



Estimating the impact of an Australia–Indonesia trade and investment agreement





Department of Foreign Affairs and Trade



Centre for International Economics Canberra & Sydney

January 2009

The Centre for International Economics is a private economic research agency that provides professional, independent and timely analysis of international and domestic events and policies.

The CIE's professional staff arrange, undertake and publish commissioned economic research and analysis for industry, corporations, governments, international agencies and individuals. Its focus is on international events and policies that affect us all.

The CIE is fully self-supporting and is funded by its commissioned studies, economic consultations provided and sales of publications.

The CIE is based in Canberra and has an office in Sydney.

© Centre for International Economics 2009

This work is copyright. Persons wishing to reproduce this material should contact the Centre for International Economics at one of the following addresses.

Canberra

Centre for International Economics Ian Potter House, Cnr Marcus Clarke Street & Edinburgh Avenue Canberra ACT 2601

GPO Box 2203

Canberra ACT Australia 2601

Telephone	+61 2 6245 7800
Facsimile	+61 2 6245 7888
Email	cie@TheCIE.com.au
Website	www.TheCIE.com.au

Sydney

Centre for International Economics Suite 2, Level 16, 1 York Street Sydney NSW 2000

GPO Box 397

Sydney NSW Australia 2001

Telephone	+61 2 9250 0800
Facsimile	+61 2 9250 0888
Email	ciesyd@TheCIE.com.au
Website	www.TheCIE.com.au

Disclaimer

While the CIE endeavours to provide reliable analysis and believes the material it presents is accurate, it will not be liable for any party acting on such information.

Contents

E	cecutive summary	vi
A	bout this report	x
1	The Australia-Indonesia economic relationship	1
	Merchandise trade	1
	Services trade	5
	Investment	7
	Movement of people	7
2	Complementary or competing economies?	10
	Comparative advantage index	11
	Bilateral trade intensity index	12
	Trade specialisation index	13
	Intra-industry trade index	14
	Trade complementarity index	15
	Summary	17
3	Barriers to trade	18
	Tariff barriers to merchandise trade	18
	Non-tariff barriers to merchandise trade	22
	Barriers to services trade	27
	Trade liberalisation and dynamic productivity	31
4	Investment liberalisation	33
	Current barriers to investment	33
	Australia-Indonesia bilateral investment liberalisation	36
	What are the effects of investment liberalisation?	38
	Quantifying the impact of investment liberalisation	38
5	Assessing the economic impacts of liberalisation	46
	The economic model used	46
	The baseline	47
	Bilateral liberalisation undertaken by Australia and Indonesia	49
6	Macroeconomic effects of the liberalisation	51
	Macroeconomic effects – Australia	52
	Macroeconomic effects – Indonesia	59

В	ilateral trade	64
7 S	ectoral effects of the liberalisation	65
C	GE models and sectoral impacts — the low base effect	65
Iı	mpact of liberalisation on Australian sectors	66
Iı	npact of liberalisation on Indonesian sectors	70
8 (- Nther modelling simulations	75
0 C S	lower paced trade liberalization	75
0	lower paced trade interalisation	75
APF	PENDICES	79
ΑT	rade index formulae	81
ВТ	rade liberalisation and dynamic productivity gains	84
СБ	Detailed sectoral modelling results	92
Box	es, charts and tables	
1	Estimated impact of the trade and investment agreement on real GDP	vii
1.1	Bilateral merchandise trade	2
1.2	Direction of merchandise trade	3
1.3	Composition of bilateral merchandise trade	4
1.4	Top ten bilaterally traded goods	4
1.5	Bilateral services trade	5
1.6	Composition of bilateral services trade	6
1.7	Australian personal service imports from Indonesia	6
1.8	Composition of arrivals in Australia	7
1.9	Indonesian visitor arrivals to Australia	8
1.10	Flow of students between Australia and Indonesia	8
1.11	Indonesian enrolments in Australia by education sector	9
1.12	Australia's exports of education related services to all countries	9
2.1	Comparative advantage index	11
2.2	Example of RSCA at different levels of aggregation	12
2.3	Bilateral trade intensity index	13
2.4	Trade specialisation index	14
2.5	Intra-industry trade index	15
2.6	Trade complementarity index	16
2.7	Trade complementarity indices for select trading partners	16
3.1	Distribution of applied tariffs	19
3.2	Applied tariff barriers to bilateral merchandise trade	20
3.3	Trade Restrictiveness Indices	26
3.4	Non-tariff barriers to trade	27
3.5	Barriers to services trade via modes 1 and 4	30

4.1	FDI restrictions in regional economies	34
4.2	FDI barriers in Australia and Indonesia	37
4.3	Empirical estimates of the relationship between investment barriers and investment	30
4.4	Bilateral Australia-Indonesia FDI	40
4.5	FDI stocks in Australia and Indonesia	41
4.6	Assumptions used to condition the analysis	42
4.7	Investment barriers and FDI Service sectors	43
6.1	Macroeconomic effects for Australia	53
6.2	Australia's production and welfare gains	55
6.3	Sources of Australia's gains	56
6.4	Changes in real GDP in Australia	57
6.5	Changes in employment and wages in Australia	58
6.6	Macroeconomic effects for Indonesia	59
6.7	Indonesia's production and welfare gains	61
6.8	Sources of Indonesia's gains	62
6.9	Changes in real GDP in Indonesia	62
6.10	Changes in employment and wages in Indonesia	63
6.11	Bilateral Australia-Indonesia trade	64
7.1	Impact of liberalisation on Australian sectors	67
7.2	Impact of liberalisation on Indonesian sectors	71
8.1	Main economic impacts under different phase-in scenarios	76
8.2	Present value of economic impacts under different phase-in scenarios	77
C.1	Sectoral aggregation	93
C.2	Australian sectoral output	94
C.3	Australian sectoral employment	95
C.4	Australian sectoral investment	96
C.5	Australian sectoral exports	97
C.6	Australian sectoral imports	99
C.7	Indonesia sectoral output	100
C.8	Indonesian sectoral employment	101
C.9	Indonesian sectoral investment	102
C.10	Indonesian sectoral exports	104
C.11	Indonesian sectoral imports	105

Executive summary

The Australian and Indonesian Governments announced in July 2007 that they would undertake a joint feasibility study into the merits of a bilateral free trade agreement. The joint feasibility study will serve as the basis for discussions between officials, who will then make recommendations to both governments on the next steps.

This report provides an independent assessment of the potential economic impacts of an Australia–Indonesia trade and investment agreement.

Macroeconomic impacts of bilateral trade and investment liberalisation

- Given the uncertainty with respect to the pace and scope of (any) liberalisation, it
 has been assumed that the bilateral trade and investment liberalisation will be
 comprehensive in scope with all barriers being removed immediately on
 commencement of the agreement, assumed to occur on 1 January 2010.
- As can be seen from chart 1, an Australia–Indonesia Free Trade Agreement is estimated to have a beneficial, but small, impact on the GDP of both economies. By 2030, 20 years after the trade and investment agreement has come into force, Australia's GDP is estimated to be 0.02 per cent higher than otherwise, and 0.23 per cent higher in the case of Indonesia.
- The fact that Indonesia benefits more from the trade and investment agreement reflects the trading relationship and magnitude of trade barriers — Indonesia has higher trade barriers than Australia, and Australia is currently a more important trading partner to Indonesia than Indonesia is to Australia.
- Over the period 2010–30, Australia is estimated to gain A\$3.2 billion in real GDP in (2008) net present value terms, versus Indonesia's real GDP gain of A\$33.1 billion.
- The gains arising from the bilateral Australia–Indonesia trade and investment agreement are estimated to be quite small due to the fact that Australia and Indonesia have already agreed to trade liberalisation under the ASEAN– Australia–New Zealand Free Trade Agreement (AANZFTA). Hence compared to what is already happening under AANZFTA, the 'marginal' impact of the bilateral agreement will be restricted to bringing forward the pace of liberalisation, liberalisation across a wider range of areas (comprising tariffs, nontariff barriers, service barriers and foreign investment barriers), and more comprehensive liberalisation (in the case of Indonesia).



1 Estimated impact of the trade and investment agreement on real GDP

Data source: CIEG-Cubed modelling simulation.

Interpreting modelling results – a word of caution

- While a computable general equilibrium (CGE) model is the best framework with which to quantify the potential gains from trade and investment liberalisation, it must be appreciated that CGE models are not perfect. By definition, economic models are a simplification of reality and rely on numerous assumptions about economic parameters, behaviour and relationships. As such, modelling results should only be used to infer the outcome of liberalisation (positive or negative) and the magnitude of such impacts (small or large). That is, only broad messages and trends should be taken from the modelling results.
- Furthermore, modelling a bilateral trade and investment agreement that sees the overnight removal of all tariff, NTB, service and investment barriers to bilateral trade and investment represents a significant change to policy. As such, and over the short term, the economic impacts thereof may be quite large and fluctuate. However, when gauging the impact of the liberalisation, it is perhaps more prudent to focus on the impacts over the longer term (say 10–15 years post liberalisation). That way the policy changes will have worked their way through the economy and any changes to GDP (etc) will have settled down.
- Finally, modelling results are based on the removal of all (calculated) tariffs, NTBs, service and investment barriers to bilateral trade and investment, with all liberalisation assumed to occur overnight on 1 January 2010. If Australia and Indonesia are to negotiate a trade and investment agreement, then it is probable that the pace and scope of the negotiated liberalisation would differ from that assumed here. This needs to be borne in mind when looking at the potential economic gains from a bilateral trade and investment agreement.

Barriers to merchandise trade

- The average applied Australian tariff in 2008 is estimated to be a low 3.5, with nearly 48 per cent of tariff lines being duty free. The highest tariff during 2008 is 17.5 per cent (levied on some apparel and textile products). Australia has bound nearly 97 per cent of its tariff lines in the WTO, with the average bound ad valorem tariff rate being 10 per cent.
- The average applied tariff in Indonesia during 2008 is a higher 9.8 per cent, with nearly 21 cent of tariff lines being duty free. The average tariff masks some substantial variation in tariff rates. For example, during 2008 Indonesia had 48 tariff lines that had a tariff equal to or in excess of 170 per cent (certain alcoholic drinks). Indonesia has bound 93 per cent of its tariffs in the WTO, with the average ad valorem bound tariff rate being a high 37.5 per cent.
- Estimated non-tariff barriers to trade have been based on a manufacturing sector's 'demand' for protection taken to be those sectors with a revealed comparative disadvantage and allowing for the sectors with the greatest revealed disadvantage to get receive the greatest protection via the NTBs. This sees Australian NTBs ranging between 1.1–3.6 per cent, and 0.4–3.2 per cent in the case of Indonesia.
- Indonesia applies its most favoured nation (MFN) tariff rate to Australian imports, while Australia applies its developing country tariff rate to Indonesian imports. Hence Australia already affords Indonesia some tariff concessions relative to imports from an MFN country.

Barriers to services trade

- Barriers to services trade are nationalistic treatments that hinder or prevent market entry and price competition between 'foreign' and domestic service providers.
- Service barriers can comprise things such as restrictions on FDI, restrictions on the recognition of professional qualifications, residency/local presence obligations and limitations on the scope of activities that can be undertaken by foreigners.
- It is considered that there is little in the way of barriers to consumption abroad (such as barriers to Australians taking holidays in Indonesia, or to Indonesian students studying in Australia). Barriers to services delivered via commercial presence are typically barriers to foreign direct investment, and as such were dealt with when estimating the impact of investment liberalisation (see below).
- This leaves barriers to services delivered via cross border supply and movement
 of persons (such as professionals travelling temporarily to the economy into
 which they are delivering their services). While service barriers will be of a
 'behind the border' and regulatory nature, the effect thereof will be similar to a
 tariff applied to merchandise imports the service barriers will act to increase
 the cost of those service imports and reduce competition in the local market.

 Drawing on published research, the tariff equivalents of barriers to services typically delivered via cross border trade and movement of persons – water transport, communications and professional services – were found to range between 0–5 per cent in the case of Australia and 4–33 per cent in the case of Indonesia.

Barriers to investment

- Estimates of barriers to foreign direct investment (FDI) in the service sectors are available for 29 OECD countries and 48 other (largely developing) countries. On a scale of 0 (no restrictions) to 1 (totally restricted), Australia's investment environment is accredited with a 'score' of 0.32, while Indonesia is scored at 0.61.
- Despite Australia having a high FDI barrier score (relative to other OECD countries), Australia appears to be an attractive place for foreign investment, as indicated by an (inward) FDI stock to GDP ratio of 38 per cent. Hence FDI barriers are only one factor influencing the magnitude of FDI. Other important factors include macroeconomic and political stability, good governance and policy transparency, absence of corruption, high quality infrastructure, the presence of a skilled work force and so on.
- While FDI is important to Australia and Indonesia, bilateral FDI between Australia and Indonesia is currently modest. Indonesia is the destination for a small share (0.5 per cent) of Australia's outward FDI stock, with the value of Australia's FDI stock in Indonesia being A\$1839 million in 2007. Australia is the destination for 0.2 per cent of Indonesia's outward FDI stock, with the value of Indonesia's FDI stock in Australia estimated to be around A\$55 million in 2007.
- Comprehensive liberalisation of bilateral FDI is estimated to see Indonesia 's stock of investment in Australia increasing by A\$120 million, while Australian FDI in Indonesia is estimated to increase by A\$6.2 billion.
- Continued economic development in Indonesia and greater future integration of the two economies could see investment liberalisation having a much larger impact on bilateral FDI flows than that estimated here.

About this report

On 27 July 2007 Australian Prime Minister John Howard and Indonesian President Susilo Bambang Yudhoyono announced in Bali that Australia and Indonesia would undertake a joint feasibility study into the merits of a bilateral free trade agreement.

This report provides an independent assessment of the economic impacts of an Australia–Indonesia free trade agreement. The study report will serve as the basis for discussions between officials, who will then make recommendations to both governments on the next steps. The report was commissioned by the Australian Department of Foreign Affairs and Trade.

The Australia–Indonesia FTA feasibility study was jointly produced by specialist consultants from the Centre for International Economics. Team members comprised:

- Lee Davis (Associate Director)
- Kevin Hanslow (Quantitative Analyst)
- Clare Saunders (Economist).

The assistance of Dr Andy Stoeckel (CIE) in peer reviewing the report is gratefully acknowledged.

This report was managed and overseen by the South-East Asia Division of the Australian Department of Foreign Affairs and Trade.

1 The Australia-Indonesia economic relationship

The Australian and Indonesian economies are at differing levels of development, with Australia having one of the highest GDP per capita figures of any country. Conversely, Indonesia has been through some challenging times since the political transformation in May of 1998 when the Suharto government, which had governed Indonesia for 32 years, fell. This coincided with the 1997 East Asian financial crisis, of which Indonesia was the most severely affected country, having only gained its precrisis level of real GDP in 2004. Indonesia has also severely affected by natural disasters including a devastating tsunami in December 2004 which killed over 130 000 people in Indonesia alone.¹

As close neighbours, Australia and Indonesia have established strong bilateral ties in political, economic, social and cultural areas. As part of this, Australia will provide Indonesia with development assistance of A\$458 million in 2007-08, making Indonesia Australia's largest recipient of Official Development Aid. Australia and Indonesia also cooperate strongly and effectively on many social and cultural crossborder issues. Terrorism, illegal fishing, illegal immigration, and avian influenza are among the issues that are currently on the agenda for cooperation.

While political ties have intermittently been strained throughout the period of their relationship, commercial ties have always remained strong. Two-way trade between Australia and Indonesia was nearly A\$10.4 billion dollars in 2006, making Indonesia Australia's 13th largest trading partner.²

Merchandise trade

Merchandise trade flows between Australia and Indonesia have increased significantly over the last decade, growing at an average rate of 7.2 per cent per year, with the most recent figures their highest (A\$9 billion). While growth on average has been positive, there have been large swings around the average.

1

¹ The United Nations Office of the Special Envoy for Tsunami Relief estimate that nearly 230 000 people worldwide were lost as a result of the December 2004 tsunami.

² World Trade Atlas (online database) and DFAT 2007, *Trade in Services: Australia 2006,* Market Information and Analysis Section, DFAT.

Trade between Australia and Indonesia contracted significantly during the late 1990s, particularly Australia's exports to Indonesia, in response to the Asian financial crisis and the subsequent fall in demand for imports in Indonesia. Trade recovered rapidly after the financial crisis, but again dipped during 2002-03 reflecting the impact of the SARS outbreak on the global economy. Trade has once again recovered strongly, resuming its earlier growth trajectory, with the rate of growth increasing year on year. This is illustrated in chart 1.1 below, which shows the flow of exports between Australia and Indonesia over the ten-year period to 2006.

Despite the peaks and troughs in the value of trade between Australia and Indonesia, bilateral trade has remained important to each country. In 2006 Indonesia was Australia's 10th largest export market, and the 12th largest source of Australian imports. Australia was Indonesia's 8th largest export market and also the 8th largest source of Indonesian imports. Australia and Indonesia each account for 3 per cent of the others export market, and 3 and 5 per cent respectively of each others import market, indicating that they are of high importance to one another as trading partners. Chart 1.2 summarises the trading partners for Australia and Indonesia. Australia and Indonesia share many common trading partners, which is to be expected given that they are both located in the Asia-Pacific region, although Indonesia trades more heavily with other ASEAN member economies than does Australia.³ Australia has a more diverse group of countries with whom it trades, reflecting its historical connections to the UK and Europe. Of the ASEAN member



1.1 Bilateral merchandise trade

Note: Australian merchandise imports from Indonesia are used as a proxy for Indonesia merchandise exports to maintain data collection consistencies. *Data source:* World Trade Atlas (online database).

³ In addition to Indonesia, ASEAN member economies include Thailand, Myanmar, Brunei Darussalam, Singapore, Malaysia, Laos, Cambodia and Vietnam.

3

economies with whom Australia and Indonesia trade, Singapore is the most important (by far for Indonesia), followed by Malaysia and Thailand.



1.2 Direction of merchandise trade 2006

Data source: World Trade Atlas (online database)

Composition of trade

Australia has a somewhat unusual profile of trade given its level of development; Australia exports large amounts of minerals, fuels and agricultural products, reflecting Australia's endowment of natural resources. Indonesia too has a rich endowment of natural resources, in particular oil and tin, although aging oil fields and a lack of investment in necessary infrastructure mean exports of the former are waning. The current composition of trade between Australia and Indonesia is illustrated in the charts of figure 1.3.



1.3 Composition of bilateral merchandise trade 2006

Note: Australian merchandise imports from Indonesia are used as a proxy for Indonesia merchandise exports to overcome inconsistencies in data collection methodology between Australia and Indonesia. *Data source:* World Atlas (online database).

The aggregated grouping in chart 1.3 hides some stand out sectors. Highlighted below in table 1.4 are the top ten bilaterally traded merchandise goods. Notable in this table is that Australia and Indonesia's mostly highly exported products are both mineral fuel, oil etc. The extent to which this indicates that Australian and Indonesia have competitive rather than complementary economies will be explored in chapter 2.

Australian ex	ports to Indones	sia	Indonesian exports to Australia		
Good	Value	Share ^a	Good	Value	Share ^a
	A\$ million	Per cent		A\$ million	Per cent
Mineral fuel, oil etc.	770	17.5	Mineral fuel, oil etc.	1 786	39.3
Aluminium	346	7.8	Precious stones, metals	691	15.2
Live animals	247	5.6	Electrical machinery	348	7.7
Cotton+Yarn, fabric	244	5.5	Machinery	237	5.2
Machinery	224	5.1	Wood	197	4.3
Copper+articles	172	3.9	Paper and paperboard	167	3.7
Dairy, eggs, honey	171	3.9	Furniture and bedding	94	2.1
Iron and steel	120	2.7	Rubber	63	1.4
Iron/steel products	106	2.4	Plastic	57	1.3
Meat	78	1.8	Woven apparel	47	1.0
Total	4 408	56.2	Total	4 542	81.2

1.4 Top ten bilaterally traded goods 2006

^a Share is in respect to the total value of bilateral exports.

Note: Merchandise good description reflects the 2-digit Harmonized System codes; Australian merchandise imports from Indonesia are used as a proxy for Indonesia merchandise exports to overcome inconsistencies in data collection methodology between Australia and Indonesia.

Source: World Trade Atlas (online database).

5

Services trade

Trade in services between Australia and Indonesia which was valued at A\$2 billion in 2001, decreased to A\$1.4 billion over the 5 year period to 2006 at an average decline in bilateral service exports of 6.2 per cent per annum. Australian services exports have declined steadily, but in 2006 turned the pattern around to have (marginally) positive growth. Australian services imports from Indonesia have been a little more erratic whilst following a downward trend. Services imports decreased substantially in 2003, just as they did for merchandise imports, again reflecting the negative economic impact that the 2003 SARS outbreak had upon trade flows. While services imports rebounded above their pre-SARS level in 2004, they have since declined again.

The fluctuations in bilateral services trade, and particularly in Indonesian services exports to Australia, are largely driven by year-to-year variation in personal travel services, which account for (on average) over 50 per cent of Australia's services imports from Indonesia. The composition of Australian bilateral services imports and exports is illustrated in chart 1.6. The largest source of services trade is travel services.



1.5 Bilateral services trade

Note: Indonesia's service exports are not recorded separately in Indonesian statistics. Therefore, Australian imports of Indonesian services are used as a proxy for Indonesian service exports to Australia.

Data source: DFAT (2007), Trade in Services: Australia 2006, Market Information and Analysis Section, DFAT.



1.6 **Composition of bilateral services trade** 2006

Data DFAT (2007), Trade in Services: Australia 2006, Market Information and Analysis Section, DFAT.

Given the importance of travel services, and more specifically 'other personal' travel services (as opposed to business or education related travel services), to Indonesia's services exports, fluctuations in other personal travel services drive the observed fluctuations in Indonesia's services exports to Australia. This is illustrated in chart 1.7, which maps the movement in Indonesia's services exports to Australia alongside those of other personal travel services exports. Other personal travel services imports peaked in 2004 at A\$642 million and within two years had dropped to A\$297 million, an almost 54 per cent decrease.



1.7 Australian personal service imports from Indonesia

Data source: DFAT 2007, Trade in Services: Australia 2006, Market Information and Analysis Section, DFAT.

7

Investment

Current bilateral investment flows — comprising portfolio, direct, and other investment — are quite modest. In 2007 total Australian investment in Indonesia was valued at A\$3.4 billion, whereas Indonesian investment in Australia totalled A\$409 million.

In terms of foreign direct investment (FDI), Indonesia is not an important source of FDI for Australia. It is estimated that in 2007 just 0.01 per cent (some A\$55 million) of Australia's total inward FDI stock came from Indonesia. Indonesia is the destination for a likewise small share (0.5 per cent) of Australia's outward FDI stock. In 2007, the Australian FDI stock in Indonesia was valued at A\$1839 million.

The bilateral FDI relationship is discussed more fully in chapter 4.

Movement of people

The inflow of people in to Australia is dominated by short-term (stays of less than 12 months) arrivals (and returns). Of the arrivals in to Australia, the majority are non-resident short term visitors, as illustrated in chart 1.8.

Of those non-resident people arriving in Australia, they can generally be grouped into short-term visitors (primarily tourists), students attending higher education in Australia, and long-term visitors. Over the 2006-07 financial year nearly 91 000 arrivals of Indonesians were recorded, making Indonesia the 16th largest source of



1.8 Composition of arrivals in Australia

Data source: DIAC (2008), Total Arrivals by Country of Birth, available online at <u>http://www.immi.gov.au/media/statistics/</u> statistical-info/oad/totalmovs/totmova.htm, accessed 12 February 2008. visitor arrivals to Australia.^{4,5} Of these visitor arrivals, over 90 per cent were shortterm visitors with the remaining long-term. The visitor (short and long term) arrivals can also be broken down according to their visa categories, which are illustrated in chart 1.9.



1.9 Indonesian visitor arrivals to Australia

Data source: DIAC (2008), Visitor Arrival Data, available online at http://www.immi.gov.au/media/statistics/statistical-info/oad/visitors/visit.htm, accessed 12 February 2008.

Chart 1.9 illustrates that students represent a significant proportion of all Indonesian visitor arrivals to Australia. This flow of students between Australia and Indonesia has effectively been one way; there has been a steady flow of students from Indonesia to Australia, but very few travelling the opposite direction as the figures in table 1.10 demonstrate.

Alternative Australian data sources provide a more detailed picture of the sector of education that Indonesian students in Australia are enrolled. This is presented in table 1.11 below. Higher education dominates all other sectors, accounting for roughly 56 per cent of all enrolments.⁶ In 2001 Indonesia was the third largest source

1.10 Flow of students between Australia and Indonesia

	1999	2000	2001	2002	2003
Students from Indonesia to Australia	8976	9934	n/a	13 658	13 260
Students from Australia to Indonesia	11	Na	21	21	Na

Note: Data based upon enrolments in higher education; Na = not available. Source: UNESCO Institute for Statistics (online database).

- ⁵ As determined by country of birth.
- ⁶ On average over the period from 2001 to 2006.

⁴ Note that the number of arrivals does not necessarily reflect the number of travellers, but rather the movement of travellers.

	2000	2001	2002	2003	2004	2005	2006
Higher education	9720	10 484	11 440	11 405	10 587	9555	8772
Vocational education	3764	4638	5402	4883	3994	3643	3596
School education	2079	1629	1353	1243	1033	791	595
ELICOS ^a	2305	1868	2000	2001	1618	1420	1418
Other	Na	Na	790	804	906	712	657
Total	17 868	18 619	20 985	20 336	18 138	16 121	15 038

1.11 Indonesian enrolments in Australia by education s
--

^a English Language Intensive Courses for Overseas Students.

Note: Na = not available.

Source: Australian Education International (available online <u>www.aei.dest.gov.au</u>).

of international student enrolments, but by 2006 had fallen to 8th position. While international students from Indonesia have been decreasing, those from India and China have been growing rapidly.

Although student enrolments from Indonesia have decreased, Indonesia is still a substantial consumer of Australia's exports of education related services. Indonesia is Australia's 6th largest consumer of education related travel services, consuming A\$480 million worth of services.⁷ Education related travel services are by far the largest contributor to Australia's exports of education related services, as illustrated in chart 1.12 below.





Data source: DFAT (2007), Trade in Services: Australia 2006, Market Information and Analysis Section, DFAT.

9

⁷ Based upon 2006 data.

2 Complementary or competing economies?

While Australia and Indonesia are already important trading partners of one another, trade does appear to be concentrated in a handful of products types. In this chapter a series of trade indices are used to investigate whether the Australian and Indonesian economies are complementary to one another, or are competing economies. The degree of complementarity is an important determinant of the magnitude of benefits from a preferential trade and investment agreement. The gains from trade and trade liberalisation will be greatest when the liberalising economies are complementary trading partners. The trade indices can also provide insight into where a country's competitive 'edge' lies, and hence provide insight into likely sectoral impacts of a trade and investment agreement.

