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**ASEAN-New Zealand Trade Relations  
and Trade Potential**

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## **Abstract**

This paper explores trade development by the Association of South East Asian Nations (ASEAN) with a particular reference to New Zealand and in the context of free trade agreements and partnerships. It describes the history of ASEAN, its trade composition, diversity and intensity. The paper includes an analysis of Kojima indices of trade intensities, the trade potential index and a gravity trade model using panel data and multivariate analysis. Hypotheses derived from trade theories are then tested to identify the key determinants of trade and the implications for policy. Overall, the study shows that economic integration has had a positive impact on ASEAN nations and with New Zealand and with ongoing potential.

## **Key Words**

international trade  
regional economic integration  
trade potential  
ASEAN-New Zealand trade  
FTA  
CEP

## **JEL Classification**

F10; F02; F13; F14; F15

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## **1. INTRODUCTION**

The Association of Southeast Asian Nations (ASEAN) was established in August 1967. The founding members were Indonesia, Malaysia, the Philippines, Singapore and Thailand. Subsequently, Brunei joined in January 1984; Vietnam in July 1995; Laos and Myanmar in July 1997 and Cambodia in April 1999. According to the 2006 ASEAN Statistics Year book, ASEAN countries had a combined regional population of around 560 million people, a total area of 4.5 million square kilometers, a combined gross domestic product of around US\$1,100 billion and total trade of around US\$1,400 billion per annum.

In 1976, member countries signed the Treaty of Amity and Cooperation in Southeast Asia. This treaty sets out the basic principles of their relationship and the conduct of the Association's plans for cooperation including:

- (a) Mutual respect for the independence, sovereignty, equality, territorial integrity and national identity of all nations;
- (b) The right of every state to lead its national existence free from external interference, subversion or coercion;
- (c) Non-interference in the internal affairs of one another;
- (d) Settlement of differences or disputes by peaceful means and renunciation of the threat or use of force and effective cooperation among themselves.

The aim and purpose of the ASEAN Declaration states is to (a) accelerate economic growth, social progress and cultural development in the region through joint endeavours in the spirit of equality and partnership and so strengthen the foundation for a prosperous and peaceful community and (b) to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship amongst countries in the region and adherence to the principles of the United Nations Charter.

## **2. ASEAN-NEW ZEALAND DIALOGUE**

### **2.1 General Background**

New Zealand became a dialogue partner to ASEAN in 1975. The Trade and Investment Promotion Programme (TIPP) of 1991 is an important part of the ASEAN-New Zealand dialogue. Its goal is to promote trade and investment with an emphasis on the expansion of ASEAN exports and New Zealand investments. As well as discussions with New Zealand directly, the ASEAN-New Zealand relationship is also being pursued within the framework of a closer economic partnership (CEP) between AFTA and the Closer Economic Relations (CER) between Australia and New Zealand.

In 1995, ASEAN and CER Trade and Economic Ministers agreed to establish a dialogue to facilitate trade and investment linkages between the regions. At a meeting in September 1996, ASEAN and CER Ministers signed a Memorandum of Understanding (MOU) to promote cooperation on standards and conformance. The 13th Consultation between the ASEAN Economic Ministers (AEM) and the Ministers of Australia and New Zealand (CER)

was held in Singapore on 28 August 2008. The Consultation was chaired by H.E. Lim Hng Kiang, Minister for Trade and Industry, Singapore; the Honourable Simon Crean, the Australian Minister for Trade and the Honourable Phil Goff, the then New Zealand Minister of Trade.

## **2.2 ASEAN-Australia and New Zealand FTA**

The Ministers welcomed the conclusion of the negotiations between ASEAN, Australia and New Zealand Free Trade Agreement (AANZFTA), which started in March 2005. They commended the ASEAN-Australia-New Zealand Trade Negotiating Committee (AANZTNC) and its Working Groups for completing the negotiations and forging a comprehensive single undertaking FTA Agreement between ASEAN and CER. Commitments were given to resolve a small number of bilateral market access issues between certain parties.

Negotiations on the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) were concluded at the 13<sup>th</sup> ASEAN Economic Ministers-Closer Economic Relations (AEM-CER) consultations held in Singapore on 28 August 2008. The Agreement is recognised as an important milestone in the long-standing ASEAN-CER partnership. It will allow for an enhancing of the region's economic integration and act as an impetus to deepen and broaden the trade and investment ties among the twelve participating countries. The Agreement is comprehensive in scope covering trade in goods and services, investment, electronic commerce, movement of natural persons, intellectual property, competition policy and economic cooperation.

The ASEAN-Australia-New Zealand FTA was signed at the 14th ASEAN Summit in Thailand on 27 February 2009. This signing came six months after the conclusion of negotiations between the nations in August 2008. The joint media statement released following the signing stated that 'Ministers were confident that the AANZFTA Agreement not only provides a platform for ASEAN, Australia and New Zealand to work together towards sustainable growth and development - thereby, strengthening regional economic integration - but also serves as a building block for the WTO Doha Development Agenda and a stronger multilateral trading system' (ASEAN Secretariat, 2009). This is the first region agreement signed by these countries, and also the first that Australia and New Zealand have signed jointly with other trading partners. The agreement has been given practical effect through the signing of an Implementing Arrangement. This involves a five-year Economic Cooperation Work programme to support implementation of the AANZFTA.

The AANZFTA Agreement effectively creates a free trade area of over 600 million people with a combined GDP of US\$ 2.3 trillion. This is expected to have reached US\$ 2.7 trillion, according to the IMF forecast for 2008 (ASEAN Secretariat, 2009). Intra-regional trade between ASEAN, Australia and New Zealand, has been growing an average of about 16 per cent per annum since the start of the FTA negotiations in 2005 (ASEAN Secretariat, 2009). The AANZFTA Agreement will enter into force sixty days after Australia and New Zealand, and at least four ASEAN Member States have notified completion of their ratification processes.

### 3. ASEAN Economic Indicators

**Table 1: ASEAN Nations GDP 2000-2007**

USD millions

Country	2001	2002	2003	2004	2005	2006	2007
Brunei Darussalam	5,601	5,847	6,540	7,864	9,528	11,460	12,317
Cambodia	3,783	4,027	4,664	5,131	6,250	7,256	8,662
Indonesia	164,805	196,303	234,997	239,134	284,790	364,400	431,718
Laos	1,740	1,805	2,135	2,518	2,860	3,522	4,128
Malaysia	88,001	95,263	103,992	124,750	137,179	156,924	186,961
Myanmar	6,935	7,095	11,747	10,585	11,169	12,030	12,633
The Philippines	71,985	76,648	79,578	86,912	98,757	118,083	146,895
Singapore	85,659	88,107	92,372	107,464	116,639	132,273	161,546
Thailand	115,595	126,880	142,863	161,386	176,407	206,951	245,702
Viet Nam	32,647	35,066	39,535	45,544	52,953	60,965	71,292
<b>ASEAN</b>	<b>576,749</b>	<b>637,046</b>	<b>718,393</b>	<b>791,467</b>	<b>896,533</b>	<b>1,073,866</b>	<b>1,281,854</b>
<b>NZ</b>	<b>51,327</b>	<b>67,856</b>	<b>89,148</b>	<b>105,928</b>	<b>108,417</b>	<b>105,985</b>	<b>129,051</b>
<b>Australia</b>	<b>353,677</b>	<b>415,738</b>	<b>588,548</b>	<b>653,612</b>	<b>712,436</b>	<b>768,121</b>	<b>921,724</b>

Source: GDP: ASEAN Statistics, ASEAN Secretariat website, World Economic Outlook database (NZ and Australia); Population: World Economic Outlook database.

**Table 2: ASEAN Nations GDP per capita 2000-2007**

USD 000s

Country	2001	2002	2003	2004	2005	2006	2007
Brunei Darussalam	16.4	16.7	18.3	21.5	25.5	30.0	31.6
Cambodia	0.3	0.3	0.3	0.4	0.4	0.5	0.6
Indonesia	0.8	0.9	1.1	1.1	1.3	1.6	1.9
Laos	0.3	0.3	0.4	0.5	0.5	0.6	0.7
Malaysia	3.7	3.9	4.2	5.0	5.3	6.0	7.0
Myanmar	0.1	0.2	0.2	0.2	0.2	0.2	0.3
The Philippines	0.9	1.0	1.0	1.0	1.2	1.4	1.7
Singapore	20.9	21.2	21.9	25.1	27.0	30.2	36.4
Thailand	1.9	2.1	2.3	2.6	2.8	3.3	3.8
Viet Nam	0.4	0.4	0.5	0.5	0.6	0.7	0.8
<b>ASEAN</b>	<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>1.6</b>	<b>1.9</b>	<b>2.2</b>
<b>NZ</b>	<b>13.2</b>	<b>17.2</b>	<b>22.3</b>	<b>26.2</b>	<b>26.5</b>	<b>25.6</b>	<b>30.9</b>
<b>Australia</b>	<b>18.3</b>	<b>21.2</b>	<b>29.7</b>	<b>32.5</b>	<b>35.1</b>	<b>37.4</b>	<b>44.4</b>

Source: GDP: ASEAN Statistics, ASEAN Secretariat website, World Economic Outlook database (NZ and Australia); Population: World Economic Outlook database.

Indonesia has the highest GDP of the ASEAN nations, significantly higher than that of the other four founding nations. GDP has approximately doubled between 2001 and 2007 for Brunei, Cambodia, Laos, Malaysia, the Philippines, Thailand, Viet Nam, and the ASEAN region as a whole. Relatively lower levels of growth, but still high by world standards, have occurred in Singapore and Myanmar. Indonesia's growth has more than doubled over this

period. Approximately 91% of the total GDP of the ASEAN region is made up of the founding five ASEAN nations.

Brunei Darussalam and Singapore both have significantly higher per capita incomes than the other ASEAN nations, of an order of magnitude of more than four times that of the next highest, Malaysia. After Malaysia, Thailand is the only other nation to be above the ASEAN average GDP per capita of USD 2,227. Myanmar has easily the lowest GDP per capita, at only around USD 300.

### 3.1 ASEAN Nation Correlations between GDP and Trade

It is clear from Table 3 that there is a strong correlation between growth in GDP and growth in trade. Correlation does not of course imply causation, but the link is interesting. Virtually all of the values given are above 0.9, which shows that GDP and trade values move together closely. The import value correlations with GDP for Myanmar and Brunei are the only exceptions to this. The total trade (X + M) column reveals a very high correlation with GDP of 0.94 or greater for all of these ASEAN nations.

