export Demand Model: Q1 1993: Q4 2012

Dependent Variable: Current Exports	Thai Exports to Aus	Aus Exports to Thailand
Lagged export growth	-0.117 (0.107)	0.206* (0.122)
Income Elasticity Effect (Lagged Foreign GDP growth)	1.55*** (0.375)	0.435 (0.307)
Price Elasticity Effect (Lagged RER growth)	-0.764* (0.395)	-0.613 (0.389)
Lagged Exports	-0.604*** (0.110)	-0.963*** (0.168)
Income Effect (Lagged Foreign GDP)	0.358*** (0.110)	1.045*** (0.246)
Price Effect (Lagged RER)	-0.323 (0.344)	-0.582 (0.360)
Time Effect	0.014*** (0.004)	0.011*** (0.004)
TAFTA Dummy	3.334 (2.300)	1.134*** (0.342)
Interaction TAFTA and Lagged Aus GDP	0.192 (0.296)	
Interaction TAFTA and Lagged RER	-1.622** (0.635)	
Interaction TAFTA and Time Effect		-0.211*** (.007)
Constant		-7.49*** (2.526)
Adjusted R-Squared	0.384	0.352
Number of Observations	76	76
F statistic	5.74***	5.52***
Root MSE	0.138	0.168

Note; Standard errors are in parentheses.

*, **, *** suggests coefficient is statistically significant at 10%, 5% and 1% levels of significance respectively.

The observed statistically insignificant impact of the TAFTA on Thai exports to Australia could be due to the limited impact of the TAFTA on trade barriers in Australia, as

Thai exporters already enjoyed low tariffs prior to implementation of the TAFTA. The insignificant income effect observed in presence of TAFTA confirms that the TAFTA agreement had no impact on Thailand's demand for Australian exports even while the Australian economy was growing.

In the case of Australian exports to Thailand, a statistically significant positive impact is observed for lagged export growth, the income effect, time and the TAFTA dummy. Price, income elasticity and price elasticity effects here are also insignificant. Results suggest that, while a 1% increase in past period aggregate demand (income) in Thailand stimulates an increase in Australian exports to Thailand by 1.04%, on average, *ceteris paribus*; Australian exports are not sensitive to income or price changes in Thailand over time.

The results further suggest that, while the TAFTA has had a positive, significant impact on bilateral exports from Australia to Thailand, increasing bilateral exports on an average by 1.1%, *ceteris paribus*, the impact on Thai exports to Australia due to TAFTA has been insignificant (see Table 14). Theoretically expected signs are observed for income and price effects for both Thai exports to Australia and vice-versa.

A statistically significant negative impact is observed for Australian exports to Thailand for past exports (previous quarter exports), and the interaction between the TAFTA and time, suggesting that over time, bilateral exports from Australia to Thailand are more likely to decline in the presence of the TAFTA than without it. This could be due to possible trade diversion faced by Australia as a result of the Thai-NZ FTA, which also came into effect in 2005, and subsequent membership of both countries in the wider regional AANZFTA, which came into effect from 2010.

VII. Conclusions and Policy Implications

Since the 1990s, trade relations between Australia and Thailand have significantly changed. These changes are reflected in the bilateral trade patterns and trade performance of each

nation in the other's market. Australia's share in Thailand's trade and Thailand's share in Australia's trade have improved between 1990 and 2011. The composition of bilateral trade has also changed over the years. In the case of Australia, the importance of manufactured goods (SITC6) as one of the key export commodity groups significantly decreased. Its ratio of total exports to Thailand decreased from 43.5% in 1990 to 14.0% in 2011. On the contrary, the share commodity group SITC9 (otherwise not classified) increased dramatically from 1.7% in 1990 to 39.6% in 2011. Interestingly, gold and non-monetary goods (SITC97) constituted between 97.4% and 99.6% of the goods under the SITC9 commodity group during 1990-2011. For Thailand, it lost ground in terms exporting food and live animals (SITC0). The contribution of this group of commodities to Thailand's total exports to Australia decreased from 32.5% in 1990 to 9.6% in 2011. Another commodity which lost market share in Australia was manufactured goods (SITC6). Its relative share decreased from 23.9% in 1990 to 9.7%. Surprisingly, the increase in the ratio of Thailand's export of machinery and transport equipment to Australia has been quite impressive, increasing from 10.2% in 1990 to 54.9% in 2011. Most of the goods in this commodity group came from Thailand's automobile sector (mainly vehicles) whose contribution, to SITC6, increased from a mere 2.6% in 1990 to 64.7% in 2011.

In terms of trade performance, Australia has lost competitiveness in food and live animals, and mineral fuels and lubricants perhaps due to its shift in export focus to crude materials. Whereas Thailand has automotive vehicles driving exports to Australia, Australia has no equivalent export industry for Thailand. This is surprising given the high RCAI in crude materials; Australia's speciality. The CITS analysis exhibits that Thailand has little need for Australia's crude materials, regardless of how good Australia is at producing them.

