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**he impact of the Asian  
Crisis on Australia's  
primary exports: why it  
has not been so bad**

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## Abbreviations

ASEAN	Association of South East Asian Nations
CDE	constant differences in elasticity
CIE	Centre for International Economics
GTAP	Global Trade Analysis Project

## Key to symbols used in tables

n.a.	not applicable
..	not available
-	zero
.	insignificant

## Abstract

Apart from a substantial exchange rate depreciation, the impact of the Asian Crisis on the Australian economy has been surprisingly mild. An exploration of the reasons for the modest impact to date on Australia's primary commodity exports, using a global general equilibrium model, shows the following: (i) as capital flees Asia, investment in Australia increases and the trade deficit enlarges, (ii) while Australian exports to the region generally decline, imports from the region become cheaper as the crisis countries recover in the medium run, and the favourable terms of trade effect leads to an expansion of domestic consumption, (iii) primary commodities that are used as raw materials in manufactured exports in crisis countries expand as these countries try to export their way out of trouble with depreciated currencies. Diversification also helps alleviate the impact of the Asian Crisis in the short run, (iv) the more income-elastic primary commodities used for direct consumption fare less well than the income-inelastic foodstuffs as incomes decline in the crisis countries, and (v) Australia's relatively low dependence on manufactured exports is a buffer as manufactured exports come under heavy pressure from exports from the crisis countries.

## Introduction

It has been two years since the onset of the Asian Crisis.<sup>1</sup> Many commentators have been surprised by the resilience of the Australian economy to the Crisis. Why has Australia weathered the storm so well despite its extensive trade links with Asia and particularly Southeast Asian countries which have been hardest hit by the Crisis? Apart from sound macroeconomic fundamentals, there have been no major government policy initiatives to combat the adverse impact of the Crisis. Have we missed something important in analysing the impact of the Crisis on Australia?

In this paper, we examine the impact of the Asian Crisis using the GTAP global computable general equilibrium model and its latest corresponding database (version 4). The multiregion nature of the model and its rich commodity and country details make it a useful tool to trace the impact of the Crisis by looking at the capital account effect, the terms of trade effect, trade structure, and sectoral linkages, among other aspects of an economy, which may be important in explaining the impact of the Crisis.

## The Asian Crisis and its implications for Australia

The currency crisis which began in Thailand in July 1997 developed into widespread regional financial crises, which ultimately led to economic recession in many of the countries in the region.<sup>2</sup> While great efforts have been devoted to explaining the causes and policy responses to the crises, research on the impact of the crises on the real economy has been limited.<sup>3</sup> It has been commonly believed that the Asian Crisis and the subsequent

recession in many of the economies in the region will have a significant adverse impact on the Australian economy because of Australia's close links with Asia in trade and investment. To understand how the Asian Crisis might affect Australia, and its primary commodity trade in particular, we need to examine how shocks from the Asian Crisis are transmitted into Australia and, for that matter, any other countries which did not suffer the Crisis in the first place.

There are two channels through which the Asian Crisis shocks affect Australia's primary commodity trade. The first and most obvious channel is the capital flight which precipitated the substantial depreciations of local currencies in the crisis economies.<sup>4</sup> This sharply reduced domestic investment and hence demand for capital goods. The economies contracted. Meanwhile, currency depreciations have dramatically expanded the debt volume denominated in foreign currencies and the servicing cost of the debt. Net saving (saving minus investment) increases in order to pay the enormously increased cost of debt service. The increase in net saving will have to last for at least several years before the foreign debt situation is stabilised. In addition, the Crisis may have heightened the feeling of insecurity among the people affected, and increased saving is seen as an insurance against any future risks. Again, this effect on saving is likely to last well beyond the short run. This should lead to continuous increases in the capital account deficits in the crisis countries and capital account surpluses in non-crisis countries such as Australia. Increases in capital inflows in Australia stimulate investment, which, in turn, generates greater demand in the economy as a whole. This is what Yang and Tyers (1999) have called the 'capital account' effect of the Asian Crisis.

The second channel is the reduction of Asian imports from Australia and an increase in Australia's imports from Asia over time. The Asian Crisis and the subsequent recession have substantially reduced the wealth, as well as income, that these countries have accumulated during the long boom prior to the Crisis. The collapse of stock and real estate markets has caused many people and firms to become bankrupt, while the recession has significantly reduced the income of the population. Thus, consumption has fallen and imports have contracted accordingly. In the short run, however, exports were not able to expand, because widespread insolvency and the ensuing credit crunch have led to widespread plant closures. This observation is confirmed by a recent World Bank (1999) survey of 3,700 companies in Indonesia, Korea, Malaysia, the Philippines, and Thailand. On average, insolvency struck 15 per cent of the companies surveyed. In Indonesia, which was the worst hit by the Crisis, 51 per cent of the surveyed companies reported insolvency. Illiquidity is more widespread than insolvency, reaching 28 per cent among the surveyed companies.