**Table 3: Correlation between GDP and Total Exports, Total Imports and Total Trade**

Country	Exports ( $X$ )	Correlation with GDP Imports ( $M$ )	Exports + Imports
Cambodia	0.97	0.97	0.97
Indonesia	0.93	0.97	0.96
Laos	0.96	0.95	0.97
Malaysia	0.99	0.99	0.99
Myanmar	0.95	0.69	0.90
The Philippines	0.92	0.97	0.95
Singapore	0.97	0.98	0.98
Thailand	0.92	0.96	0.94
Viet Nam	0.97	0.96	0.97

*Source:* World Economic Outlook Database (2008), UNCTAD Statistical Handbook (2008)

### 3.2 ASEAN Population

Table 4 shows that the population of the ASEAN region makes up approximately 8.5% of total world population. The table also shows that the ASEAN population is growing at a faster rate than overall world population, as the ASEAN share of total world population continues to grow. The overall population of the ASEAN nations is greater than that of NAFTA, and this gap is widening. This indicates a higher population growth rate in the ASEAN nations. As the ASEAN nations are developing countries, this result is not surprising. It does however demonstrate the importance of ASEAN as a large and growing market.

**Table 4: ASEAN Population: Total and Percentage of World Population, 1990-2007**

	1990	1995	2000	2005	2007
ASEAN ('000's)	439834	480438	519178	556602	571346
Percent of World Population	8.31	8.40	8.48	8.54	8.56

Source: World Economic Outlook Database, 2008

### 3.3 ASEAN Exports and Imports

Table 5 shows that ASEAN exports as a share of world exports have increased from 4.3% in 1990 to the current level of over 6%, as reported in the ASEAN Statistical Yearbook. The lower value of 6.06% in 2005 was of concern to the ASEAN countries. This increased to 6.26 in 2007. The top five exported commodities from the ASEAN nations for 2006 were: (85) electronic machinery, equipment and parts; sound equipment; television equipment, (27) mineral fuels, mineral oils and products of their distillation; bitumen substances; mineral wax, (84) nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, (39) plastics and articles thereof, (29) organic chemicals. (Reported in ASEAN Statistical Yearbook 2006 by HS Classification.)

**Table 5: ASEAN Export Share in World Exports 1995 – 2007, Percentage**

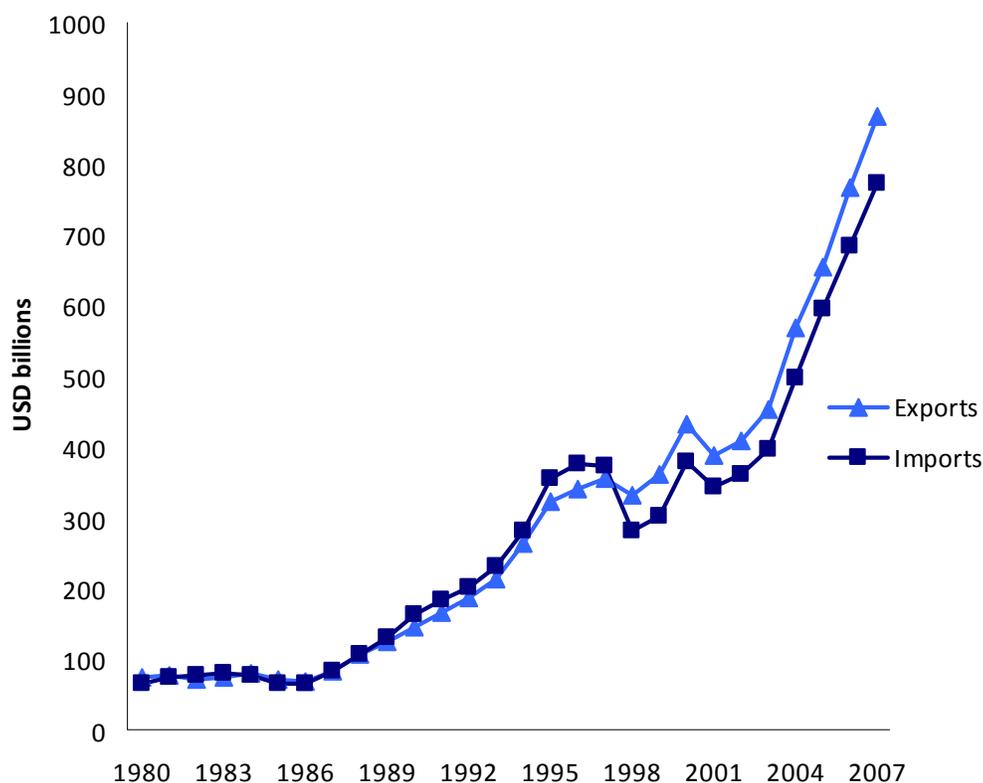
	1990	1995	2000	2005	2007
Exports	4.3	6.37	6.68	6.06	6.26
Imports	3.94	6.20	5.24	5.03	5.49

Source: ASEAN Statistical Yearbook, various editions. UNCTAD Statistical Handbook (2008).

Table 5 also shows that ASEAN imports as a share of world imports increased rapidly in the early 90's from 3.94% in 1990 to 6.2% in 1995. This has since declined somewhat to the 2005 level of just over 5%. In each of the years given, ASEAN's share of global exports is higher than its share of global imports. This indicates a strong export focus in the region. The growth rate of imports to ASEAN from the world, and exports from ASEAN to the world have followed very similar paths over time as shown in Figure 1.

Growth in ASEAN trade with the world was initially quite low immediately following the formation of the regional economic arrangement in 1967. The rate of growth continued to be relatively low until the late 1980s, where it began to increase and ASEAN trade (both imports and exports) with the world exceeded 100 billion USD for the first time. From this point onwards, both ASEAN imports and exports have continued at a strong growth rate, reaching 200 billion USD by 1992, and 300 billion USD by 1995. Exports levelled out at approximately 350 billion US in 1997 during the Asian financial crisis, while imports from the world into ASEAN took a dive during 1998 to well below 300 billion. This separation has been maintained following the recovery from the crisis during the early 2000's, and the value of exports from ASEAN to the world continued to exceed the value of imports into ASEAN from the world by more than 100 billion USD (this is largely driven by the approximately 70 billion USD trade surplus run by Malaysia).

**Figure 1: ASEAN–World Trade 1980-2007**



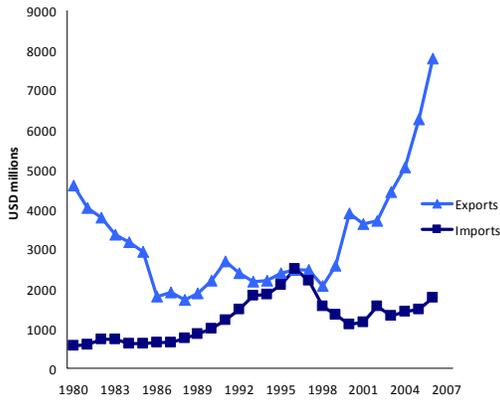
Source: UNCTAD Statistical Handbook 2008.

The Figure 2 shows that the Brunei's trade with the world has been somewhat erratic. Both imports from and exports to the world prior to 1980 were relatively low at less than half a billion USD. Growth in imports increased steadily to exceed 4 billion USD at around the time of the Asian financial crisis, but have since fallen dramatically to level out at approximately 1.5 billion USD in 2005. The value in Brunei's exports to the world increased sharply from a 1980 value of about half a billion to a 1981 value of approximately 4 billion. From 1981 to 2000 the value of exports fluctuated between 2 and 4 billion, but since the Asian financial crisis exports have grown rapidly to exceed 6 billion USD in 2005.

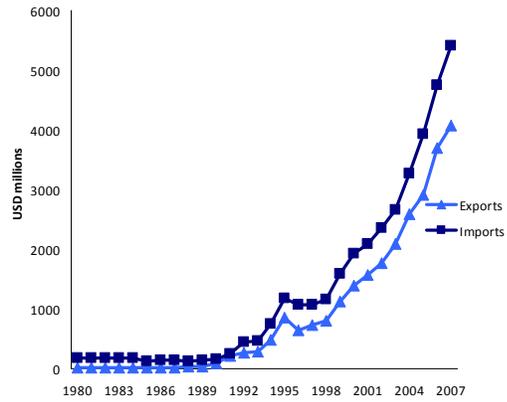
Cambodia's trade with the world was almost non-existent in terms of value prior to 1990. Since the early 1990's, both imports from and exports to the world have increased rapidly, with the value of imports exceeding that of exports by just under 1 billion USD in 2005. Growth in Indonesia's trade with the world has been more measured and less erratic than many of its fellow ASEAN members. Exports have grown relatively steadily over time to exceed 20 billion USD in the early 1980's, 60 billion in the late 1990's, and in 2005 were valued close to 100 billion USD. Imports have followed a similar path but at a lower level, reaching a 2005 value of just under 60 billion USD. This path is similar to that seen by Thailand, the Philippines, Singapore and Malaysia.