Complementary trading partners, in many ways, are characterised by the differences in the goods and services produced and consumed between the economies. Economies that produce a different 'basket' of goods and services to other countries have greater potential for gains from trade. That is, trade is more likely to occur when two economies produce and export different goods and services rather than the same goods and services (with the exception of intra-industry trade).

To estimate the degree to which Australia and Indonesia have complementary rather than competing economies, several indices are constructed. The indices used to assess the extent of complementarity between the Australian and Indonesian economies comprise the:

- revealed symmetric comparative advantage index
- trade specialisation index
- bilateral trade intensity index
- intra-industry trade index
- trade complementarity index.

All indices are constructed using Harmonized System (HS) 2 digit level data (which identifies 96 product groups), but for ease of presentation results are grouped into 15 HS codes. Refer to appendix A for index formulae.

Comparative advantage index

The revealed symmetric comparative advantage (RSCA) index measures the relative competitive performance of Australia's and Indonesia's exports respectively. The RSCA index can be used to assess a country's export competitiveness relative to a trading partner, or relative to the world.

Table 2.1 presents the RSCA index for Australia and Indonesia, assessing export competitiveness both bilaterally and globally. The RSCA ranges from -1 to 1, where a value greater than (less than) zero reveals a country's comparative advantage (disadvantage) in the production of a good. The cells highlighted in table 2.1 reflect the products in which Australia and Indonesia have comparative advantage. While it is possible for both Australia and Indonesia to each have a comparative advantage relative (or disadvantage) to the global economy, relative to one another, only one economy can have a comparative advantage in the production of a particular good. An illustration of this is animal and animal products, in which globally, both Australia and Indonesia have a comparative advantage (with Australia having the larger/stronger advantage). But relative to one another, Australia has the comparative advantage in the production of animal and animal products.

The bilateral RSCA provides one of the best indicators of the types of products that a preferential trade agreement will increase trade in. The bilateral RSCA tells us that the country with the bilateral comparative advantage (disadvantage) will export

HS code	RSCA of Australia, relative to		RSCA of Indonesia, relativ		
	Indonesia	Global	Australia	Global	
Animal & Animal Products	0.5	0.6	-0.5	0.1	
Vegetable Products	0.6	0.5	-0.6	-0.2	
Foodstuffs	-0.2	0.1	0.2	0.3	
Mineral Products	0.8	0.6	-0.8	-0.2	
Chemicals & Allied Industries	-0.6	-0.1	0.6	0.5	
Plastics / Rubbers	-0.4	-0.7	0.4	-0.3	
Raw Hides, Skins, Leather, & Furs	-0.5	0.1	0.5	0.6	
Wood & Wood Products	-0.7	-0.3	0.7	0.5	
Textiles	-0.4	-0.1	0.4	0.3	
Footwear / Headgear	-0.9	-0.8	0.9	0.5	
Stone / Glass	0.7	0.4	-0.7	-0.5	
Metals	0.3	0.1	-0.3	-0.1	
Machinery / Electrical	0.3	-0.6	-0.3	-0.8	
Transportation	-0.3	-0.5	0.3	-0.2	
Miscellaneous	-0.3	-0.5	0.3	-0.3	
Explanatory notes					
Maximum value		1			
Minimum value		-1			
Critical point	Comparative advantage = >0				

2.1 Comparative advantage index 2006

Source: CIE calculations.

(import) a particular product. The bilateral RSCA between Australia and Indonesia suggests that Australia will export agricultural and mining products, whilst Indonesia will export chemicals, wood and textile industry based products.

The level of aggregation presented in this table disguises the fact that Australia and Indonesia each have a comparative advantage in some of the products that comprise the HS product grouping. To illustrate this, the RSCA for animal and animal products is broken down into 5 HS 2-digit level products and presented in table 2.2. Australia has a very strong (in excess of 0.9) for four of the five products groups that comprise animal and animal products, whilst Indonesia has a comparative advantage in fish and seafood products.

HS code	HS 2 digit	Bilateral RS	RSCA	
		Australia- Indonesia	Indonesia-Australia	
Animal & Ani	mal Products	0.5	-0.5	
	Live Animals	0.9	-0.9	
	Meat	1.0	-1.0	
	Fish And Seafood	-0.4	0.4	
	Dairy, Eggs, Honey, etc	0.9	-0.9	
	Other Of Animal Origin	0.9	-0.9	

2.2 Example of RSCA at different levels of aggregation

Source: CIE calculations.

Bilateral trade intensity index

Bilateral trade intensity is determined by comparing bilateral export trade between Australia and Indonesia to that which each export to the rest of the world. Trade is deemed 'intense' if they trade with each other relatively more than they do with the rest of the world. Table 2.3 presents the bilateral trade index for Australia and Indonesia with values greater than one indicating 'intense' trade. Australia's trade with Indonesia is deemed more intense than Indonesia's with Australia. In other words, Australia exports to Indonesia are larger than expected on the basis of Australia's importance in world trade, inferring that Indonesia is a comparatively important trading partner of Australia's.

HS code	Australia	Indonesia
Animal & Animal Products	9.6	1.3
Vegetable Products	2.2	2.5
Foodstuffs	1.4	0.4
Mineral Products	0.5	18.2
Chemicals & Allied Industries	1.9	0.2
Plastics / Rubbers	8.0	4.9
Raw Hides, Skins, Leather, & Furs	3.3	0.1
Wood & Wood Products	4.9	3.2
Textiles	18.0	1.0
Footwear / Headgear	4.7	1.0
Stone / Glass	1.1	8.5
Metals	8.0	1.7
Machinery / Electrical	6.6	3.1
Transportation	6.0	0.1
Miscellaneous	5.2	1.9
	Explanatory notes	
Maximum value	Unbou	inded
Minimum value	0	
Critical point	Intense	e = >1

2.3 Bilateral trade intensity index 2005

Source: CIE calculations.

Trade specialisation index

The trade specialisation index (TSI) is the most widely-used measure to analyse bilateral competitiveness. It does this by comparing the *net* flow of goods (exports minus imports) to the total flow of goods (exports plus imports) for Australia and Indonesia, each with the world respectively. A positive value indicates that a country exports more goods in that product group than it imports inferring that it specialises in the production of those goods. The cells highlighted in table 2.4 represent those product groups that Australia and Indonesia specialise in.

We have also calculated the simple correlation coefficient between Australia and Indonesia's TSI. The correlation coefficient can take a value from -1 to 1. A positive correlation coefficient indicates that the economies are competitors since both countries specialise (or are net exporters) of the same products. Consequently, a negative value suggests that the economies do not specialise in the production of the same goods, and are therefore natural trading partners. The TSI for Australia and Indonesia are negatively correlated, providing evidence of the complementary nature of their economies.

HS code	Australia	Indonesia	Correlation coefficient
Animal & Animal Products	0.8	-0.3	
Vegetable Products	0.7	0.4	
Foodstuffs	0.1	-0.5	
Mineral Products	0.5	0.6	
Chemicals & Allied Industries	-0.2	-0.1	
Plastics / Rubbers	-0.7	0.8	
Raw Hides, Skins, Leather, & Furs	0.2	0.7	
Wood & Wood Products	-0.4	0.6	
Textiles	0.0	0.9	
Footwear / Headgear	-0.9	0.4	
Stone / Glass	0.2	0.0	
Metals	0.3	-0.5	
Machinery / Electrical	-0.6	0.3	
Transportation	-0.6	0.5	
Miscellaneous	-0.6	-0.3	
Total			-0.3
	Explanatory not	tes	
Maximum value	1 (export spec	cialisation)	1
Minimum value	-1 (import spec	cialisation)	-1
Critical point	Specialisati	on = 0+	Competitor = >0

2.4 Trade specialisation index 2006

Note: The correlation coefficient is sensitive to the level of data used; The TSI is calculated for each country with respect to the rest of the world.

Source: CIE calculations.

Intra-industry trade index

Intra-industry trade attempts to ascertain how much trade between two economies occurs within the same industry. It is based upon the premise that economies of scale provide and incentive to trade, even when factor endowments and consumer preferences are identical between partner economies.

Intra-industry trade between Australia and Indonesia, as the figures in table 2.5 illustrate, is limited to just a few product groups, and reflects that the trade between Australia and Indonesia is primarily driven by the differences in factor endowments. This is not unexpected, since intra-industry trade is predominantly between developed economies (North-North) because they have similar market structures, and therefore import/export similar goods.

For the product areas which Australia and Indonesia do have intra-industry trade, the scale economies are thought to lead to more rapid productivity gains and hence faster economic growth. However, the index should be treated with some caution, since the results are be affected by the level of data used. The higher the level of aggregation, the greater the bias towards *intra*-industry trade (as opposed to *inter*-industry trade). The intra-trade industry index presented in table 2.5 has been constructed at the 2-digit HS code level.

HS code	Australia	Indonesia
Animal & Animal Products	0.0	0.0
Vegetable Products	0.2	0.0
Foodstuffs	0.3	0.2
Mineral Products	0.3	0.3
Chemicals & Allied Industries	0.5	0.3
Plastics / Rubbers	0.5	0.5
Raw Hides, Skins, Leather, & Furs	0.2	0.1
Wood & Wood Products	0.2	0.2
Textiles	0.1	0.1
Footwear / Headgear	0.0	0.1
Stone / Glass	0.1	0.2
Metals	0.2	0.2
Machinery / Electrical	0.5	0.4
Transportation	0.3	0.3
Miscellaneous	0.2	0.1
	Explanatory notes	
Maximum value	1	1
Minimum value	C)
Critical point	Intra-trad	le = 0.5+

2.5 Intra-industry trade index 2006

Source: CIE calculations.

Trade complementarity index

The likely success of a preferential trade and investment agreement between Australia and Indonesia can be summarised by the trade complementarity index. The trade complementarity index assesses the suitability of a preferential trade agreement between two economies given how well the structure of one potential partner's exports match the imports of the other potential partner.

The trade complementarity index has been constructed for each year from 1996 to 2006, as illustrated in chart 2.6. As can be seen, the complementarity between the Australian and Indonesian economies has improved over time (particular from the perspective of Indonesia), and that the degree of complementarity is approximately equal for Australia and Indonesia.



2.6 Trade complementarity index

Note: Critical value is 40. A TCI greater than 40 indicates that the economies are highly complementary. *Data source:* World Atlas (online database) and CIE calculations.

Not only are the two economies highly complementary with one another, but the relative importance of this complementarity still prevails, particularly for Australia's exports and Indonesia's imports, when placed in the context of some of their major trading partners (see table 2.7). Indonesia has the second most complementary export profile for Australia, but compared to other regional economies is not particularly complementary in regards to Australia's import profile. Conversely, Australia is Indonesia's third most complementary import partner, but only fourth most complementary export partner.

	Austr	alia	Indor	nesia
	Export complementarity	Import complementarity	Export complementarity	Import complementarity
Australia	Na	Na	51	50
China	40	61	50	44
Indonesia	50	51	Na	Na
Japan	58	64	71	46
New Zealand	19	33	25	31
Singapore	42	62	49	50
Thailand	49	70	54	51
United States	48	75	58	54

2.7 Trade complementarity indices for select trading partners 2006

Note: Critical value is 40. A TCI greater than 40 indicates that the economies are highly complementary. *Data Source:* UNCOMTRADE (online database) and World Atlas (online database).

Summary

None of the five indices presented above are perfect — they each have their limitations in terms of their construction and what can be implied from the results. For example, index results can be influence d by the level of commodity aggregation; whilst trade patterns are affected by barriers to trade, which vary across products and markets.

However, taken together, the five indices suggest that Australia and Indonesia have production and consumption patterns that are complementary with one another. Reducing the barriers to trade through the establishment of a bilateral trade and investment agreement should therefore result in greater trade and gains to welfare. This conclusion will be more vigorously tested in the course of this study through detailed general equilibrium modelling (see chapters 6 and 7).

3 Barriers to trade

A trade and investment agreement between Australia and Indonesia will likely entail, amongst other things, liberalisation of merchandise and service trade. Such liberalisation will allow Indonesian producers greater access to the Australia market whilst at the same time it will improve the competitive position of Australia producers in one of South East Asia's most populous countries. The magnitude of any bilateral trade liberalisation carried out under a trade and investment agreement needs to be kept in perspective — in the main, Australia already has a very open trading environment while Indonesia has been steadily reducing its trade barriers.

The current barriers – comprising tariffs, non-tariff barriers and service barriers – to bilateral merchandise and service trade are discussed below.

Tariff barriers to merchandise trade

The Australia tariff schedule identifies 6124 tariff lines (identified at the 8-digit Harmonised System (HS) level and using 2005 tariff nomenclature). In 2007, nearly 48 per cent of these lines were duty free, with the vast majority of the remaining 52 per cent being levied with an ad valorem tariff. There is a small number of tariff lines (17, or 0.3 per cent of all tariff lines) that are levied with either a tariff rate quota (5 lines) or combination tariff/specific duty (12 lines).

The Indonesian tariff schedule identifies 11 115 tariff lines (at the 10-digit HS level). In 2007 nearly 21 per cent of these tariff lines were duty free, over 78 per cent attracted an ad valorem duty, 0.2 per cent a specific duty, while 0.2 per cent were levied with a tariff drawn from various parts of other tariff lines. Chart 3.1 shows the distribution of tariffs applied in Australia and Indonesia on imports from the other country.

Note that Indonesia applies its most favoured nation (MFN) rate to Australian imports, while Australia applies its developing country tariff rates to Indonesian imports. Hence as a developing country, Australia already affords Indonesia some tariff concessions relative to those levied on imports from a MFN country. Tariff concessions are in the order of 1–5 percentage points lower than the standard MFN rate and are granted on a range of tariff lines. It is typically manufacture products – chemicals, metal and metal products, other mineral products, wood and paper products, machinery etc — that receive the tariff concessions. The notable exceptions



3.1 Distribution of applied tariffs 2007

Data source: CIE calculations based on Australian and Indonesian tariff schedules.

are imports of textiles, apparel and motor vehicles and parts, which receive little in the way of tariff concessions.

Across all tariff lines in the Australian and Indonesian tariff schedules, the average (unweighted) 2007 tariff rate levied on imports from the other country was 3.5 per cent in Australia and 9.8 per cent in Indonesia.

Australia has bound nearly 97 per cent of its tariff lines, with the average bound rate being 10 per cent.⁸ With a bound versus applied tariff gap of 6.5 percentage points, Australia could potentially raise its applied tariffs by a substantial margin. This could act as a source of uncertainty with respect to the applied tariff. Indonesia has bound 93 per cent of its tariffs in the WTO, with the average bound tariff being 37.5 per cent.⁹ Hence when compared to the average applied tariff of 9.8 per cent, Indonesia has the ability to substantially raise its applied tariffs. The ability to raise its tariffs by such a margin (27.7 percentage points on average) represents a large source of tariff uncertainty for exporters, as there is no legal impediment to Indonesia raising its applied tariffs to 37.5 per cent (on average).

It is important to note that the average (applied) tariffs, especially in the case of Indonesia, mask substantial variation in rates. For example, the maximum ad valorem tariff rate in Australia during 2007 was 17.5 per cent (some apparel and textile products) while in Indonesia 48 tariff lines had a tariff in excess of 170 per cent (certain alcoholic drinks).

⁸ WTO Secretariat 2007, 2007 Trade Policy Review of Australia, WTO, pp. 31 and 33.

⁹ Department of Foreign Affairs and Trade 2007, Indonesia-Australia FTA Feasibility Study: Background Paper for Industry Consultation, 17 October 2007, page 13.

Tariffs levied on imports from Australia and Indonesia

Applied tariff barriers to bilateral merchandise trade are reported in table 3.2. Note that these are the tariffs that existed in year 2007, and are not necessarily the tariffs that would be removed (or reduced) under any agreement. Australia has committed to future unilateral tariff reductions; hence some of the tariffs identified in table 3.2 are scheduled to fall regardless of whether Australia and Indonesia enter into a trade and investment agreement.¹⁰

Sector	Aus. tariff	Indon. tariff	Sector	Aus. tariff	Indon. tariff
	Per cent	Per cent		Per cent	Per cent
Paddy rice	0.0	15.8	Dairy products	1.0	4.9
Wheat	0.0	2.0	Processed rice	0.0	16.6
Cereal grains nec	0.0	3.6	Sugar	0.7	20.1
Vegetables, fruit, nuts	0.8	5.3	Food products nec	1.9	7.7
Oil seeds	0.6	5.0	Beverage and tobacco	2.8	93.8
Sugar cane, sugar beet	0.0	5.0	Textiles	7.1	9.3
Plant-based fibers	0.0	3.8	Wearing apparel	13.5	13.8
Crops nec	0.2	5.6	Leather products	5.3	7.6
Bovine cattle and sheep	0.0	2.7	Wood products	3.8	5.8
Other animal products	0.4	3.0	Paper goods, publishing	3.8	4.3
Raw milk	0.0	5.0	Petroleum, coal products	0.0	3.5
Wool, silk-worm cocoons	0.0	5.0	Chemical, rubber, plastic	2.0	6.8
Forestry	0.4	1.3	Mineral products nec	3.4	7.2
Fishing	0.1	5.5	Ferrous metals	4.1	9.4
Coal	0.0	5.0	Metals nec	1.2	5.5
Oil	0.0	0.0	Metal products	4.4	10.9
Gas	0.0	5.0	Motor vehicles and parts	5.9	30.0
Minerals nec	0.5	4.0	Transport equipment nec	2.3	12.6
Bovine meat products	0.0	5.2	Electronic equipment	1.2	4.9
Meat products nec	0.7	5.3	Machinery nec	2.8	4.1
Vegetable oils and fats	1.7	4.6	Manufactures nec	2.4	11.1

3.2 Applied tariff barriers to bilateral merchandise trade 2007

Source: CIE calculations based on Australia and Indonesian tariff schedules, World Trade Atlas import quantities and values, and announced unilateral tariff reductions.

The tariffs to be liberalised under any agreement will therefore depend not only on what is negotiated, but also on the tariffs prevailing at that time.

As already noted, the Australia tariff schedule contains a very small number of tariff lines that are subjected to a tariff rate quota (the Cheese and Curd Quota Scheme) or a combination tariff/specific duty. The ad valorem equivalent (AVE) of these tariff

¹⁰ The Australian Government has made commitments to unilaterally lower tariffs on imports of textiles, clothing and footwear, and passenger motor vehicles and parts. The next rounds of TCF reductions are to occur in 2010 and 2015, by which time all TCF tariffs will be at 5 per cent. PMV tariff reductions are next occurring in 2010, when PMV tariffs will be reduced to 5 per cent.

lines have been calculated and included in the tariffs identified in chart 3.1 and table 3.2. 11

For the five Australian tariff lines subjected to a TRQ, the applicable tariff is a specific duty, where the duty levied depends on whether imports are within the 11 500 annual quota (A\$0.096/kg) or out of quota (A\$1.220/kg).¹² The AVE of the five TRQs was determined by deriving, in a partial equilibrium framework, the quantity of imports that would have been demanded in Australia in the absence of the out-of-quota tariffs. The quota and (theoretical) quantity consumed in the absence of the TRQ were then used as weights to derive a weighted average of the in-quota and out-of-quota tariffs. The average tariff rate for the five tariff lines subjected to a TRQ was calculated to be 3.3 per cent.

For four tariff lines, Australia applies the smaller of an ad valorem tariff (5 per cent) or a specific duty (A\$0.45/kg). The AVE of the specific duties was determined and then compared to the tariff to determine which rate applied. In all cases the minimum tariff (5 per cent) was found to apply. Finally, for eight tariff lines dealing with the importation of used motor vehicles, Australia levies an ad valorem tariff (currently 10 per cent) and a specific duty of A\$12 000 per vehicle. However, the specific duty component of the duty is exempted if the vehicle is a specialist or vintage car, and it is understood that the A\$12 000 specific duty is rarely applied.¹³ Given this, it is assumed that only the ad valorem component of the duty applies.

The only complexities concerning the Indonesian tariff schedule are the use of specific duties in 27 tariff lines, and 17 tariff lines that take their tariff from parts of other tariff lines. The average AVE of the specific duty tariff lines was calculated to be 18.9 per cent. For those tariff lines were the tariff is drawn from other HS codes, tariffs were calculated by taking a simple average of tariff rates in the relevant 'parent' lines. The average parts tariff was calculated to be 22.1 per cent.

Australia levies its tariffs on the free-on-board (fob) value of imports, whereas Indonesia levies its tariffs on the cost, insurance and freight (cif) value of imports.

¹¹ Estimating the AVE of specific duties can be problematic as the tariff equivalence will change over time as the price at which the product enters Australia changes (due to, for example, exchange rate movements or cost saving efficiency gains). The AVE of specific duties have been calculated using the average unit import price over the last three years to derive the tariff equivalence of the specific duty.

¹² Note that the quota only applies to cheese and curd imports from countries that Australia does not have a trade agreement with. Hence cheese and curd imports from New Zealand, PNG, South Pacific Forum Island Countries, Singapore, Thailand and the United States are not covered by the quota.

¹³ Of course, the fact that the A\$12 000 specific duty is rarely applied might imply that for non specialist/vintage used cars, the specific duty is prohibitive.

Non-tariff barriers to merchandise trade

Non-tariff barriers (NTBs) can often have a more profound effect in restricting trade than do tariffs. Recent World Bank research suggests that, on average, NTBs add 87 per cent to the level of trade restrictiveness imposed by tariffs.¹⁴ The same research also finds that as countries become richer their protection regimes become less trade restricting. However, the overall lowering of trade restrictions primarily reflects a lowering of tariffs, as NTBs are found to be more prominent in ovrall protection of higher income countries. This suggests that tariffs and NTBs are substitutes, as the incidence of NTBs tends to be higher when tariffs are low.

Australia

The WTO reports that tariffs are Australia's main trade policy instrument.¹⁵ Given the small size of tariffs in Australia, we could, a priori, expect NTBs to likewise be small. This expectation is given further credence by the OECD's finding that the level of agricultural support in Australia is second lowest across all OECD members (with only New Zealand availing lower producer support), with domestic and border prices being closely aligned in Australia.¹⁶

However, while this may be true 'on average', numerous countries have identified specific issues of relevance to them. For example, the United States notes that the Australian Government maintains a 'conservative and restrictive quarantine regime that effectively limits the openness of its markets'.¹⁷ The stringent application of sanitary and phytosanitary (SPS) measures sees restrictions and prohibitions on imports of many agricultural and food products. Partly in response to such criticism from its trading partners, in December 2004 Australia established Biosecurity Australia, an agency to oversee science based quarantine and SPS policy. Even with the creation of Biosecurity Australia, the OECD notes that risk assessment procedures can be lengthy, therefore making access to Australian markets difficult for some agro-food imports.¹⁸

Whether or not Australia's SPS regime acts as a trade barrier is hotly debated. Australia maintains that restrictions are needed for Australia to remain free of exotic diseases/pests, with restrictions being scientifically based. Trading partners suggest



¹⁴ Kee, L.H., Nicita, A. and Olarreaga, M. 2008, *Estimating Trade Restrictiveness Indices*, Development Research Group, The World Bank, Washington, January 2008.

¹⁵ WTO Secretariat 2007, 2007 Trade Policy Review of Australia, WTO, page 29.

¹⁶ OECD 2007, Australia - Agricultural Policies in OECD Countries: Monitoring and Evaluation 2007, OECD, pp. 82–83.

¹⁷ United States Trade Representative 2007, 2007 National Trade Estimate on Foreign Trade barriers, USTR, page 31.

¹⁸ OECD 2005, Agricultural Policies in OECD Countries: Monitoring and Evaluation 2005 Highlights, OECD, page 39.

that by having standards stricter than those promulgated by relevant international bodies, Australia's SPS regime unnecessarily restricts trade.

Even if this debate could be resolved, a trade and investment agreement with Indonesia is unlikely to see a dismantling of Australia's SPS regime. Rather, it is more likely that a framework will be developed under which specific bilateral animal and plant health matters can be resolved as they arise.

Australia maintains local content requirements for free-to-air television, television commercials and radio. Drama channels on subscription television are required to allocate a certain percentage of the programming budget to new Australian drama programs. A trade and investment agreement with Indonesia is unlikely to see Indonesian audiovisual production being substituted for Australian production, thus these barriers are overlooked.¹⁹

Australia is the only major industrialised country that is not a signatory to the plurilateral WTO Agreement of Government Procurement (GPA). As such, Australia is not bound by the GPA's rules on open and non discriminatory policies in government procurement. However value for money is the core principle underpinning Australia's procurement policy.²⁰ This is achieved by encouraging competition and ensuring non-discrimination in procurement, which means foreign competitors have the same opportunity to compete for Government business as domestic businesses. However, the Australian Government does target sourcing at least 10 per cent of purchases from small to medium enterprises, and maintains local content requirements for government procurement of motor vehicles.²¹ Under the Australia-United States Free Trade Agreement all such barriers/impediments to US competitors must be removed by the start of 2008; and Australia has decided to apply the government procurement rules agreed under AUSFTA to suppliers from all countries.²² As an Australia-Indonesia trade and investment agreement (if negotiated) would start after 2008, it is likely that there will be no barriers in place to Indonesian firms wishing to access the Australian Government procurement market.

There are some restrictions imposed on foreign businesses when competing for state/territory procurement opportunities. For example, the New South Wales (NSW) Government's procurement policy requires all NSW agencies and departments to place a 20 per cent margin on the price of all non Australian and New Zealand companies tendering for the supply of manufactured goods. This is

¹⁹ Note that under the Australia-United States Free Trade Agreement, analogue audiovisual restrictions were allowed to remain, but were prohibited from being extended to other media or means of transmission.

²⁰ Department of Finance and Administration 2005, *Commonwealth Procurement Guidelines* 2005, Financial Management Guidance No. 1.

²¹ WTO Secretariat 2007, 2007 Trade Policy Review of Australia, WTO, pp. 50–52.

²² WTO Secretariat 2007, 2007 Trade Policy Review of Australia, WTO, pages 24 and 52.

effectively a 20 per cent 'tariff' on government procurement for these types of businesses. For the purpose of this study, it has been assumed that there will be no changes to the procurement policies of Australian states/territories.

Indonesia

Indonesian trade and investment policy is aimed towards further opening the economy to international trade and foreign investment. The Indonesian Government also set up a body responsible for reviewing tariff and non-tariff measures (including rationalising and harmonising tariffs, removing bans and quotas etc). While significant progress has been made, some trading partners report that more still needs to be done.