Widespread plant closures (permanent or temporary) arising from insolvency and illiquidity have led to substantial contractions of production in the short run, and probably more so than those caused by the reduction in domestic investment. In the medium run, however, as insolvency issues are resolved and access to credit improves, production

expands and exports will rise, spurred by substantial real depreciations of local currencies. From Australia's perspective, it is inevitable that the trade deficit will rise. With the increase in the overall trade deficit, some sectors of the Australian economy will expand and others will contract. This is what Yang and Tyers (1999) have called the 'compositional effect' of the Asian Crisis. How this effect translates into changes in Australia's primary commodity exports will depend on demand and supply responses in both domestic and overseas markets.

Both the capital account and trade compositional effects need to be properly modelled to evaluate the impact of the Asian Crisis on Australia's primary commodity exports. The way in which these effects are captured in the GTAP model through the crafting of the model closure and construction of shocks is spelt out in the next section.

## **Modelling the impact of the Asian Crisis**

The GTAP comparative static framework is a model of the real economy and is therefore not suitable for the analysis of financial issues that have been central to the Asian Crisis.<sup>5</sup> Nor can it address issues of a short-run dynamic nature, such as adjustments in the nominal exchange rate. Other models, such as the G-Cubed model (McKibbin and Wilcoxon 1995) and Dixon and Rimmer (1997), are more suited to such tasks. The GTAP model is more suitable for the analysis of the short run to medium-term impact on the real economy.

The model is a valuable tool in the context of research on the impact of the Asian Crisis on the Australian economy. For our purposes, the following features of the model prove to be very useful. The model explicitly incorporates a capital goods sector to service investment and a utility function to determine consumption and savings in each region. The average saving rate is normally exogenous, but can be made endogenous if the change in the capital/current account balance is imposed based on prior information. Together with any observed change in investment, which can also be made exogenous, this provides a realistic representation of global capital movement arising from the Asian Crisis. Observed differences in tastes across regions are explicitly modelled using the non-homothetic constant differences in elasticity (CDE) function. In the analysis of the Asian Crisis, this feature of the model is important, because both the income and price changes involved are substantial. Another useful feature of the model is its incorporation of empirically based differences in technology across regions. This is not only reflected in the cross-regional and cross-industrial differences in the factor intensity of the five explicitly identified primary factors (land, unskilled labour, skilled labour, capital and natural resources), but also in different usage of intermediate inputs based on regional input-output tables. Finally, the model incorporates product differentiation by country of origin, and this enables us to trace changes in bilateral trade flows of various commodities arising from the Asian Crisis (see Appendix Table A1 for the Armington elasticities used).

We have introduced two closures (short and medium runs) to reflect the length of time in which we allow the impact of the Asian Crisis to work through.<sup>6</sup> Common to both closures, capital is made sector-specific. Labour is assumed to be fully mobile and fully

employed in both the short and long runs, while land and natural resources remain 'sluggish' in their movement across industries. All factors are domestically owned and there is no factor mobility across countries. As a result, returns to all factors are intra-regional.<sup>7</sup> All factor returns remain flexible. Regional investment in the crisis countries is made exogenous and reduced by the observed magnitude. Trade balance is made exogenous and altered by the observed values, while the average saving rate is made endogenous. In non-crisis countries, investment and the trade account are endogenous, while the average saving rate is exogenous.

In the short run, reductions in investment in the crisis economies cannot fully explain the extent of output contraction. In industries where this is the case, we make output exogenous and reduce it by the magnitude of observed changes.<sup>8</sup> Furthermore, we assume that output contractions arising from insolvency and illiquidity result in sectoral unemployment of capital in order to reflect temporary shutdowns of plants in the crisis economies. Thus, capital stock at the industrial level is made endogenous.

Normally, if unemployment of a factor is allowed, some sort of factor price rigidity has to be introduced. In this study, however, capital unemployment is a result of the contraction of industrial production. We impose exogenous reductions in production based on the observed changes in sectoral output collected from national production statistics. Yang and Tyers (1999) have shown that if output is reduced because some firms shut down, the quantity of capital that is still in use is determined so long as the remaining firms behave perfectly competitively. That is, there is a one-to-one relationship between profit-maximising output and capital use under such circumstances.