**Figure 2: ASEAN Trade with the World: By country over time (1980-2007)**

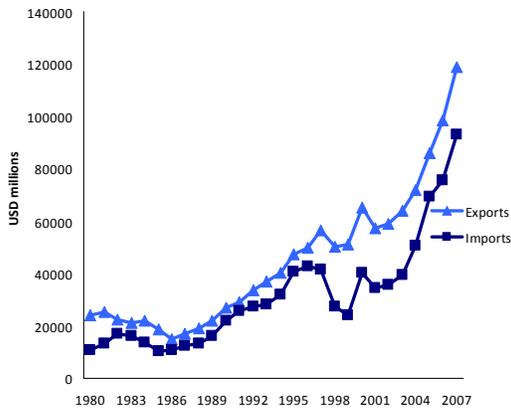
(a) Brunei



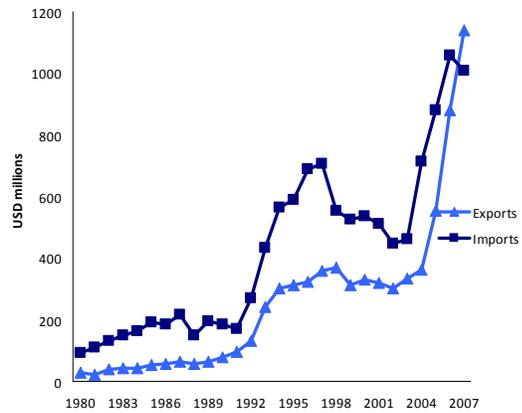
(b) Cambodia



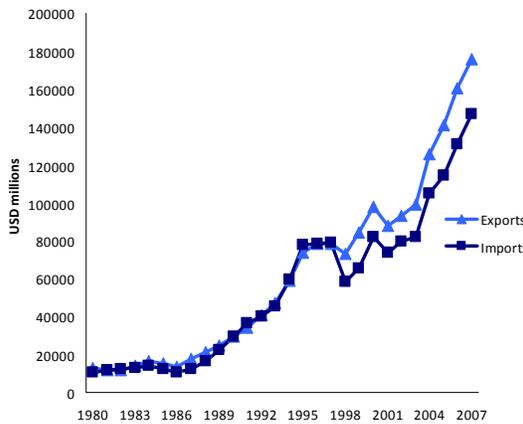
(c) Indonesia



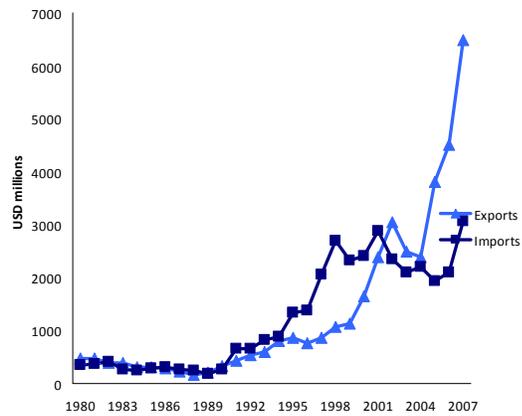
(d) Laos



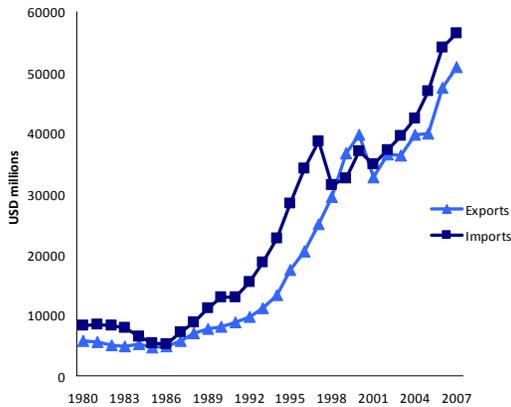
(e) Malaysia



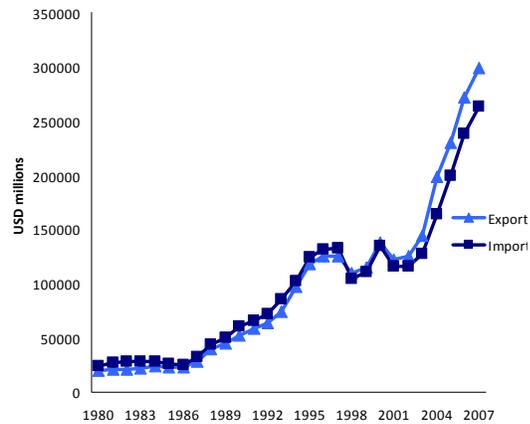
(f) Myanmar



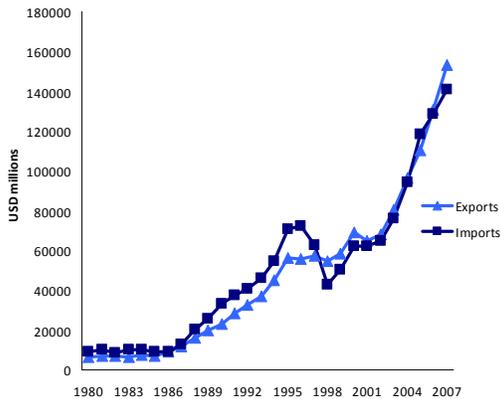
(g) Philippines



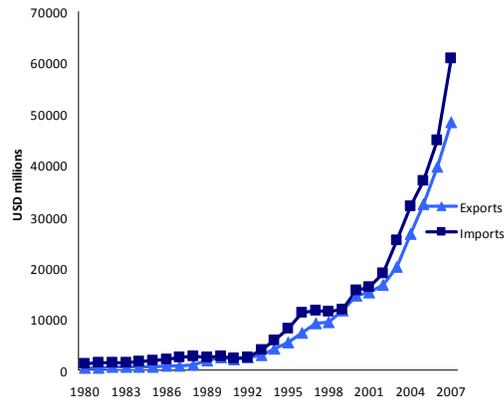
(h) Singapore



(i) Thailand



(j) Viet Nam



Source: UNCTAD Statistical Handbook 2008.

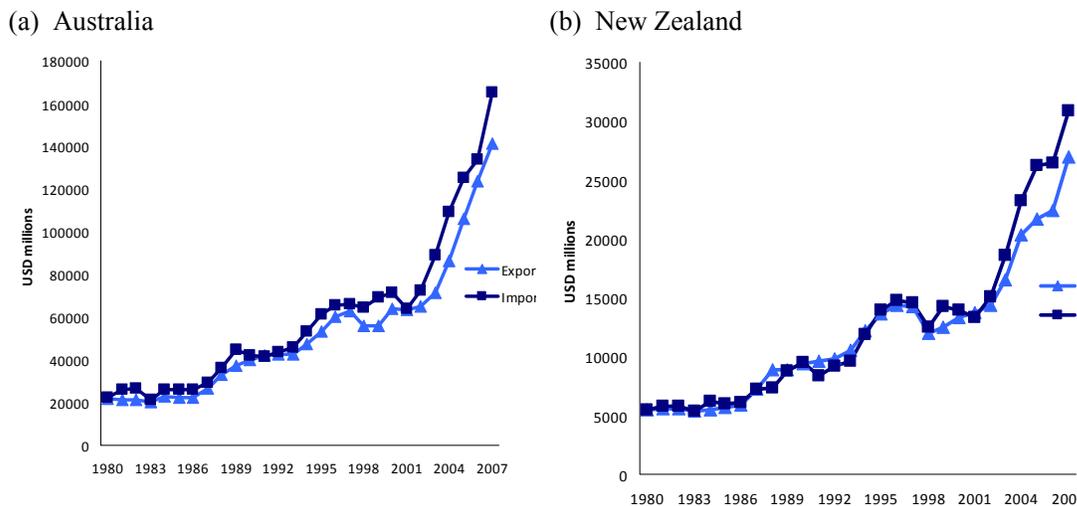
Laos is another member example of an ASEAN member whose trade with world has fluctuated considerably over time. As with Cambodia, Laos's trade was relatively low prior to 1990. In the early 1990s imports grew rapidly to exceed 800 million USD, while exports also grew to close to 500 million USD. The values of both imports and exports fluctuated over the 1990s, but the value of imports has shown growth trend since the late 1990's. The value of imports into Laos in 2005 is approximately twice the value of exports from Laos at over 1.1 billion USD.

While all of the ASEAN countries have to some degree shown an exponential growth pattern in terms of their imports and exports, this is particularly visible in Viet Nam's trade with the world. After relatively insignificant trade levels prior to the late 1980s, at around

1990 exports and imports began to climb at an increasing rate to reach a 2005 value of nearly 35 billion USD. Apart from a short period in the early 1990s where imports exceeded exports, the import and export growth has followed almost identical paths. Viet Nam's trade growth paths also appear to have been least affected by the Asian financial crisis when compared with the other ASEAN nations. Of the ASEAN-5, all except the Philippines have export values which exceed import values. This demonstrates that these are export orientated economies. Myanmar, Laos, and Brunei also have export values which exceed import values.

Figures 3(a) and 3(b) show fairly similar growth paths for both Australia and New Zealand. Both had low rates of growth in imports and exports throughout the early and mid 1980's. This was followed by a relatively steady but steeper growth in trade up until the 2000's. Since 2001, both countries have experienced high growth in both values of imports and exports. Prior to 2000, differences between values of imports and exports were relatively insignificant. In more recent years however, the difference between imports and exports has become more pronounced for both countries, with imports exceeding exports.

**Figure 3: New Zealand - Australia CER Trade with the World: By country 1980-2007**



Source: UNCTAD Statistical Handbook 2008.

### 3.4 ASEAN's Major Trading Partners

Table 6 shows that the total value of imports into the ASEAN region are significantly lower than the values of exports from the ASEAN region. Approximately a quarter of total ASEAN imports and exports are to other ASEAN nations. NAFTA and the EU make up relatively similar shares of trade with ASEAN, although the ASEAN-USA trade by itself is approximately equal to the ASEAN-EU trade. For both NAFTA and the EU the value of exports from ASEAN to these blocks significantly exceeds the value of imports into ASEAN. Japan and China each also make up more than ten percent of ASEAN's total trade. The value of imports from Japan, and exports to Japan, are approximately equal. For China, however, the value of imports to ASEAN exceeds the value of exports from ASEAN. This is at odds with the trade balance experienced with other major ASEAN trading partners.

**Table 6: ASEAN Trade by Selected Partner Country/Region 2006**  
(Value in US\$ millions, share in percent)

Partner Country/Region	Exports		Imports	
	Value	Share	Value	Share
Intra-ASEAN	189,176.8	25.2	163,594.5	25.0
NAFTA (USA and Canada)	100,859.9	13.4	67,222.8	10.3
EU-25	94,471.8	12.6	66,118.1	10.1
Japan	81,284.9	10.8	80,495.6	12.3
China	65,010.3	8.7	74,950.9	11.5
Total Selected Partner Country / Region	530,803.7	70.7	452,381.9	69.2
Others	219,904.1	29.3	201,715.9	30.8
Total	750,707.8	100.0	654,097.8	100.0

*Note:* 2006 is the most recent statistical update on the ASEAN Secretariat website (March 2009).

*Source:* ASEAN Secretariat Statistics 2007.

### 3.5 Tariffs: Intra-ASEAN

**Table 7: ASEAN Tariff Commitment Information**

Country	2007 Commitments	2008 Commitments	Long-Term Commitments
Brunei D.	80% at 0 tariffs		All import duties removed by 2010
Cambodia	80% at 0-5 tariffs	Tariff elimination of the 1st tranche of ICT products	All import duties removed by 2015
Indonesia	80% at 0 tariffs		All import duties removed by 2010
Lao PDR	90% at 0-5 tariffs	60% at 0 tariffs	All import duties removed by 2015
Malaysia	80% at 0 tariffs	Tariff elimination of the 1st tranche of ICT products	All import duties removed by 2010
Myanmar	90% at 0-5 tariffs	60% at 0 tariffs.	All import duties removed by 2015
Philippines	80% at 0 tariffs	Tariff elimination of the 1st tranche of ICT products	All import duties removed by 2010
Singapore	80% at 0 tariffs		All import duties removed by 2010
Thailand	80% at 0 tariffs		All import duties removed by 2010
Viet Nam		Tariff elimination of the 1st tranche of ICT products	All import duties removed by 2015

*Source:* ICT (Information and Communications Technology), 2007 ASEAN CEPT Commitments, ASEAN Secretariat website; 2008 ASEAN CEPT Commitments, ASEAN Secretariat website; Southeast Asia- A Free Trade Area, ASEAN Secretariat Publication, 2002.

For goods originating from member nations, a common effective preferential tariff schedule (CEPT) exists. As of 1 January 2005, tariffs on 99 percent of the products in the Inclusion List (products had to undergo immediate liberalisation through reduction in intra-regional (CEPT) tariff rates) of the ASEAN-6 (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) were reduced to no more than 5 percent. More than 60 percent of these products have zero tariffs. The average tariff for ASEAN-6 had been reduced from more than 12 percent when AFTA started to 2 percent in 2005. For the newer

Member Countries, i.e. Cambodia, Lao PDR, Myanmar, and Viet Nam (CLMV), tariffs on about 81 percent of their Inclusion List have been reduced to within the 0-5 percent range. Under the 2007 CEPT commitments, the original members must reduce the tariff on 80 percent of the goods on the Inclusion list to 0 percent, while the newer members must reduce the tariffs on 90 percent of the goods on the Inclusion list to the 0-5 percent range. (ASEAN Secretariat website.)