In so far as non-tariff barriers to trade, key areas of concern, as identified by the WTO and United States Trade Representative, include:^{23,24}

- the presence of an import licensing system (including alcoholic drinks, explosives and certain chemicals) with 141 tariff lines being subjected to import licensing restrictions (used to protect public health, safety, the environment and morals), with only domestic companies being eligible to become registered importers;
- variable use of rice import bans depending, in part, on season and success of domestic rice harvest, with only the National Logistics Agency — a state owned enterprise — being allowed to import rice (if not prohibited);
- only five licensed companies are allowed to import sugar and importers must utilise 75 per cent of sugar cane produced by small farmers, with the Ministry of Trade deciding which companies can import sugar and what quantity;
- banning of salt imports during harvest season (July-December), with salt importing companies being required to source 50 per cent of salt locally;
- the importation of alcoholic beverages is restricted to three registered importers, of which one is a state-owned enterprise;
- banning importation of some chicken parts on the basis of not being produced in accordance with Islamic practices (halal), despite compliance with Indonesia's established requirements for halal certification;
- meat and poultry imports require an Importer Letter of Recommendation, in which the government can arbitrarily change the quantity allowed to be imported, thus having the potential to act as a de facto quota scheme;
- the occasional use of import reference prices on which duties are levied rather than actual recorded transaction prices, resulting in effective duties being higher than that specified in the tariff code;

²³ WTO Secretariat 2007, 2007 Trade Policy Review of Indonesia, WTO, pp. 46-48 and 52-55.

²⁴ United States Trade Representative 2007, 2007 National Trade Estimate on Foreign Trade barriers, USTR, pp. 287–290.

- excessive and burdensome food labelling requirements, potentially seeing exporters revealing propriety information, thereby leading exporters to discontinue exports to Indonesia;
- all imported food must obtain a registration number and be tested by the national food and drug agency — reportedly an overly complex, time consuming and costly process;
- exclusive import rights assigned to local producers of select goods (including textile cloth, hot and cold rolled coiled iron, and steel); and
- involvement of state-owned-enterprises which are estimated to account for 40 per cent of Indonesia's GDP in certain sectors of the economy, with (an apparent) view to assisting domestic production and influencing trade flows in a number of important sectors (such as energy, cement, steel, mining, agricultural plantations, transport, banking and telecommunications).

Quantified NTBs to bilateral trade

Quantified NTBs to merchandise trade have been estimated using Trade Restrictiveness Indices produced by the World Bank.²⁵ The Trade Restrictiveness Index (TRI) is defined as:

...the uniform equivalent tariff that would maintain the country's aggregate import volume at its current level, given the country's heterogenous tariff regime. It captures the trade distortions that each country's tariffs impose on its import bundle using estimated elasticities to calculate the impact of a tariff schedule on a country's imports. They do not take into account domestic subsidies or export taxes. (World Trade Indicators 2008)

There are several TRIs calculated, one for tariffs (for each of applied MFN and applied including preferences), and an overall TRI that covers tariffs and NTBs (once again, for each of applied MFN and applied including preferences). By subtracting the tariff TRI (T-TRI) from the Overall TRI (O-TRI), an estimate of the non-tariff barrier TRI (NTB-TRI) can be obtained. Table 3.3 provides the various TRIs for Australia and Indonesia, and for a selection of comparator countries (TRIs for all sectors and for the agricultural and non-agricultural sectors are provided).

Table 3.3 reports the uniform tariff/NTB across all tariff lines at the HS6 digit level required to keep aggregate imports at their current volume. From table 3.3 it can be seen that, for example, the required uniform tariff in Australia to keep agricultural based imports at their current level is 1.3 per cent, with the uniform NTB being a substantially higher 34.6 per cent. However, in deriving the tariff and NTB TRIs for agricultural products (including raw materials and food categories), the World Bank notes:

²⁵ See World Bank 2008, World Trade Indicators 2008: Benchmarking Policy and Performance, The World Bank, Washington 2008.

Country		T–TRI			NTB-TRI			0-TRI	
	All	Ag	Non-ag	All	Ag	Non-ag	All	Ag	Non-ag
	Per cent								
Australia	3.1	1.3	3.2	6.4	34.6	4.7	9.5	35.9	7.9
New Zealand	3.5	5.2	3.4	9.8	27.6	7.7	13.4	32.8	11.1
United States	2.4	5.6	2.2	4.8	14.6	4.2	7.2	20.2	6.4
Japan	4.8	31.3	1.4	18.3	24.7	17.5	23.1	56.0	18.9
High inc. OECD	3.7	16.0	2.6	5.4	34.6	2.8	9.1	50.6	5.4
Indonesia	4.5	4.0	4.5	2.1	13.6	0.7	6.6	17.6	5.3
Thailand	6.6	20.8	5.7	2.0	30.3	0.4	8.6	51.1	6.1
Philippines	3.8	10.8	3.3	15.2	37.7	13.3	19.0	48.5	16.6
China	5.3	11.1	5.1	4.8	8.3	4.6	10.1	19.5	9.7
Lower middle inc.	8.3	14.1	7.7	7.5	21.4	7.0	15.8	35.5	14.7

0.0 ITade Restrictiveness marces (with applied tanns and h	IIS and INTES
--	---------------

Source: World Trade Indicators (2008).

The non-tariff measures cover only those NTMs which include various price control measures, variable charges, anti-dumping and countervailing actions, quantitative restrictions, non-automatic licensing, or other prohibitions. NTMs include non-protectionist measures such as technical barriers to trade (TBT) and sanitary and phytosanitary standards (SPS) that though they may also raise the restrictiveness of trade policy may have legitimate consumer-protection and public health rationales. (World Trade Indicators 2008)

Hence Australia's high NTB-TRI may reflect stringent SPS requirements, as opposed to price control measures, non-automatic licensing etc. If we make the assumption that the NTB-TRIs reflect only SPS measures, and given the above discussion about SPS, then it is unlikely that an FTA will see changes to the SPS regime. Given this, agricultural NTBs are not considered further (for either country).

This leaves NTBs for the non-agricultural sectors, with Australia's NTBs having a uniform tariff equivalence of 4.7 per cent and 0.7 per cent in the case of Indonesia. As the NTBs for manufactured imports likely include TBT, for the purpose of ensuring that products meet basic safety and consumer-protection requirements, there will likely be some minimum benchmark below which a country will not go. In the case of Australia, this minimum benchmark is taken to be the NTB-TRI for non-agricultural imports of the High income OECD countries (2.8 per cent). Australia therefore has 1.8 percentage points 'room to move' in lowering NTBs as they apply to non-agricultural imports. (No benchmark type adjustment is made for Indonesia given Indonesia's low non-agriculture NTB-TRI relative to other countries.)

Australia therefore has a Tariff-TRI of 3.2 per cent and a NTB-TRI of 1.8 per cent, and 4.5 per cent and 0.7 per cent (respectively) in the case of Indonesia. Taking the ratio of these two sets of figures sees Australia having a Tariff-TRI to NTB-TRI ratio of 0.57 and 0.16 in the case of Indonesia. Hence for every 1 per cent uniform tariff
levied on non-agricultural imports, there is a 0.57 per cent uniform NTB in Australia and 0.16 per cent uniform NTB in Indonesia.

These ratios are in turn applied to the estimated non-agricultural sectoral tariffs (see table 3.2 for tariffs) for those sectors deemed to have 'demand' for protection — taken to be those sectors with a revealed symmetric comparative disadvantage — to arrive at a total NTB figure to be allocated across those sectors demanding protection (sectors with a comparative disadvantage). NTBs are allocated/scaled according to a sector's comparative disadvantage relative to other sectors, which sees the sectors at the greatest comparative disadvantage receiving the greatest protection. This allows account to be taken of the latest research, which suggests that tariffs and NTBs are substitutes.²⁶ NTBs calculated for Australia and Indonesia are reported in table 3.4.

As the impacts of bilateral trade liberalisation are being investigated, it is important to note that only those NTBs that can be addressed bilaterally can be included in the modelling. Hence it is not possible to incorporate all NTBs (such as production subsidies) into the analysis.

It is also important to appreciate that many of the NTBs may be applied in a manner consistent with WTO rules.

Sector	Aus. NTB	Indon. NTB	Sector	Aus. NTB	Indon. NTB
	Per cent	Per cent		Per cent	Per cent
Textiles	2.4	0.6	Metals nec	0.0	0.5
Wearing apparel	3.6	0.6	Metal products	1.1	1.4
Leather products	1.9	0.4	Motor vehicles and parts	2.3	3.2
Wood products	2.5	0.0	Transport equipment nec	2.5	2.7
Paper goods, publishing	1.9	0.0	Electronic equipment	2.6	2.2
Chemical, rubber, plastic	1.3	0.9	Machinery nec	2.5	2.4
Mineral products nec	2.3	0.7	Manufactures nec	2.2	1.1
Ferrous metals	2.6	2.2			

3.4 Non-tariff barriers to trade

Source: CIE calculations based on World Bank research.

Barriers to services trade

The service sectors account for around 70 per cent of Australian GDP and 40 per cent of Indonesian GDP, with trends suggesting this proportion will increase.²⁷

²⁶ See Kee, L.H., Nicita, A. and Olarreaga, M. 2008, *Estimating Trade Restrictiveness Indices*, Development Research Group, The World Bank, Washington, January 2008.

²⁷ Note that these GDP shares are taken from the World Bank's World Development Indicators, and exclude the service sectors of construction and electricity, water and gas. If these sectors were to be included, then the service sectors accounted for over 78 per cent of Australian GDP in 2006 (figures for Indonesia not available).

International trade in services is also well established with Australia service exports approaching A\$44 billion in 2006, and Indonesian service exports exceeding A\$17 billion (2005 figure).²⁸ In 2006 Australia had a A\$1.1 billion trade surplus in services whereas Indonesia had A\$14.3 billion service trade deficit.

International trade in services can occur via four modes, these being:

- cross border supply, where a Australia individual or firm offers their services to customers outside of Australia (for example, a Australia insurance firm who sells insurance to consumers residing in Indonesia);
- 2. consumption abroad, where an individual or firm provides services to an international visitor (for example, tourism services provided within Australia to visiting Indonesian tourists);
- commercial presence, where an Australia service provider sets up operations in a foreign country (for example, an Australia bank opening a branch in Indonesia); and
- 4. movement of natural persons, where an individual or firm offers their services while in the destination country (for example, a lecturer teaching in Indonesia while employed by a Australia university).

Barriers to services trade are nationalistic treatments that hinder or prevent market entry and price competition between 'foreign' service providers and domestic providers. These barriers to services may include one or more of:

- restrictions on foreign direct investment (FDI) ;
- licensing requirements on management;
- restrictions on the recognition of professional qualifications;
- restrictions on the acquisition of land;
- restrictions on the promotion of products and services;
- nationality/citizenship requirements;
- residency/local presence obligations;
- requirements for joint ventures to be formed with domestic producers; and
- limitations on the scope of activities that can be undertaken.

There is very little in the way of notable/sizeable barriers to bilateral services trade via consumption abroad. For example, there is little in the way of barriers to Australians taking holidays in Indonesia, or to Indonesian students studying in

²⁸ Department of Foreign Affairs and Trade 2007, *Trade in Services Australia 2006*, Market Information and Analysis Section, DFAT, June 2007, page 30; and Department of Foreign Affairs and Trade 2007, *The APEC Region: Trade and Investment 2007*, Market Information and Analysis Section, DFAT, September 2007, page 132 (US\$ figures converted into AUD).

Australia. Given the already open education and tourism markets, barriers to services exported via mode 2 are not considered further.

Barriers to services delivered via commercial presence are typically barriers to FDI. Negotiating bilateral FDI liberalisation can therefore have the same end result as negotiating liberalisation of services delivered via commercial presence (and viceversa). Liberalisation of bilateral FDI flows is discussed in chapter 4.

This leaves barriers to services delivered via cross border supply and movement of persons (such as professionals travelling temporarily to the economy into which they are delivering their services). While service barriers will be of a 'behind the border' and regulatory nature, the effect thereof will be similar to a tariff applied to merchandise imports — the service barriers will act to increase the cost of those imports and reduce competition in the local market.

By restricting competition, some service barriers will allow domestic and incumbent foreign providers to earn quasi-rents by permitting these firms to charge a mark up of price over the cost of production. Alternatively, barriers may increase the real resource cost of providing services (for example red tape for professionals). Removing such barriers would in some cases increase competition, improve efficiency and allow for the service to be provided locally at more competitive prices.

Ultimately, the impact of a reduction in barriers to services trade between Australia and Indonesia will depend on:

- the level of existing restriction treatment that hinders/prevents trade and price competition between foreign service providers and domestic providers; and
- the potential for market penetration whether service providers in the partner country have a comparative advantage in supplying services in the sector through to the ability to take advantage of a reduction in barriers to services trade.

Therefore, even if restrictions in a particular sector are extremely high, if the partner country is not in a position to further penetrate that sector, then gains from services trade (and/or investment) liberalisation will be limited.

Barriers to cross border supply and movement of persons

A tariff equivalence of barriers to services delivered via cross border supply or movement of persons has been estimated drawing on research undertaken by the Australian Productivity Commission.²⁹ This research saw frequency indexes being

²⁹ See Doove, S., O. Gabbitas, D. Nguyen-Hong, and J. Owen, 2001, Price effects of regulation: International air transport, telecommunications, and electricity supply, Productivity Commission, Staff research paper, AusInfo, Canberra, October; Nguyen-Hong, D., and R. Wells, 2003, Restrictions on trade in education services: Some basic indexes, Productivity Commission, Staff working paper, AusInfo, Canberra, October; Nguyen-Hong, D., 2000, Restrictions on trade in professional services, Productivity Commission, Staff research paper,

constructed for service restrictions, with the associated price and cost impact thereof being determined econometrically.

The estimated tariff equivalence of barriers to services delivered via cross border supply or movement of persons are reported in table 3.5. Although frequency indexes have been calculated for the majority of service industries, some industries do not have associated price impact estimates. For these industries, the barrier impact was estimated by taking a ratio of frequency indexes for the industry of interest to a benchmark service industry, and then multiplying that ratio by the known cost impact for the benchmark industry.

It should also be appreciated that data on barriers to services trade was only available for a few service sectors (those in table 3.5). For those service sectors not identified in table 3.5, the lack of data meant that no tariff could be reported/included in the economic modelling. As is discussed further in chapter 7, the lack of tariff data for the service sectors has a bearing on the sectoral results, and can act to reduce the reliability of the results for the service sectors.

Also note that only those barriers that can be addressed bilaterally are considered. This raises the issue of air transport services (passenger and freight movements). Air transport services could, in theory, be liberalised within a trade agreement. However, in reality most trade agreements do not address liberalisation of air transport services. For example, in reviewing 12 major free trade agreements that have taken place around the world, Ochiai found that most agreements do not go beyond commitments imposed by the WTO's General Agreement on Trade in Services.³⁰ It has therefore been assumed that there will be no liberalisation of air transport services between Australia and Indonesia within a free trade agreement.

Sector	Australia	Indonesia
	Per cent	Per cent
Maritime transport	5.2	8.7
Communications	0.0	32.8
Other business services ^a	2.1	3.5

3.5 Barriers to services trade via modes 1 and 4

^a Includes professional services such as accountancy, architecture, engineering and legal services.
Source: CIE calculations based on Productivity Commission research.

AusInfo, August; and Kalirajan, K., 2000, *Restrictions on trade in distribution services*, Productivity Commission, Staff working paper, AusInfo, Canberra, August.

³⁰ Ochiai, R., P. Dee, and C. Findlay, 2007, Services in free trade agreements, RIETI Discussion paper series 07-E-015, <u>www.rieti.go.jp/jp/publications/dp/</u> <u>07e015.pdf</u> accessed 11 April, 2007.

Trade liberalisation and dynamic productivity

Examination of the performance of economic models leads to the observation that they typically tend to under predict the gains resulting from trade liberalisation. The current thinking is that economic models typically under predict the gains associated with trade liberalisation due to ignoring effects related to productivity linkages, procompetitive effects and investment dynamics. These effects have been termed the 'dynamic productivity' effects of trade liberalisation. Research into dynamic productivity is increasing, the latest research (by the IMF) suggesting that reform of product markets, including trade liberalisation, is one factor that helps to explain Australia's strong productivity performance since the early 1990s.³¹

It is generally accepted that countries can achieve allocative efficiency gains through trade liberalisation. Allocative gains – arising through the (re)allocation of resources to the efficient sectors of the economy - represent the traditional theory on the benefits from trade liberalisation. Consequently, it is these gains that are typically estimated and reported.

However, trade reform also sees an increase in import competition, thereby encouraging domestic producers to pursue productivity gains, either though the use of better technology and business practices, or through innovation and/or quicker adoption of new ideas. Improved domestic efficiency and liberalisation of other countries' trade barriers will improve the competitive position of exporters, and greater exports may also be associated with productivity gains. There can be learning by exporting where the experience and knowledge gained in export markets can be translated into productivity gains.³² Exporting may also allow producers to expand output and exploit economies of scale, thereby lowering average production costs.³³

Finally, a 'more efficient' economy will likely open the way for new foreign investment opportunities leading to transfer of technical know-how and capital accumulation, which can in turn stimulate productivity growth and lead to higher economic growth.

Ignoring the relationship between trade and investment liberalisation and dynamic productivity gains may therefore see an understatement of gains from trade liberalisation. Following the approach of Itakura, Hertel and Reimer (2003), dynamic productivity gains arising from increased imports, exports and foreign direct



³¹ See Tressel, T., 2008, Does Technological Diffusion Explain Australia's Productivity Performance?, IMF Working Paper, WP/08/4.

³² Aw, B.A., Chung, S. and Roberts, M.J. 2000, 'Productivity and Turnover in the Export Market: Micro-level Evidence from the Republic of Indonesia and Taiwan (China)', The World Bank Economic Review, 14(1), pp. 65-90.

³³ Itakura, K., Hertel, T.W. and Reimer, J.J. 2003, The Contribution of Productivity Linkages to the General Equilibrium Analysis of Free Trade Agreements, GTAP Working Paper 23, March 2003.

investment due to Australia and Indonesia undertaking bilateral trade and investment liberalisation have been included in the economic modelling, specifically:

- increases in imports productivity gain is a function of the percentage change in relative prices of imports and local production and the ability of firms to absorb a reduction in mark-ups (prices) in order to maintain output (the elasticity of domestic price mark-up with respect to foreign prices, assumed to be 0.2);
- increases in exports exporters are assumed to be 8 per cent more efficient than domestically orientated firms, hence if the change in output exported exceeds the change in output sold domestically, productivity of the sector rises (productivity gain depends on relative changes in output exported/sold domestically and share of output exported/used domestically; and
- increases in foreign direct investment a 1 percentage point increase in FDI sees an increase in productivity, with the productivity gain varying depending on the level of FDI, ranging between a maximum gain of 1.7 per cent at an FDI to GDP ratio of zero, to a productivity gain of 0.01 per cent at an FDI to GDP ratio of 2.

The issue of trade liberalisation and dynamic productivity is further discussed in appendix B.

4 Investment liberalisation

Investment liberalisation is playing an increasingly important role in negotiations aimed at international integration. Bilateral trade and investment liberalisation between Australia and Indonesia may see removal of some barriers to bilateral investment. This chapter assesses the current barriers to investment in Australia and Indonesia, identifies areas where barriers may be removed and provides a basis for modelling the impact of these changes on investment flows and the economy.

Current barriers to investment

Barriers to investment can come in a number of forms and are typically spread unevenly across industries. The Australian Productivity Commission, OECD and UNCTAD have explored quantification of barriers to foreign direct investment (FDI).³⁴ Australia's investment barriers are spread relatively evenly across limits on foreign ownership, screening requirements and operational freedom, while Indonesian barriers are mainly limits on foreign ownership. Chart 4.1 shows barriers to FDI in the service sectors for various Asia-Pacific economies. It should be noted that chart 4.1 reflects barriers to FDI as reported to the OECD by the assessed countries themselves. Hence there could be 'informal' impediments to FDI not captured in the figures.

FDI barrier data is available for 29 OECD countries and 48 other (largely developing) countries. In terms of the OECD countries, the Australian service sector has the second most restrictive investment environment, with only Mexico being more restrictive. Of the 48 other economies, Indonesia is estimated to have the 45th most restrictive FDI environment.

Australia's investment barriers

Several firms and industries in Australia are considered to be strategic or in some way sensitive. As a result, there are established policies and regulations that protect

³⁴ For example, see Hardin, A. and L. Holmes 2002, 'Measuring and Modelling Barriers to FDI', in Bora, B. (ed.) Foreign Direct Investment: Research Issues, Routledge, London; Golub, S. 2003, 'Measures of Restrictions on Inward Foreign Direct Investment for OECD Countries', OECD Economic Studies No. 36, 2003/1; and UNCTAD 2006, 'Measuring Restrictions on FDI in Services in Developing Countries and Transition Economies', UNCTAD/ITE/IIA/2006/1, United Nations, Switzerland.



4.1 FDI restrictions in regional economies^a Service sectors

Data source: Stephen Golub personal communication 13 March 2007, unpublished data and UNCTAD, personal communication 29 June 2006, unpublished data (data underlying paper UNCTAD 2006, *Measuring Restrictions on FDI in Services in*

Developing Countries and Transition Economies, UNCTAD/ITE/IIA/2006/1, United Nations, Switzerland).

these firms and industries in particular ways. Reflecting these sensitivities, Australia has relatively high FDI restrictions, especially when compared with other high income OECD countries. Restrictions range from limits on foreign ownership in certain sectors to modest screening procedures for a wide range of investment proposals. Across all service sectors, it is estimated that 26 per cent of Australia's restrictions on FDI result from limits on foreign ownership, 37 per cent from screening requirements and 36 per cent from limits to operational freedom.

Restrictions that result in a more binding barrier to entry are those that apply to investments in sensitive sectors. Australia maintains specific limits on, or requirements relating to, foreign investment in:

- Newspapers;
- Broadcasting;
- Telstra;
- Commonwealth Serum Laboratories (CSL);
- Qantas Airways Ltd and other Australian international airlines;
- federal leased airports;
- urban land; and
- shipping.

Notification to the Foreign Investment Review Board (FIRB) and possible objection procedures for foreign investment include those for:

- investments by foreign persons in existing Australian businesses in the media sector including direct (that is, non-portfolio) investment irrespective of size and portfolio investments of 5 per cent or more;
- investments by foreign persons in existing Australian businesses with total assets of \$50 million or more in:
 - the telecommunications sector;
 - the transport sector, including airports, port facilities, rail infrastructure, international and domestic aviation and shipping services provided either within or to and from Australia;
 - the manufacture or supply of training, human resources or military goods, equipment or technology to the Australian or other defense forces;
 - the manufacture or supply of goods, equipment or technologies able to be used for a military purpose;
 - the development, manufacture or supply of, or provision of services relating to, encryption and security technologies and communication systems; and
 - the extraction of (or where rights to extract are held) uranium or plutonium, or the operation of nuclear facilities;
- direct investments by foreign governments or their agencies, or companies with a greater than 15 per cent direct or indirect holding by a foreign government or agency, or otherwise regarded as controlled by a foreign government, irrespective of size; and
- acquisitions of interests in Australian urban land (with the exception of acquisitions of interests in developed commercial real estate).

Indonesia's investment barriers

From chart 4.1 it can be seen that there is a notable increase in the magnitude of barriers to FDI (in the service sectors) between OECD and developing regional economies, with limits on foreign ownership being particularly prevalent in the latter. In the case of Indonesia, limits on foreign ownership account for 57 per cent of estimated FDI barriers (in the service sectors), screening requirements account for 16 per cent of barriers, and operational restrictions 26 per cent of barriers.

Foreign direct investment in Indonesia declined sharply following the 1997-98 financial crisis. While investor confidence is rebounding of late, Indonesia's stock of FDI in 2006 was just below the level it was at in 1995. In an effort to improve the investment climate, the current Administration has set about reforming investment, tax, customs and labour laws; embarking upon an anti-corruption campaign; and commencing judicial and civil service reform.³⁵ Despite these reforms to the

³⁵ USTR 2007, 2007 National Trade Estimate on Foreign Trade Barriers, Office of United States Trade Representative, page 294.

investment climate, Indonesia still maintains some explicit barriers to FDI, most notably:

- maintaining a (negative) list of sectors that are closed to foreign investment, including industries producing certain chemicals, weapons, alcoholic drinks, casinos, forestry, local transportation, media and medical services are reserved for domestic enterprises only;
- foreign investment, under condition of a joint venture with Indonesian interests, are required for investment in infrastructure (seaports, electricity, potable water, hospitals, telecommunications and airlines);
- subjecting foreign investment in a range of industries (but typically industrial) to certain operational restrictions, such as saucing of raw materials (lumbar), location, size of plant (electricity generation), and government appointment/ licence (money printing and explosive production);
- foreign investors do not have the legal right to own land (although some leeway is provided in that foreign investors can have their land use rights — activity, duration and opportunity to mortgage — authorised); and
- while 100 per cent foreign ownership of a company is welcomed (noting the exceptions above), within 15 years from first commercial production some equity must be sold to Indonesian interests.

It is understood that in 2007 Indonesia prepared legislation that would see a number of the above restrictions to FDI being addressed. However, as yet, the new investment law/legislation has not been promulgated, nor is it known when (or if) the new investment legislation will be enacted.

Australia-Indonesia bilateral investment liberalisation

This study is an ex ante analysis of the possible gains of trade and investment liberalisation between Australia and Indonesia. As such, the extent and patterns of the trade and investment liberalisation that would occur under any future liberalisation is unknown. The sectoral patterns of investment barriers for Australia and Indonesia give some guidance as to areas where the largest investment liberalisation could occur (outlined in chart 4.2).

Recent trade and investment agreements entered into by Australia and Indonesia might provide some insight into the likely pattern and extent of investment liberalisation between Australia and Indonesia.

For example, a major element of Australia's investment liberalisation under the recently (January 2005) commenced Australia–United States Free Trade Agreement was the increase in the notification limit for foreign investment from the United States. Instead of foreign investment greater than \$50 million needing to notify the Foreign Investment Review Board, this threshold was raised to \$800 million (to be



4.2 FDI barriers in Australia and Indonesia Service sectors

Data source: Golub personal communication 13 March 2007, unpublished data (data underlying OECD 2006, OECD's Regulatory Restrictiveness Index: Revision and Extension to More Economies, Working Paper on International Investment number 2006/4, OECD, Paris) and UNCTAD, personal communication 29 June 2006, unpublished data (data underlying paper UNCTAD 2006, Measuring Restrictions on FDI in Services in Developing Countries and Transition Economies, UNCTAD/ITE/IIA/2006/1, United Nations, Switzerland).

indexed over time). This was an across the board change in non-sensitive sectors. As screening requirements represent Australia's largest source of FDI restrictions (refer back to chart 4.1), the changes under AUSFTA should see Australian restrictions on FDI from the United States being substantially reduced.