In the medium run, we assume that insolvency and illiquidity problems are resolved, so that all capital stock returns to production and its supply afterwards becomes exogenous. However, capital stock remains sector-specific. Industrial output therefore returns to endogeneity.

There is anecdotal evidence that some urban labour retreated to the countryside following the Crisis. We assume that there is a rise in the productivity of land, but a decline in the productivity of labour. These shocks, together with those to investment and the balance of trade are summarised in Table 1.

Contractions in investment tend to be smaller in the medium run than in the long run. In the medium run, as production bounces back the value of savings will increase from their short run levels. With investment remaining subdued to a large extent, the capital account deficit and trade account surplus tend to increase in the medium run. We assume that this situation is likely to last beyond 1999 and is not entirely transitory. As Krugman (1999) points out, even though the recovery of the crisis economies is inevitable, it will take quite a while before foreign capital returns, and when it returns its share in total investment in these economies is unlikely to be restored to the pre-crisis level. Huge distortions in the capital market had probably already led to rapid diminishing returns prior to the Crisis. In addition, the domestic assets that constituted the collateral enabling much

**Table 1 Shocks to the Asian developing economies in the short run**

	Investment (per cent)	Balance of trade (1995 US\$ billion)	Agricultural labour productivity (per cent)	Land productivity (per cent)
Indonesia	-57.7 (-57.7)	9.4 (12.3)	5	-3
Korea	-43.6 (-37.2)	44.6 (50.3)	5	-3
Malaysia	-14.2 (-14.2)	7.4 (19.1)	3	-2
Thailand	-57.3 (-56.5)	18.8 (24.5)	5	-3
Other ASEAN	-25.9 (-25.9)	10.9 (27.2)	2	-1
Chinese economies	2.3 (2.3)	10.7 (11.1)	0	0

**Note:** Numbers in the parentheses are for the medium run scenario.

**Sources:** International Monetary Fund (1999b) for investment figures; *The Economist* for balance of trade figures; and authors' estimations for productivity changes.

of the earlier investment in Asia have been greatly reduced in value. Although there is evidence that investment in the crisis economies has begun to rise, the effect this might have had in reducing their capital account surplus is probably offset in the current account by a rise in debt service flows (Yang and Tyers 1999).

### Tracing the effects of the Asian Crisis

As discussed in the previous section, the first channel through which the Asian Crisis is transmitted into Australia is the capital account. In the short run, as investment falls in the crisis economies, capital is sent overseas. Real exchange rates depreciate substantially against the rest of the world. In the current account, exports expand, but imports decline, reflecting the effect of reduced domestic absorption (Table 2). Note that in the short run, export expansion is limited for most of the crisis economies, and the current account surplus is achieved mainly through the contraction of imports.<sup>9</sup>

In Australia, as in the rest of the world, there is a real currency appreciation against the crisis economies, but a moderate depreciation against other industrial economies in North America and Europe (Table 3). Changes in the external account in Australia are therefore mirror images of what happens in Asia. Investment increases as the capital account surplus increases. This, of course, is balanced by an enlarged current account deficit. It is important to note that this increase in the current account deficit is attributed to a decline in the price of exports relative to the price of imports. Import volumes, in fact, decline more than export volumes.

In the medium run, this pattern of global redistribution of investment is retained. Notice, however, that capital movement across regions is considerably larger. As production in the crisis economies recovers in the medium run, income bounces back and saving increases much more strongly (or declines to a lesser extent) than in the short run, leading to a larger capital outflow. Export expansion is no longer so much constrained by the

**Table 2 Changes in trade in Australia's trading partners following the Asian recession, 1995 (per cent)**

Destinations/sources	Short run		Medium run	
	Exports	Imports	Exports	Imports
Japan	-5.5	2.7	-5.6	3.2
Korea	12.2	-21.5	31.1	-10.6
Indonesia	-1.3	-21.9	14.1	-12.9
Thailand	1.3	-22.4	16.3	-19.3
Malaysia	1.2	-9.8	16.5	-10.5
Rest of ASEAN	4.4	-3.5	13.3	-6.2
Chinese economies	2.1	-0.9	2.4	-0.5
South Asia	-1.7	1.1	-1.9	1.8
Rest of world	-1.1	0.6	-1.8	1.0

**Source:** Simulation of the GTAP model, database version 4.

contraction of production, and imports contract to a much lesser extent. On balance, this leads to the larger current account surplus observed in the medium run than in the short run (Table 1).