### 3.6 Extra-ASEAN Trade Tariffs with New Zealand (prior to FTA)

Each nation within ASEAN is able to set its own tariff schedule for goods produced by countries who are not members of ASEAN, unlike other regional economic areas such as the EU. Under the Trans-Pacific Strategic Economic Partnership Agreement signed in 2005, tariffs were eliminated on 92% of New Zealand’s exports to Brunei. New Zealand and Indonesia enjoy an open trading relationship, where Indonesian applied tariffs on products exported by New Zealand are generally below 5 percent, but tariffs on some agricultural products remain high at up to 47 percent.

Malaysia is the ASEAN nation which New Zealand currently has the strongest trading relationship with in dollar terms. New Zealand and Malaysia have signed a bilateral trade agreement, and are currently negotiating a free trade agreement. Malaysia’s tariffs are relatively low for most goods, but may range between 0-30 percent. The Philippines has no trade agreement with New Zealand, and has a tariff regime under which most goods imported face a 0-10% tariff rate. New Zealand has a closer economic partnership agreement with Singapore (which came into force in 2001), under which tariffs have been eliminated. New Zealand also signed a closer economic partnership agreement with Thailand in 2005, under which 52% of New Zealand exports have had tariffs removed. New Zealand’s trade with Laos, Cambodia, Myanmar and Viet Nam remains very limited.

### 3.7 Australia–ASEAN Trade Value and Shares

Australia’s exports to ASEAN in 2007 were valued at over AUS\$18 billion in 2007, which equates to approximately 11% of total Australian exports. This value is similar, although slightly lower, than the two preceding years.

**Table 8a: Australia Exports to ASEAN as a Share of Total Exports**  
Values in AUS \$millions

	2005	2006	2007
ASEAN	15,862	18,784	18,194
WORLD	139,076	163,749	168,335
Percent	11.4	11.5	10.8

*Source:* Australian Department of Foreign Affairs and Trade (2007) Australia’s Trade with East Asia.

**Table 8b: Australia Imports from ASEAN as a Share of Total Imports**  
AUS\$ millions

	2005	2006	2007
ASEAN	28,007	35,131	37,033
WORLD	155,726	176,085	187,825
Percent	18.0	20.0	19.7

*Source:* Australian Department of Foreign Affairs and Trade (2007) Australia's Trade with East Asia

Australia's imports from ASEAN in 2007 were valued at over AUS\$37 billion in 2007, which equates to nearly 20% of total Australian imports. Imports from ASEAN to Australia are valued at approximately double the value of exports from Australia to ASEAN. ASEAN is clearly an important trading partner for Australia. The Australian Department of Foreign Affairs and Trade (DFAT) state that as a group, ASEAN is a larger trading partner for Australia than any single country, with trade in goods and services with the 10 ASEAN countries accounting for 16 percent of Australia's total trade (approximately AUS\$71 billion)(Australian Department of Foreign Affairs and Trade, 2007). Australia also supplies 70 per cent of ASEAN's wool imports, 97 per cent of ASEAN's live cattle imports, and more than 50 per cent of its alumina, salt and barley imports (Australian Department of Foreign Affairs and Trade, 2007).

### 3.8 Australia–ASEAN Trade Composition

**Table 9a: Australia's Most Significant Exports to ASEAN (AUS\$ millions) 2007**

Commodity	Exports Value	Share of Total ASEAN Exports
Aluminium	1,666	9.16
Milk and cream	698	3.84
Medicaments	580	3.19
Cotton	250	1.37
Uncoated flat steel	164	0.90

*Source:* Australian Department of Foreign Affairs and Trade (2007) Australia's Trade with ASEAN.

**Table 9b: Australia's Most Significant Imports from ASEAN (AUS\$ millions) 2007**

Commodity	Imports Value	Share of Total ASEAN Imports
Crude petroleum	9,680	26.14
Refined petroleum	5,911	15.96
Transport vehicles	2,014	5.44
Computers	1,622	4.38
Televisions	599	1.62

*Source:* Australian Department of Foreign Affairs and Trade (2007) Australia's Trade with ASEAN.

### 3.9 New Zealand–ASEAN Trade

The value of New Zealand's exports to ASEAN has increased at a steady rate of approximately 10% per annum. The proportion of New Zealand's total exports going to the ASEAN region also exhibits an upwards trend, from below 8% to just over 10% in 2007. The value of New Zealand imports from ASEAN have shown a general upwards trend, with a significant increase in the value of ASEAN imports occurring between 2005 and 2006 (a \$1,447,268,000 increase). The proportion of NZ imports from the ASEAN region also exhibits an upwards trend, from 8.45% in 2003 to 12.9% in 2007.

**Table 10a: NZ Exports to ASEAN 2003 – 2007, NZ\$000**

	2003	2004	2005	2006	2007
ASEAN	2,178,288	2,260,014	2,303,117	2,707,573	3,646,815
Percent	7.99	7.65	7.81	8.27	10.41

Source: ASEAN Secretariat Statistics 2007. New Zealand External Trade Statistics (various December editions), Statistics New Zealand.

**Table 10b: NZ Imports from ASEAN, NZ\$000**

	2003	2004	2005	2006	2007
ASEAN	2,685,873	3,372,831	4,117,019	5,564,287	5,670,959
Percent	8.45	9.66	11.05	13.65	13.54

Source: New Zealand External Trade Statistics (various December editions), Statistics New Zealand

Table 11 demonstrates that New Zealand's main export partners are Australia, the EU and the US. Of the ASEAN nations, the original five (Indonesia, Malaysia, the Philippines, Singapore and Thailand) are significant trading partners- each receiving close to two percent of New Zealand's exports. In terms of New Zealand imports, Australia, the EU, and the US remain important sources of imports. China is another key partner for imports, which provided over 13 percent of total New Zealand imports in 2007. Table 19 shows that for countries other than Australia, New Zealand is a relatively small source of exports and imports. New Zealand exports provide a significant share of total imports to the Philippines and Indonesia at close to 1 percent. New Zealand provides a relatively small export market for most of the nations listed here (again other than Australia). Of the ASEAN nations, New Zealand provides an export market for approximately half of a percent of the total exports from Indonesia, Malaysia, Singapore and Thailand.

**Table 11: New Zealand Bilateral Trade as a Percentage of Total NZ Trade, 2007**

Partner	Exports to Partner as a % of Total NZ Exports	Imports from Partner as a % of Total NZ Imports	X + M as a Percent of Total NZ Trade
Australia	21.95	20.59	21.22
EU	15.50	16.00	15.77
US	11.53	9.78	10.60
China	5.34	13.34	9.62
Japan	9.20	9.42	9.32
UK	4.49	2.59	3.47
Singapore	1.88	5.13	3.62
Malaysia	1.78	2.69	2.27
Thailand	1.55	2.69	2.16
Indonesia	2.13	1.75	1.92
Philippines	1.83	0.52	1.13
Viet Nam	0.99	0.32	0.63
Brunei D.	0.01	0.44	0.24
Myanmar	0.01	0.00	0.01
Lao PDR	0.00	0.00	0.00
Cambodia	0.00	0.00	0.00
Other (rest of the world)	26.30	17.35	21.49
World Total	100.00	100.00	100.00

Source: UN COMTRADE Database

**Table 12: New Zealand Bilateral Trade as a Percentage of Partner's Trade, 2007**

Partner	NZ Exports as a % of Partner's Imports	NZ Imports as a % of Partner's Exports	NZ Bilateral Trade as a % of Partners Total Trade
Australia	3.80	4.57	4.16
Philippines	0.85	0.32	0.60
Indonesia	0.77	0.47	0.59
Thailand	0.29	0.54	0.42
Malaysia	0.33	0.47	0.41
Japan	0.40	0.41	0.40
Singapore	0.19	0.53	0.37
Viet Nam	0.44	0.21	0.34
China	0.15	0.34	0.26
EU	0.21	0.29	0.25
UK	0.19	0.18	0.19
US	0.15	0.26	0.19
Myanmar	0.11	0.02	0.05
Lao PDR	0.06	0.00	0.03
Cambodia	0.02	0.02	0.02
Brunei D.	-	-	-
World	0.19	0.22	0.21

Source: UN COMTRADE Database, UNCTAD Statistical Handbook 2008.

#### **4. NZ-ASEAN: Composition of Trade; Agriculture Products**

All values in this section are given in \$NZ FOB and taken from New Zealand External Trade Statistics (various December editions) held by Statistics New Zealand.

##### **Agriculture**

The value of agriculture exports from New Zealand to the ASEAN region has fluctuated over the 2000 to 2007 period, with a low value of \$1,546,724,000 in 2003, and the highest value reached in 2007 at \$2,643,794,000. As a proportion of New Zealand's total agriculture exports to the world, the proportion exported to the ASEAN countries remained relatively constant at between 10 and 11% between 2000 and 2006, but jumped to 13.4% in 2007.

The value of imports into New Zealand from the ASEAN region has been growing over the 2000 to 2007 period, from \$172,803,000 to \$407,313,000. As a proportion of ASEAN's total exports to the world in Agriculture, the proportion exported to New Zealand has also exhibited an upwards trend, from a low of 6.8% in 2001 to a high of 11.3% in 2007.

##### **Meat Exports**

The value of exports from New Zealand to the ASEAN region has shown a general upwards trend in recent years (2003 onwards), from a low value of \$123,084,000 in 2003, and the highest value reached in 2007 at \$407,313,000. As a proportion of New Zealand's total meat exports to the world, the proportion exported to the ASEAN countries has followed the same trend, increasing dramatically from 2.7% in 2002 to 11.3% in 2007.

## NZ Dairy Exports

The value of exports from New Zealand to the ASEAN region has fluctuated over the 2000 to 2007 period, with a low value of \$1,178,914,000 in 2003, and the highest value reached in 2007 at \$1,924,707,000. As a proportion of New Zealand's total Dairy exports to the world, the proportion exported to the ASEAN countries has also fluctuated, with a low of 19.2% in 2006, and a high of 23.3% in 2001.

The Export Intensity Index (XII) provides additional insights into the secular changes in bilateral trade flow. The following formula is used to calculate the Trade Intensity Index (See Kojima 1964, Wadhva *et al.* 1985).

The Export Intensity Index (XII) formula is:

$$XII_{ij} = \left( \frac{\frac{X_{ij}}{X_i}}{\frac{M_j}{M_w - M_i}} \right)$$

where:  $X_{ij}$  = country  $i$  exports to country  $j$   
 $X_i$  = total exports of country  $i$   
 $M_j$  = total imports of country  $j$   
 $M_i$  = total imports of country  $i$   
 $M_w$  = total world imports  
 $XII_{ij}$  = export intensity index.