There has been a remarkable shift in Australia's trade policy since the 1980s. Australia has gradually deregulated its industrial sector by withdrawing government protection for domestic industries. Unfortunately, this sector has remained globally

uncompetitive. On the contrary, the growth in demand for Australian mineral resources has contributed to significant expansion of the mining sectors. Side by side, Thailand's demand for this group of commodities has also increased. The increase in share of SITC3 (mineral fuels, lubricants and related) to Australia's exports to Thailand demonstrates this. The high value of the Australian dollar has also made Australian manufacturers less competitive in international markets when exporting their products.

The change in Australia's composition of trade has been driven by a rise in the RCAI index for mineral fuels since 2005 and a fall for manufactured goods since 2000. CMS analysis also indicates volatility in the commodity composition effect and competitiveness residual.

The composition of Thailand's exports to Australia has changed even more dramatically. The share of manufactured goods, food and live animals fell considerably, and has been replaced by a rise in the export of machinery and transport equipment in the period 1990-2011. In general, there has been a strong upward trend in Thailand's export sector, with export commodities aligning with Australia's import needs. This has not been the case for the reverse trade flow. The categories of food and live animals, and crude materials for which Thailand has maintained a specialisation in and has been aligned with Australian import needs have not performed well relative to the domination of automotive exports to Australia. Considering the low specialisation (still above unity) of machinery and transport equipment which Thailand has exhibited, it is profound that since 2000 this commodity group constituted more than 50% of Thailand's exports to Australia. This is reflective of Australia's huge need for relatively inexpensive imported cars.

In a more general sense, the evidence from CMS suggests the changes in Thailand's exports to Australia have been driven mainly by Thailand's competitiveness as an exporter. CMS analysis finds that the competitiveness residual explains most of the difference between export and standard growth for Thailand. Although the TAFTA, as a determinate of trade

between Thailand and Australia, initially appeared to reinforce the trends of Thai export growth and export competitiveness, Thai competitiveness fell sharply from 2010. Australian competitiveness, as measured by CMS, appears to be unaffected by the implementation of the TAFTA.

Evidence from our export demand model suggests that while the positive effect of the TAFTA is larger for Thai exports to Australia than Australian exports to Thailand, the effect is only significant for Australian exports. As already discussed in Section IV (vi), this result could be due to Australia's comparatively higher level of openness prior to the TAFTA, meaning the relative reduction in tariff rates for Thai exporters is minimal compared to that experienced by Australian exporters.

Experience from the TAFTA could be used by Australian policy makers to design and establish future FTAs with Southeast nations which have similar economic characteristics to Thailand. Australia's membership with the same country in three different FTAs (bilateral, regional and cross-regional) could throw up additional challenges of utilization of these agreements for actual business purposes. Australia should be aware that the distribution of gains from establishing a free trade agreement may be distributed unevenly if the trading partners do not have the same level of development, similar tariff structures or similar socio-economic characteristics as in the case of the TAFTA. Policy makers in Thailand however, should be encouraged to reduce trade barriers in the coming years in order to establish more FTAs for the enhancement of this newly industrialising country's export opportunities and to promote economic growth. In this sense, it is part of Australia's global responsibility to engage in FTAs with developing nations to encourage and participate in their development.

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APPENDIX Measurement of Trade Competitiveness

(i) Revealed Comparative Advantage Index

Balassa (1965) introduced the **export specialisation ratio** as a measure of comparative advantage. He examined the effects of trade liberalisation in the long-run, inferring that the changing commodity pattern of trade reflects changing relative costs as well as differences in non-price factors. In this sense, changes in comparative advantage were ‘revealed’ over time and so developed the **revealed comparative advantage index (RCAI)**. Some difficulties exist with the measure. For example, the assumptions made are relatively unrealistic, such as the uniformity of tastes and import duties. Also, the calculation may be distorted by trade barriers. Nonetheless, the aim of the measure was to determine and show the benefits of international specialisation and associated economies of scale. The index is given by:

$$RCAI_{ij} = \frac{X_{ij}/X_i}{X_{wj}/X_w} \quad (1)$$

Where X_{ij} is country i 's exports of product j , X_i is country i 's total exports, X_{wj} is world exports of product j , and X_w is world exports. A value of unity implies the export performance of country i for product j matches its relative size as an exporter. Any revealed comparative advantage index greater than one implies country i exports a particular good above what should be expected given its size therefore suggesting country i has a competitive advantage in that commodity.

(ii) Cosine Index of Trade Similarity

The cosine index of trade similarity is designed to show the extent to which a nation's exports are compatible with another nation's imports (Linnermann, 1966). In this sense, it is a useful approximation of the potential for trade between nations. The index is calculated as follows:

$$CITS_{ij} = \frac{\sum_k x_{ik} m_{jk}}{\sqrt{\sum_k x_{ik}^2 \sum_k m_{jk}^2}} \quad (2)$$

Where i , j and k refer to the exporting country, importing country and commodity class, respectively. Further x and m refer to exports and imports, respectively. This index is the cosine of the angle between the vector of country i 's exports x , and the vector of country j 's imports m . The index varies between zero and one. A value of unity implies that the nation's exports are very similar to its partner's imports, making bilateral trade likely. In contrast, a value of zero implies there is no potential for trade.