In the short run, GDP in Australia hardly changes following the Asian Crisis (Table 4). Domestic consumption falls slightly, but this is offset by an increase in investment. Measured by equivalent variation, Australia's economic welfare is reduced slightly by the Asian Crisis, largely as a result of a deterioration in its terms of trade. Such a result is not surprising, because declines in import demand in the crisis economies drive down Australia's export prices in the short run, as can be seen in Table 3.

In the medium run, Australia's exports fall further and imports increase, leading to an even larger current account deficit (Table 3). As exports from the crisis economies expand, however, Australia begins to enjoy cheaper imports. At the same time, increased demand for imports in the crisis economies begins to push up the price of Australian exports. Together, these lead to an improvement in Australia's overall terms of trade. This in turn leads to an enhancement of Australia's economic welfare, along with gross domestic product. Real wages increase, as does domestic consumption.

The real depreciation of the Australian dollar against the crisis economies would inevitably lead to the contraction of the more tradable sector and the expansion of the less tradable sector. This, however, does not happen in the short run (Table 5). As mentioned earlier, the substantial reduction in production as a result of under-utilisation of capital in the crisis economies severely restricts their capacity to export. Thus, Australia's imports from these economies decline sharply. As a result, the more heavily traded sector expands relative to the less traded sector (mainly the service sector). There are, however, some variations among the more heavily traded industries, even though most changes are small. Most primary industries contract,<sup>10</sup> the exceptions are cereals, oil seeds, meat and dairy products. The general observation is that less income-elastic commodities and those that are less likely to be intermediate inputs tend to suffer less, or do not suffer at all from the Asian Crisis (See Appendix Table A3 for income elasticities).

**Table 3 Changes in Australia's balance of trade and the real exchange rate following the recession in developing Asia, 1995 (US\$ billion)**

	Short run	Medium run
Trade account		
Exports	-1.7	-1.9
Imports	-1.0	0.4
Balance of trade	-1.0	-2.3
Capital account		
Investment	0.3	2.3
Saving	-0.4	0.0
Capital account balance	-0.7	-2.3
Real exchange rate (per cent) <sup>a</sup>	-6.2 (-1.4)	-8.4 (-0.5)

**Note:** <sup>a</sup> Against the Crisis Economies (Indonesia, Korea, Malaysia, Thailand, other ASEAN economies). Numbers in the parentheses are against the 'rest of the world' (mainly North America and Europe). The change in the real exchange rate is approximated by the per cent change in the ratio of Australia's GDP deflator with the trade weighted averages of the economies in comparison.

**Sources:** IMF (1999b), and model simulations described in the text.

**Table 4 Macroeconomic impact of the Asian Crisis on Australia, 1995 (per cent)**

Economic variable	Short run	Medium run
GDP	0.0	0.0
Equivalent variation (US\$b)	-1.1	0.4
Allocative efficiency	-0.1	0.1
Terms of trade	-1.0	0.3
Real wages	0.1	0.1
Exports	-0.4	-2.0
Imports	-0.7	1.0
Export price	-1.6	-0.2
Import price	-0.4	-0.5
Consumption	-0.3	0.1
Terms of trade	-1.2	0.3
World price effect	-0.7	0.0
Export price effect	-0.6	0.1
Import price effect	0.1	-0.2

**Source:** Simulation of the GTAP model, database version 4.

In the medium run, however, the more heavily traded sector contracts and the less heavily traded sector expands. Furthermore, labour-intensive industries tend to contract more than capital-intensive industries. The services sector, as a less traded sector, benefits from the real appreciation of the Australian currency. All agricultural commodities experience small declines in production, but the output of mineral commodities remains steady. The labour-intensive industries are among the most adversely affected, but, even there, the contraction is not large.

**Table 5 Impact of the Asian Crisis on sectoral output in Australia, 1995 (per cent)**

Industry	Short run	Medium run
Rice and wheat	0.2	0.1
Other grain	0.1	-0.2
Oil seeds	0.0	-0.3
Plant-based fibres	-1.4	1.2
Other crops	-1.2	-0.7
Livestock	-0.2	-0.3
Wool	-0.4	-0.3
Other agriculture	-0.8	-0.3
Mineral energy	-0.2	0.0
Other minerals	-0.1	0.0
Meat and dairy products	0.2	-0.5
Processed rice	-1.0	-0.9
Other food	-0.3	-0.9
Labour-intensive manufactures	1.2	-0.8
Import-competing manufactures	1.1	-0.2
Services	-0.1	0.1

**Source:** Simulation of the GTAP model, database version 4.

To understand why production is so mildly affected by the Asian Crisis, one has to look at how Australia's trade changes in various overseas markets in response to the Asian Crisis. As is evident in Table 6, exports to the crisis economies are severely hampered, but exports to the rest of the world expand considerably, offsetting the loss of exports to the crisis economies to a large extent. This is especially true in the short run, where exports to the Chinese economies and South Asia, as well as those to the 'rest of the world', expand. On the import side, only imports from Korea experience a substantial increase in the short run—increases in imports from most other crisis economies are moderate. Imports from Indonesia even decline due to the severe contraction of domestic production there.