In 1998, ASEAN Ministers signed the Framework Agreement on the ASEAN Investment Area (AIA). The AIA aims to make the ASEAN region a conducive and liberal investment area. Amongst other measures, this is to be achieved through:

- the immediate opening of all industries to investment (with the exception of those industries specified in the Temporary Exclusion List or Sensitive List) to ASEAN investors by 2010 and all investors by 2020;
- granting immediate national treatment to investors from other ASEAN members by 2010 and to all investors by 2020 (noting the TEL and SL exemptions); and
- eliminating investment barriers and liberalising investment rules and policies in the sectors covered by the AIA.

Under the AIA Indonesia allows 100 per cent foreign equity ownership in all sectors, except for those considered to be strategically important for reasons of national security, public health and morals, or environmental protection. Examples of such sectors include industries producing chemicals harmful to the environment, weaponry, air traffic system providers, casinos, and alcoholic drinks (as stipulated in Presidential Decree No. 96/2000 and 118/2000).

What are the effects of investment liberalisation?

Lowering investment barriers can have a number of impacts.

- Increasing the allocative efficiency of investment. That is, investment can move to areas where it has the highest marginal product of capital or can generate the greatest value of production. This can happen by reducing discrepancies in the marginal product of capital between different countries. Alternatively, it can happen if investment is attached to particular skills and technology, in which case these attributes are allocated more efficiently. Improvements in allocative efficiency can drive up productivity.
- 2. Lowering the cost of investment through increasing the pool of available funds. A reduction in investment barriers may effectively increase the supply of funds for Australia and Indonesian investment and therefore lower the cost of obtaining those funds. Note that there could also be increase in the demand for funds through the impacts noted above.
- 3. Lowering the transaction costs of investment barriers. For instance, the requirement to notify the Foreign Investment Review Board in Australia of a proposed foreign investment imposes a (small) transactions cost on that investment.

Note that like import competition, the potential for investment to move between countries can lead to benefits without any change in investment flows. That is, removing investment restrictions may increase contestability.

Quantifying the impact of investment liberalisation

Quantifying the impact of investment liberalisation on investment and welfare is not an easy task. Empirical work has found wide estimates of the impact of trade and investment agreements on investment (see box 4.3). This reflects a number of factors.

- Isolating the impact of any investment liberalisation from the numerous other events going on in the economy is inherently difficult.
- Quantifying the size of the liberalisation is difficult. Because each liberalisation is different, as are countries' starting positions, the most robust work would need to quantify the differences in the extent and patterns of liberalisation between different agreements. There has only been limited research into quantifying investment barriers, and little to quantify the extent of investment agreements on these barriers.
- There may be many other aspects of the economies that mitigate or enhance the impact of investment liberalisation. For instance, the structure and size of the economies and savings patterns could all be important.

4.3 Empirical estimates of the relationship between investment barriers and investment

The literature has not been able to precisely estimate the impact of trade and investment liberalisation on FDI, but some broad conclusions have emerged:

- agreements tend to lead to large increases in FDI flows to the developing country and moderate increases to developed countries (Mexico and NAFTA);
- free trade agreements typically have some impact on FDI flows; and
- investment liberalisation can lead to extra impacts on FDI flows, beyond that arising from trade liberalisation.

Despite the difficulties of empirical work, the literature gives us a broad handle on the magnitude of the impact of trade and investment liberalisation on FDI flows. These estimates range from little impact (for straight investment treaties), to a 25 per cent increase in FDI inflows in Mexico following NAFTA.

Estimates include:

- an investment and trade liberalisation agreement is associated with a 26 per cent increase in FDI stock, based on a number of liberalisation agreements;³⁶
- NAFTA was associated with a 0.6 to 1.6 per cent increase in FDI inflows for the US, Canada and Mexico;³⁷
- NAFTA was associated with a 25.4 per cent increase in FDI inflows to Mexico³⁸ and
- bilateral investment treaties have little effect on FDI.³⁹

The literature also suggests that in agreements between developed and developing countries, it is the developing country that experiences the larger FDI change.⁴⁰

Other strands of evidence also point to the potential for increases in FDI to follow trade and investment liberalisation agreements. For example, it is found that investment promotion agencies can increase FDI.⁴¹ In many respects a trade and liberalisation agreement can play a similar role through the dissemination of information.

³⁶ Yeyati, Levy E., Stein, E. and Daude, C. 2002, 'The FTAA and the location of FDI', Paper prepared for the IDB-Harvard Conference on the FTAA in Punta del Este, Uruguay, December 7.

³⁷ MacDermott, R. 2004, 'NAFTA and Foreign Direct Investment', mimeo, Western Illinois University.

³⁸ Sanchez, M. and Karp, N. 2000, 'NAFTA's economic affects on Mexico', Grupo Financiero Bancomer draft paper.

³⁹ Hallward-Driemeier M. 2003, 'Do Bilateral Investment Treaties Attract FDI? Only a bit...and they could bite', World Bank, *Development Economics Research Group* paper.

Current direct investment between Australia and Indonesia

Current bilateral FDI flows between Australia and Indonesia are modest.

Inward FDI is quite considerable for Australia with an FDI stock to GDP ratio of 38 per cent.⁴² However, Indonesia is not an important source of FDI for Australia, with just 0.01 per cent of Australia's inward FDI stock in 2007 estimated to come from Indonesia (see left hand panel of chart 4.4). This FDI stock is slightly more important from Indonesia's perspective, making up 0.2 per cent of Indonesia's total outward FDI stock in 2007. It is estimated that Indonesian FDI in Australia was valued at A\$55 million in 2007.⁴³

Indonesia is the destination for a likewise small share (0.5 per cent) of Australia's outward FDI stock in 2007. From Indonesia's perspective, the inward FDI stock from Australia is important, accounting for nearly 2.5 per cent of Indonesia's total FDI stock in 2007, down from a high of 5.5 per cent in 2006 (see right hand panel of chart 4.4). In 2007, the Australian FDI stock in Indonesia was valued at A\$1839



4.4 Bilateral Australia–Indonesia FDI^a

- ⁴⁰ Blomstrom, M. and Kokko, A. 1997, 'How foreign investment affects host countries', World Bank *Policy Research Working Paper* no. 1745.
- ⁴¹ Morisset, J. and Andrews Johnson, K. 2004, 'The effectiveness of promotion agencies at attracting foreign direct investment', Foreign Investment Advisory Service, Occasional Paper no. 16.
- ⁴² Note that FDI is a stock and GNP is a flow.
- ⁴³ The FDI estimate of A\$55 million is based on the average share of FDI in total Indonesian investment in Australia over 1991-92 to 2000-01 (noting that data points are not available for all years), with the average share of FDI in total Indonesian investment in Australia (13)

million.

Compared to other regional economies, Australian investment in Indonesia is below other countries. For example, Indonesia is the destination for nearly 15 per cent of Australian FDI in ASEAN members, despite Indonesia accounting for nearly 35 per cent of ASEAN GDP. It would therefore appear that Indonesia is underrepresented in terms of being a destination for Australian FDI, in part reflecting Indonesia's relatively large barriers to FDI.

Total FDI in Indonesia is not currently as important as is the case for Australia — Indonesia's FDI to GDP ratio is currently 13.6 per cent, versus 38 per cent in the case of Australia. At its peak immediately prior to the financial crisis (1998), Indonesia's FDI to GDP ratio was nearly 33 per cent. As of 2007, the inward FDI stock of Australia was US\$312 billion versus US\$59 billion in Indonesia (see chart 4.5).

4.5 FDI stocks in Australia and Indonesia



Data source: UNCTAD Foreign Direct Investment Database (online) and World Bank World Development Indicators Database (online).

Modelling Australia-Indonesia investment liberalisation

The methodology used in modelling the impact of investment liberalisation considers two effects of investment liberalisation.

1. An increase in foreign investment following liberalisation.

per cent) then being applied to observed total Indonesian investment in Australia in 2007 (A\$409 million) to derive an estimate of A\$55 million (estimates for years 2002 to 2006 were also derived using the same approach).

2. An increase in dynamic productivity through FDI churn and improved capital allocation, and the transfer of skills, know-how and technology associated with that FDI.

Table 4.6 shows the key assumptions made in the modelling of investment liberalisation.

4.6 Assumptions used to condition the analysis	
--	--

Area	Assumption
Reduction in investment barriers	All barriers to bilateral FDI are removed.
Increase in FDI stock from reduction in in investment barriers	From Indonesia to Australia: 218 per cent based on upper panel of chart 4.7 From Australia to Indonesia: 338 per cent based on lower panel of chart 4.7
Sectoral pattern of investment change due to lowering of investment barriers	Modelled according to capital intensive nature of sectors.
Timing of increase in investment	Modelled according to capital depreciation.
Source: CIE	

Increase in investment

As is to be expected, there is a broad relationship between investment barriers and the level of inward investment. As can be seen in chart 4.7, and typically speaking, the stock of FDI is greater the lower the investment barriers. This is to be expected.

FDI depends on numerous location offer factors, including macroeconomic and political stability, good governance and policy transparency, ease of doing business, absence of corruption, law and order, market opportunities, high quality infrastructure, supplier access and the presence of a skilled work force. (Note that there are other factors that are important in determining the FDI stock, chief amongst which is a country's domestic saving and investment patterns.) Hence even if a country has no investment barriers, the FDI inward stock may still be low if the country's performance in these other areas is lacking. Conversely, a country with relatively high barriers to FDI may still attract significant amounts of FDI if that country excels in the other location offer areas. This could be said about Australia, which had an (inward) FDI stock to GDP ratio of 38 per cent in 2007 despite relatively high barriers to FDI (as reported by the OECD). For comparison, the US has a FDI to GDP ratio of 15 per cent, China 10 per cent, South Korea 12 per cent, Japan 3 per cent, New Zealand 55 per cent and Singapore 155 per cent.

Generally speaking, high income countries typically have good track records in the location offer factor areas. Removal of investment barriers (of the same magnitude) will therefore likely be associated with a larger increase in FDI in high income countries than in say non-OECD countries (which have other impediments to FDI).



4.7 Investment barriers and FDI Service sectors

Data sources: Stephen Golub personal communication 13 March 2007, unpublished data; UNCTAD personal communication 29 June 2006, unpublished data; World Bank World Development Indicators online database; OECD 2007, OECD In Figures: 2007 *Edition*, OECD, Paris; and CIE calculations.

As this is an ex ante analysis of liberalisation between Australia and Indonesia, there is little precise information on the extent and patterns of investment liberalisation. A number of assumptions are made to quantify the impact of investment liberalisation, and the magnitude of impacts is conditional on these assumptions.

For the purpose of the economic modelling, and not wanting to second guess what might be achieved in any Australia–Indonesia negotiations, it has been assumed that both Australia and Indonesia remove all barriers to FDI originating in the other country.

Running regressions of the ratio of inward FDI stock (in the service sectors) to GDP (from the service sectors) against investment barriers (in the service sectors) allows a relationship between reduction in investment barriers and FDI stock to be

established (see chart 4.7 for relationship). The relationship shows that removal of all of Australia's investment barriers would increase the inward FDI stock to GDP ratio by 218 per cent if the liberalisation occurred on a multilateral basis.⁴⁴ For Indonesia, the increase in the inward FDI stock is estimated to be 338 per cent (once again, if the liberalisation was comprehensive and multilateral in nature).

Trade and investment liberalisation between Australia and Indonesia would be bilateral in nature. The stock of Indonesian FDI in Australia in 2007 is estimated at A\$55 million in 2007, so a 218 per cent increase in this amount is equivalent to an A\$120 million increase in Australia's inward FDI stock. Using the same approach and assumptions, the increase in Indonesia's inward FDI stock is estimated to be around A\$6.2 billion.

The case for downgrading the effect of bilateral investment liberalisation to reflect the share sourced from the other country is not as clear-cut as it first appears. Under the Australia–Indonesia agreement, it is likely that capital from other countries could flow through Indonesia and into Australia, and likewise through Australia and into Indonesia. That is, unlike for goods flows, country of origin restrictions are very difficult to enforce for capital flows. However, in this case, Indonesia should already be able to move capital through other countries that have agreements with Australia, such as the United States, Singapore and Thailand. Because the importance of these factors is not well understood, the increase in the inward FDI stock associated with investment liberalisation is kept at A\$120 million for Australia and A\$6.2 billion for Indonesia.

The impact of lowering investment barriers will not occur instantly, as assets are not easily moveable between activities. For instance, while new capital is able to move almost costlessly, capital already invested in plant or machinery is typically unable to be transferred to another use. Instead, investment patterns change as the machinery depreciates and is not replaced. This is endogenously accounted for within the CIEG-Cubed global economic model.

The increase in FDI captures only the impact of investment liberalisation. Foreign investment would also increase in response to trade liberalisation and increases in dynamic productivity, and overall improvements to the investment climate (such as streamlining regulation, infrastructure improvements, greater government transparency and improved governance, and so on). Furthermore, the exogenous increases in investment will drive greater dynamic productivity gains and hence see further increases in investment in response to the improved productivity.

⁴⁴ Note that the calculated increase in FDI stock should, strictly speaking, occur only in the service sectors (as only barriers for FDI in these sectors have been quantified). However, in the absence of data pertaining to the other sectors, it is assumed that an equal FDI increase occurs in other sectors of the economy.

The investment liberalisation that has been modelled assumes the total liberalisation of bilateral FDI flows. In the event that any investment liberalisation is smaller than that modelled, there will be likewise smaller effects on foreign investment flows.

5 Assessing the economic impacts of liberalisation

In negotiating bilateral trade and investment liberalisation, Australia and Indonesia must decide on the rate at which trade and investment barriers are removed and the range of goods, services and sectors subject to trade and investment liberalisation. The pace and scope of liberalisation will be key factors in determining the magnitude of any economic gains arising from the liberalisation.

As yet, neither Australia nor Indonesia has tabled, as a starting point for future negotiation, a program of trade and investment liberalisation. Hence at this point in time we are not in a position to know what the pace and scope of trade and investment liberalisation under any resulting agreement may be. A range of modelling simulations have therefore been conducted.

Before discussing the trade liberalisation scenarios investigated, the model used to evaluate the economic impacts is briefly discussed.

The economic model used

The CIEG-Cubed global economic model has been used to estimate the impacts of Australia and Indonesia entering into a bilateral trade and investment agreement.

CIEG-Cubed is the most appropriate global economic model currently available with which to analyse the welfare implications of a trade and investment agreement. The advantages of using CIEG-Cubed include:

- identification of trade flows between countries/regions;
- identification of investment flows between countries/regions;
- incorporates an integrated financial sector (comprising money, bonds, interest rates, lending, borrowing, expectations, financial flows, and wealth);
- it is a fully dynamic model that can capture the time path of adjustment for each of the economies/regions modelled;
- consumers and producers are allowed to borrow and lend money over time, with decision influenced by the return on capital versus other assets;
- inclusion of adjustment costs and expectations; and

identification of up to 57 sectors of production and 87 countries.⁴⁵

The GTAP6 database underlies the CIEG-Cubed model. However, GTAP6 pertains to year 2001. In order to make the modelling results as realistic as possible, trade flows with major trading partners, trade barriers and the structure of the Australian and Indonesian economies have been updated with the latest statistics (typically year 2006). To keep the modelling tractable, 57 sectors of production and 14 regions are identified.⁴⁶

While CIEG-Cubed is the best available global economic model, it must be appreciated that the CIEG-Cubed model, like all computable general equilibrium models, are not perfect. By definition, economic models are a simplification of reality and rely on numerous assumptions about economic parameters, behaviour and relationships. As such, modelling results should only be used to infer the outcome of trade liberalisation (positive or negative) and the magnitude of such impacts (small or large). It would be inappropriate to, for example, report modelling results to the 3rd decimal point and claim that as the unambiguous impact of any bilateral trade reforms. That is, only broad messages and trends should be taken from the modelling results. Qualitative and geopolitical considerations will therefore also be important in deciding whether or not Australia and Indonesia should more fully consider negotiating a trade agreement.

The baseline

To estimate the potential economic impacts of trade and investment liberalisation between Australia and Indonesia, an appropriate counterfactual (the 'baseline') needs to be established. The baseline represents the business-as-usual scenario — that is, what we can expect to happen in the absence of trade and investment liberalisation between Australia and Indonesia.

The baseline needs to encompass views about the future structure of the economy and include other (relevant) policy decisions, such as scheduled tariff reductions resulting from previous commitments made elsewhere (for example, WTO commitments and unilateral reductions). It would not be appropriate to, for example, remove Australian tariffs on clothing imports from Indonesia under the trade agreement and attribute all resultant outcomes as an impact of the bilateral

⁴⁵ More details on the APG model (the predecessor of CIEG-Cubed) can be found at <u>www.msgpl.com.au</u> and in McKibbin W.J. and Vines, D. (2000), "Modelling Reality: The Need for Both Intertemporal Optimization and Stickiness in models for Policymaking", *Oxford Review of economic Policy*, vol. 16, no. 4; and McKibbin W. and Wilcoxen P. (1998), "The Theoretical and Empirical Structure of the G-Cubed Model", *Economic Modelling*, 16, 1, pp. 123–148.

⁴⁶ The 14 regions identified in the modelling comprise Australia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Rest of ASEAN, China, Japan, South Korea, EU(25), New Zealand, the United States and the Rest of the World.

liberalisation when some of those impacts would be realised anyway as Australia has already announced unilateral reductions in clothing tariffs.

A key consideration in developing the baseline concerns the structure of the Australia and Indonesian economies in the future. In developing the baseline, the following factors have been assumed/taken into account:

- the Australia and Indonesian economies meet IMF medium term forecasts for major macroeconomic indicators;
- Australia meets its unilateral tariff liberalisation commitments as already specified/announced;
- trade liberalisation proceeds as negotiated under the recently announced ASEAN-Australia-New Zealand FTA (AANZFTA);
- Australia meets it phased bilateral trade liberalisation commitments as negotiated in the 2005 commenced trade agreements with Thailand and the United States (as do Thailand and the US);
- as a large and important trading partner of both Australia and Indonesia, China's unilateral merchandise trade liberalisation a condition of its WTO accession is incorporated into the baseline;
- the recently negotiated New Zealand-China FTA enters into force (as expected) in October 2008, with the negotiated timeline for tariff liberalisation being met;
- Indonesia has recently entered into a bilateral trade agreement with Japan (Economic Partnership Agreement) and, as part of the wider ASEAN group, free trade agreements with China and South Korea. However, as the liberalisation schedules under these agreements were not made available it has not been possible to include them in the baseline;
- Indonesia has announced that it will undertake unilateral tariff liberalisation over the next 5 years. Unfortunately, the pace and scope of any such unilateral liberalisation has not as yet been announced and as such cannot be included in the baseline;
- as the respective tariff reduction paths to meet the APEC Bogor commitment of complete unilateral trade liberalisation by 2010 for developed country members and by 2020 for developing members are voluntary and unknown, any such liberalisation has been overlooked; and
- no bilateral trade liberalisation results from other trade agreements currently being negotiated/under consideration by Australia and Indonesia.

It is important to appreciate that including AANZFTA in the baseline will greatly reduce the benefits of a bilateral trade agreement with Indonesia. A comprehensive agreement with a fast rate of liberalisation with the ten ASEAN members, of which one is Indonesia, will make redundant a bilateral Australia-Indonesia agreement, as the bilateral Australia-Indonesia agreement will be a subset of the larger AANZFTA.

A bilateral agreement can however deliver economic benefits to both Australia and Indonesia if the negotiated trade liberalisation has wider coverage or a faster rate of implementation than that negotiated under AANZFTA.

Finally, it needs to be appreciated that the baseline represents what is known about the future trade policy environment at the time the economic modelling was conducted (late 2008). As soon as a new (and significant) policy announcement is made that has the potential to influence trade flows — such as an emissions trading scheme — or the occurrence of some other economic 'disruption' — such as the sub-prime inspired financial crisis — the baseline used in the modelling is immediately out-of-date. The question then turns to whether or not the modelling results are still applicable given the new baseline. What can be said in response to this question is that unless the new policy/disruption sees a significant and fundamental change in the sectoral composition of the economy over the long term, then the modelling results still hold in terms of direction and likely magnitude. That is, if the bilateral trade and investment liberalisation is found to have a beneficial impact on Australian and Indonesian GDP, then that finding will likely still hold under an alternative baseline (assuming that there is not a significant change over the long term to the composition of the economies modelled).

Bilateral liberalisation undertaken by Australia and Indonesia

Results from the liberalisation simulation(s) are compared with the baseline, with the difference being attributable to the bilateral trade and investment liberalisation between Australia and Indonesia. Model results are typically presented as a percentage change from the baseline outcome and are presented for each year until 2030. That is, modelling results should be interpreted as 'GDP (for example) will be X per cent higher/lower than otherwise would have been the case'.

Australia and Indonesia have a vast range of liberalisation implementation scenarios at their disposal. For example, trade barriers could either be completely or partially eliminated; removed immediately or phased out over 5 or 10 years; goods, services and investment could be covered, or just goods; and so on. Furthermore, both countries need not adopt the same trade liberalisation schedule.

Given the uncertainty with respect to the pace and scope of liberalisation, and not wanting to 'second guess' (any) trade negotiations, it has been assumed that the bilateral trade and investment liberalisation will be comprehensive in scope with barriers being removed immediately on commencement of the agreement. This main modelling simulation is supplemented by two 'what if' type simulations. The various modelling simulations are detailed below.

1. Overnight trade and investment liberalisation — Australia and Indonesia announced on 1 January 2009 that they will enter into a bilateral trade agreement, with trade barriers (identified in chapter 3) and investment barriers (chapter 4)

being removed overnight on the commencement of the trade and investment agreement, which is assumed to be 1 January 2010.

- 2. Phased trade and investment liberalisation trade and investment liberalisation is assumed to be announced on 1 January 2009, with the liberalisation commencing on 1 January 2010 and with barriers being removed over:
 - 5 years
 - 10 years.

Results for simulation 1 can be found in chapters 6 (macroeconomic) and 7 (sectoral impacts). Key results for simulation 2 are reported in chapter 8.

It should be appreciated that modelling a bilateral trade and investment agreement that sees the overnight removal of all tariff, NTB, service and investment barriers to bilateral trade and investment represents a significant change to policy. As such, and over the short term, the economic impacts thereof may be quite large and fluctuate. However, when gauging the impact of the trade liberalisation, it is perhaps more prudent to focus on the impacts over the longer term (say 10–15 years post liberalisation). That way the policy changes will have worked their way through the economy and any changes to GDP (etc) will have settled down to a constant deviation from baseline.

6 Macroeconomic effects of the liberalisation

Bilateral trade and investment liberalisation between Australia and Indonesia would have implications for growth, trade and investment flows in both countries. Being a fully dynamic model that integrates goods and financial markets with a sophisticated treatment of assets and financial variables, the CIEG-Cubed model is well placed to explore the implications of the liberalisation for the macroeconomy. The implications for the macroeconomic variables of (real) gross domestic product, welfare, exports and imports, investment, current account, and the exchange rate as well as the effects on employment and real wages are reported for both countries until year 2030.

This chapter reports the macroeconomic impacts on Australia and Indonesia of comprehensive and overnight trade and investment liberalisation, assumed to occur on 1 January 2010 when the bilateral agreement enters into force.

Before turning to the modelling results, the size of any gains from trade will be primarily determined by several factors, namely:

- the size of barriers to trade and investment:
 - the average Australian tariff levied on Indonesian imports in 2010 is 0.5 per cent (under AANZFTA);
 - the average Indonesian tariff levied on Australian imports in 2010 is 7.9 per cent (under AANZFTA);
- the contribution of exports and imports to GDP;
- the extent and composition of bilateral trade between the countries:
 - 2.5 per cent of Australia's exports go to Indonesia, while Indonesia is the source of 2.3 per cent of Australia's imports (in 2006);
 - 2.9 per cent of Indonesia's exports go to Australia, while Australia is the source of 4.3 per cent of Indonesia's imports (in 2006); and
- as FDI liberalisation is being considered, the importance of the other country as a source of FDI:
 - the stock of Australian FDI in Indonesia was valued at A\$1.8 billion in 2007, accounting for 2.4 per cent of Indonesia's inward FDI stock; and
 - the stock of Indonesian FDI in Australia was estimated at A\$55 million in 2007, accounting for 0.01 per cent of Australia's inward FDI stock.

Given the above facts, it could be said that Australia is a more important trading partner to Indonesia, than Indonesia is to Australia. This, combined with the fact that Indonesia's trade and investment barriers are higher than Australia's, leads to the expectation that Indonesia stands to benefit relatively more from the trade and investment agreement than does Australia.

However, it should be noted that the gains from an Australia–Indonesia trade and investment agreement are expected to be small, especially over the longer term. (And as discussed in the previous chapter, when gauging the economic impacts of the bilateral trade and investment liberalisation, the focus should be on impacts over the longer term.)

Only small gains are expected over the longer term due to the fact that Australia and Indonesia have already agreed to trade liberalisation under AANZFTA. Hence compared to what is already happening under AANZFTA, the marginal impact of the bilateral agreement will be restricted to:

- bringing forward the pace of liberalisation (to overnight liberalisation in 2010);
- liberalisation across a wider range of areas (comprising tariffs, non-tariff barriers, service barriers and FDI barriers); and
- more comprehensive liberalisation (in the case of Indonesia).

Macroeconomic effects – Australia

The macroeconomic effects of trade and investment liberalisation under the overnight and comprehensive liberalisation scenario are reported in chart set 6.1. For Australia, the trade and investment liberalisation is projected to bring about a positive, but small, economywide impact. Both output and welfare are projected to increase above baseline levels as a result of the bilateral liberalisation. The rise in real GDP peaks at nearly 0.03 per cent above baseline in 2010 (the year of liberalisation), before tapering off to a long term gain of 0.02 per cent above baseline. The rise in real consumption — the preferred welfare measure — reaches just over 0.02 per cent above baseline in 2019 and remains relatively constant thereafter.

What is interesting to note is that agents' forward looking expectations/ behaviour sees changes to the Australia economy even before the trade and investment liberalisation commences in 2010. For example, investment is projected to increase in 2009, even though the trade and investment agreement does not commence until 2010. This occurs as a result of anticipated higher future returns to capital stemming from the bilateral liberalisation. In expectation of these higher returns, investment is made prior to the liberalisation so that once that liberalisation occurs, that investment is 'online' and can reap the higher returns. This investment activity impacts on other macroeconomic indicators (for example, GDP, exports and imports, and consumption).



6.1 Macroeconomic effects for Australia

Data source: CIEG-Cubed modelling simulation.

Increased openness to (Indonesian) FDI lowers the cost of investing in Australia. This, combined with improved access to the Indonesian market and the greater domestic efficiency that trade liberalisation brings, sees capital in the Australia economy earning a higher return. This in turn causes a rise in real investment, with investment peaking at nearly 0.03 per cent above baseline over the period 2014–2017. Once that investment is online and as liberalisation under the trade and investment agreement stops, investment tapers off to around 0.02 per cent above baseline (reflecting that over the longer term, the bilateral trade liberalisation improves the attractiveness of Australia to investment).