The average value of this index is equal to unity. If the index value is greater than unity, there is a higher degree of trade intensity between two given countries. If the value is closer to zero, there is a lower trade intensity.

The Import Intensity Index (III) formula is:

$$III_{ij} = \left( \frac{\frac{M_{ij}}{M_i}}{\frac{X_j}{X_w - X_i}} \right)$$

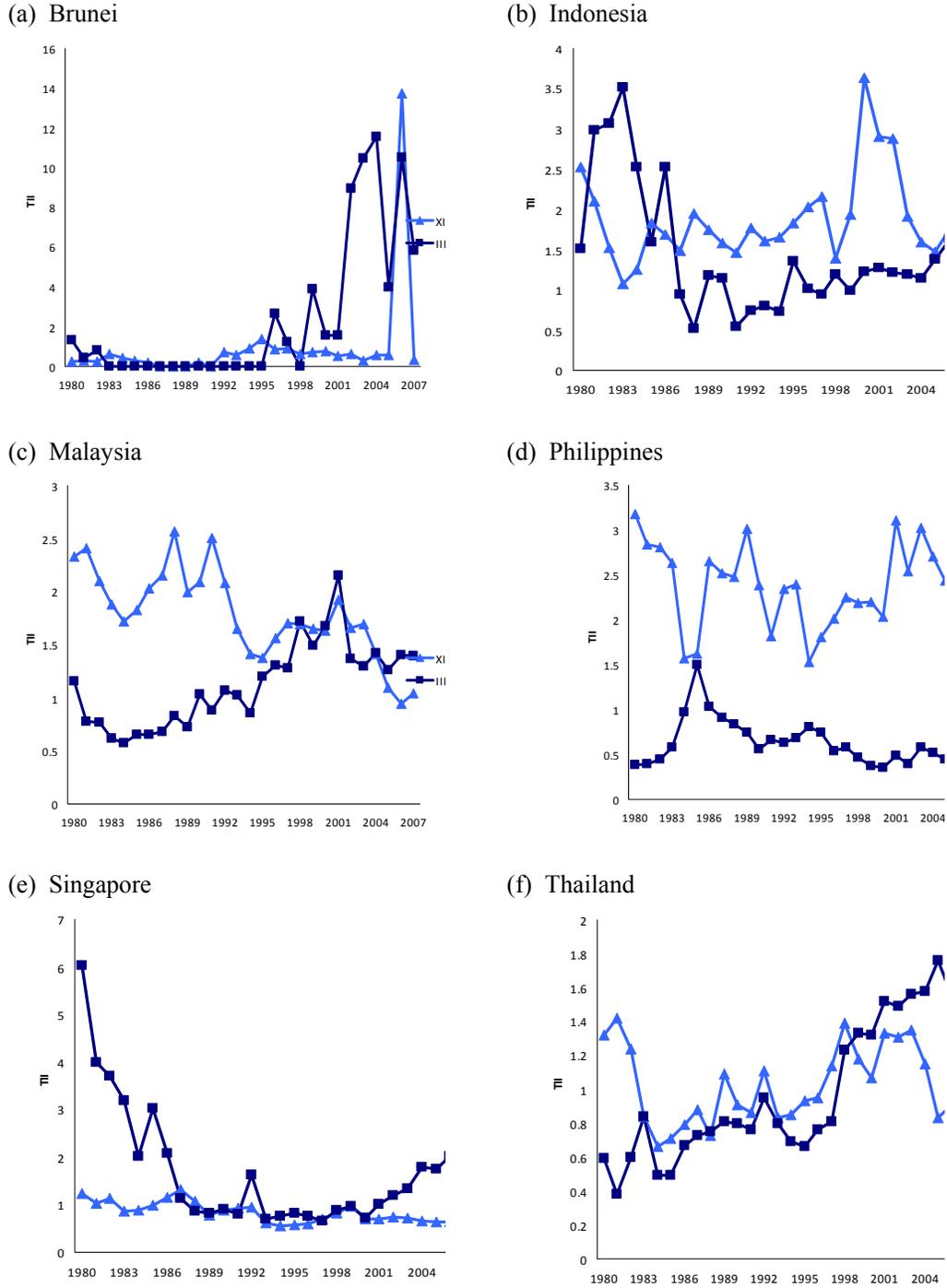
where:  $M_{ij}$  = country  $i$  imports to country  $j$   
 $M_i$  = total imports of country  $i$   
 $X_j$  = total exports of country  $j$   
 $X_i$  = total exports of country  $i$   
 $X_w$  = total world exports  
 $III_{ij}$  = import intensity index.

Figure 4 shows estimated export and import intensities between New Zealand and ASEAN trading partners between 1980 and 2007.

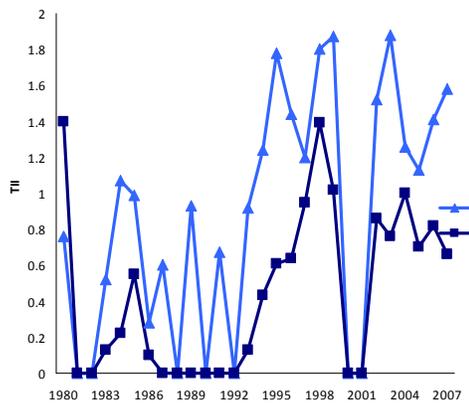
## 5. New Zealand–ASEAN Trade Intensities 1980-2007

NZ-ASEAN country export and import intensities are reported in Appendix A and illustrated in Figure 4.

**Figure 4: Exports (XII) and Import Intensity Indexes (III) of New Zealand to ASEAN Countries**



(g) Viet Nam



Source: ASEAN Secretariat Statistics 2007.

IMF Direction of Trade Statistics Yearbooks various issues. (Author calculations).

### 5.1 Export (XII) and Import Intensity (III) between NZ and ASEAN Countries

**Brunei:** Shows considerable variation in the XII, ranging from a value of 0.00 in 1987, 1988 and 1991, through to a value of 13.75 in 2006 (this unusual value is well above all of the others). No real trend in the XII is apparent, although almost all values are below 1. The III also displayed considerable variation. Values of 0 appeared for 1983 to 1995 and for 1998. Values greater than 1 were gained for all other years from 1996 onwards, with unexpectedly high values of above 10 gained for the years 2003, 2004, and 2006.

**Indonesia:** Shows no real trend in the XII, although all values are above 1 throughout the entire period, with a value of 2.9 in 2001. There is greater variation in the III, but again no real trend. The majority of the values remain above 1.

**Malaysia:** Shows a general downwards trend in the XII, from 2.41 in 1981 to 1.04 in 2007. All values were above 1 except for 2006 (0.94). There appears to be a general upwards trend in the III. All values after 1995 are above 1.

**Philippines:** Shows all of the XII values are above 1, and the majority of the values are above 2. There is no real trend, but the values are relatively consistent. The vast majority of the III values are below 1, but there is no real trend.

**Singapore:** Shows a general downwards trend in the values of the XII, from 1.24 in 1980 to 0.7 in 2007. There is some fluctuation around this trend however. All XII values after 1988 are below 1. There was a downwards trend in the III which persisted until the early 1990's, and took the index below 1. This trend began to reverse in the mid 1990's, and the index began to increase up to a 2007 level of 2.01.

**Thailand's** XII remained relatively constant over the period, with values fluctuating close to unity, particularly from 1990 onwards. The III has increased fairly consistently from a value of 0.38 in 1981, through to 1.58 in 2007. All values since 1998 have been above unity.

**Viet Nam's** XII values prior to 1994 vary significantly, with several values of 0 reported. All reported XII values since 1994 however have been greater than 1. III values also vary significantly, although the vast majority are below 1. Many values were also reported as 0.

## 5.2 NZ-ASEAN Trade Relations: Some observations

Although there have been ups and downs, which are not unexpected, trade between New Zealand and ASEAN expanded over the years (1980-2006) and continues to expand. The increase, as indicated in value of exports and imports figures, and as more rigorously measured by the export and import intensity indices (XII & III), which are explained briefly in Appendix B is particularly evident with ASEAN, with the singular exception of the Philippines. Increased bilateral trade between New Zealand, on one hand, and the ASEAN member-states of Singapore, Brunei, Thailand and Malaysia, on the other hand, is very evident as indicated by their trade intensities. This development is understandable since New Zealand has entered into bilateral trade agreements with these countries.

## 6. Trade Potential between New Zealand and ASEAN

Maximum potential trade between two trading partners can be examined in a simple way by matching the total export supply for a given commodity (or group of commodity/products) of a country with the total import demand for that commodity of a trading partner. The importance of products in bilateral trade is examined in terms of their estimated high potential. The estimation of potential trade is based on following formulae:

$$\text{Trade Potential} = [(min, SE, MI) - ET]$$

where: *SE* - Suppliers' Global Exports ( e.g. New Zealand Global Exports)

*MI* - Markets' Global Imports (e.g. Trading Partner's Global Imports)

*ET* - Existing Bilateral Exports (NZ Export of a product/commodity to a trading partner, e.g. Indonesia)

By matching the import demand with export supply for a given commodity, an estimate can be gained of the possibility of trade expansion under the most favourable competitive conditions after subtracting existing trade (Mukherji 2007; World Bank, 2008).

Table 13 demonstrates how New Zealand trade potential can be calculated using the example of Indonesia as bilateral trading partner Table 14 below provides a breakdown of trade potential with New Zealand by ASEAN trading partner. SITC is revision 3 and aggregated at the 1 digit level:

- 0 = Food and live animals
- 1 = Beverages and tobacco
- 2 = Crude materials, inedible, except fuels
- 3 = Mineral fuels, lubricants and related materials
- 4 = Animal and vegetable oils, fats and waxes
- 5 = Chemicals and related products, n.e.s.
- 6 = Manufactured goods classified chiefly by material
- 7 = Machinery and transport equipment
- 8 = Miscellaneous manufactured articles.