In the medium run, Australia's exports to most crisis economies decline less, with Australia's exports to Malaysia and the 'Rest of ASEAN' declining further. This recovery of exports to the crisis economies is, however, more than offset by the decline in exports to the rest of the world. In fact, exports to Japan, the Chinese economies, and South Asia, decline in the medium run, in contrast to the increases in the short run. In the medium run, as the crisis economies recover their exports expand in the world market, competing with Australian exports.

Turning to sectoral export performance, over half of Australia's primary commodity exports are negatively affected by the Asian Crisis, especially in the short run (Table 7). The most severely affected tend to be primary, income-elastic ones, such as plant-based fibres, vegetables and fruits ('other crops'), livestock, forestry, and fishery ('other agricultural commodities'). Cereals, oil seeds, and meat and dairy products fare quite well.<sup>11</sup> The exports of these commodities increase not only because exports to the crisis

**Table 6 Impact on Australian trade by destination and source, 1995 (per cent)**

Destinations/sources	Short run		Medium run	
	Exports	Imports	Exports	Imports
Japan	1.2	-4.0	-1.3	-3.0
Korea	-20.4	18.4	-6.4	35.8
Indonesia	-16.9	-3.9	-5.0	13.4
Thailand	-18.7	2.2	-18.0	19.0
Malaysia	-8.2	1.1	-13.7	19.6
Rest of ASEAN	-0.4	6.4	-12.3	18.0
Chinese economies	0.6	2.2	-3.3	3.6
South Asia	2.5	-2.3	-0.7	-2.2
Rest of world	4.5	-2.4	1.6	-2.8

**Source:** Simulation of the GTAP model, database version 4

economies fall to a lesser extent, but also because exports to the rest of the world increase (Table 7). As noted earlier, the moderate falls in manufactured exports to the crisis economies are more than offset by the increases in the exports to the non-crisis economies, leading to overall increases in the exports of manufactured exports in the short run.

On the import side, the real depreciation of the currencies of the crisis economies leads to substantial increases in Australia's imports from the region, especially primary commodities, even though they start from very low basis. These increased imports are largely offset by the decline in the imports of manufactured products from the region. In the end, Australia's overall imports from the crisis economies only increased moderately. In contrast, Australia's imports from the rest of the world falls across the board, and this more than offsets the increased imports from the crisis economies, leading to a slight fall in Australia's overall imports in the short run.

In the medium run, most exports of primary commodities to the crisis economies begin to rise, with exceptions of 'other crops', livestock products, meat and dairy products, processed rice and 'other food' (Table 8). The most adversely affected exports are, however, manufactures and services. This is not only because the recovery of domestic production in the crisis economies reduces the need for imports from Australia, but also because recovery inevitably leads to export surges in third country markets. Although Australian currencies depreciate against those in the third markets, currencies of the crisis economies depreciate even more. This erodes Australia's competitiveness in the major markets in North America, Europe and the Chinese economies. As a result, Australia's exports to these markets perform less well in the medium run than in the short run.

In contrast to the short run, imports from the crisis economies increase across the board, and in many industries, especially manufacturing industries, the increases are substantial. Imports from non-crisis economies decline in almost all industries as a response to the real depreciation of Australian currencies, but these declines are not sufficient to compensate for the surge in imports from the crisis economies.