The slight decline (0.02 per cent below baseline) in exports prior to 2010 can be attributed to greater investment and the switching of goods from the export market to the local investment market (that is, exports are crowded out).

Despite rising GDP, domestic saving does not increase by a sufficient amount to cover the rise in investment. This is due, in part, to consumers seeing/expecting future income gains and raising consumption (today) to smooth this. The extra capital for investment is therefore met by additional capital inflow. As a balanced Balance of Payments is assumed in the long run, the increasing capital account necessitates, by definition, a deterioration of the current account deficit (that is, imports exceed exports). Hence Australia's current account deficit marginally increases, by an amount equivalent to nearly 0.01 per cent of real GDP in 2009.

The deterioration in the current account in 2009 is necessary in order to balance/offset the increase in the capital account brought about by additional capital inflow needed to (partially) fund the rise in investment. After 2010 the demand for capital inflow eases once the new investment is in place. This, combined with the change in value of exports exceeding the value of imports, sees a very slight improvement in the current account deficit over the longer term.

Real exports from Australia are projected to peak at 0.25 per cent above baseline in 2010, before settling down to a long term gain of nearly 0.11 per cent above baseline. Note that export growth will be influenced by trade liberalisation undertaken by Australia and Indonesia under AANZFTA, which has the net effect of diminishing the magnitude of trade liberalisation undertaken as part of the bilateral liberalisation with Indonesia. With the rise in Australia's economic activity and lower barriers to Indonesian imports, there is an increase in import volume of around the same magnitude as the increase in exports. The increase in real imports over the longer term is estimated to be over 0.12 per cent above baseline levels.

With the change in real imports (marginally) exceeding the change in real exports over the longer term, the slight improvement in the current account deficit is brought about by an increase in export prices (due to increased export demand by Indonesia) relative to the price of imports.

To facilitate the capital inflow and trade changes, there must be an appreciation of the Australia currency. The Australia dollar is estimated to strengthen against the US dollar in nominal terms by nearly 0.04 per cent, and in real terms by over 0.01 per cent, by 2030.

Welfare and production gains

The predicted additional production (real GDP) and welfare (real consumption) gains under the bilateral trade and investment agreement are reported in chart 6.2. Results are presented in net present value (NPV) terms. The net present value allows a current value to be placed on gains that may not be experienced until some time in the future. Over 20 years from 2010 to 2030, Australia is estimated to gain A\$3.2 billion in real GDP and A\$2 billion in real consumption (expressed in 2008 dollar terms). These gains are equivalent to 0.3 and 0.2 per cent of GDP (respectively) in



6.2 Australia's production and welfare gains NPV^a

^a Over 2010 to 2030, expressed in 2008 dollar terms using a 5 per cent real discount rate. *Data source:* CIEG-Cubed modelling simulation.

2008. Expressing the gains as a share of GDP is perhaps a better indication of the magnitude of gains (as opposed to the absolute monetary value) as account is taken of the size of the underlying economy.

Sources of benefits

Charts 6.3 and 6.4 decompose Australia's predicted gains from bilateral trade and investment liberalisation with Indonesia into the various contributing factors.

The left hand panel of chart 6.3 shows the gains from each country acting alone (that is, Australia and Indonesian unilateral trade and investment liberalisation against trade/investment from the other country). What is interesting to note is that improved access to the Indonesian market is of more importance to Australia's production and welfare gains than is the opening up the Australia economy to greater trade and investment. This observation is typical of countries with already low trade barriers — there is little left in the way of allocative efficiency gains from removal of the remaining trade barriers.

Indonesia's liberalisation accounts for nearly all of Australia's GDP and consumption gains. This primarily reflects the starting point for the trade liberalisation. As Australia's trade barriers are already low, Australia has less to gain from its own removal of already low tariff barriers than Australia has to gain from a trading partner removing high barriers to Australia exports/foreign direct investment.

While Indonesia's liberalisation is unambiguously good for Australia as it increases demand for Australia exports, Australia's own liberalisation has pluses (allocative efficiency gains) and very slight minuses (terms of trade loss).



6.3 Sources of Australia's gains NPV 2008^a

^a Over 2010 to 2030, expressed in 2008 dollar terms using a 5 per cent real discount rate.. *Data source:* CIEG-Cubed modelling simulation.

The small loss of real consumption arising from Australia's own liberalisation is attributable to Australia's liberalisation of its merchandise trade barriers. As tariffs are removed, imports increase. To pay for these additional imports, Australia must export more, which necessitates a real exchange rate depreciation (that is, Australia experiences a slight terms of trade loss).⁴⁷ In other words, a unit of Australia output is worth less than before (in terms of what it can be exchanged for on the world market). This sees a loss of real consumption, amounting to A\$0.1 billion in NPV terms over the period 2010 to 2030.

The right hand panel of chart 6.3 (and chart 6.4) decomposes the impacts of the trade and investment liberalisation into five factors, namely:

- removal of bilateral tariff barriers to merchandise trade;
- removal of bilateral non-tariff barriers to merchandise trade;
- removal of barriers to bilateral services trade;
- removal of barriers to bilateral investment; and
- resultant dynamic productivity gains.

Australia's gains are dominated by dynamic productivity gains arising from the trade and investment liberalisation. Indeed, dynamic productivity accounts for around 67 per cent of the real GDP gains post 2010.

⁴⁷ Note that overall, Australia's real exchange rate appreciates. However, within this overall exchange rate appreciation, and in isolation of other areas of trade liberalisation (such as removal of Indonesian tariffs), removal of Australia barriers to Indonesian imports sees a depreciation of the real exchange rate.



6.4 Changes in real GDP in Australia

Data source: CIEG-Cubed modelling simulation.

Also evident from charts 6.3 and 6.4 is the contribution to GDP removal of non-tariff barriers makes. Removal of Australia's and Indonesia's NTBs is estimated to account for nearly 19 per cent of Australia's real GDP gain (versus 4 per cent for merchandise tariffs). These results suggest that if Australia and Indonesia do decide to negotiate a trade and investment agreement, then attention should be given to eliminating NTBs.

Finally, the observed importance of dynamic productivity gains to Australia, combined with the fact that it is Indonesia's liberalisation that accounts for the majority of Australia's gains, leads to the conclusion that Australia's dynamic productivity gains are export based. That is, 'learning by exporting' sees the experience and knowledge gained in export markets being translated into productivity gains.

Employment

With the estimated increase in real GDP, the trade and investment liberalisation has a positive impact on employment in Australia (see chart 6.5).

Although the economic model assumes fixed labour supply and full employment determined by the population growth rate in the long run, in the short run employment deviates from the full employment equilibrium level because real wages adjust slowly to labour market conditions and the model takes account of imperfect labour mobility.

Prior to the liberalisation commencing in 2010, employment falls slightly below baseline levels. Note that the changes pre 2010 are so small that they will not be readily discernible, but are nonetheless explained below. The marginal decline in employment reflects a combination of a very small decline in GDP (observable only at the third decimal point), and dynamic productivity gains. In 2009 investment



6.5 Changes in employment and wages in Australia

Data source: CIEG-Cubed modelling simulation.

increases, and this sees an increase in imports (to satisfy the increase in investment demand). The increase in imports exceeds the increase in exports and investment demand, such that there is a minute contraction in GDP (0.004 per cent below baseline in the absence of dynamic productivity gains). As GDP is lower, so too is employment. The imports also drive dynamic productivity gains (which act to bolster GDP by 0.002 per cent). Productivity gains see less labour (and other inputs) being required per unit of output, hence the demand for labour falls further. The dynamic productivity gains also see prices falling (nearly 0.02 per cent lower in 2009), and with sticky nominal wages, this in turn sees an increase in the real wage. As real wages increase, there is a further decline in employment.

After the liberalisation commences the increase in imports contracts, and hence there are less dynamic productivity gains (meaning more labour is required per unit of output compared to that required in 2009). As GDP increases above baseline levels the associated increased demand for labour dominates adjustment costs (which, economywide, will be low due to Australia's already low trade barriers). This sees employment rising above baseline levels. Sticky nominal wages limit the ability of wage increases to bring the demand for labour back to baseline levels. Employment is estimated to peak at nearly 0.02 per cent above baseline in 2010.

Over time, wages adjust (increase) to ensure that employment falls back to its baseline level — the natural rate of unemployment. The long term gain to employment is reflected in higher real wages. The real wage rate, which is the difference between the nominal wage rate and inflation, increases over time and reaches around 0.04 per cent higher than the baseline level in 2030.

www.TheCIE.com.au

Macroeconomic effects – Indonesia

Over the longer term, Indonesia is also projected to benefit from bilateral trade and investment liberalisation with Australia.

Chart 6.6 provides the macroeconomic effects for Indonesia of entering into a comprehensive bilateral trade and investment agreement with Australia. A first observation to make is that the effects on the Indonesian economy are larger than that experienced by Australia. As is discussed further below, nearly 70 per cent of Indonesia's GDP gain is accounted for by Indonesia's removal of its high barriers to foreign direct investment. The resulting increase in (Australian) investment is large, and sees Indonesia's capital stock rising by around 0.5 per cent. The investment



6.6 Macroeconomic effects for Indonesia

Data source: CIEG-Cubed modelling simulation.

'boom' and subsequent increase in productive assets sees both an immediate and long term gain to the Indonesian economy.

It is estimated that Indonesia's real GDP would peak at 0.35 per cent above baseline in 2012, before settling down to a gain over the longer term of 0.23 per cent above baseline. The long term gain in real consumption is estimated to be 0.12 per cent above baseline.

Indonesia's real exports are estimated to contract in 2009, being some 0.47 per cent below baseline, before rebounding in 2010. Over the longer term it is estimated that Indonesia's exports will be around 0.55 per cent above baseline levels. The initial contract in exports in 2009 is due to the substantial increase in investment in that year, and the diversion of goods from the export market to the domestic market in order to meet the increased investment demand (that is, exports are crowded out). Indonesia's imports increase as well, peaking at nearly 1.3 per cent above baseline levels in 2010, then settling down to an increase of 0.46 per cent over the longer term.

The allocative efficiency gains expected/brought about by Indonesia's own trade liberalisation and the liberalisation of (Australian) foreign direct investment combine to see a substantial increase in investment in response to expected increases in economic activity and capital earning a higher rate of return. In 2010 investment is estimated to be around 1.4 per cent above baseline, and nearly 0.6 per cent above baseline over the longer term (hence the liberalisation improves the attractiveness of Indonesia to investment).

Due to the large share of the increase in investment accounted for by foreign investment, the capital account goes into surplus. The balanced Balance of Payments assumption necessitates a deterioration of the current account, which worsens by an amount equivalent to nearly 0.3 per cent of GDP in 2009 (when the differential between the change in exports and imports is at its largest). As the increase in investment softens over time, so too does capital inflow and the current account begins to return to baseline levels. However, a permanent deterioration in the current account of 0.07 per cent of GDP is estimated over the longer term.

To facilitate the trade and investment flows, Indonesia's nominal exchange rate first appreciates quite strongly, before tapering off to a long term appreciation (against the US\$) of 0.17 per cent above baseline. However, an increase in local prices sees the real exchange rate depreciating against the US\$, being some 0.07 per cent below baseline in 2030.

Welfare and production gains

Chart 6.7 reports Indonesia's estimated gains in net present value terms. Over the 20 year period from 2010 to 2030, the NPV of increases in Indonesia's real GDP and consumption are estimated to be A\$33.1 billion and A\$13.5 billion (respectively) in



6.7 Indonesia's production and welfare gains NPV 2008^a

^a Over 2010 to 2030, expressed in 2008 dollar terms using a 5 per cent real discount rate. *Data source:* CIEG-Cubed modelling simulation.

2008 dollar terms. Indonesia's real GDP and consumption gains are equivalent to 6.7 and 2.7 per cent (respectively) of GDP in 2008.

Hence in both absolute terms and relative to the size of the underlying economy, Indonesia would experience a larger gain from the bilateral trade and investment liberalisation than Australia. This is expected due to Indonesia being a more important trading and investment partner to Australia than Australia is to Indonesia.

Sources of benefits

Charts 6.8 and 6.9 decompose Indonesia's estimated gains from the trade and investment agreement with Australia into the various contributing factors.

The left hand panel of chart 6.8 shows the gains from each country acting alone. As can be seen, Indonesia's gains would arise mainly from its own liberalisation, as a result of improved allocative efficiency and dynamic productivity gains resulting from removing high trade and investment barriers. Indeed, Indonesia's unilateral action accounts for 95 per cent of its GDP gain, and 46 per cent of its consumption gain.

The right hand panel of chart 6.8 (and chart 6.9) decomposes the impacts of the trade and investment liberalisation.

As shown in the charts, investment liberalisation accounts for nearly 70 per cent of the GDP gains, but only 20 per cent of the consumption gains. While investment liberalisation is unambiguously good for economic activity and GDP, that investment is foreign and hence the returns to the additional investment flow back to the source country (Australia). The additional investment does, however, increase the capital stock, and thus the productivity of Indonesian employees. This in turn allows them



6.8 Sources of Indonesia's gains NPV 2008^a

^a Over 2010 to 2030, expressed in 2008 dollar terms using a 5 per cent real discount rate.. *Data source:* CIEG-Cubed modelling simulation.



6.9 Changes in real GDP in Indonesia

Data source: CIEG-Cubed modelling simulation.

to be paid more (see below), which flows through to an increase in household consumption. This investment 'story' helps to explain why Indonesia's liberalisation accounts for 95 per cent of its GDP gain, but only 46 per cent of its consumption gain.

Dynamic productivity accounts for 27 per cent of the GDP gain, but a much higher 72 per cent of the consumption gain. The productivity gains increase the marginal product of labour (and all inputs for that matter). More productive labour means the wage able to be commanded by employees increases, which in turn feeds through to greater household consumption.
It is interesting to note from chart 6.9 that dynamic productivity gains occur prior to the trade and investment liberalisation commencing in 2010. In 2009 there is increased capital inflow as investment increases in preparation for the trade liberalisation commencing in 2010. The capital inflow sees an appreciation in the exchange rate, which in turn makes imports cheaper. Imports increase, and combined with greater capital inflows, drives dynamic productivity gains.

Employment

With a higher level of economic activity the trade and investment liberalisation has a positive impact on employment in Indonesia. As shown in chart 6.10, and due to slow adjustment in wages, employment rises initially, peaking at 0.28 per cent higher than baseline in 2011. employment increases despite strong dynamic productivity gains (which decrease the demand for labour per unit of output). The dynamic productivity gains do, however, see a small decrease in prices (0.2 per cent below baseline in 2010). Sticky nominal wages and the price decline combine to see an increase in real wages in 2010. There is then a slight fall in real wages as prices begin to return back to baseline levels (as the productivity gains begin to decline), before wages begin to increase in order to return employment to the baseline level.

In the long run, the real wage rate adjusts to ensure that employment (eventually) falls back to its baseline level. The long term gain in employment is reflected in higher real wage rates, which are estimated to be over 0.4 per cent higher than the baseline level in 2030. Note that by 2030, employment is marginally (nearly 0.01 per cent) below baseline levels do to the increase in the real wage 'overshooting' the increase required to return employment to the baseline level. As the real wage continues to track down, employment will once again return to the baseline level.





Data source: CIEG-Cubed modelling simulation.

Bilateral trade

Indonesia's trade barriers are notably higher than those in Australia. As such, bilateral trade liberalisation will advantage Australian exporters more than Indonesian exporters.

As such, it is to be expected that Australian exports to Indonesia should increase by more than Indonesian exports to Australia. As can be seen in chart 6.11, this expectation is observed. After an initial spike in Australian exports to Indonesia (in order to help meet Indonesia's increase in investment demand), Australia's exports to Indonesia are estimated to be over 9 per cent above baseline in 2030, whereas Indonesian exports to Australia are over 6 per cent higher. Note that the increase in bilateral exports reflects both the magnitude of trade barriers being removed and liberalisation induced dynamic productivity gains. Dynamic productivity gains are important for a country as they act to improve a country's competitive position in all international markers, and not just in the bilateral trading partner (which is what bilateral trade liberalisation does).



6.11 Bilateral Australia-Indonesia trade

Data source: CIEG-Cubed modelling simulation.

7 Sectoral effects of the liberalisation

Bilateral trade and investment liberalisation between Australia and Indonesia is estimated to see a long term gain in Australia's GDP of nearly 0.02 per cent above baseline, and nearly 0.23 per cent above baseline in the case of Indonesia. While the economic modelling suggests that both economies 'as a whole' benefit from the bilateral liberalisation, there will be differing impacts between sectors.

CGE models and sectoral impacts – the low base effect

Before examining the sectoral impacts of an Australia-Indonesia trade and investment, it is important to note that the results of a CGE modelling exercise reflect the data (and assumptions) used in the modelling. Missing data on trade barriers, or low levels of trade (the low base effect) can result in counterintuitive results.

Low levels of current trade are interpreted in CGE models as reflecting a low level of competitive advantage in those products (all else the same). As a result, once all barriers are reduced, those low base sectors may see resources (capital, labour and land) being diverted away from them in favour of other sectors where trade currently takes place (and which are therefore deemed to be more competitive). It is those sectors with a combination of the (relatively) largest trade and highest barriers that stand to benefit the most from the trade liberalisation. This can lead to some counter-intuitive results, especially for sectors that are considered to be competitive yet there is little in the way of bilateral trade.

The service sector results typically suffer from the low base effect, and also the fact that barriers to services trade (delivered via cross border trade and movement of natural persons) could only be identified for a handful of service sectors. This meant for a number of the service sectors no tariff was able to be estimated. Consequently, the service sectors for which there was no estimated tariff are relatively disadvantaged by the trade liberalisation. This result is purely a manifest of the (lack of) data.

The lack of tariff estimates combined with the low base effect reduces the reliability of the results as they pertain to the service sectors. Because many services sectors historically have not been traded in volume between Australia and Indonesia, this can see the modelling results suggesting (modest) reductions from the baseline for certain service sectors under the trade and investment agreement. This is because resources are assumed to flow to merchandise sectors where trade has occurred in the past, and away from the service sectors (where there is little trade recorded today). However, trade in financial services, for instance, has historically been negligible between many trading partners due to legislated barriers, such as licence requirements, which can completely block such trade occurring (rather than raising the cost of such imports as tariffs do). As a result, when those legislated blockages are removed, it may be discovered that partner countries' financial sectors are much more competitive than was apparent, and more substantial trade could commence after the trade liberalisation.

Impact of liberalisation on Australian sectors

In line with the macroeconomic impacts, the sectoral impacts of an Australia-Indonesia trade and investment agreement are likewise small, typically only observable at the second decimal point.

Of the 57 sectors of the Australian economy identified in the economic modelling, which are aggregated to the 26 sectors reported in table 7.1, output for 82 per cent is expected to increase above baseline levels as a results of Australia entering into a trade and investment agreement with Indonesia. Just over half of the benefiting sectors are in the manufacturing (includes food processing) sector, while a quarter are in each of the primary and service sectors. The spread of benefiting Australian sectors primarily reflects Indonesian tariffs, which are highest in the manufacturing sectors (see table 3.2). Hence comprehensive trade liberalisation benefits the Australian manufacturing sectors more than say the Australian primary sectors, which, with the exception of rice, face lower trade barriers.

A further general observation to make is that for those Australian sectors that are estimated to experience an increase in output under the trade and investment liberalisation, the growth in output is likely (but not always) to be export driven. That is, Australia's GDP is estimated to be only 0.02 per cent above baseline in 2030, and the muted domestic economic growth will not be a large factor in driving increases in sectoral output. Rather, sectoral output is driven by export growth.

Importantly, the modelling results presented in table 7.1 relate to year 2020, ten years after the bilateral trade and investment liberalisation is assumed to have occurred. Hence the presented sectoral results represent the estimated impacts over the long term (once the economy has returned to equilibrium).

Modelling results for different years and at a greater level of sectoral detail can be found in appendix C.

From table 7.1 it can be seen that there are essentially four classes of impact on Australia's sectors, these being:

- higher output, employment, investment and exports;
- higher output and lower exports;

Sector	Output	Employment	Investment	Exports	Imports
	Per cent	Per cent	Per cent	Per cent	Per cent
Rice	0.04	0.01	0.08	0.14	0.09
Wheat	-0.07	-0.10	-0.03	-0.13	-0.02
Other crops	0.00	-0.03	0.04	-0.04	0.03
Vegetable & fruit	0.04	0.01	0.08	0.11	0.08
Cattle	0.04	0.01	0.09	0.42	0.08
Other animal products	0.01	-0.03	0.05	-0.06	0.02
Forestry	0.03	0.01	0.06	-0.07	0.09
Fishing	0.02	-0.03	0.04	-0.02	0.04
Minerals & energy	-0.03	-0.07	-0.01	-0.04	0.05
Meat	0.01	-0.02	0.04	0.00	0.07
Dairy	0.09	0.06	0.14	0.35	0.15
Sugar	0.07	0.04	0.10	0.50	0.13
Other food & beverages	0.07	0.03	0.11	0.45	0.09
Textiles & clothing	0.02	-0.04	0.02	0.18	0.07
Chemicals	0.05	0.03	0.06	0.23	0.09
Metal	0.09	0.09	0.11	0.17	0.17
Transportation	0.11	0.07	0.12	0.84	0.14
Electrical products	0.05	0.01	0.03	0.24	0.08
Machinery	0.12	0.09	0.12	0.87	0.15
Other manufacturing products	0.06	0.00	0.05	0.20	0.20
Construction	0.02	0.01	0.02	-0.06	0.00
Transport	0.02	0.00	0.03	-0.02	0.07
Communication	0.02	0.01	0.03	1.45	0.06
Financial services	-0.01	-0.01	0.00	0.07	0.06
Other non-public services	0.01	0.00	0.02	-0.08	0.05
Public services	0.01	0.01	0.02	-0.09	0.05

7.1 Impact of liberalisation on Australian sectors 2020, per cent deviation from baseline

Source: CIEG-Cubed modelling simulation.

- higher output and lower employment;
- lower output, employment, investment and exports.

Before discussing each of these classes of results (see below), the impact of the trade and investment agreement on employment is considered as it is relevant to all sectors. In the previous chapter it was reported that the real wage in Australia is estimated to be 0.04 per cent above baseline in 2030. As the real wage rises, the other (main) factor of production — capital — becomes relatively cheaper. Hence in response to rising wages, there will be capital for labour substitution (as a means of reducing costs). In table 7.1 it can be seen that the change in investment is larger (or less 'negative') than the change in employment. The relativity of the employment and investment changes will be influenced by the labour/capital intensiveness of the various sectors.

Dynamic productivity gains, which account for around 67 per cent of Australia's GDP gains, will also affect sectors' demand for labour. Productivity gains mean less labour (and other inputs) are required per unit of output. Hence if a sector has large

productivity gains, but whose output demand is relatively invariant to price, then less labour (and other inputs) will be needed by that sector.

Higher output, employment, investment and exports

These sectors experience increases in all indicators (including imports). Examples include the Rice sector, the Dairy, Sugar and Other food sectors, and the heavy manufacturing sectors. These sectors accounted for 51 per cent of total Australian exports to Indonesia in 2007.

These sectors primarily benefit from export led growth, and an expanding Indonesian economy (due to Indonesia's own liberalisation). For example, Indonesia imposes tariffs in year 2010 of over 7.4 per cent and NTBs of around 1.4 per cent on Australian imports of the aggregated Metals sector (comprising ferrous metals, other metals and metal products). Removing a barrier of nearly 9 per cent on Australian metal exports, valued at A\$837 million in 2007, has a positive impact on the Australian Metal sector. Indeed, metal exports to Indonesia are estimated to be nearly9 per cent above baseline in 2020.⁴⁸

The expanding Indonesian economy sees greater demand for production inputs (such as chemicals, metals, transportation, machinery etc). This in turn stimulates an increase in imports thereof, and increased output of the corresponding Australian Chemicals, Metals, Transportation and Machinery (etc) sectors that supply these imports.

As sectoral output increases, so too does the demand for labour and capital (investment) in these sectors. Indonesia's trade liberalisation sees an increase in exports, some of which is met by diverting local production from the Australian market to Indonesia. The 'shortfall' in product going to the Australian market is met by increased imports.

Higher output and lower exports

A number of primary and service sectors experience an increase in output under the trade and investment agreement, yet a fall in exports. The increase in output is therefore clearly not being driven by export led growth.

For these sectors, the expanding Australian economy sees products being diverted from the export market to the local market in order to meet increasing local demand, whether it is from now wealthier households or upstream sectors advantaged by the trade and investment liberalisation and subsequently increasing output. This is especially the case for the service sectors — as household income rises, there is

⁴⁸ Note that this large increase in metal exports to Indonesia translates into an increase in global metal exports of 0.17 per cent in 2020.

increased local consumption of services. (Also note that the 1–1.8 per cent decline in exports for the service sectors may be a manifestation of a low export base.)

The Forestry sector is an example on once sector experiencing an increase in output (0.03 per cent above baseline in 2020) yet a fall in exports (0.07 per cent below baseline in 2020). The expanding Australian economy sees increased demand for production inputs such as timber, hence the Forestry sector expands output and diverts product from the export market to the local market to meet the increase in demand. For output of the Forestry sector to expand, there needs to be a sufficient resource base. If this is not the case, or if government policies prevent increased logging, then output will not be able to expand by the forecast 0.03 per cent. However, there will still be increased local demand for Australian timber, and this increased demand will materialise in the form of higher prices. Hence instead of sectoral output increasing in response to the increase in demand, prices increase. Despite the potential that output might not increase by (up to) 0.03 per cent, GDP is not expected to be lower as the higher prices will ultimately translate into a higher return to capital in the Forestry sector. This will counteract any 'unrealised' increase in output. The same situation would apply to other resource based sectors.

Higher output and lower employment

The Meat and Textiles & clothing Sectors are all forecast to experience an increase in output under the trade and investment agreement, but a contraction in employment (the Other crops sector could also be assigned to this grouping). This phenomenon primarily reflects the capital for labour substitution story explained above, and the labour intensities of the Australian sectors. Furthermore, the expansionary effects on sectoral output following liberalisation is not sufficiently large to see a net increase in demand for labour once the capital for labour (and any dynamic productivity gains) have been accounted for.

Lower output, employment, investment and exports

Two of the aggregated sectors in table 7.1 — Wheat and Minerals & energy — are forecast to experience shortfalls relative to the baseline in the output, employment, investment and export indicators. The Wheat sector is also estimated to experience a decline in imports (note, however, that the import result is subject to a low base problem — imports of wheat were less than A\$0.1 million in 2007, hence the import result could be said to be meaningless).