**Table 13: Trade Potential between New Zealand and Indonesia, 2007 \$US Millions**

<b>Commodity Classification, 1 digit UNSITC (Rev. 3)</b>	<b>NZ Global Exports (All countries) (SE)</b>	<b>Trade Partners Global Imports (MI)</b>	<b>Existing NZ Exports to Trade partner (ET)</b>	<b>Estimated Trade Potential</b>
0 - Food and live animals	12,638	6,884	407	6,477
1 - Beverages and tobacco	701	331	0	330
2 - Crude materials, inedible, except fuels	2,892	4,479	104	2,789
3 - Mineral fuels, lubricants and related materials	1,076	21,994	0	1,076
4 - Animal and vegetable oils, fats and waxes	99	91	0	91
5 - Chemicals and related products, n.e.s.	1,412	10,045	20	1,392
6 - Manufactured goods classified chiefly by material	3,131	9,612	21	3,110
7 - Machinery and transport equipment	2,753	19,085	17	2,735
8 - Miscellaneous manufactured articles	1,251	1,943	2	1,249

**Table 14: Trade Potential between New Zealand and Selected ASEAN Trading Partners 2007 \$US Millions (unless otherwise indicated)**

<b>Partner (y)</b>	<b>SITC (1 digit)</b>	<b>NZ exports (SE)</b>	<b>Partners imports (MI)</b>	<b>Existing NZ exports to partner (ET)</b>	<b>Trade Potential</b>
Indonesia	0	12,638	6,884	407	6,477
	1	701	331	0	330
	2	2,892	4,479	104	2,789
	3	1,076	21,994	0	1,076
	4	99	91	0	91
	5	1,412	10,045	20	1,392
	6	3,131	9,612	21	3,110
	7	2,753	19,085	17	2,735
Malaysia	8	1,251	1,943	2	1,249
	0	12,638	6,829	222	6,606
	1	701	496	1	495
	2	2,892	4,749	47	2,846
	3	1,076	12,885	0	1,076
	4	99	923	0	99
	5	1,412	12,067	18	1,394
	6	3,131	18,555	21	3,110
7	2,753	78,183	26	2,727	
8	1,251	7,356	4	1,246	

<b>Partner (y)</b>	<b>SITC (1 digit)</b>	<b>NZ exports (SE)</b>	<b>Partners imports (MI)</b>	<b>Existing NZ exports to partner (ET)</b>	<b>Trade Potential</b>
The Philippines	0	12,638	3,713	404	3,309
	1	701	246	1	245
	2	2,892	1,145	23	1,123
	3	1,076	9,883	0	1,076
	4	99	179	2	97
	5	1,412	4,200	9	1,403
	6	3,131	4,442	41	3,090
	7	2,753	18,233	10	2,742
Singapore	0	12,638	5,157	254	4,903
	1	701	1,765	7	694
	2	2,892	1,867	6	1,861
	3	1,076	52,619	112	964
	4	99	484	0	99
	5	1,412	15,739	20	1,392
	6	3,131	19,740	16	3,115
	7	2,753	138,075	68	2,685
Thailand	0	12,638	4,904	263	4,640
	1	701	303	1	302
	2	2,892	4,672	65	2,828
	3	1,076	25,895	47	1,029
	4	99	148	1	98
	5	1,412	15,350	4	1,407
	6	3,131	29,854	13	3,119
	7	2,753	50,738	20	2,733
<b>Brunei (2006)</b>	0	10,351	236	2	236
	1	507	41	-	-
	2	2,531	14	0	14
	3	368	28	-	-
	4	68	7	-	-
	5	1,150	175	0	175
	6	2,787	405	0	405
	7	2,684	589	63	526
<b>Viet Nam (2006)</b>	0	10,351	2,288	104	2,184
	1	507	144	0	144
	2	2,531	2,074	40	2,034
	3	368	6,699	-	-
	4	68	253	0	68
	5	1,150	6,287	1	1,149
	6	2,787	12,102	12	2,775
	7	2,684	10,753	2	2,682
8	1,024	2,233	1	1,023	

Source: United Nations COMTRADE Website: (Author Calculations).

The trade potential calculations presented in table 13 indicate the maximum levels of trade which would have been possible between New Zealand and each of these ASEAN trading partners from 2007 import and export data. Recent bilateral data for the ASEAN countries Laos, Cambodia, and Myanmar was not available from the UN COMTRADE database. 2007 bilateral data was not available for Brunei Darussalam or Viet Nam, so trade potential calculations were based on 2006 data (as indicated in Table 13).

Unsurprisingly, the SITC category which provides the most potential for trade is SITC0, food and live animals. Malaysia and Indonesia are the two ASEAN countries with which New Zealand has the greatest trade potential, strongly driven by the potential for trade within the SITC 0 categories. The lowest trade potential calculated with regard to New Zealand exports was with Brunei Darussalam. Trade in none of the SITC categories for this country exceeded one billion \$US.

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## **7. Gravity Model Review**

Gravity models have been used to provide an indication of the determinants of bilateral trade. Papazoglou, Pentecost, and Marques (2006) sought to quantify the potential gains from trade from the Eastern and Northern expansion of the EU single market using a gravity model. The authors used a two stage approach to determine the predicted trade pattern differences which can be assigned just to EU membership, while controlling for other influences. The main results were that all transition members were expected to see a rise in export and import levels as a result of accession. There was also an expectation of a rise in the EU15 share of these exports of these countries, while trade decreased with the rest of world.

Sharma and Chua (2000) used a gravity model to analyse the impact of the APEC on the integration of ASEAN countries using a gravity model. Instead of pooling data across the countries, a single equation was estimated for each of the ASEAN 5, with the goal of providing a better understanding of the impact of ASEAN and APEC on the individual countries. The log of total bilateral trade (imports plus exports) was used as a dependent variable, while products of GDP and per capita GDP, distance, and dummy variables for ASEAN and APEC were used as independent variables. All variables were found to be significant and had the expected signs, however the coefficient on the ASEAN dummy variable was found to be negative in most cases- indicating that ASEAN trading arrangement did not increase intra-ASEAN trade.

In Roberts (2004), the aim of the research was to test the suitability of the gravity model to the proposed China-ASEAN Free Trade Area (CAFTA); and to determine any policy implications for both the proposed RTA governments and for the broader multilateral trade system. A cross-sectional regression tested standard gravity model variables as well as the Linder hypothesis (that countries with similar levels of income per capita trade more amongst

themselves). The gravity model was found to explain the pattern of trade for CAFTA well. The negative sign on the per capita GDP difference variable (although insignificant) supports the Linder hypothesis. This has policy implications to suggest that steps should be taken to try to bring about convergence in relation to the lesser developed ASEAN nations in order to maximise the potential trade from the CAFTA agreement.

Bhattacharyya and Banerjee (2006) determine whether the gravity model can be used to explain India's direction of trade, and if so, what insights the model can reveal about the role of these determinants. Panel data was used here with a dataset comprised of bilateral trade data with India from all countries which have traded with India between 1950 and 2000. The gravity model used a dummy variable describing where the trading partners had a common colonizer- this was found to explain around 43 per cent of the fluctuations in India's direction of trade in the second half of the twentieth century. Bhattacharyya and Banerjee (2006) also found that India's trade responds less than proportionally to size and more than proportionally to distance. India was also found to trade more with developed rather than underdeveloped countries; however the size of the trading partner has a greater determining influence on India's trade than the level of development of the trading partner.

Sudsawasd and Mongsawad (2007) investigated the unexplored trade potential and the economic impacts of bilateral free trade agreements between ASEAN-5 member countries and the candidate FTA partners (Australia, India, Japan, NZ, South Korea, USA). A gravity model was used here in order to determine if the formation of ASEAN resulted in more trade amongst ASEAN members, as well as to provide estimates of the trade potential between the ASEAN-5 members and potential FTA partners. The dataset covered trading partner's bilateral trade with these countries between 1948 and 1999. An FTA dummy variable used demonstrated that FTA's have the effect of creating trade. The model showed increases in trade within each FTA to range from 129 to 600 percent. The ASEAN FTA increased intra-ASEAN trade by 182 percent. Trade potentials for the ASEAN-5 were highest with the four largest candidate FTA partners, and in particular China and India.

Jugurnath, Stewart, and Brooks (2007) studies five different RTA's (ASEAN, CER, APEC, MERCOSUR, NAFTA) using a gravity model to test for trade creation and diversion. They used annual panel data from 26 countries covering the five RTA's in the Asia and Pacific region between 1980–2000 using four sub-periods: 1980–1985, 1985–1990, 1990–1995 and 1995–2000. The dependent differed from the 'total value of trade (exports + imports)' normally used. They used imports, because this variable as a proxy for the effects of domestic trade barriers. Their results showed that there were considerable differences in the effects which the different RTA's had on bilateral trade and trading patterns. The ASEAN and CER agreements fostered greater trade with trading partners as well as the rest of the world. However APEC, MERCOSUR and NAFTA tended to be trade diverting i.e. they expanded intra-bloc trade at the expense of trade with other nations.

## 7.1 Gravity Trade Model Application and Data

The model used here is an augmented version of the simple gravity trade model proposed by Linneman (1966), in that several other variables have been added and tested for their significance within the NZ-ASEAN trade context. In reality, however, cross-section data observed over several time periods (panel data methodology) result in more useful information than cross-section data alone (Rahmen 2005). Panel data allows for the capturing of relationships among variables over time, while also allowing us to monitor the unobservable individual effects of each trading pair combination (Rahmen 2005).

Multivariate trade data between Australia, Hong Kong, China, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, and Thailand were used to estimate the gravity model. This data covered multivariate trade between each pair of these countries for the time period from 1980 to 2007. Observations for some years had data missing for certain country partner combinations. These were not used and this resulted in an unbalanced panel. Taking these factors into account, the gravity model estimated in this research is based on a total of 1500 observations.

$T_{ij}$  (total trade) represents total trade values (imports + exports) between country  $i$  and  $j$  and are expressed in millions of U.S. dollars. The GDP and per capita GDP variables are stated in billions of U.S. dollars. The GDP and per capita GDP coefficients are expected to have a positive sign because of the direct relationship between trade, economic size, and income (Roberts 2004).

The distance variable is one of the foundation variables of the gravity model. The physical distance between trading countries is a proxy for transport costs. It is expected that the coefficient on distance will be negatively correlated with trade. The distance variable is the geographical distance between the capital cities of the home country  $i$  and the partner country  $j$  in kilometres.

Dependency on trade ( $X/GDP$ ) and openness to trade ( $M/GDP$ ) variables are introduced to augment the basic model. These variables measure trade (exports and imports) with individual trading partners as a share of the GDP in the home economy. A positive sign on the coefficients would indicate whether a higher degree of dependency or openness to trade has a tendency to increase or reduce total trade between trading partners, holding other factors constant.

Exchange rate is another variable introduced to augment the basic model. The exchange rate variable is the nominal exchange rate of the pair of countries converted to US dollars. The FTA and language variables are introduced as dummy variables. A value of unity for the FTA variable indicates that both the home and partner country are members of the same free trade agreement. Similarly, a value of unity for the language variable indicates that both countries share a common official language. The signs on these coefficients will indicate whether sharing a free trade agreement or a common language between the partner and home countries increases total trade between the partners increases trade.

The proposed augmented gravity model can be expressed as:

$$\text{Log}T_{ij} = \alpha + \beta_1 \log \text{GDP}_i + \beta_2 \log \text{GDP}_j + \beta_3 \log \text{GDP}_i / \text{Pop}_i + \beta_4 \log \text{GDP}_j / \text{Pop}_j + \beta_5 \log (X_i / \text{GDP}_i) + \beta_6 \log (M_i / \text{GDP}_i) + \beta_7 \log \text{Exchange Rate} + \beta_8 \log \text{Distance}_{ij} + \beta_9 \text{FTA} + \beta_{10} \text{Language} + u_{ij}$$

where  $i$  and  $j$  represent home country  $i$  and partner country  $j$ .