**Table 7 Impact of the Asian Crisis on Australia's trade in primary commodities in the short run, 1995 (per cent)**

	Exports			Imports		
	To crisis economies	To non-crisis economies	Total	From crisis economies	From non-crisis economies	Total
Rice and wheat	-1.6	2.2	0.5	13.6	-0.2	-0.2
Other grain	-5.6	1.4	0.7	18.5	-1.2	-1.2
Oil seeds	-7.0	1.8	1.5	25.5	-0.6	-0.4
Plant-based fibres	-12.8	6.5	-3.4	48.2	-8.0	-0.9
Other crops	-16.9	2.2	-3.5	13.8	-3.7	0.0
Livestock	-21.0	4.2	-2.7	19.6	-1.4	-0.3
Wool	-18.8	1.1	-0.9	26.4	-0.8	-0.8
Other agriculture	-20.3	2.0	-5.6	81.4	-7.7	-2.5
Mineral energy	-12.2	0.6	-1.2	7.1	-2.9	0.1
Other minerals	-11.6	1.0	-0.9	17.9	-1.3	0.6
Meat and dairy products	-9.5	2.5	0.5	19.2	-2.0	0.0
Processed rice	-10.9	-2.3	-2.4	8.1	-4.0	1.9
Other food	-9.0	1.0	-1.1	10.0	-3.3	0.2
Labour-intensive manufactures	-15.0	5.7	0.6	-2.6	-0.6	-0.9
Capital-intensive manufactures	-4.1	4.9	3.0	-2.5	-1.1	-1.2
Services	-24.1	1.0	-1.9	31.3	-4.1	-0.1
Total	-13.3	-2.6	-0.4	6.4	-1.7	-0.7

Source: Simulation of the GTAP model, database version 4.

**Table 8 Impact of the Asian Crisis on Australia's trade in primary commodities in the medium run, 1995 (per cent)**

	Exports			Imports		
	To crisis economies	To non-crisis economies	Total	From crisis economies	From non-crisis economies	Total
Rice and wheat	1.5	0.4	0.9	0.5	-0.4	-0.4
Other grain	2.3	1.1	1.2	13.8	-1.1	-1.1
Oil seeds	5.9	1.8	2.0	-5.1	-0.3	-0.3
Plant-based fibres	8.4	-3.1	2.8	4.4	0.7	1.2
Other crops	-6.8	1.0	-1.3	9.2	-2.8	-0.2
Livestock	-3.4	1.7	0.3	17.8	-1.1	-0.1
Wool	4.2	-0.6	-0.1	6.6	-0.6	-0.6
Other agriculture	1.0	-1.9	-0.9	41.1	-2.3	0.3
Mineral energy	4.2	-0.4	0.3	1.0	-0.2	0.2
Other minerals	6.0	-0.7	0.3	8.0	-0.8	0.1
Meat and dairy products	-8.8	0.8	-0.9	22.0	-1.6	0.6
Processed rice	-19.9	-2.1	-2.4	4.0	-2.3	0.8
Other food	-11.3	-0.6	-2.9	12.1	-2.8	1.1
Labour-intensive manufactures	-17.0	0.6	-3.8	16.4	-1.3	1.0
Capital-intensive manufactures	-11.8	0.6	-2.0	27.6	-2.0	0.6
Services	-19.6	-1.8	-3.3	36.7	-2.9	1.6
Total	-9.7	-0.3	-2.0	21.5	-1.9	1.0

Source: Simulation of the GTAP model, database version 4.

It is worth noting that, in the short run, primary industries bear the brunt of the impact of the Asian contraction in the immediate aftermath of the Crisis. Over time, however, the pressure tends to shift to the manufacturing industries, because the main exports from the crisis economies are manufactured commodities. Australia's export structures which is skewed towards primary commodities therefore alleviates the longer-term impact of the Asian Crisis.

In many cases, Australia's primary exports are also helped by the export expansion of manufacturing industries which use Australian commodities as intermediate inputs. This is evident from the considerable increases in Australasia's exports of plant-based fibres, wool, and mineral commodities to the crisis economies (Tables 7 and 8). This means that agriculture-based processing industries in Australia will face strong competition from the crisis economies as well as industry-based processing industries. Thus, meat and dairy products, processed rice, and the 'other food' category, are likely to recover more slowly in exports.

### **Concluding remarks**

It has been a common assertion that the Asian Crisis would have a severe impact on the Australian economy. Such assertions seem to be supported by the increasing trade deficit in recent months. While this development in the trade account is expected, it does not reflect the total impact of the Asian Crisis on Australia.

There is no doubt that the falling income in the crisis countries has led to declines in the demand for Australian products in the region. In the short run, falling income and real exchange rate depreciation in the crisis economies hurt Australian primary industries most, especially the more income-elastic ones. Widespread plant closures and illiquidity restrict these economies' major exports, most of which are manufactured products. Thus, in the short run, manufacturing industries are more insulated from the impact of the Asian Crisis than primary industries. This also means that import prices do not fall to the same extent as do export prices, resulting a deterioration in Australia's terms of trade and hence economic welfare in the short run, although the latter is negligible.

