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Economic Growth, Comparative Advantage and Agricultural Trade of Pacific Rim Countries

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While agriculture's contribution to national output and employment tends to decline with economic growth, its contribution to exports need not. Neoclassical theory suggests that a country's comparative advantage in agriculture depends on its endowment of agricultural land relative to mineral resources and nonfarm capital, compared with endowment ratios in other countries. Over time, a country's agricultural comparative advantage will decline faster, the faster its mineral extraction, its growth in nonfarm capital per worker and its rates of nonfarm relative to farm technological change, again compared with other countries. Empirical support for this theory is provided by evidence from the diverse set of economies on the Pacific rim. The paper concludes with a discussion of likely future trends in comparative advantage and agricultural trade of Pacific rim countries, particularly Australia.

Introduction

What happens to the agricultural trade situation of a country as its economy grows? As with all interesting economic questions, the answer is: it depends. We know agriculture's contributions to employment and output tend to decline with economic growth. However, the correlation between per capita income and agriculture's contribution to exports is considerably weaker, with numerous high-income countries continuing to dominate world agricultural markets.[1] The purpose of the first section of the paper is to give a brief nontechnical guide to the determinants of a growing country's changing agricultural trade situation. The second and main section discusses the actual changes that have taken place over the past two decades in the major countries on both sides of the Pacific Ocean. The final section points to some implications of these developments, and of possible policy responses to them, for closer economic integration among countries on the Pacific rim. The paper concludes with a brief discussion of the implications for Australia in particular.

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[1] In 1977, the correlation coefficients between per capita income (a rough index of stage of economic development) and agriculture's contributions to employment, national product and exports were −.71, −.69 and −.52 respectively, using a sample of 72 countries for which data were available. The value of agricultural exports from developing countries in 1977–79 was about half that from industrial countries. More than one-quarter of the world's agricultural exports in those years came from the four high-income countries of Australasia and North America alone.

Determinants of a Country's Agricultural Trade Situation

According to neoclassical trade theory, a country's comparative advantage is determined primarily by its resource endowment ratios relative to those ratios in the rest of the world[2]. For present purposes it is sufficient to think initially of there being three sets of resources, labour, capital and agricultural land, and two productive sectors, agriculture and manufacturing. The agricultural sector requires labour and land while the manufacturing sector requires labour and capital. (See below for the case where farmers also use capital.) In this model, at a given set of international prices, the wage rate is determined by the overall per worker endowment of land (adjusted for quality differences) and capital (defined broadly to include human skills and technological knowledge), with labour being allocated between the two sectors according to the ratio of land to capital.

A country with little capital relative to land will export agricultural products in exchange for manufactures. As capital is accumulated (or flows in from abroad), labour will tend to be attracted to the manufacturing sector which will expand relative to the agricultural sector. Hence the country will gradually switch from exporting agricultural goods to exporting manufactures if international prices remain unchanged. This transformation will begin at a lower level of capital per worker, and the manufactures initially produced will be more labour intensive, the lower the country's land endowment per worker. Over time, with further increases in the per worker endowment of capital, comparative advantage within the agricultural and manufacturing sectors will shift towards more capital-intensive industries unless it is possible for industries initially using labour-intensive techniques to switch to more capital-intensive techniques.

The conclusion that a country well endowed with land per worker will begin manufacturing at a later stage of capital accumulation per worker, and will specialise in manufacturing less than densely-populated countries, is strengthened if a mining sector is added to the model. However, comparative advantage in agriculture will be less in this expanded model, the extent of which will depend on the country's mineral reserves relative to agricultural land. The above conclusion is further strengthened if allowance is made for the fact that primary production also requires capital. This is partly because as capital becomes available some of it will be used in primary production rather than manufacturing, but also because the possibility of substituting capital for land and/or labour in rural production increases the scope for slowing the rate of decline in comparative advantage in agriculture. In addition, the conclusion that countries tend to switch from being net primary exporters to net exporters of manufactures as capital accumulates is stronger when the model recognises that many primary products are inputs into manufacturing so that domestic demand for them expands with manufacturing output. A further necessary complication to the model is the addition of a nontradables sector, call it services. As incomes rise the demand for services also rises, so labour and capital are drawn out of tradable sectors. Since agriculture is the major employer