Compared to other primary sectors, the tariff faced by Australian producers exporting wheat to Indonesia is low. Indonesia's wheat tariff is a low 2.0, versus, for example, around 16 per cent in the case of rice, over 5 per cent in the case of vegetables and fruit, and 5 per cent in the case of oil seeds. Hence compared with the liberalisation other Australian primary exporters receive, wheat exporters are relatively disadvantaged under the trade and investment agreement (as they receive the lower tariff reductions). This sees resources (land, capital, labour) being diverted to the more advantaged sectors. For example, employment and investment in the Rice sector increase by 0.01 and 0.08 per cent (respectively). Output of the Wheat sector subsequently declines. However, as there is still domestic demand for wheat, wheat is diverted from export markets to the local market, hence exports decline.

Almost the same explanation exists for the Australian Minerals & energy sector. The only difference is that following the 0.03 per cent decline in sectoral output, there is an increase in imports of 0.05 per cent above baseline in order to meet domestic demand for minerals and energy (coal, oil, gas etc). With imports of minerals and energy being over A\$15 billion in 2007, the 0.05 per cent increase in imports (in year 2020) is observable in absolute terms.

Impact of liberalisation on Indonesian sectors

The impacts of the bilateral trade and investment liberalisation on Indonesian sectors is typically much larger than was the case for Australia's sectors, reflecting the magnitude of the economic impacts the liberalisation has on each country.

Of the 57 sectors of the Indonesian economy (which are aggregated to the 26 sectors identified in table 7.2), 86 per cent are expected to experience an increase in output as a result of entering into a bilateral trade and investment agreement with Australia. Of the benefiting sectors, 22 per cent are primary sectors, 47 per cent are secondary sectors, and 30 per cent are service sectors.

Importantly, the modelling results presented in table 7.2 relate to year 2020, ten years after the bilateral trade and investment liberalisation is assumed to have occurred. Hence the presented sectoral results represent the estimated impacts over the long term (once the economy has returned to equilibrium).

Modelling results for different years and at a greater level of sectoral detail can be found in appendix C.

Similar to the Australian experience, the Indonesian sectors also experience capital for labour substitution in response to an increase in the availability of investment (0.6 per cent above baseline in 2030) and the real wage (0.4 per cent above baseline in 2030). Given the relatively larger increase in wages in Indonesia, there is greater capital for labour substitution and hence the difference between the changes in employment and investment is much larger for the Indonesian sectors than was the case for Australia.

Also important for Indonesia is the magnitude of the dynamic productivity gains experienced by the Indonesian sectors, with the productivity gains estimated to

Sector	Output	Employment	Investment	Exports	Imports
	Per cent	Per cent	Per cent	Per cent	Per cent
Rice	0.00	-0.22	1.04	-0.93	0.63
Wheat	-0.08	-0.46	1.04	-0.01	0.18
Other crops	-0.26	-0.57	0.87	-1.08	0.39
Vegetable & fruit	0.04	-0.19	1.21	-0.59	0.55
Cattle	-0.07	-0.54	0.88	0.41	1.43
Other animal products	0.02	-0.30	1.11	-0.33	0.23
Forestry	0.61	0.11	1.13	0.45	0.27
Fishing	0.16	-0.47	0.94	0.16	0.25
Minerals & energy	0.33	-0.24	0.91	0.33	0.04
Meat	0.16	-0.35	0.92	0.27	0.60
Dairy	0.19	-0.41	0.80	1.13	0.35
Sugar	-0.63	-2.26	-1.15	6.16	12.76
Other food & beverages	0.16	-0.44	0.75	0.50	0.80
Textiles & clothing	0.26	-0.24	1.03	0.43	0.10
Chemicals	0.24	0.06	0.50	0.28	0.19
Metal	0.64	0.39	0.76	0.96	0.73
Transportation	0.34	0.03	0.29	1.74	0.86
Electrical products	0.53	0.35	0.71	0.94	0.31
Machinery	0.59	0.36	0.71	1.39	0.67
Other manufacturing products	0.48	0.04	1.05	0.84	0.14
Construction	0.52	0.40	0.44	0.07	0.48
Transport	0.27	0.01	0.53	0.59	0.08
Communication	0.27	0.11	0.32	0.57	2.10
Financial services	0.22	0.09	0.31	0.18	0.20
Other non-public services	0.23	0.07	0.32	0.31	0.07
Public services	0.10	0.05	0.27	-0.88	0.55

7.2 Impact of liberalisation on Indonesian sectors 2020, per cent deviation from baseline

Source: CIEG-Cubed modelling simulation.

range between zero and 1.09 per cent (with a simple average of 0.04 per cent).⁴⁹ Dynamic productivity has a large impact on the modelling results as the productivity gains arising from trade and investment liberalisation with Australia apply to all trade (irrespective of source and destination), and not just to bilateral trade.⁵⁰ Hence while bilateral trade liberalisation improves Indonesia's competitive position in the Australian market, productivity gains improve Indonesia's competitive position globally. While an Indonesian sector could lose domestic market share to now cheaper Australian imports, the resultant productivity gains and improvement in the sector's international competitive position could see the sector actually experiencing a net increase in output (that is, the gains in export markets exceed the losses in the local market).

There are five classes of sectoral impact for Indonesia's sectors, these being:

⁴⁹ Note that some sectors actually experience a loss of productivity, due to, for example, declining exports or a loss of foreign investment from the sector.

⁵⁰ Note that it is the change in the price of the total import bundle relative to the price of locally produced products that drives the dynamic productivity gains, and not changes in trade volumes (that is, the quantum of imports).

- higher output, employment, investment, exports and imports
- higher output and lower exports
- lower output and higher exports
- higher output, investment, exports and imports, but lower employment
- lower output, employment and exports, but higher investment and imports.

Each of these classes of impact is discussed below.

Higher output, employment, investment and exports

From table 7.2 it can be seen that there are a large number of sectors that are forecast to experience increases in all indicators. These sectors are typically of a heavy manufacturing nature, or service sectors. The Forestry sector also falls into this class (due to its link to the Construction sector). Due to increased economic activity following the trade and investment liberalisation, output of these sectors increases, as does employment and investment. However, the trade liberalisation also sees an increase in imports, which, along with the increase in FDI, drives dynamic productivity gains. The productivity gains combine with Australia's trade liberalisation to see an increase in exports.

Higher output and lower exports

The Rice, Vegetables & fruit, Other animal products and Public services sectors are forecast to experience an increase in output yet fall in exports under the trade and investment agreement. As was the case for Australian sectors of the same class, the expanding Indonesian economy sees product being diverted from the export market to the local market in order to meet increased domestic demand resulting from the growing Indonesian economy. These sectors have relatively low trade barriers pre liberalisation, and as such the resulting dynamic productivity gains are muted (averaging 0.02 per cent). The productivity gains are not sufficiently large enough to see a net increase in global exports, and hence a larger increase in output and positive increase in employment (compared to the situation of the sectors in the above class).

Lower output and higher exports

The Cattle and Sugar sectors are estimated to experience declines in output relative to the baseline, yet higher exports. Pre liberalisation, Australian cattle and sugar imports faced Indonesian tariffs of 2.7 and 20.1 per cent (respectively). Hence following bilateral trade and investment liberalisation, there is an increase in imports from Australia (especially in the case of sugar). The imports capture market share, and hence the local Indonesian sectors contract output. The contraction in output in the Sugar sector is sufficiently large that investment also falls below baseline (along

with employment), despite economywide investment being 0.6 per cent above baseline in 2020.

The increase in imports drives dynamic productivity gains in the Sugar and Cattle sectors, with the productivity gains being 1.08 and 0.17 per cent (respectively). The productivity improves the competitive position of Indonesian exports in the global market, and hence exports increase. In the case of sugar, the increase in exports is quite large at 6.2 per cent. (Note that the increase in sugar exports comes off a low base — Indonesia's sugar exports were valued at A\$66 million in 2007.)

Output (and consequently employment and investment) of the Sugar and Cattle sectors is also influenced by the dynamic productivity gains experienced by downstream sectors, with the productivity gains having the effect of lowering the demand for sugar and cattle inputs per unit of output of the downstream sectors. For example, over 47 per cent of the output of the domestic Cattle sector is sold to the downstream Meat sector, while over 23 per cent of the output of the domestic sugar sector is sold to the Other foods & beverages sector. Dynamic productivity gains by the downstream Meat (0.02 per cent) and Other food & beverages (0.04 per cent) sectors means (marginally) less inputs are required per unit and output, and this sees a slight decrease in demand for domestic cattle and sugar inputs.

Higher output, investment, exports and imports, but lower employment

The Minerals & energy, Meat, Dairy, Other food & beverages and Textiles & clothing sectors experience an increase in all indicators, except for employment. This primarily reflects that while the trade and investment liberalisation is beneficial, the output gain is not sufficiently large to counteract a fall in employment driven by capital for labour substitution and dynamic productivity gains by the sectors themselves (which see a fall in demand for all inputs, including labour) and downstream sectors (which indirectly sees a fall in demand for labour by these sectors). The dynamic productivity gains are driven by Indonesia's own trade and investment liberalisation (with imports and foreign direct investment increasing), and also by Australia's trade liberalisation (with exports increasing and hence productivity gains via the learning by export route).

Lower output, employment and exports, but higher investment and imports.

The bilateral trade and investment liberalisation sees Indonesia's Wheat and Other crop sectors losing market share to imports, which in turn sees sectoral output being lower than baseline. However, the loss of market share to imports should not be that large as Indonesia's tariffs are only in the order of 2–5.6 per cent for the individual sectors.

The decline in sectoral output of the Wheat and Other crops sectors is also accounted for by the liberalisation undertaken by Australia, and what this mean for individual Indonesian sectors. Australia has typically non-existent, or very low tariff barriers, in the primary sectors. Hence the trade liberalisation undertaken by Australia will not be that advantageous for Indonesia's primary sectors as their exports to Australia are already basically duty free. In contrast, Indonesia's manufacturing sectors will be benefitted when Australia liberalises its trade as Australia's trade barriers are highest on manufactured imports. Hence under the trade and investment agreement Indonesia's manufacturing sectors are advantaged more that the primary sectors. This sees resources being attracted to the manufacturing sectors, and away from the primary sectors (such as Wheat and Other crops) that are less advantaged. As resources are drawn away, employment and exports decline, and investment is lower than otherwise would have been the case.

Faced with a loss of market share to imports and a loss of resources to other sectors, the Wheat and Other crops sectors substitute the now relatively more expensive labour for capital as a defensive/cost cutting strategy. Replacing the now relatively more expensive labour with capital sees the fall in employment being larger than if the decline in output was not accompanied by capital for labour substitution. However, the substitution and subsequent larger decline in employment means that sectoral output need not decline as far due to the cost savings brought about by the capital for labour substitution.

8 Other modelling simulations

In addition to the main modelling simulation, the results of which were reported in chapters 6 and 7, two other modelling simulations have been conducted to investigate how a slower pace of bilateral trade and investment liberalisation affects the economic benefits.

Slower paced trade liberalisation

The modelling results presented in chapter 6 report the economic impacts for Australia and Indonesia from the immediate removal of all bilateral barriers to trade and investment on commencement of the agreement on 1 January 2010. We now consider what happens when the trade and investment barriers between Australia and Indonesia are removed over time. Two scenarios are considered -5 year and 10 year phase-ins of the agreement (commencing in 2010). In each scenario, the same percentage point reduction in trade barriers occurs every year after 2010 until the full liberalisation is achieved in the specified time period.

Chart 8.1 shows the paths of Australia's and Indonesia's real GDP and consumption under the five year phase-in and ten year phase-in. The impacts under overnight liberalisation (taken from chapter 6) are also shown for comparison. It can be seen from the chart that immediate liberalisation leads to a larger and earlier increase in economic benefits (as measured by real GDP and consumption). These results are as expected — removing trade barriers earlier results in a greater gain net of capital adjustment costs (which are incorporated and allowed for in this model).

In the long term, all three liberalisation scenarios converge to (approximately) the same GDP and consumption gains. The difference between the scenarios therefore occurs in the fist 5–10 years. A slower pace of liberalisation essentially delays the benefits of trade and investment liberalisation.

The difference among the alternative implementation scenarios considered is quite small for Australia, but substantially larger for Indonesia. This is because Indonesia's trade and investment barriers are higher than Australia's, and therefore the gains from liberalisation are larger for Indonesia than is the case for Australia. In the case of Indonesia, delaying such potentially large gains, as the slower phase-in scenarios do, translates into a noteable reduction in gains when results are expressed in present value terms.



8.1 Main economic impacts under different phase-in scenarios

Data source: CIEG-Cubed modelling simulation.

Chart 8.2 shows the production and welfare gains expressed in net present value terms. As can be seen, and compared with overnight liberalisation, a 5 year phase-in of the agreement would see Australia and Indonesia forgoing GDP gains of nearly A\$9 million and A\$3.3 billion (respectively), while a 10 year phase-in would see GDP gains of A\$225 million and A\$7.9 billion being forgone (respectively). The conclusion to draw is that the more ambitious the trade negotiators are in terms of the pace of liberalisation, the better the outcomes.

Despite Australia and Indonesia committing to trade liberalisation under AANZFTA, bilateral Australia-Indonesia liberalisation undertaken over 10 years still benefits both countries. As to why a bilateral agreement should deliver additional GDP gains when both countries are already liberalising trade over a similar timeframe under AANZFTA is an obvious question. A bilateral Australia-Indonesia trade and investment agreement is estimated to offer benefits over and above that of AANZFTA due to:

 the range of liberalisation undertaken — under the bilateral agreement it is assumed that tariffs, non-tariff barriers, service barriers and investment barriers are removed, versus only tariffs under AANZFTA;



8.2 Present value of economic impacts under different phase-in scenarios NPV^a

^a Over 2010 to 2030, expressed in 2008 dollar terms using a 5 per cent real discount rate. *Data source:* CIEG-Cubed modelling simulation.

- the scope of liberalisation under the bilateral agreement it is assumed that all barriers are removed, while this is not the case under AANZFTA:
 - by year 2020, Australia has completely liberalised all tariff barriers; yet
 - by year 2025, Indonesia still has tariffs (ranging between 4–170 per cent) on 6.7 per cent of its tariff lines; and
- the pace of liberalisation bilateral liberalisation over 10 years is broadly on par with Australia's liberalisation under AANZFTA, but faster than Indonesia's liberalisation under AANZFTA.

Appendices

A Trade index formulae

Revealed symmetric comparative advantage index (RSCA)

This index is defined as the share of each commodity group (*k*) in an economy's total exports divided by the share of each commodity group in another economy's total exports:

$$RCA = \frac{X_{iw}^k}{X_{iw}} \div \frac{X_{jw}^k}{X_{jw}}$$

Where *X* denotes exports, *k* denotes the commodity group classification of exports, *i* and *j* denote export countries, and *w* refers to the world. It should be noted that the partner economy (j) can be another economy (to assess bilateral RCA) or the world (to assess global RCA).

Values of the RCA greater than one (and unbounded) infer specialisation, whiles values less than one (and bounded by zero) infer non-specialisation. Since the index is not comparable on both sides of unity, the RCA is modified using the following equation

$$RSCA = \frac{RCA - 1}{RCA + 1}$$

such that the measure ranges from minus one to one.

Bilateral trade intensity index (TII)

This index measures whether the value of trade between two countries is larger (or smaller) than expected, based upon their importance to world trade. Trade intensity is measured as the exporting country's share of world exports of a particular commodity to a partner country, divided by the exporting country's share of total world exports.

$$TII = \frac{X_{ij}^k}{X_{wj}^k} \div \frac{X_{iw}^k}{X_{ww}^k}$$

Where *X* denotes exports, *k* denotes the commodity group of exports, *i* denotes the export country, *j* denotes the import country, and *w* refers to the world.

The trade intensity index takes values from zero, with no upper bound. Values greater than one infers that trade between the exporting and partner country are intense relative to their trade with the rest of the world.

Trade specialisation index (TSI)

The TSI is the most widely-used measure to assess bilateral competitiveness. It compares the *net* flow of goods to the *total* flow of goods between two countries.

$$TII_{ij} = \frac{X_{ij}^{k} - M_{ij}^{k}}{X_{ij}^{k} + M_{ij}^{k}}$$

Where *X* denotes exports, *M* denotes imports, *k* denotes the commodity group of exports, and *i* and *j* denote the export and import countries respectively.

The simple correlation coefficient can be used to summarise the TII of each commodity group to provide an overall measure of the complementarity of the trading partners' economies;

$$\rho_{ij} = \frac{\sum_{k=1}^{n} (TII_{ij} - \overline{TII}_{ij})(TII_{ji} - \overline{TII}_{ji})}{\sqrt{\sum_{k=1}^{n} (TII_{ij} - \overline{TII}_{ij})^{2}(TII_{ji} - \overline{TII}_{ji})^{2}}}$$

Where $TII_{ij}(TII_{ji})$ is the trade specialisation index for country *i* (*j*) with partner country *j* (*i*), and *TII* is the average of \overline{TII} across all commodities.

A negative correlation coefficient infers that the two economies do not, on the whole, specialise in the same commodities, which makes them complementary trading partners. Conversely, a positive correlation coefficient infers that the economies specialise in the same commodities, and are therefore competitors on the global market.

Intra-industry trade index (ITT)

The intra-industry trade index is used to measure the extent of trade between two countries within a particular industry.

$$IIT_{ij} = 1 - \frac{\sum_{k=1}^{n} \left| X_{ij}^{k} - M_{ij}^{k} \right|}{\sum_{k=1}^{n} X_{ij}^{k} + M_{ij}^{k}}$$

Where *X* and *M* denotes exports and imports respectively, *k* denotes the commodity group of exports, and *i* and *j* denote the export and import countries respectively.

The IIT index ranges in value from zero to one, where values greater than one indicate intra-industry trade.

This index is vulnerable to the level of aggregation of the data used. The greater the extent of aggregation, the greater the bias towards finding intra-industry trade

Trade complementarity index

The TCI is a summary measure of the complementarity of two economies, based upon how well the structure of one country's exports matches the imports of another country.

$$TCI_{ij} = 100 - \sum_{k=1}^{n} \frac{\left|m_{j}^{k} - x_{i}^{k}\right|}{2}$$

Where x_i^k (m_j^k) is country *i*'s (*j*'s) exports (imports) of commodity *k* as a share of country *i*'s (*j*'s) total exports (imports). It is expressed algebraically as:

$$x_i^k = \frac{X_{iw}^k}{X_{iw}}$$
 and $m_j^k = \frac{M_{jw}^k}{M_{jw}}$

Where subscripts *iw* and *jw* denote the exports from country *i* to the world and imports into country *j* from the world, respectively.

The TCI can also be constructed to assess how well the imports of one country match the exports of another. The measure of import complementarity is constructed as above, but import and export countries are reversed.

B Trade liberalisation and dynamic productivity gains

Global general equilibrium models, such as CIEG-Cubed, are typically used to quantify the economic impacts of trade liberalisation. However, examination of the models' predicted changes in growth and trade flows against observed changes leads to the observation that economic models typically tend to under predict the welfare gains resulting from trade liberalisation. The current thinking is that economic models under predict the changes associated with trade liberalisation due to ignoring effects related to productivity linkages, pro-competitive effects and investment dynamics. These effects have been termed the 'dynamic productivity' effects of trade liberalisation.

Dynamic productivity

An increase in openness to trade is thought to promote productivity increases and growth within a country through an increase in the efficient allocation of resources, the stimulation of innovation, and the transfer of knowledge and technology between countries. There are two types of productivity growth recognised by economists from trade liberalisation — allocative efficiency gains and dynamic productivity gains.

It is generally accepted that countries can achieve allocative efficiency gains through trade liberalisation. These gains are improvements in the level of output and productivity from the reallocation of resources to the more productive/efficient sectors of the economy. Allocative gains represent the traditional theory on the benefits from trade liberalisation. Consequently, it is these gains are typically estimated and reported.

However, trade reform also sees an increase in import competition, thereby encouraging domestic producers to pursue productivity gains, either though the use of better technology and business practices, or through innovation and/or quicker adoption of new ideas. Improved domestic efficiency and liberalisation of other countries' trade barriers will improve the competitive position of exporters, and greater exports may also be associated with productivity gains. There can be learning by exporting where the experience and knowledge gained in export markets can be translated into productivity gains.⁵¹ Exporting may also allow producers to expand output and exploit economies of scale or deeper division of labour (specialisation), thereby lowering average production costs (Itakura, Hertel and Reimer 2003).

Finally, a 'more efficient' economy will likely open the way for new foreign investment opportunities leading to transfer of technical know-how (through market-based cooperation or spillovers) and capital accumulation, which can in turn stimulate productivity growth and lead to higher economic growth.

Improvements to efficiency due to additional imports, exports, and investment from a change in trade policy (as opposed to resource reallocation) are referred to as dynamic productivity gains. The literature on dynamic efficiency gains from trade openness is not as robust compared to that on allocative gains, and consequently these types of gains are often excluded from trade policy analysis. However, researchers are now turning their attention to the issue of dynamic productivity, and a number of econometric studies have found a relationship between import competition, exporting and foreign investment and productivity growth.⁵² If dynamic gains are important and they are not considered in modelling the economic effects of trade liberalisation, then excluding dynamic gains may understate the net benefits (or bias the results downwards).

There is, however, current debate on whether a reduction in trade barriers actually increases productivity and growth. Although a number of studies have found a positive relationship between trade openness and growth, some economists have been sceptical of the econometric results. According to Edwards, two issues have been at the core of these controversies — until recently, theoretical models had been unable to link trade policy to faster equilibrium growth, and secondly, the empirical literature on the subject has been affected by serious data problems.⁵³ These include generating satisfactory indexes to measure trade policy orientation, and the specification of equations used to measure direct relationships between trade policy and growth.

The relationship between trade policy and economic productivity and growth is therefore debatable. As has been noted by some prominent researchers:

⁵¹ Aw, B.A., Chung, S. and Roberts, M.J. 2000, 'Productivity and Turnover in the Export Market: Micro-level Evidence from the Republic of Australia and Taiwan (China)', *The World Bank Economic Review*, 14(1), pp. 65–90.

⁵² See for example Itakura, K., Hertel, T.W. and Reimer, J.J. 2003, *The Contribution of Productivity Linkages to the General Equilibrium Analysis of Free Trade Agreements*, GTAP Working Paper 23, March 2003, <u>http://www.gtap.agecon.purdue.edu/resources/download/1296.pdf</u>, accessed 22 November 2004 and Wacziarg, R. 2001, 'Measuring the dynamic gains from trade', *The World Bank Economic Review*, vol. 15, no. 3, pp. 393-429.

⁵³ Edwards, S. 1998, 'Openness, productivity and growth: What do we really know?', *The Economic Journal*, vol. 108, pp. 383-98.

Our bottom line is that the nature of the relationship between trade policy and economic growth remains a very much open question. The issue is far from having being settled on empirical grounds.

We suspect that the relationship is a contingent one, dependent on a host of country and external characteristics. $^{54}\,$

Despite this debate, there is substantial anecdotal evidence of the existence of dynamic productivity gains.

Where can dynamic gains come from?

Most previous empirical models of trade have excluded the impacts trade liberalisation can have on productivity throughout time. According to the World Bank, recent empirical models have extended their analysis from static allocative efficiency type gains to measuring dynamic gains along four main research paths.⁵⁵ For each of these four paths to induce productivity and economic growth, they either have to increase factors of production (labour and capital), and/or re-organise production in a more efficient way.

- Dynamic investment as tariffs are often imposed on investment goods, a reduction in trade barriers on these goods can lead to an increase in the return to capital and, consequently, a rise in real investment through capital deepening and a rise in productivity (assuming the returns to capital are not diminished). Higher incomes from increased productivity lead to higher savings and thus further capital accumulation. Furthermore, a reduction in tariffs on intermediate inputs can supplement shortages of domestic resources and/or introduce new technology.
- Pro-competitive effects and scale economies an increase in foreign competition can have disciplinary effects on domestic mark-ups by reducing the market power of domestic firms. Furthermore, the ability to increase market size through greater exports allows domestic firms to reduce their average cost, for example, by introducing more specialised equipment and bulk-handling methods.
- Endogenous productivity it can be argued that foreign firms with relative productivity efficiencies will expand into a domestic market. Consequently, local firms may take advantage of new technologies and skills, innovations, and production methods introduced into the economy through market-based cooperation or spillovers from new foreign firms to enhance productivity within incumbent domestic and foreign firms.
- Endogenous capital flows there is significant empirical evidence that dynamic productivity gains from international capital mobility are quantitatively



⁵⁴ Rodriguez, F. and Rodrik, D. 1999, *Trade policy and economic growth: A sceptic's guide to the cross national evidence*, NBER, Working paper 7081, page 4.

⁵⁵ World Bank 2002, Global Economic Prospects and the Developing Countries.

important.⁵⁶ Foreign direct investment from abroad may bring new and improved technologies and management skills that could flow into the domestic economy (through spillover and demonstration effects), thereby increasing market productivity.

An increase in Indonesia's exposure to Australian competition may come from three sources — a greater number of Australia's firms locating in the Indonesian market, more imports from Australia into the Indonesian market, or an expansion of Indonesia's exports into the Australian market (an analogous increase will occur for Australia's exposure to Indonesian competition). However, the size of any dynamic productivity gains for Indonesia (and Australia) as a result of bilateral trade and investment liberalisation would ultimately depend upon:

- the linkages between competition, innovation, foreign direct investment, and dynamic productivity within each economy;
- the magnitude of FDI already in place, and the nature and form of any resultant investment liberalisation induced FDI inflows;
- the relative sectoral efficiencies (incorporating management practices and technology) that already exist between Indonesia and Australia. The greater the difference between sectoral efficiencies in each market, the greater the scope to capture some dynamic productivity gains;
- the size of the change in competition as a result of trade liberalisation within each market. There are two competing aspects to competition and dynamic productivity:
 - if there already exists an internationally competitive market, then the capacity for capturing dynamic productivity is reduced as the scope to introduce better production methods and technologies is lessened;
 - if the market is competitive, then it will be quick to adopt new production methods and technology;
- the barriers to entry that exist within each market (higher barriers to entry means less scope to increase competition and capture some of the dynamic productivity gains); and
- the skills/technology gap between the host country and the new foreign country. If the skills/technology gap is large then there is scope to capture large dynamic productivity gains. But there is an optimal gap size because if the gap becomes too large, the ability of domestic firms to incorporate innovation, capital, and new production techniques can diminish.

⁵⁶ Organisation for Economic Cooperation and Development 2006, Dynamic gains from trade, OECD trade policy working paper no. 43, November.

A measure of the impacts of trade liberalisation on productivity can be estimated by investigating recent empirical studies on the effects of trade liberalisation on domestic and international markets.