As the crisis economies recover over time, however, imports from the crisis economies increase substantially in response to the real depreciation of their currencies. This leads to a more favourable terms of trade for Australia. With this, consumer products and capital goods become cheaper, and real income in Australia increases, rather than declines. The contraction in Australia's export sector may be completely offset by the expansion of household consumption and investment. If business confidence in investment remains strong, and consumer confidence is not harmed by the reports of the Crisis, then Australia has a good chance of maintaining strong economic growth, provided the world economy is not dragged into recession by the Crisis.

At the industry level, primary industries that produce more income-elastic commodities tend to be the hardest hit in the short run, while manufacturing industries are protected by the collapse of production in the crisis economies. As these economies begin to recover in the medium run, the tradable sector as a whole will contract. However, some industries within the sector, especially those primary industries that provide inputs to the manufacturing sector in the crisis economies, may well expand in the medium term. For this to occur, the recovery of the crisis economies must be led by strong export expansion following the substantial real depreciation of their currencies. This generates demand for Australia's raw materials, including many agricultural and mineral products. Overall, the contractionary pressure on primary industries will ease over time, while that on manufacturing industries will increase for some time.

The challenge for manufacturing industries is that they have to compete more fiercely in the third country markets with similar products from the crisis countries. While they may have an advantage in the crisis country markets because of the real depreciation of Australian currencies against those of North America, Europe and possibly China, competition from local industries will be strong because of the real depreciation of their currencies against the Australian dollar. Manufactured exports are not as important to Australia as to many other countries. This trade structure, which is often considered less desirable, may alleviate the impact of the Asian Crisis on Australia.

As the Asian crisis economies recover, it is inevitable that their tradable sector will expand, while their nontradable sector will contract relatively. This structural change in the crisis economies necessitates a mirror image change in the Australian economy. In particular, Australia's trade deficit tends to increase and some manufacturing industries will be under renewed pressure. This could be a political as well as an economic problem given Australia's low savings rate, inefficient labour-intensive manufacturing, and the volatility of the Australian dollar in recent months. Having weathered the storm of the Asian Crisis so well, Australia stands to benefit from Asia's recovery if it can maintain macroeconomic stability and avoid protectionist response to a growing trade account deficit.

## Notes

An earlier version of this paper was presented at the Australian Agricultural and Resource Economics Society Symposium 'The Asian Crisis and Australia's Agricultural and Resource Sectors', Sydney, November 1998.

<sup>1</sup> We have excluded Japanese recession in this study in order to focus on the events which has occurred since mid-1997.

<sup>2</sup> Obviously, there is now a vast literature on the causes of the Asian Crisis. The following may interest the reader: McLeod and Garnaut (1998), Kalpana, Loungani and Stone (1998), Radelet and Sachs (1998), Krugman (1998) Corbett and Vines (1998), Goldstein (1998), Corsetti *et al.* (1998) and Wong (1998). For an explanation of how economic vulnerability led to the Thai Crisis, see Warr (1998).

<sup>3</sup> The literature is, however, emerging. See Adams (1998), CIE (1998), Suryahadi (1998), Tyers and Yang (1999) and Yang and Tyers (1999).

<sup>4</sup> These economies include Korea, Indonesia, Malaysia, Thailand, the rest of ASEAN (the Philippines and Singapore).

<sup>5</sup> Readers interested in the details of the model should refer to Hertel (1997) and McDougall *et al.* (1998) for the GTAP theory and database.

<sup>6</sup> By short run, we mean a time period of one year or so, whereas the medium run refers to a time frame of 2-3 years.

<sup>7</sup> This may lead to biases in the evaluation of the income effect of the Asian Crisis as the crisis countries are clearly the host of large foreign investment. The flight of short-term capital precipitated the currency crisis and subsequently the financial crisis.

<sup>8</sup> Agricultural industries are excluded from this screening process. Therefore, all industries that suffer from plant closures are in the industrial sector. Appendix Table A3 reports these industries by country and the extent of production contraction.

<sup>9</sup> Trade balance by industry is reported in Appendix Table A4.

<sup>10</sup> The working definition of primary industries (commodities) here are all but manufacturing and service industries (commodities).

<sup>11</sup> Yang (1998) noted in relation to the impact of the Asian Crisis on China that the initial impact of the Asian Crisis tends to be dominated by the income effect. Over time, the price effect tends to gain dominance as real depreciation of the crisis economy currencies leads to greater price competitiveness.