The coefficient interpretation of a log-log model is one of constant elasticity (Roberts, 2004). The log-log specification gives the elasticity of total trade with respect to the variables. The interpretation of the coefficients is that a 1% in change in a variable is associated with a  $\beta_1$ % change in total trade, holding constant other variables (where  $\beta_1$  is the variables coefficient).

Multiple regression and panel data models may be estimated using a number of techniques. OLS (ordinary least squares) is the most common of these. As the name suggests, this technique identifies a ‘best fit’ line through the data points, by minimising the sum of the squared residuals. A modified version of the OLS principle can be used to estimate dynamic models such as the panel gravity model used here. Fixed or random effects estimators are also often used as estimators for coefficients in panel data analysis. These estimators are used in models to assist in controlling for unobserved heterogeneity when it is constant over time (or across sectors) and correlated with independent variables. Each of these estimators is trialled in the research here.

As the data used in this research is panel data, non-stationarity and cointegration among the variables are issues which need to be addressed. One of the OLS assumptions is that the error term ( $u_{ij}$ ) must be uncorrelated across observations over time. This assumption is violated when using panel data where observations for one entity are repeated over time. While this is likely to have a minimal impact in this research with our relatively small time span, the normal heteroskedasticity-consistent standard errors are replaced with heteroskedasticity and autocorrelated-consistent standard errors.

As shown in Table 14, the base model was initially estimated with panel OLS (regression (1)), and then estimated again with the fixed effects (FE) estimator (regression 2). The difference in the coefficients from these techniques was very minor. A Hausman test was run to determine whether a random effects specification was more appropriate, but the results of this test indicated that this was not the case. A fixed effects (FE) model was adopted for all model estimation from this point onwards. The literature has established that this is an appropriate technique for log-log economic models of this nature, and is widely considered to give the best results (see Jugurnath, Stewart, and Brooks 2007).

Multicollinearity is a statistical issue which must be taken into account when undertaking regressions such as that used here. It arises where some or all of the explanatory variables are highly correlated with one another. While there may be some degree of correlation between the variables used in the gravity model, multicollinearity is not generally considered to be a concern for models of this type.

The basic gravity model states that total trade is a function of the size of the countries, income, and distance. Logs are taken of both the dependent and independent variables in order to indicate elasticity's of the variables. The basic model is estimated in regressions (1), (2), (3) and (4) in Table 14. Regression (1) is estimated with panel OLS, where GDP (in billions) is used as a proxy for the size of the countries, GDP per capita reflects income and distance is measured in kilometres. The coefficient on distance is found to be negative and statistically significant as expected. The magnitude of the coefficient falls inside the expected range from other empirical studies. The coefficients on size and income are positive and statistically significant, and plausible in magnitude.

**Table 14: Gravity Model Estimation Results Dependent Variable: log**  
(Exports + Imports)

Regressor	(1-OLS)	(2-FE)	(3-FE)	(4-FE)	(5-FE)	(6-FE)
Log (distance)	-0.968*** (0.038)	-0.954*** (0.038)	-0.954*** (0.039)	-0.957*** (0.038)	-0.304*** (0.034)	-0.303*** (0.035)
Log(GDPi)	0.526*** (0.018)	0.509*** (0.020)				
Log(GDPj)	0.457*** (0.020)	0.444*** (0.021)				
Log(popi)			0.509*** (0.020)			
Log(popj)			0.444*** (0.021)			
Log(GDP/Pi)	0.303*** (0.016)	0.292*** (0.017)	0.801*** (0.025)			
Log(GDP/Pj)	0.336*** (0.019)	0.330*** (0.019)	0.773*** (0.025)			
Log (GDPij)				0.481*** (0.014)	0.516*** (0.012)	0.515*** (0.012)
Log (GDP/Pij)				0.306*** (0.014)	0.142*** (0.013)	0.144*** (0.012)
FTA					0.352*** (0.052)	0.337*** (0.051)
Language					-0.103** (0.052)	-0.103** (0.052)
Log (X/GDP)					0.190*** (0.021)	0.190*** (0.021)
Log (M/GDP)					0.300*** (0.019)	0.300*** (0.019)
Log (Exchange Rate)					-0.007 (0.006)	
Intercept	9.765*** (0.332)	9.828*** (0.332)	3.248*** (0.450)	9.847*** (0.330)	7.247*** (0.279)	7.234*** (0.279)

Summary Statistics						
SER	0.908	0.904	0.904	0.905	0.665	0.665
Adjusted r <sup>2</sup>	0.706	0.709	0.709	0.714	0.842	0.842
n	1500	1500	1500	1500	1500	1500

Note: \* indicates level of statistical significance. \* = 10%, \*\* = 5%, \*\*\* = 1%.

Regression (2) repeats the specification from regression (1) using the fixed effects estimator. The difference in the coefficients from these techniques was very minor. A Hausman test was run to determine whether a random effects specification was more appropriate, but the results of this test indicated that this was not the case. A fixed effects model was adopted for all model estimation from this point onwards, as this is generally deemed to be the most appropriate for use in a gravity model. Regression (3) replaces the GDP variables with population, as another variable which can be used to proxy country/market size. This resulted in plausible coefficients for all variables, and an identical coefficient on distance to that found in regression (2). Regression (4) used multiplied values for the GDP and GDP per capita variables (that is, GDP of home country  $i$  multiplied by the GDP of partner country  $j$ , GDP per capita of home country  $i$  multiplied by the GDP per capita of partner country  $j$ ). This again resulted in an almost identical coefficient on distance, and plausible coefficients on the multiplied variables. These multiplied variables were used in regressions (5) and (6).

Regressions (5) and (6) incorporated several other variables in order to increase the explanatory power of the base gravity model. These variables are: the exchange rate of the home country to USD, the value of exports of the home country as a share of GDP, the value of imports of the home country as a share of GDP. Dummy variables were also included to indicate whether the countries share a common language, and whether a free trade agreement exists between the two partner countries. In regression (5), all of these variables were used. This had the effect of reducing the magnitude of the distance variable considerably, although it still remains negative and statistically significant.

The language variable was found to be statistically significant in these regressions at the 5 percent level, but negative. This was a little surprising given the theoretical relationship between cultural similarity and trade. This may be a result of the relatively narrow scope of the dataset in terms trading partner combinations. A more global dataset might reach a different conclusion. The lower level of significance of this variable compared with others, as well as the fact that language was found to not be statistically significant in the next set of regressions, may indicate that this variable is not particularly important in the context of the nations selected. The dummy variable for free trade agreements had a positive and statistically significant effect on total trade. This was expected, reinforcing the hypothesis that free trade agreements foster trade between countries. The coefficients on shares of imports and exports of GDP also were positive and statistically significant. The exchange rate of the home country in USD yielded a coefficient which was not statistically significant.

In Table 15, the same regressions are carried out but without including logs. This provides an estimate of the real value of each of these coefficients on total trade based on the model. The models perform less well in this context, which is to be expected given the nature of the equations and potential for pairings between large countries to skew the result in dollar terms. As a result, the sign and statistical significance of the variables are the most important factors in interpreting these results.

The coefficient on distance is negative, as hypothesised. As the dependent variable is given in millions of dollars, an additional kilometre between trading partners reduces total

trade by more than USD 0.5 million. Both the individual and combined GDP's and of countries  $i$  and  $j$  were found to have a positive impact on trade. However the coefficient on GDP per capita provided mixed results. The coefficient on this variable in regressions (1), (2), (5), and (6) all produced at least one negative result for country  $i$ . In regressions (1) and (2) however, the positive variable on country  $j$  was large enough to overwhelm this result. The FTA variable was found to be strongly positive and statistically significant, indicating that the presence of a free trade agreement between the country pairings tended to increase total trade between countries. The r-squared value for each of these regressions is lower than that seen in the log-log regressions previously. This is not surprising, given that the log-log specification was expected to provide the best result in gravity analysis.

**Table 15: Gravity Model Estimation Results Dependent Variable: Total trade in USD**  
(Exports + Imports)

<b>Regressor</b>	<b>(1-OLS)</b>	<b>(2-FE)</b>	<b>(3-FE)</b>	<b>(4-FE)</b>	<b>(5-FE)</b>	<b>(6-FE)</b>
Distance	-1.44*** (0.13)	-1.26*** (0.13)	-1.58*** (0.14)	-1.10*** (0.11)	-0.53*** (0.11)	-0.550*** (0.115)
GDPj	6.12*** (0.36)	5.89*** (0.35)				
GDPi	6.05*** (0.43)	6.42*** (0.42)				
Popi			0.01*** (0.00)			
Popj			0.01*** (0.00)			
GDP/Pi	- 127.19*** (35.70)	- 227.93*** (37.56)	294.02*** (41.12)			
GDP/Pj	428.40*** (41.57)	306.91*** (43.71)	728.79*** (39.05)			
GDPij				0.02*** (0.00)	0.02*** (0.00)	0.015*** (0.000)
GDP/Pij				3.08** (1.43)	-2.34 (1.46)	-0.219 (1.461)
FTA					4816.53** * (768.90)	2976.666* ** (744.303)
Language					40.16 (748.99)	-766.651 (755.861)
X/GDP					196661.9* ** (18082.00)	171028.4* ** (18111.73)
M/GDP					- 99684.38* ** (20821.40)	- 71633.73* ** (20891.67)
Exchange Rate					-0.78*** (0.10)	
Intercept	6035.41** * (723.31)	7393.60** * (734.22)	1398.38 (936.97)	9617.31** * (575.85)	5870.84** * (668.79)	5349.738* ** (678.189)
<b>Summary Statistics</b>						
SER	12941.15	12558.21	13548.72	10896.91	9997.21	10190.84
Adjusted r <sup>2</sup>	0.44	0.47	0.38	0.60	0.66	0.651
n	1500	1500	1500	1500	1500	1500

Note: \* indicates level of statistical significance. \* = 10%, \*\* = 5%, \*\*\* = 1%.

## 8. Summary and Conclusions

ASEAN is a dynamic trade bloc. It has evolved substantially since its beginning in 1967. ASEAN's 600 million people and more than \$1,100 billion of GDP play a major role in international business and economic development. One of the significant initiatives from ASEAN is the ASEAN-Australia-NZ FTA signed in 2009. ASEAN trade volumes are correlated strongly with GDP. Indonesia, Thailand, Malaysia, Singapore, the Philippines and Vietnam have been the dominant countries. However, the trade involving Laos is higher than expected and that of the Philippines is less than expected.