There have been a number of global trade simulations that have included dynamic productivity gains, including studies by the World Bank and OECD. Comparing the gains from full trade liberalisation from a selected number of studies shows static efficiency gains are substantially magnified (by a factor of 2–4) when dynamic productivity is included.⁵⁷

There has been an increasing amount of effort employed by economists to determine the size of the link between additional competition and productivity growth. Several studies have attempted to estimate econometrically the impact of a reduction in trade barriers on productivity and growth, resulting in a wide variety of estimates.⁵⁸

Incorporating dynamic productivity gains

One approach to incorporating dynamic productivity is to use econometric estimates of the impact of trade openness on productivity and add these to the CGE model simulation. The average relationship between a tariff reduction and an increase in productivity in Australian manufacturing suggests that a 1 percentage point unilateral reduction in tariffs in manufacturing sectors will result in an approximate 0.3 per cent increase in productivity.⁵⁹ The productivity gain could then be scaled by the reduction in tariffs occurring in each sector, with the gains then adjusted for the proportion of total imports (by sector) accounted for by the other country (to reflect the fact that trade liberalisation is on a bilateral basis and not multilateral).⁶⁰ Hence the larger the tariff reduction to occur, and the larger the share of total imports of that product accounted for by imports from the other country, the larger the assumed dynamic productivity gain in that sector. This approach sees the dynamic productivity gain being *exogenous* to any increase in competition (as indicated by a

⁶⁰ As this method uses an average elasticity estimate of tariff reduction to GDP, it does not take into consideration the individual country impacts on dynamic productivity. For example, dynamic productivity gains in manufacturing from the US would be larger than a country that is less advanced in manufacturing practices, such as Indonesia.

⁵⁷ World Bank 2002, Global Economic Prospects and the Developing Countries.

⁵⁸ See for example, Chand, S. 1999, 'Trade liberalisation and productivity growth: Time series evidence from Australian manufacturing', *Economic Record*, vol. 75, no, 228, pp. 28–35; Frankel, J and Romer, D. 1999, 'Does trade cause growth?', *The American Economic Review*, vol. 89, no. 3, pp. 379–99; and Ianchovichina, E., Binkley, J. and Hertel, T. 2000, 'Procompetitive effects of foreign competition on domestic markups', *Review of International Economics*, vol. 8, no. 1, pp. 138–48.

⁵⁹ See Chand, S. and Vousden, N. 1996, *Trade liberalisation and Productivity Growth: A Panel Data Study of Australian Manufacturing*, mimeo, Australian National University, Canberra; and Chand, S. 1999, 'Trade liberalisation and productivity growth: Time series evidence from Australian manufacturing', *Economic Record*, vol. 75, no, 228, pp. 28–35.

change in imports, exports and foreign direct investment) arising as a result of the trade liberalisation.

Rather than drawing a direct relationship between tariff reduction and productivity, another method would be to calculate the expected change in imports, exports and FDI, and drawing a relationship between trade and investment flows and growth. An econometric study by the Bank of Korea shows that if import growth rises by one per cent, then on average total factor productivity growth across all 11 manufacturing sectors will rise by an average of 0.15 per cent.⁶¹ Similarly, if foreign direct investment increases by one per cent then productivity is expected to grow by around 0.05 per cent across the same manufacturing sectors. Productivity in five Korean service sectors were found to miss out on productivity improvements as a result of increased imports and FDI due to the relatively low reliance on imports and FDI.⁶²

Work by Itakura et al offers an alternative approach to incorporating dynamic productivity gains in the economic modelling.⁶³ The approach taken by these researchers is to explicitly model the productivity gains arising from changes to trade and foreign investment flows, which are thought to be the underlying drivers of productivity growth. For example, in using a dynamic version of the GTAP model to quantify the effects of a Korea–ASEAN free trade agreement, a productivity gain (based on econometric studies) was included for each of:

- increased import competition, which has a market discipline effect on domestic producers with producers absorbing tariff cuts (and increased competition from imports) through a combination of price and output reductions rather (as opposed to output alone);
- changing exports, with an increase in exports being associated with rising average productivity for the sector (exporters are assumed to be 8 per cent more efficient than domestically orientated firms); and
- increases in foreign direct investment (FDI) being associated with increases in domestic firm productivity (a 1 per cent increase in FDI seeing a 1.4 per cent increase in firm productivity).⁶⁴

62 Ibid.

⁶¹ Bank of Korea 2003, The effects of economic openness on productivity, Bank of Korea, Internal Working Paper, <u>http://www.bok.or.kr/content/old/attach/00000710/</u> 200307280921071.pdf, accessed 22 March, 2007.

⁶³ Itakura, K., Hertel, T.W. and Reimer, J.J. 2003, *The Contribution of Productivity Linkages to the General Equilibrium Analysis of Free Trade Agreements*, GTAP Working Paper 23, March 2003, <u>http://www.gtap.agecon.purdue.edu/resources/download/1296.pdf</u>, accessed 22 November 2004.

⁶⁴ Chuang, Y.C., and C.M. Lin, 1999, Foreign direct investment, R&D and spillover efficiency: Evidence from Taiwan's manufacturing firms, *The Journal of Development Studies*, Vol.35, pp. 117-137, April.

Hence the dynamic productivity gains are endogenous to the model, with there being a direct relationship between the change in competition (as indicated by changing import, export and foreign direct investment flows) and the resulting dynamic productivity gain. This differs from the above approach where the productivity gain is determined outside of the model.

The approach adopted by Itakura et al should be viewed as an initial attempt to investigate the potential impacts and importance of dynamic productivity gains when quantifying the economic impacts of trade agreements. Indeed, the authors identify several areas of required further research to refine the approach and verify the productivity linkages/relationships.

Despite these qualifiers, the approach of Itakura et al offers a way to directly link the dynamic productivity gain to changes in competition brought about by the trade and investment liberalisation. Hence, and while noting that further econometric work is needed to verify the productivity relationships (and importantly, to see if these hold across various countries), the approach of Itakura et al has been adopted as it offers a direct relationship between the productivity gain and the change in competition. Note that the approach of Itakua et al has been slightly modified to take account of the fact that the level of FDI already in place will influence the productivity gains arising from FDI inflow.

A dynamic productivity gain is assumed to arise from each of:

- increases in imports productivity gain is a function of the percentage change in relative prices of imports and local production and the ability of firms to absorb a reduction in mark-ups (prices) in order to maintain output. This 'ability' is measured by the elasticity of domestic price mark-up with respect to foreign prices, which is assumed to be 0.21;⁶⁵;
- increases in exports exporters are assumed to be 8 per cent more efficient than domestically orientated firms, hence if the rate of change in output exported exceeds the rate of change in output sold domestically, productivity of the sector rises through an increase in the average level of technology;⁶⁶, and
- increases in foreign direct investment a 1 percentage point increase in FDI sees an increase in productivity, with the productivity gain varying depending on the level of FDI, ranging between a maximum gain of 1.7 per cent at an FDI to

⁶⁵ This is the midpoint of estimated elasticities for various industries found in Ianchovichina, E., Binkley, J. and Hertel, T. 2000, 'Procompetitive effects of foreign competition on domestic markups', *Review of International Economics*, vol. 8, no. 1, pp. 138–48.

⁶⁶ Itakura, K., Hertel, T.W. and Reimer, J.J. 2003, *The Contribution of Productivity Linkages to the General Equilibrium Analysis of Free Trade Agreements*, GTAP Working Paper 23, March 2003, <u>http://www.gtap.agecon.purdue.edu/resources/download/1296.pdf</u>, accessed 22 November 2004.

GDP ratio of zero, to a productivity gain of 0.01 per cent at an FDI to GDP ratio of 2.

Note that the reverse also occurs - if, for example, the share of output exported declines for a particular sector, then that sector will experience a fall in productivity.

Making the dynamic productivity gain endogenous to CIEG-Cubed means there will be second round, third round, and further round effects. For example, tariff liberalisation by Australia would see an increase in Indonesia exports to Australia, which would confer a productivity improvement to Indonesia sectors. This in turn will improve the competitive position of exporters and see a further increase in Indonesia exports, delivering a further (smaller) export related productivity gain and so on.

C Detailed sectoral modelling results

In Chapter 7 modelling results for 26 aggregated sectors are reported. The sectoral aggregation was undertaken so as to ease the presentation of the modelling results. The mapping between the (aggregated) 26 sectors reported in chapter 7 and the 57 (GTAP) sectors identified in the CIEG-Cubed economic model is reported in table C.1.

The impact of the comprehensive overnight liberalisation scenario at the detailed (57) sectoral level for each of Australia and Indonesia is reported in the tables that follow. Results at five yearly intervals of 2010, 2015, 2020, 2025 and 2030 are provided for each of:

- Australia
 - sectoral output table C.2
 - sectoral employment table C.3
 - sectoral capital stock/investment table C.4
 - sectoral exports table C.5
 - sectoral imports table C.6
- Indonesia
 - sectoral output table C.7
 - sectoral employment table C.8
 - sectoral capital stock/investment table C.9
 - sectoral exports table C.10
 - sectoral imports table C.11.

Aggregated sectors	Comprising sectors
Rice	Paddy rice, Processed rice
Wheat	Wheat
Other crops	Cereal grains, Oil seeds, Plant fibres, Other crops
Vegetable & fruit	Vegetables, fruits and nuts
Cattle	Cattle
Other animal products	Wool, Other animal products
Forestry	Forestry
Fishing	Fishing
Minerals & energy	Coal, Oil, Gas, Other minerals
Meat	Cattle meat, Other meat
Dairy	Raw milk, Milk
Sugar	Sugar cane, Sugar
Other food & beverages	Vegetable oils and fats, Other food products, Beverages and tobacco
Textiles & clothing	Textiles, Wearing apparel
Chemicals	Petroleum and coal products, Chemicals, rubber and plastic products
Metal	Ferrous metals, Other metals, Metal products
Transportation	Motor vehicles and parts, Other transport equipment
Electrical products	Electronic products
Machinery	Machinery and equipment
Other manufacturing products	Leather, Wood products, Paper products and publishing, Other mineral products, Other manufactures
Construction	Construction
Transport	Water transport, Air transport, Other transport
Communication	Communication
Financial services	Insurance, Other financial services
Other non-public services	Other business services, Trade
Public services	Electricity, Gas manufacture and distribution, Water, Recreation and other services, Public administration, defence, health and education, Dwellings

C.1 Sectoral aggregation

Source: CIE.

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	-0.02	0.02	0.03	0.04	0.04
Wheat	-0.20	-0.08	-0.07	-0.07	-0.07
Cereal grains nec	-0.02	0.00	0.00	0.00	0.00
Vegetables, fruit, nuts	0.06	0.03	0.04	0.04	0.04
Oil seeds	-0.09	-0.04	-0.03	-0.03	-0.03
Sugar cane, sugar beet	0.09	0.05	0.05	0.05	0.05
Plant-based fibers	1.32	-0.02	-0.02	-0.02	-0.02
Crops nec	0.05	0.01	0.01	0.01	0.01
Cattle, sheep and goats, horses	0.11	0.03	0.04	0.05	0.05
Animal products nec	0.00	-0.02	-0.01	-0.01	-0.01
Raw milk	0.30	0.13	0.07	0.08	0.08
Wool, silk-worm cocoons	-0.12	-0.06	-0.04	-0.04	-0.04
Forestry	0.06	0.03	0.03	0.03	0.03
Fishing	0.02	0.02	0.02	0.02	0.02
Coal	-0.05	0.01	0.02	0.02	0.02
Oil	-0.02	0.01	0.01	0.02	0.02
Gas	-0.13	-0.09	-0.11	-0.12	-0.12
Minerals nec	-0.16	-0.06	-0.05	-0.05	-0.05
Bovine meat products	-0.05	-0.02	0.00	0.00	0.01
Meat products nec	0.20	0.02	0.02	0.02	0.02
Vegetable oils and fats	0.06	0.01	0.00	0.00	0.00
Dairy products	0.38	0.17	0.09	0.10	0.11
Processed rice	0.01	0.04	0.05	0.05	0.06
Sugar	0.07	0.06	0.07	0.07	0.07
Food products nec	0.09	0.05	0.05	0.05	0.05
Beverages and tobacco products	0.08	0.10	0.12	0.13	0.13
Textiles	0.09	0.01	0.02	0.02	0.02
Wearing apparel	0.01	0.01	0.01	0.01	0.01
Leather products	0.11	0.03	0.02	0.02	0.02
Wood products	0.16	0.12	0.13	0.13	0.14
Paper products, publishing	0.06	0.03	0.04	0.04	0.04
Petroleum, coal products	0.05	0.03	0.04	0.04	0.04
Chemical, rubber, plastic products	0.18	0.06	0.06	0.07	0.07
Mineral products nec	0.04	0.03	0.04	0.04	0.04
Ferrous metals	0.50	0.26	0.24	0.25	0.25
Metals nec	0.25	0.02	0.02	0.03	0.03
Metal products	0.35	0.13	0.11	0.11	0.11
Motor vehicles and parts	0.15	0.11	0.11	0.12	0.12
Transport equipment nec	0.12	0.09	0.09	0.10	0.10
Electronic equipment	0.05	0.04	0.05	0.05	0.05
Machinery and equipment nec	0.22	0.12	0.12	0.13	0.13
Manufactures nec	0.05	0.04	0.04	0.04	0.04
Electricity	0.06	0.01	0.02	0.02	0.02
Gas manufacture, distribution	0.06	0.02	0.02	0.03	0.03
Water	-0.02	0.00	0.01	0.02	0.02
Construction	0.01	0.02	0.02	0.01	0.01
Trade	0.00	0.01	0.01	0.00	0.00
Transport nec	0.03	0.02	0.02	0.02	0.02
Water transport	0.06	0.05	0.05	0.05	0.05

C.2 Australian sectoral output per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent				
Air transport	0.02	0.02	0.02	0.02	0.02
Communication	0.00	0.01	0.02	0.02	0.03
Financial services nec	-0.03	-0.01	0.00	0.00	0.00
Insurance	-0.02	0.00	0.00	0.00	0.00
Business services nec	-0.02	-0.01	-0.01	-0.01	-0.01
Recreational and other services	0.00	0.01	0.01	0.01	0.01
Public admin., Defence, Edu., Health	0.01	0.01	0.01	0.01	0.01
Dwellings	0.02	0.02	0.02	0.02	0.02

C.2 Australian sectoral output per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	-0.02	0.00	0.00	0.00	0.00
Wheat	-0.21	-0.10	-0.10	-0.11	-0.11
Cereal grains nec	-0.02	-0.02	-0.03	-0.03	-0.03
Vegetables, fruit, nuts	0.06	0.01	0.01	0.00	0.00
Oil seeds	-0.10	-0.07	-0.07	-0.07	-0.08
Sugar cane, sugar beet	0.09	0.03	0.02	0.02	0.02
Plant-based fibers	1.35	-0.04	-0.05	-0.06	-0.06
Crops nec	0.05	-0.02	-0.02	-0.03	-0.03
Cattle, sheep and goats, horses	0.11	0.01	0.01	0.01	0.01
Animal products nec	-0.01	-0.04	-0.04	-0.04	-0.05
Raw milk	0.30	0.11	0.04	0.05	0.05
Wool, silk-worm cocoons	-0.12	-0.08	-0.08	-0.08	-0.08
Forestry	0.05	0.02	0.01	0.01	0.00
Fishing	-0.01	-0.02	-0.03	-0.03	-0.04
Coal	-0.05	-0.03	-0.03	-0.04	-0.05
Oil	-0.04	-0.02	-0.01	-0.02	-0.02
Gas	-0.14	-0.11	-0.14	-0.15	-0.15
Minerals nec	-0.17	-0.08	-0.08	-0.09	-0.09
Bovine meat products	-0.05	-0.04	-0.03	-0.03	-0.03
Meat products nec	0.18	0.00	-0.01	-0.01	-0.01
Vegetable oils and fats	0.03	-0.03	-0.04	-0.05	-0.05
Dairy products	0.36	0.14	0.06	0.06	0.06
Processed rice	0.01	0.01	0.01	0.01	0.01
Sugar	0.06	0.04	0.04	0.03	0.03
Food products nec	0.08	0.02	0.01	0.01	0.01
Beverages and tobacco products	0.07	0.07	0.08	0.08	0.08
Textiles	0.04	-0.03	-0.03	-0.04	-0.04
Wearing apparel	-0.09	-0.06	-0.04	-0.05	-0.05
Leather products	0.04	-0.02	-0.03	-0.03	-0.04
Wood products	0.07	0.04	0.03	0.03	0.03
Paper products, publishing	0.03	-0.01	-0.01	-0.01	-0.02
Petroleum, coal products	0.03	0.01	0.01	0.01	0.01
Chemical, rubber, plastic products	0.15	0.04	0.03	0.04	0.04
Mineral products nec	0.02	0.01	0.01	0.01	0.00
Ferrous metals	0.46	0.22	0.20	0.21	0.21

olo ruolaini oooloini ompiojinone por contacon non	C.3 🖌	per cent deviation from baseline
--	-------	----------------------------------



	jiii eiii pe			(0011011000)	
Sector	2010	2015	2020	2025	2030
	Per cent	Per cent	Per cent	Per cent	Per cent
Metals nec	0.20	0.00	0.00	0.01	0.01
Metal products	0.31	0.10	0.08	0.08	0.08
Motor vehicles and parts	0.12	0.09	0.09	0.09	0.09
Transport equipment nec	0.06	0.04	0.03	0.03	0.03
Electronic equipment	0.01	0.01	0.01	0.01	0.01
Machinery and equipment nec	0.18	0.09	0.09	0.09	0.09
Manufactures nec	0.02	0.01	0.01	0.01	0.01
Electricity	0.07	0.00	-0.01	-0.01	-0.01
Gas manufacture, distribution	0.06	0.00	0.00	-0.01	-0.01
Water	-0.02	0.00	0.00	0.01	0.01
Construction	0.00	0.01	0.01	0.01	0.00
Trade	0.00	0.00	0.00	0.00	0.00
Transport nec	0.03	0.01	0.00	0.00	0.00
Water transport	0.05	0.03	0.02	0.02	0.02
Air transport	0.01	0.00	0.00	0.00	0.00
Communication	0.00	0.01	0.01	0.01	0.01
Financial services nec	-0.03	-0.01	-0.01	-0.01	-0.01
Insurance	-0.02	-0.01	-0.01	-0.01	-0.01
Business services nec	-0.02	-0.01	-0.02	-0.02	-0.02
Recreational and other services	-0.01	0.00	0.00	0.00	0.00
Public admin., Defence, Edu., Health	0.01	0.01	0.01	0.01	0.01
Dwellings	0.02	0.01	0.01	0.01	0.01

B.3 Australian sectoral employment per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

C.4 Australian sectoral investment per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	0.36	0.11	0.08	0.08	0.07
Wheat	0.94	0.03	-0.03	-0.04	-0.04
Cereal grains nec	0.22	0.06	0.04	0.04	0.03
Vegetables, fruit, nuts	-0.10	0.09	0.08	0.07	0.07
Oil seeds	0.42	0.04	0.00	-0.01	-0.01
Sugar cane, sugar beet	-0.16	0.10	0.10	0.09	0.08
Plant-based fibers	-12.48	0.06	0.01	0.01	0.01
Crops nec	-0.36	0.06	0.04	0.04	0.03
Cattle, sheep and goats, horses	-0.74	0.12	0.09	0.08	0.08
Animal products nec	-0.09	0.06	0.03	0.02	0.02
Raw milk	-1.42	-0.04	0.13	0.12	0.12
Wool, silk-worm cocoons	0.51	0.03	-0.01	-0.01	-0.01
Forestry	-0.04	0.07	0.06	0.06	0.05
Fishing	0.22	0.06	0.04	0.03	0.03
Coal	0.36	0.12	0.06	0.03	0.02
Oil	0.25	0.03	0.01	0.01	0.01
Gas	0.59	-0.13	-0.14	-0.12	-0.13
Minerals nec	0.86	0.01	-0.03	-0.04	-0.05
Bovine meat products	0.09	0.11	0.04	0.04	0.03
Meat products nec	-1.38	0.07	0.06	0.05	0.05
Vegetable oils and fats	-0.03	0.02	0.01	0.01	0.00

Sector	2010	2015	2020	2025	2030
	Per cent				
Dairy products	-1.72	-0.07	0.14	0.13	0.12
Processed rice	0.25	0.10	0.08	0.08	0.07
Sugar	0.11	0.11	0.10	0.10	0.09
Food products nec	-0.18	0.08	0.07	0.07	0.06
Beverages and tobacco products	0.31	0.17	0.16	0.15	0.14
Textiles	-0.01	0.03	0.02	0.02	0.02
Wearing apparel	0.26	0.01	0.01	0.01	0.01
Leather products	0.08	0.03	0.03	0.02	0.02
Wood products	0.17	0.11	0.08	0.08	0.08
Paper products, publishing	-0.07	0.05	0.04	0.03	0.03
Petroleum, coal products	-0.02	0.05	0.05	0.04	0.04
Chemical, rubber, plastic products	-0.58	0.04	0.07	0.06	0.06
Mineral products nec	0.06	0.04	0.03	0.03	0.03
Ferrous metals	-0.52	0.00	0.25	0.24	0.24
Metals nec	-1.43	-0.08	0.04	0.04	0.03
Metal products	-0.47	-0.01	0.11	0.10	0.10
Motor vehicles and parts	0.12	0.07	0.13	0.12	0.12
Transport equipment nec	0.07	0.01	0.06	0.06	0.06
Electronic equipment	0.15	0.05	0.03	0.03	0.03
Machinery and equipment nec	-0.28	0.11	0.12	0.11	0.11
Manufactures nec	0.11	0.04	0.04	0.03	0.03
Electricity	-0.28	0.01	0.04	0.03	0.03
Gas manufacture, distribution	-0.19	0.02	0.04	0.04	0.04
Water	0.12	0.04	0.03	0.02	0.02
Construction	0.14	0.03	0.02	0.01	0.02
Trade	0.06	0.02	0.01	0.01	0.01
Transport nec	-0.02	0.03	0.03	0.03	0.03
Water transport	-0.01	0.05	0.05	0.05	0.04
Air transport	0.07	0.04	0.03	0.03	0.02
Communication	0.11	0.04	0.03	0.03	0.03
Financial services nec	0.11	0.02	0.01	0.00	0.00
Insurance	0.10	0.02	0.01	0.00	0.00
Business services nec	0.11	0.00	-0.01	-0.01	-0.01
Recreational and other services	0.10	0.03	0.02	0.02	0.02
Public admin., Defence, Edu., Health	0.05	0.03	0.02	0.02	0.02
Dwellings	0.01	0.03	0.02	0.02	0.02

B.4	Australian sectoral investment	per cent deviation from baseline	(continued)
			(

Source: CIEG-Cubed modelling simulation.

C 5	Australian sectoral exports	per cent deviation from baseline
0.5	Australian sectoral exports	per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent	Per cent	Per cent	Per cent	Per cent
Paddy rice	-0.40	-0.12	-0.07	-0.05	-0.05
Wheat	-0.32	-0.14	-0.13	-0.13	-0.13
Cereal grains nec	-0.10	-0.04	-0.03	-0.03	-0.02
Vegetables, fruit, nuts	0.28	0.09	0.11	0.13	0.14
Oil seeds	-0.16	-0.08	-0.07	-0.07	-0.07
Sugar cane, sugar beet	0.00	0.00	0.00	0.00	0.00
Plant-based fibers	2.25	-0.03	-0.03	-0.03	-0.03
				(Continued	on nové nogo)



	0040				
Sector	2010	2015	2020	2025	2030
Cropp pop	Per cent				
Citys nec	-0.10	-0.08	-0.07	-0.07	-0.07
Animal products nos	0.09	0.39	0.42	0.43	0.44
Animal products nec	-0.08	-0.04	-0.03	-0.03	-0.03
Wool silk worm coccore	0.00	0.00	0.00	0.00	0.00
Forestry	-0.21	-0.08	-0.07	-0.00	-0.00
Fishing	-0.15	-0.07	-0.07	-0.07	-0.07
Cool	-0.03	-0.02	-0.02	-0.02	-0.02
	-0.00	0.00	0.02	0.02	0.02
	-0.00	0.00	0.02	0.02	0.02
GdS	-0.20	-0.20	-0.20	-0.28	-0.20
Revine most products	-0.27	-0.09	-0.08	-0.07	-0.07
Boville meat products	-0.00	-0.05	-0.01	0.00	0.01
Meat products nec	2.27	0.13	0.17	0.19	0.19
	0.20	-0.09	-0.13	-0.15	-0.10
Dairy products	1.43	0.67	0.35	0.41	0.43
Processed lice	-0.03	0.11	0.16	0.20	0.22
Sugar	0.33	0.40	0.50	0.57	0.60
Pour products nec	0.77	0.41	0.37	0.41	0.43
Teverages and tobacco products	0.30	0.40	0.51	0.59	0.02
	1.13	0.21	0.20	0.21	0.21
	0.78	0.34	0.18	0.19	0.19
	0.76	0.20	0.16	0.16	0.15
wood products	0.57	0.37	0.39	0.41	0.41
Paper products, publishing	0.67	0.03	0.05	0.06	0.06
Petroleum, coal products	0.08	0.08	0.09	0.10	0.10
Chemical, rubber, plastic products	1.01	0.31	0.29	0.32	0.33
	0.66	0.14	0.18	0.20	0.21
	3.69	2.10	1.94	2.07	2.13
Metals nec	0.36	0.01	0.02	0.03	0.03
Meter vehicles and nexts	0.00	2.48	2.04	2.18	2.24
	0.75	0.92	0.93	1.02	1.07
	0.75	0.54	0.58	0.65	0.08
Electronic equipment	0.31	0.22	0.24	0.25	0.20
Machinery and equipment nec	1.57	0.82	0.87	0.92	0.94
	0.23	0.09	0.10	0.12	0.12
Electricity	0.00	0.00	0.00	0.00	0.00
	-0.30	-0.11	-0.07	-0.06	-0.06
Construction	-0.33	-0.11	-0.07	-0.06	-0.05
Trade	-0.15	-0.07	-0.06	-0.06	-0.06
	-0.16	-0.08	-0.08	-0.08	-0.08
Water transport	-0.15	-0.06	-0.05	-0.05	-0.05
Aistenenert	0.08	0.16	0.20	0.22	0.23
	-0.10	-0.04	-0.03	-0.02	-0.02
	0.90	1.17	1.40		1.74
	-0.25	-0.11	-0.09	-0.09	-0.09
	-0.24	-0.11	-0.09	-0.09	-0.09
	-0.06	0.00	0.10	0.12	0.13
	-0.17	-0.07	-0.06	-0.06	-0.06
	-0.17	-0.09	-0.09	-0.10	-0.10
Dweilings	0.00	0.00	0.00	0.00	0.00