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## Appendix

**Table A1 Elasticities of substitution**

Commodity	Between domestic goods and imports	Among sources of imports
1 Rice and wheat	2.2	4.4
2 Other grain	2.2	4.4
3 Oil seeds	2.2	4.4
4 Plant-based fibres	2.2	4.4
5 Other crops	2.2	4.4
6 Livestock	2.8	5.6
7 Wool	2.2	4.4
8 Other agricultural products	2.8	5.6
9 Mineral energy	2.8	5.6
10 Other minerals	2.8	5.6
11 Meat and dairy products	2.2	4.4
12 Processed rice	2.2	4.4
13 Other food	2.2	4.4
14 Labour-intensive manufactures	3.1	6.1
15 Import-competing manufactures	2.7	5.9
16 Services	2.0	3.8

**Source:** GTAP database, version 4.

**Table A2 Short-run output contractions in the Crisis economies (per cent)**

	Korea	Indonesia	Thailand	Malaysia
Mineral energy	-12.4	-2.1	-3.7	n.a.
Other minerals	-12.4	-4.7	-5.3	n.a.
Labour-intensive manufactures	-15.8	-15.9	-13.6	-7.7
Import-competing manufactures	-12.3	-19.7	-16.5	-11.8
Services	-10.2	-22.6	-11.9	-0.8

**Note:** n.a. Not applicable as output in these industries is endogenous.

**Sources:** National statistics websites

Indonesia: <http://www.bps.go.id/statbysector/natres/gdp/tables.shtml>,

Malaysia: <http://www.bnm.gov.my/pub/msb/199904/>, Korea: <http://www.bok.or.kobank/owa/>,

Thailand: <http://www.nesdb.go.th/>

**Table A3 Income elasticities by region and commodity**

Commodity	Australia	Japan	Korea	Indonesia	Thailand	Malaysia	Other ASEAN	China	South Asia	Rest of world
1 Rice and wheat	0.14	0.16	0.18	0.41	0.08	0.18	0.36	0.42	0.31	0.47
2 Other grain	0.14	0.16	0.18	0.41	0.08	0.18	0.21	0.40	0.30	0.29
3 Oil seeds	0.14	0.36	0.57	0.66	0.53	0.57	0.44	0.63	0.74	0.53
4 Plant-based fibres	0.27	0.36	0.57	0.66	0.53	0.57	0.65	0.40	0.75	0.59
5 Other crops	0.20	0.36	0.57	0.66	0.53	0.57	0.55	0.83	0.74	0.42
6 Livestock	0.22	0.69	0.64	0.77	0.33	0.35	0.57	1.06	0.67	0.42
7 Wool	0.85	0.84	0.87	0.83	0.79	0.88	0.83	0.95	0.87	0.87
8 Other agricultural products	0.24	0.36	0.71	0.70	1.05	0.59	0.68	0.80	1.32	0.81
9 Mineral energy	1.00	0.99	1.05	1.02	0.95	1.05	1.06	1.11	1.08	0.98
10 Other minerals	1.12	1.09	1.28	1.39	1.14	1.22	1.38	1.15	1.64	1.28
11 Meat and diary products	0.16	0.66	0.64	0.8	0.39	0.36	0.59	0.69	0.66	0.27
12 Processed rice	0.15	0.16	0.18	0.41	0.08	0.18	0.21	0.34	0.39	0.26
13 Other food	0.18	0.36	0.57	0.66	0.53	0.57	0.57	0.71	0.74	0.35
14 Labour-intensive manufactures	1.01	0.98	1.06	1.08	0.95	1.09	0.99	1.06	0.98	1.05
15 Import-competing manufactures	1.07	1.01	1.15	1.18	1.12	1.18	1.25	1.17	1.49	1.14
16 Services	1.08	1.11	1.24	1.31	1.12	1.17	1.22	1.10	1.42	1.08

**Source:** GTAP database, version 4.

**Table A4 Changes in trade balance in the crisis economies by industry, 1995 (US\$ million)**

Industries	Korea	Indonesia	Thailand	Malaysia	Other ASEAN
1 Rice and wheat	17	-9	12	31	1
2 Other grain	126	18	3	19	2
3 Oil seeds	59	26	3	15	1
4 Plant-based fibres	133	219	115	6	0
5 Other crops	938	612	81	316	133
6 Livestock	400	60	20	23	17
7 Wool	71	0	13	3	1
8 Other agricultural products	471	381	-23	161	10
9 Mineral energy	2,584	322	380	86	345
10 Other minerals	314	501	-23	118	11
11 Meat and diary products	396	167	120	133	50
12 Processed rice	19	144	20	18	-5
13 Other food	1,318	783	256	401	201
14 Labour-intensive manufactures	9,598	3,859	12,205	932	5,196
15 Import-competing manufactures	4,509	388	3389	651	1,202
16 Services	23,648	1,928	2229	4,487	3,734

**Source:** Simulation of the GTAP model, database version 4.