(iii) Net Exports Ratio

The net export ratio reflects the magnitude of the trade balance between two nations for a given commodity and is expressed as a percentage. It is constructed as follows:

$$nx_{ij} = \left(\frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \right) \quad (3)$$

Where X_{ij} is country i 's exports of commodity j to a given nation and M_{ij} is country i 's imports of commodity j to the same given nation.

The index ranges between -100%, when the good is imported to country i but not exported, and +100%, when the good is exported from country i but not imported. The net exports ratio can be used as an approximation to identify which country has a comparative advantage in each industry. The net export ratio differs from the revealed comparative advantage index in that it considers bilateral trade flows but suffers from similar problems.

(iv) Constant Market Share Analysis

The CMS analysis was designed to decompose various sources of export growth. Assuming a country's share of exports in world markets remains unchanged over time, export growth may be divided into structural and 'competitiveness' terms. According to Leamer and Stern (1970) CMS analysis could be used to indicate to policy makers the most advantageous distribution of exports and to provide reasons as to why export growth might not reach its potential. The measure is set out below:

$$\underbrace{\frac{E_{ij} - E'_{ij}}{E'_{ij}}}_{\text{export growth}} = \underbrace{r_{wj}}_{\text{standard growth}} + \underbrace{\frac{\sum_{k=1}^{comm} (r_{kwj} - r_{wj}) E'_{kij}}{E'_{ij}}}_{\text{commodity consumption}} + \underbrace{\frac{\sum_{k=1}^{comm} (E_{kij} - E'_{kij} (1 + r'_{kwj}))}{E'_{ij}}}_{\text{competitiveness}} \quad (4)$$

$$r_{wj} = \frac{W_{wj} - W'_{wj}}{W'_{wj}} \quad (5)$$

$$r_{kwj} = \frac{W_{kwj} - W'_{kwj}}{W'_{kwj}} \quad (6)$$

Where r_{wj} is growth of world exports to Country j , r_{kwj} is growth of world exports of commodity k to Country j , E_{ij} is Country i 's exports to country j , E'_{ij} is Country i 's exports of commodity k to Country j , W_{wj} is World exports to Country j , and W_{kwj} is World exports of commodity k to Country j . An apostrophe denotes the previous time period.

The terms on the right-hand-side represent the standard growth component (5), the commodity composition effect and the competitiveness residual respectively. The standard growth component measures the growth in world exports to country j . Discrepancies between world export growth and country i 's export growth to country j can be attributed to the commodity composition effect and the competitiveness residual. The commodity composition effect shows the extent to which country i is exporting commodities in high demand from country j . The competitiveness residual is assumed to be the change in export performance caused by a change in the competitiveness of country i 's export industry. A positive competitiveness residual suggests country i 's export growth to country j exceeds world growth for most commodities. The analysis can also be expanded to examine cases for multilateral trade flows, in which case a market distribution effect is also included.

Despite the appeal of CMS analysis, Richardson (1971) has identified some 'fundamental' problems with the tool, both theoretical and practical. On a theoretical basis, the 'competitiveness' residual, might not accurately convey changes in relative price competitiveness and could encompass changes in other factors not normally associated with competitiveness. Practical difficulties include the 'arbitrary' assumptions that have to be

made, for example, the levels of commodity aggregation. Such questioning of the basis of CMS analysis erodes its policy relevance. Nevertheless, CMS analysis remains a useful tool to analyse and decompose different influences on trade flows.

(v) Trade intensity indices

The **trade intensity index (TII)** is the ratio of two trade shares, the numerator being the share of the destination of interest (ie Thailand) in the trade of the region under study (ie Australia), and the denominator being the share of the destination of interest (Thailand) in the trade of the world. The statistic indicates whether or not a region trades more (as a percentage) with a particular country than the world does on average. Similarly, the export intensity index is the ratio of two export shares. It is effectively a uniform export share.

The TII is calculated as follows:

$$TII_{ij} = \frac{T_{ij}}{T_i} / \frac{T_{iw}}{T_w}$$

Where T_{ij} is the bilateral trade between countries i and j , T_i is country i 's total trade, T_{iw} is country i 's trade with the world and T_w is total world trade.

The closer the numerator and the denominator are in value to one another, the closer the TII is to the value of 1, the more neutral the bilateral trading relationship.

A TII greater than 1 means countries have a preference for trading with one another - the relationship is relatively important. An advantage of the TII is that it benefits from a lack of 'size' bias, so the statistic can be compared across regions, and over time when exports are growing rapidly.

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