B.5 Australian sectoral exports per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.
Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	0.26	0.15	0.15	0.15	0.15
Wheat	-0.03	-0.03	-0.02	-0.02	-0.02
Cereal grains nec	0.05	0.03	0.03	0.03	0.03
Vegetables, fruit, nuts	0.15	0.08	0.08	0.08	0.08
Oil seeds	0.02	0.01	0.01	0.01	0.01
Sugar cane, sugar beet	0.09	0.05	0.05	0.05	0.05
Plant-based fibers	1.48	0.04	0.03	0.03	0.03
Crops nec	0.20	0.05	0.04	0.04	0.04
Cattle, sheep and goats, horses	0.22	0.08	0.08	0.09	0.09
Animal products nec	0.06	0.01	0.02	0.02	0.02
Raw milk	0.30	0.13	0.07	0.08	0.08
Wool, silk-worm cocoons	0.19	0.08	0.07	0.08	0.08
Forestry	0.16	0.09	0.09	0.10	0.10
Fishing	0.04	0.04	0.04	0.05	0.05
Coal	0.08	0.05	0.05	0.05	0.04
Oil	0.04	0.04	0.05	0.06	0.06
Gas	0.14	0.04	0.02	0.03	0.03
Minerals nec	0.29	0.10	0.08	0.08	0.09
Bovine meat products	0.16	0.07	0.08	0.09	0.10
Meat products nec	0.35	0.11	0.10	0.11	0.11
Vegetable oils and fats	0.11	0.05	0.05	0.05	0.05
Dairy products	0.51	0.22	0.15	0.15	0.16
Processed rice	0.14	0.09	0.09	0.10	0.10
Sugar	0.21	0.13	0.13	0.14	0.14
Food products nec	0.17	0.09	0.08	0.08	0.08
Beverages and tobacco products	0.13	0.11	0.13	0.14	0.14
Textiles	0.21	0.09	0.08	0.08	0.08
Wearing apparel	0.18	0.09	0.06	0.06	0.06
Leather products	0.16	0.06	0.06	0.05	0.05
Wood products	0.42	0.33	0.33	0.34	0.34
Paper products, publishing	0.31	0.22	0.24	0.25	0.26
Petroleum, coal products	0.08	0.04	0.04	0.04	0.04
Chemical, rubber, plastic products	0.26	0.10	0.10	0.11	0.11
Mineral products nec	0.23	0.16	0.17	0.18	0.18
Ferrous metals	0.63	0.36	0.34	0.36	0.37
Metals nec	0.69	0.12	0.10	0.11	0.11
Metal products	0.42	0.17	0.15	0.15	0.15
Motor vehicles and parts	0.20	0.12	0.12	0.12	0.13
Transport equipment nec	0.22	0.16	0.18	0.20	0.21
Electronic equipment	0.12	0.08	0.08	0.08	0.08
Machinery and equipment nec	0.27	0.15	0.15	0.16	0.16
Manufactures nec	0.13	0.07	0.06	0.06	0.06
Electricity	0.06	0.01	0.02	0.02	0.02
Gas manufacture, distribution	0.23	0.08	0.06	0.06	0.06
Water	0.15	0.07	0.05	0.05	0.05
Construction	0.01	0.02	0.02	0.01	0.01
Trade	0.09	0.06	0.06	0.06	0.06
Transport nec	0.12	0.06	0.06	0.06	0.06
Water transport	0.31	0.24	0.26	0.27	0.27

C.6	Australian sectoral imports	per cent deviation from baseline
•••		



per cent de	eviation from b	aseline (con	tinued)	
2010	2015	2020	2025	2030
Per cent	Per cent	Per cent	Per cent	Per cent
0.09	0.05	0.04	0.04	0.04
0.10	0.06	0.06	0.06	0.07
0.10	0.05	0.04	0.04	0.04
0.11	0.05	0.05	0.05	0.05
0.11	0.06	0.06	0.06	0.06
0.09	0.05	0.04	0.04	0.04
0.10	0.05	0.05	0.06	0.06
0.18	0.06	0.04	0.03	0.03
	Per cent de 2010 Per cent 0.09 0.10 0.11 0.11 0.09 0.10 0.10 0.10 0.10	per cent deviation from b 2010 2015 Per cent Per cent 0.09 0.05 0.10 0.06 0.11 0.05 0.11 0.06 0.09 0.05 0.11 0.06 0.09 0.05 0.10 0.05 0.11 0.06 0.09 0.05 0.10 0.05 0.10 0.05 0.18 0.06 <td>per cent deviation from baseline (continue) 2010 2015 2020 Per cent Per cent Per cent 0.09 0.05 0.04 0.10 0.06 0.06 0.10 0.05 0.04 0.11 0.05 0.05 0.11 0.06 0.06 0.09 0.05 0.04 0.10 0.05 0.04 0.11 0.05 0.05 0.11 0.06 0.06 0.09 0.05 0.04 0.10 0.05 0.05 0.18 0.06 0.04</td> <td>per cent deviation from baseline (continued) 2010 2015 2020 2025 Per cent Per cent Per cent Per cent Per cent 0.09 0.05 0.04 0.04 0.10 0.06 0.06 0.06 0.10 0.05 0.04 0.04 0.11 0.05 0.05 0.05 0.11 0.06 0.06 0.06 0.09 0.05 0.04 0.04 0.11 0.06 0.06 0.06 0.09 0.05 0.04 0.04 0.10 0.05 0.05 0.06 0.10 0.05 0.05 0.06 0.18 0.06 0.04 0.03</td>	per cent deviation from baseline (continue) 2010 2015 2020 Per cent Per cent Per cent 0.09 0.05 0.04 0.10 0.06 0.06 0.10 0.05 0.04 0.11 0.05 0.05 0.11 0.06 0.06 0.09 0.05 0.04 0.10 0.05 0.04 0.11 0.05 0.05 0.11 0.06 0.06 0.09 0.05 0.04 0.10 0.05 0.05 0.18 0.06 0.04	per cent deviation from baseline (continued) 2010 2015 2020 2025 Per cent Per cent Per cent Per cent Per cent 0.09 0.05 0.04 0.04 0.10 0.06 0.06 0.06 0.10 0.05 0.04 0.04 0.11 0.05 0.05 0.05 0.11 0.06 0.06 0.06 0.09 0.05 0.04 0.04 0.11 0.06 0.06 0.06 0.09 0.05 0.04 0.04 0.10 0.05 0.05 0.06 0.10 0.05 0.05 0.06 0.18 0.06 0.04 0.03

B.6 Australian sectoral imports per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

C.7 Inc	Ionesia sectoral output	per cent deviation from baseline
---------	-------------------------	----------------------------------

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	0.13	0.03	-0.03	-0.04	-0.03
Wheat	-0.83	-0.02	-0.08	-0.06	-0.05
Cereal grains nec	0.21	0.13	0.08	0.07	0.07
Vegetables, fruit, nuts	0.15	0.10	0.04	0.03	0.03
Oil seeds	0.04	0.08	0.05	0.05	0.06
Sugar cane, sugar beet	-1.60	-1.49	-1.62	-1.66	-1.67
Plant-based fibers	-0.34	0.10	0.05	0.06	0.08
Crops nec	0.06	-0.07	-0.12	-0.10	-0.09
Cattle, sheep and goats, horses	0.07	0.01	-0.07	-0.08	-0.07
Animal products nec	0.14	0.09	0.02	0.01	0.02
Raw milk	0.11	-0.03	-0.12	-0.11	-0.10
Wool, silk-worm cocoons	0.21	0.14	0.07	0.06	0.07
Forestry	0.27	0.61	0.61	0.60	0.62
Fishing	0.16	0.19	0.16	0.14	0.14
Coal	-0.13	-0.13	-0.16	-0.12	-0.09
Oil	-0.04	0.25	0.30	0.30	0.30
Gas	-0.43	0.35	0.56	0.57	0.56
Minerals nec	0.84	0.40	0.39	0.41	0.44
Bovine meat products	0.15	0.18	0.13	0.11	0.10
Meat products nec	0.13	0.14	0.08	0.07	0.07
Vegetable oils and fats	-0.22	0.17	0.22	0.23	0.24
Dairy products	0.29	0.28	0.19	0.17	0.17
Processed rice	0.14	0.09	0.03	0.02	0.02
Sugar	-0.69	-0.53	-0.63	-0.67	-0.68
Food products nec	0.24	0.23	0.19	0.18	0.17
Beverages and tobacco products	0.12	0.14	0.09	0.08	0.07
Textiles	0.24	0.30	0.28	0.27	0.28
Wearing apparel	0.25	0.30	0.23	0.23	0.24
Leather products	0.12	0.22	0.20	0.21	0.23
Wood products	0.26	0.66	0.67	0.68	0.71
Paper products, publishing	0.04	0.32	0.35	0.35	0.36
Petroleum, coal products	0.26	0.27	0.21	0.19	0.18
Chemical, rubber, plastic products	0.23	0.27	0.24	0.23	0.24
Mineral products nec	0.70	0.53	0.38	0.36	0.38

Sector	2010	2015	2020	2025	2030
	Per cent				
Ferrous metals	1.23	0.86	0.67	0.63	0.63
Metals nec	4.67	0.85	0.67	0.67	0.70
Metal products	1.77	0.84	0.58	0.53	0.53
Motor vehicles and parts	0.60	0.46	0.30	0.25	0.24
Transport equipment nec	1.10	0.78	0.65	0.65	0.67
Electronic equipment	0.60	0.61	0.53	0.50	0.51
Machinery and equipment nec	1.17	0.74	0.59	0.56	0.58
Manufactures nec	0.42	0.38	0.32	0.29	0.29
Electricity	0.39	0.33	0.27	0.25	0.25
Gas manufacture, distribution	0.30	0.32	0.28	0.26	0.25
Water	0.16	0.21	0.16	0.14	0.14
Construction	1.17	0.73	0.52	0.48	0.50
Trade	0.34	0.40	0.31	0.27	0.27
Transport nec	0.31	0.36	0.28	0.26	0.25
Water transport	0.23	0.31	0.28	0.26	0.26
Air transport	0.14	0.24	0.22	0.20	0.19
Communication	0.05	0.30	0.27	0.25	0.25
Financial services nec	0.04	0.25	0.21	0.20	0.20
Insurance	0.14	0.13	0.07	0.06	0.07
Business services nec	0.31	0.33	0.25	0.23	0.23
Recreational and other services	0.26	0.21	0.15	0.13	0.13
Public admin., Defence, Edu., Health	0.21	0.16	0.10	0.08	0.08
Dwellings	0.21	0.21	0.16	0.14	0.14

B./ Indonesia sectoral output pe	er cent deviation from baseline
----------------------------------	---------------------------------

Source: CIEG-Cubed modelling simulation.

C.8 Indonesian sectoral employment per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	0.03	-0.15	-0.23	-0.20	-0.17
Wheat	-2.41	-0.38	-0.46	-0.39	-0.33
Cereal grains nec	0.11	-0.05	-0.12	-0.09	-0.07
Vegetables, fruit, nuts	0.01	-0.11	-0.19	-0.16	-0.13
Oil seeds	-0.15	-0.21	-0.25	-0.20	-0.15
Sugar cane, sugar beet	-2.26	-2.12	-2.26	-2.25	-2.23
Plant-based fibers	-1.20	-0.23	-0.30	-0.23	-0.17
Crops nec	-0.08	-0.29	-0.36	-0.30	-0.26
Cattle, sheep and goats, horses	-0.76	-0.45	-0.54	-0.50	-0.47
Animal products nec	-0.08	-0.21	-0.29	-0.26	-0.23
Raw milk	-0.17	-0.41	-0.51	-0.46	-0.41
Wool, silk-worm cocoons	0.00	-0.16	-0.24	-0.20	-0.18
Forestry	0.24	0.20	0.11	0.15	0.20
Fishing	0.11	-0.33	-0.47	-0.42	-0.39
Coal	-0.27	-0.61	-0.69	-0.58	-0.50
Oil	-0.14	0.05	0.09	0.12	0.14
Gas	-0.50	0.14	0.31	0.34	0.36
Minerals nec	0.64	0.02	-0.05	0.02	0.09
Bovine meat products	-0.57	-0.46	-0.56	-0.52	-0.49
Meat products nec	-0.16	-0.26	-0.34	-0.31	-0.28
Vegetable oils and fats	-0.28	-0.29	-0.32	-0.26	-0.21

Sector	2010	2015	2020	2025	2030
	Per cent				
Dairy products	-0.50	-0.40	-0.41	-0.38	-0.34
Processed rice	0.03	-0.13	-0.21	-0.19	-0.17
Sugar	-2.17	-2.11	-2.26	-2.25	-2.23
Food products nec	-0.14	-0.31	-0.40	-0.36	-0.33
Beverages and tobacco products	-0.11	-0.41	-0.52	-0.49	-0.47
Textiles	0.01	-0.16	-0.23	-0.18	-0.14
Wearing apparel	0.05	-0.14	-0.25	-0.20	-0.15
Leather products	-0.07	-0.20	-0.25	-0.19	-0.13
Wood products	0.19	0.24	0.19	0.24	0.30
Paper products, publishing	-0.09	-0.08	-0.10	-0.05	-0.01
Petroleum, coal products	0.15	0.05	-0.03	-0.02	-0.01
Chemical, rubber, plastic products	0.07	0.09	0.05	0.07	0.09
Mineral products nec	0.60	0.36	0.20	0.20	0.24
Ferrous metals	0.92	0.60	0.43	0.42	0.44
Metals nec	3.83	0.58	0.43	0.46	0.50
Metal products	1.30	0.57	0.33	0.31	0.33
Motor vehicles and parts	0.20	0.11	-0.03	-0.05	-0.05
Transport equipment nec	0.98	0.60	0.47	0.50	0.54
Electronic equipment	0.50	0.43	0.35	0.34	0.37
Machinery and equipment nec	0.93	0.51	0.36	0.37	0.40
Manufactures nec	0.28	0.19	0.12	0.12	0.13
Electricity	0.32	-0.01	-0.11	-0.10	-0.08
Gas manufacture, distribution	0.23	-0.07	-0.18	-0.16	-0.14
Water	0.11	0.10	0.04	0.03	0.04
Construction	1.10	0.62	0.40	0.38	0.40
Trade	0.30	0.28	0.17	0.15	0.16
Transport nec	0.24	0.12	0.01	0.02	0.03
Water transport	0.14	0.06	0.00	0.01	0.03
Air transport	0.06	0.00	-0.06	-0.05	-0.03
Communication	-0.01	0.15	0.11	0.10	0.11
Financial services nec	0.01	0.14	0.09	0.09	0.10
Insurance	0.10	0.05	-0.02	-0.01	0.00
Business services nec	0.24	0.22	0.13	0.13	0.14
Recreational and other services	0.18	0.10	0.03	0.03	0.03
Public admin., Defence, Edu., Health	0.16	0.10	0.05	0.04	0.04
Dwellings	0.19	0.07	0.00	-0.01	0.00

B.8 Indonesian sectoral employment per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

C.9 Indonesian sectoral investment per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	2.15	1.78	1.18	0.96	0.99
Wheat	26.00	1.42	1.04	0.90	0.92
Cereal grains nec	1.95	1.92	1.28	1.07	1.10
Vegetables, fruit, nuts	2.49	1.83	1.21	1.01	1.04
Oil seeds	2.76	1.81	1.22	1.03	1.07
Sugar cane, sugar beet	2.46	-0.36	-0.94	-1.12	-1.07
Plant-based fibers	13.97	1.74	1.21	1.04	1.09

Sector	2010	2015	2020	2025	2030
	Per cent				
Crops nec	2.22	1.61	1.12	0.93	0.95
Cattle, sheep and goats, horses	7.23	1.37	0.88	0.70	0.72
Animal products nec	2.95	1.67	1.12	0.92	0.95
Raw milk	2.82	1.37	0.92	0.79	0.81
Wool, silk-worm cocoons	2.23	1.76	1.18	0.97	1.00
Forestry	3.24	1.52	1.13	1.09	1.12
Fishing	1.55	1.29	0.94	0.79	0.80
Coal	2.87	1.90	1.37	1.14	1.19
Oil	1.72	1.03	0.69	0.59	0.63
Gas	2.68	1.65	0.97	0.78	0.86
Minerals nec	-2.36	1.31	1.14	1.08	1.14
Bovine meat products	4.93	1.02	0.65	0.51	0.52
Meat products nec	3.01	1.29	0.87	0.71	0.73
Vegetable oils and fats	2.70	1.43	0.98	0.82	0.86
Dairy products	4.66	1.45	0.80	0.66	0.69
Processed rice	1.86	1.47	0.98	0.82	0.84
Sugar	2.00	-0.73	-1.15	-1.27	-1.23
Food products nec	2.46	1.22	0.81	0.67	0.69
Beverages and tobacco products	1.44	1.02	0.67	0.53	0.54
Textiles	1.83	1.50	1.03	0.89	0.93
Wearing apparel	2.28	1.54	1.03	0.88	0.92
Leather products	2.49	1.48	1.06	0.92	0.96
Wood products	3.62	1.70	1.27	1.21	1.25
Paper products, publishing	2.39	1.43	0.99	0.86	0.90
Petroleum, coal products	1.18	0.71	0.52	0.48	0.50
Chemical, rubber, plastic products	1.50	0.67	0.50	0.49	0.52
Mineral products nec	1.71	0.60	0.52	0.66	0.64
Ferrous metals	1.38	0.72	0.74	0.83	0.83
Metals nec	-24.91	-0.52	0.92	0.92	0.99
Metal products	-0.10	0.34	0.59	0.72	0.71
Motor vehicles and parts	1.53	0.45	0.25	0.30	0.33
Transport equipment nec	1.28	0.81	0.89	0.99	0.97
Electronic equipment	1.62	0.87	0.71	0.74	0.78
Machinery and equipment nec	0.74	0.70	0.71	0.81	0.81
Manufactures nec	0.82	0.64	0.51	0.50	0.53
Electricity	0.49	0.86	0.68	0.62	0.64
Gas manufacture, distribution	1.01	0.87	0.67	0.60	0.62
Water	1.06	0.36	0.26	0.27	0.27
Construction	0.67	0.38	0.44	0.67	0.63
Trade	1.36	0.43	0.32	0.37	0.39
Transport nec	1.36	0.69	0.53	0.51	0.53
Water transport	1.19	0.74	0.56	0.52	0.54
Air transport	1.30	0.72	0.51	0.45	0.47
Communication	1.78	0.52	0.32	0.33	0.35
Financial services nec	1.72	0.48	0.31	0.33	0.36
Insurance	1.01	0.28	0.23	0.24	0.25
Business services nec	1.33	0.41	0.32	0.37	0.39
Recreational and other services	0.72	0.32	0.25	0.26	0.26
Public admin., Defence. Edu., Health	0.67	0.38	0.27	0.26	0.26
Dwellings	0.54	0.27	0.22	0.22	0.22

B.9 Indonesian sectoral investment per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	-1.23	-2.38	-2.50	-2.16	-1.92
Wheat	9.75	0.00	-0.01	-0.01	-0.01
Cereal grains nec	-0.22	-0.43	-0.46	-0.40	-0.36
Vegetables, fruit, nuts	-0.17	-0.54	-0.59	-0.52	-0.46
Oil seeds	-0.14	-0.46	-0.53	-0.48	-0.44
Sugar cane, sugar beet	0.98	0.34	0.25	0.34	0.42
Plant-based fibers	0.88	0.18	0.15	0.15	0.16
Crops nec	-0.46	-1.00	-1.10	-0.97	-0.87
Cattle, sheep and goats, horses	2.93	0.44	0.41	0.48	0.53
Animal products nec	-0.05	-0.29	-0.33	-0.28	-0.24
Raw milk	0.00	0.00	0.00	0.00	0.00
Wool, silk-worm cocoons	0.04	-0.22	-0.27	-0.21	-0.16
Forestry	-0.57	0.20	0.45	0.50	0.53
Fishing	-0.27	0.05	0.16	0.19	0.20
Coal	-0.34	-0.34	-0.35	-0.29	-0.23
Oil	-0.42	0.11	0.31	0.34	0.35
Gas	-0.76	0.39	0.75	0.76	0.76
Minerals nec	0.27	0.10	0.30	0.35	0.40
Bovine meat products	3.42	1.50	1.70	1.80	1.87
Meat products nec	0.17	-0.12	-0.13	-0.01	0.10
Vegetable oils and fats	-0.50	0.14	0.27	0.30	0.32
Dairy products	4.89	2.07	1.13	1.17	1.20
Processed rice	-0.45	-0.76	-0.82	-0.70	-0.61
Sugar	6.35	5.71	6.16	6.44	6.55
Food products nec	0.66	0.46	0.50	0.54	0.58
Beverages and tobacco products	0.19	0.42	0.49	0.53	0.55
Textiles	0.23	0.42	0.52	0.56	0.59
Wearing apparel	0.33	0.47	0.41	0.49	0.56
Leather products	0.05	0.18	0.23	0.31	0.39
Wood products	-0.29	0.75	1.08	1.16	1.22
Paper products, publishing	0.04	0.43	0.57	0.61	0.64
Petroleum, coal products	-0.04	0.09	0.13	0.14	0.14
Chemical, rubber, plastic products	0.51	0.28	0.30	0.32	0.34
Mineral products nec	0.23	0.48	0.69	0.79	0.85
Ferrous metals	1.82	1.26	1.20	1.21	1.22
Metals nec	7.63	1.13	0.86	0.88	0.90
Metal products	3.56	1.44	1.29	1.34	1.37
Motor vehicles and parts	2.39	1.55	1.40	1.43	1.45
Transport equipment nec	1.77	1.83	2.29	2.57	2.69
Electronic equipment	0.50	0.82	0.94	0.97	1.00
Machinery and equipment nec	2.11	1.35	1.39	1.43	1.45
Manufactures nec	0.69	0.73	0.90	0.96	1.01
Electricity	-0.69	0.33	0.57	0.62	0.66
Gas manufacture, distribution	-0.66	0.51	0.85	0.90	0.92
Water	-0.50	0.15	0.27	0.33	0.39
Construction	-0.05	0.03	0.07	0.12	0.16
Trade	-0.62	0.27	0.47	0.51	0.54
Transport nec	-0.35	0.23	0.36	0.39	0.42
Water transport	1.23	1.75	1.93	2.00	2.04

C.10 Indonesian sectoral exports per cent deviation from baseline

Sector	2010	2015	2020	2025	2030
	Per cent				
Air transport	-0.26	0.26	0.39	0.41	0.43
Communication	-0.44	0.38	0.57	0.61	0.65
Financial services nec	-0.67	0.07	0.21	0.26	0.31
Insurance	-0.55	-0.41	-0.41	-0.33	-0.26
Business services nec	0.01	0.28	0.35	0.38	0.42
Recreational and other services	0.06	0.11	0.12	0.18	0.23
Public admin., Defence, Edu., Health	-0.44	-0.80	-0.88	-0.74	-0.64
Dwellings	0.00	0.00	0.00	0.00	0.00

C.10 Indonesian sectoral exports per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.

Sector	2010	2015	2020	2025	2030
	Per cent				
Paddy rice	1.90	2.36	2.35	2.17	2.06
Wheat	0.43	0.22	0.18	0.17	0.16
Cereal grains nec	0.37	0.42	0.39	0.34	0.31
Vegetables, fruit, nuts	0.80	0.61	0.55	0.49	0.45
Oil seeds	0.16	0.42	0.43	0.39	0.37
Sugar cane, sugar beet	-1.60	-1.49	-1.62	-1.66	-1.67
Plant-based fibers	0.48	0.32	0.29	0.27	0.27
Crops nec	0.45	0.58	0.56	0.49	0.45
Cattle, sheep and goats, horses	4.16	1.48	1.43	1.39	1.36
Animal products nec	0.76	0.28	0.23	0.19	0.16
Raw milk	0.11	-0.03	-0.12	-0.11	-0.10
Wool, silk-worm cocoons	0.35	0.37	0.31	0.26	0.23
Forestry	0.73	0.45	0.27	0.24	0.24
Fishing	1.94	0.41	0.25	0.22	0.20
Coal	0.18	0.13	0.09	0.08	0.08
Oil	0.33	0.15	0.04	0.01	0.00
Gas	13.97	-0.19	-0.57	-0.67	-0.71
Minerals nec	5.29	0.50	0.12	0.06	0.03
Bovine meat products	8.12	3.17	3.07	3.03	3.00
Meat products nec	5.21	0.66	0.57	0.48	0.41
Vegetable oils and fats	0.25	0.04	-0.03	-0.05	-0.06
Dairy products	2.02	0.84	0.35	0.31	0.29
Processed rice	0.52	0.65	0.62	0.53	0.48
Sugar	13.44	12.74	12.76	12.77	12.75
Food products nec	1.34	0.61	0.38	0.34	0.31
Beverages and tobacco products	6.95	6.64	6.50	6.43	6.41
Textiles	0.44	0.18	0.09	0.07	0.05
Wearing apparel	1.01	0.35	0.18	0.15	0.12
Leather products	0.73	0.28	0.21	0.18	0.16
Wood products	1.25	0.46	0.30	0.27	0.27
Paper products, publishing	0.52	0.18	0.12	0.10	0.09
Petroleum, coal products	0.35	0.23	0.14	0.11	0.10
Chemical, rubber, plastic products	0.64	0.31	0.23	0.20	0.19
Mineral products nec	1.07	0.50	0.29	0.25	0.25

C.11 Indonesian sectoral imports per cent deviation from baseline



Sector	2010	2015	2020	2025	2030
	Per cent				
Ferrous metals	1.89	0.98	0.67	0.61	0.60
Metals nec	8.40	1.28	0.87	0.85	0.85
Metal products	3.58	1.25	0.78	0.70	0.68
Motor vehicles and parts	2.54	1.54	1.20	1.14	1.12
Transport equipment nec	1.15	0.76	0.61	0.59	0.60
Electronic equipment	0.69	0.45	0.31	0.27	0.26
Machinery and equipment nec	1.46	0.84	0.67	0.62	0.61
Manufactures nec	0.69	0.23	0.08	0.03	0.00
Electricity	0.73	0.16	-0.02	-0.06	-0.09
Gas manufacture, distribution	0.65	0.05	-0.18	-0.22	-0.24
Water	0.38	0.13	0.02	-0.03	-0.06
Construction	1.19	0.72	0.48	0.42	0.41
Trade	0.67	0.26	0.06	0.01	-0.01
Transport nec	0.50	0.25	0.10	0.06	0.04
Water transport	0.43	0.21	0.11	0.08	0.07
Air transport	0.29	0.11	0.02	-0.01	-0.03
Communication	2.52	2.18	2.10	2.09	2.09
Financial services nec	0.38	0.22	0.11	0.07	0.05
Insurance	0.43	0.34	0.29	0.24	0.20
Business services nec	0.45	0.31	0.19	0.15	0.14
Recreational and other services	0.22	0.15	0.09	0.04	0.01
Public admin., Defence, Edu., Health	0.43	0.57	0.55	0.47	0.41
Dwellings	0.21	0.21	0.16	0.14	0.14

C.11 Indonesian sectoral imports per cent deviation from baseline (continued)

Source: CIEG-Cubed modelling simulation.