Both Australia and New Zealand send approximately 10% of their exports to ASEAN with Australia receiving approximately 20% of its imports from ASEAN and NZ 14%. These trade volumes have been growing strongly in recent years. These figures are significant given that NZ exports approximately 22% of its exports to Australia and receives approximately 21% of its imports from Australia, its largest trading partner. NZ is a major agricultural exporter and approximately 10% of its agricultural exports go to ASEAN. What is less well known is that approximately 10% of ASEAN agricultural exports go to NZ.

NZ-ASEAN trade intensities have fluctuated considerably during the period. By the end of the period, export intensity was highest for The Philippines, Indonesia, Vietnam, Malaysia and Thailand. By way of contrast, import intensity was highest for Brunei, Singapore, Indonesia, Thailand and Malaysia. Trade potential analysis shows significant room for NZ-ASEAN trade growth. Similar potential exists for NZ trade with Malaysia, Indonesia, Singapore and Thailand with the Philippines and Vietnam not as promising.

Gravity trade models provide robust evidence of the positive impact of free trade agreements on ASEAN related trade. This research uses panel data and multivariate analysis to estimate both log and linear versions of an augmented gravity trade model. Variables used included GDP, GDP per capita, distance, a free trade dummy variable and other descriptive variables. In the log model, all key variables showed the hypothesised sign. The linear model had less explanatory power than the log model, but still showed statistically significant coefficients with the expected sign for GDP, distance and the free trade variable. The major conclusions are that distance tends to have a detrimental effect on trade and that the presence of free trade agreements, and particularly the ASEAN free trade agreement, have tended to have had positive effects on total trade of ASEAN nations. Both of these points have positive implications for future trade for New Zealand within the ASEAN region.

ASEAN governments and businesses have developed significant trade momentum with each other, major trading partners and New Zealand. There appears to be opportunities for significant further growth but enthusiasts should note the heterogeneity of ASEAN countries and appropriately nuance in their responses to the opportunities identified. New Zealand's trade relations have historically been with Europe and the USA. This has changed, with ASEAN and other Asian countries, now becoming New Zealand's major trading partners. If 'geography is destiny', New Zealand's trade destiny is with these countries. New Zealand should look more to Asia as a trading partner.

### Appendix A: New Zealand-ASEAN Trade Intensity 1980-2007

The Exports (XII) and Imports Intensity Indexes (III) of NZ to ASEAN Countries														
Year	NZ to Brunei		NZ to Indonesia		NZ to Malaysia		NZ to Philippines		NZ to Singapore		NZ to Thailand		NZ to Viet Nam	
	XII	III	XII	III	XII	III	XII	III	XII	III	XII	III	XII	III
1980	0.25	1.34	2.52	1.51	2.33	1.16	3.18	0.38	1.24	6.03	1.32	0.59	0.76	1.40
1981	0.29	0.42	2.10	2.99	2.41	0.78	2.84	0.39	1.03	3.99	1.42	0.38	0.00	0.00
1982	0.22	0.80	1.52	3.07	2.10	0.77	2.81	0.44	1.14	3.71	1.24	0.60	0.00	0.00
1983	0.62	0.00	1.07	3.52	1.88	0.62	2.63	0.58	0.87	3.19	0.84	0.84	0.52	0.13
1984	0.43	0.00	1.25	2.53	1.72	0.57	1.57	0.97	0.89	2.01	0.66	0.49	1.07	0.22
1985	0.27	0.00	1.83	1.59	1.83	0.65	1.62	1.50	0.99	3.03	0.71	0.49	0.99	0.55
1986	0.21	0.00	1.69	2.52	2.03	0.65	2.65	1.03	1.15	2.08	0.79	0.67	0.28	0.10
1987	0.00	0.00	1.49	0.94	2.15	0.68	2.52	0.91	1.31	1.13	0.88	0.73	0.60	0.00
1988	0.00	0.00	1.95	0.52	2.57	0.83	2.48	0.84	1.08	0.87	0.73	0.75	0.00	0.00
1989	0.00	0.00	1.75	1.18	1.99	0.72	3.01	0.74	0.78	0.82	1.09	0.81	0.93	0.00
1990	0.21	0.00	1.58	1.14	2.09	1.03	2.39	0.56	0.89	0.90	0.91	0.80	0.00	0.00
1991	0.00	0.00	1.46	0.54	2.51	0.88	1.82	0.66	0.93	0.80	0.86	0.76	0.67	0.00
1992	0.72	0.00	1.77	0.74	2.08	1.07	2.34	0.63	0.95	1.63	1.11	0.95	0.00	0.00
1993	0.59	0.00	1.60	0.80	1.65	1.02	2.40	0.68	0.61	0.71	0.83	0.80	0.92	0.13
1994	0.91	0.00	1.65	0.73	1.41	0.86	1.53	0.81	0.56	0.76	0.85	0.69	1.24	0.43
1995	1.39	0.00	1.83	1.36	1.38	1.20	1.81	0.74	0.58	0.83	0.93	0.66	1.78	0.61
1996	0.85	2.63	2.03	1.02	1.56	1.31	2.01	0.54	0.59	0.77	0.95	0.76	1.44	0.64
1997	0.89	1.24	2.16	0.94	1.70	1.28	2.25	0.58	0.71	0.66	1.14	0.81	1.20	0.95
1998	0.61	0.00	1.39	1.19	1.69	1.72	2.19	0.46	0.82	0.88	1.39	1.23	1.80	1.39
1999	0.72	3.86	1.94	0.99	1.65	1.49	2.20	0.37	0.96	0.96	1.18	1.33	1.87	1.02
2000	0.78	1.55	3.64	1.23	1.63	1.68	2.03	0.35	0.71	0.73	1.07	1.32	N/A	N/A
2001	0.51	1.57	2.90	1.28	1.92	2.15	3.11	0.49	0.70	1.00	1.33	1.52	N/A	N/A
2002	0.63	8.93	2.88	1.22	1.66	1.37	2.54	0.39	0.74	1.19	1.31	1.49	1.52	0.86
2003	0.28	10.48	1.91	1.19	1.69	1.30	3.03	0.58	0.72	1.33	1.35	1.56	1.88	0.76
2004	0.55	11.56	1.59	1.15	1.41	1.42	2.70	0.52	0.66	1.80	1.15	1.58	1.26	1.00
2005	0.55	3.98	1.48	1.38	1.09	1.26	2.44	0.44	0.63	1.75	0.83	1.76	1.13	0.70
2006	13.75	10.50	1.76	1.63	0.94	1.40	2.17	0.48	0.63	2.02	0.91	1.55	1.41	0.82
2007	0.34	5.81	1.78	1.98	1.04	1.39	2.43	0.65	0.70	2.01	1.03	1.58	1.58	0.66

Source: IMF Direction of Trade Statistics Yearbooks various issues (Own calculations).

## References

- ASEAN Secretariat (2002) 'Southeast Asia - A Free Trade Area' ASEAN Secretariat Publication. Downloaded from [www.aseansec.org/19132.htm](http://www.aseansec.org/19132.htm).
- ASEAN Secretariat (2007) ASEAN CEPT Commitments. Downloaded from [www.aseansec.org](http://www.aseansec.org).
- ASEAN Secretariat (2008) ASEAN CEPT Commitments. Downloaded from [www.aseansec.org](http://www.aseansec.org).
- ASEAN Secretariat (2009) Joint Media Statement on the Signing of the Agreement Establishing the ASEAN-Australia-New Zealand Free Trade Area. Downloaded from [www.aseansec.org](http://www.aseansec.org).
- ASEAN Secretariat (various years) *ASEAN Statistical Yearbook*. Downloaded from [www.aseansec.org/13100.htm](http://www.aseansec.org/13100.htm).
- Australian Department of Foreign Affairs and Trade (2007) Australia's Trade with East Asia. Downloaded from [http://www.dfat.gov.au/publications/stats-pubs/downloads/EA\\_2007.pdf](http://www.dfat.gov.au/publications/stats-pubs/downloads/EA_2007.pdf)
- Australian Department of Foreign Affairs and Trade (2007) Australia's Trade with ASEAN. Downloaded from <http://www.dfat.gov.au/publications/>
- Bano, Sayeeda (2002) 'Intra-Industry International Trade and Trade Intensities: Evidence from New Zealand' *Working Paper 5/02*. Hamilton, University of Waikato.
- Bano, Sayeeda and Sandrey Ron, (2003) 'Bilateral Trade Relations between New Zealand-Australia and Selected Asia-Pacific Nations'. Published by NZ Ministry of Foreign Affairs and Trade (MFAT) Wellington, New Zealand <http://www.mfat.gov.nz>
- Bhattacharyya, R and Banerjee, T (2006) 'Does the Gravity Model Explain India's Direction of Trade? 'A Panel Data Approach''. Indian Institute of Management, Working Paper No 2006-09-01.
- Holmes Mark J and Sayeeda Bano (2008) 'On Openness and Real Exchange Rate Volatility' *Economics Bulletin* 6(14) 1-12
- Garnaut, R and P Drysdale (1994) 'Trade intensities and the analysis of bilateral trade flows in a many-country world: a survey in Asia-Pacific Regionalism. *Readings in International Economic Relations*.
- International Monetary Fund (various years) *International Trade Statistics Yearbook*. International Monetary Fund: USA.
- Jugurnath, B, Stewart, M, and Brooks, R (2007) 'Asia/Pacific Regional Trade Agreements: An empirical study'. *Journal of Asian Economics*, 18, 974-987.
- Kojima, K. (1964) 'The Patterns of Trade among Advanced Countries' *Hitotsubashi Journal of Economics*, June, pp.16-36.
- Linnemann, H (1966) *An Econometric Study of International Trade Flows*, Amsterdam: North Holland.
- Papazoglou, C, Pentecost, E, and Marques, H (2006) 'A Gravity Model Forecast of the Potential Trade Effects of EU Enlargement: Lessons from 2004 and Path-dependency in Integration'. *The World Economy*, Oxford: Blackwell, 1077-1089.
- Rahman, M. (2005). The Determinants of Bangladesh's Trade: Evidence from the Generalized Gravity Model. *Working Paper*. Sydney: University of Sydney.
- Roberts, B (2004) 'A Gravity Study of the Proposed China-ASEAN Free Trade Area' *International Trade Journal* 18(4) 335-353.
- Sharma, S and Chua, S (2000) 'ASEAN: Economic Integration and Intra-Regional Trade', *Applied Economics Letters* 7(3) 165-169.
- Statistics New Zealand (various years) *New Zealand External Trade Statistics* (various December editions).
- Sudsawasd, S and Mongsawad, P (2007) 'Go with the Gang, ASEAN!' *ASEAN Economic Bulletin* 24(3) 339-356.
- UN COMomTrade (2008) United Nations Commodity Trade Database.
- UNCTAD (2008) UNCTAD Statistical Handbook.
- Wadhwa, C.D. and M.G. Asher (1985) 'ASEAN-South Asia Economic Relations', Singapore: Institute of South Asian Studies.