[2] This brief, non-technical section is based on a number of more detailed analyses. including Krueger (1977), Anderson (1980), Garnaut and Anderson (1980) and Anderson and Smith (1981).

of labour at early stages of development, most of the labour needed in service industries will come from farms. This will add to the tendency for agriculture's output and employment shares to decline with economic growth. In advanced industrial countries where manufacturing is the major tradable sector employer, on the other hand, extra resources for services will be drawn predominantly from manufacturing. Thus for high-income countries the industrial as well as agricultural shares of output and employment are likely to decline with further domestic income growth.

While domestic economic growth, capital accumulation and industrialisation tend to weaken a developing country's specialization in primary products, similar changes in the rest of the world tend to have the opposite effect insofar as they result in an increased demand and hence terms of trade improvement for primary products. The extent of improvement in prices of primary products relative to manufactures will be greater, the more that overseas growth is concentrated in large and/or resource-poor countries. Should the growth be concentrated in higher-wage countries, it would also improve the relative price of labour-intensive manufactures. Similarly with technological improvements. If farm production technologies improve more slowly at home than abroad for example, domestic comparative advantage in agriculture will decline, as it will if manufacturing technologies improve more rapidly at home than abroad, *ceteris paribus.*

The above economic forces are of course often modified by government policies, particularly trade policy. There seems to be a community preference in a number of countries for a more 'balanced', less specialized economy than would occur under free market conditions, particularly in countries with extreme factor endowment ratios. Thus countries at an early stage of development, and even resource-rich, high-income countries, often tax primary exports and/or provide import restrictions to protect the import-competing manufacturing sector. On the other hand, densely-populated industrializing countries may, for food security reasons, have a community preference for steadily raising assistance to the declining agricultural sector so as to slow the pace of decline in food self-sufficiency. Lobbying pressure from rural groups add to the government's incentive to provide such assistance. Similar vested interest group pressures exist for protection of declining labour-intensive manufacturing industries in advanced industrial countries.[3] The resulting distortions to incentives will tend to reduce the extent of, but usually not alter the directions of trade specialization discussed above.[4] Since it is politically easier to assist import-competing industries than export industries, *ceteris paribus* (because import and export taxes raise government revenue whereas export subsidies

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[3] See Anderson and Baldwin (1981) for a discussion of the politico-economic reasons for expecting these pressures to influence policy outcomes.

[4] Nonetheless, government policy may affect comparative advantage to some extent through public investments in technology production and diffusion. Expenditure on agricultural research and extension, for example, may be given low political priority in poor, food-surplus countries but given prominance in wealthier, food-deficit countries seeking to reduce the growth in food import dependance. As a result. farmers in the latter type of country are likely to be closer to the frontier of available technologies than those in countries neglecting such public expenditure.

drain the treasury), the structure of imports is likely to be less revealing of a country's comparative advantage than the structure of exports. Because of this, the empirical discussion in the next section will concentrate mainly on export trade.

To sum up, the above discussion suggests that at a point in time, a country's comparative advantage in agriculture will tend to be less, the lower its per worker endowment of agricultural land relative to mineral reserves and capital compared with that in the rest of the world. Over time in the course of economic growth in this and other countries, this country's comparative advantage (and shares of output and employment) in agriculture will decline faster the faster its increase in capital per worker and its mineral extraction, and the slower its rate of agricultural relative to other technological change, again compared with those rates in other countries.

Experience of Pacific Rim Countries

How well can the above discussion shed light on recent changes in comparative advantage and agricultural trade of Pacific rim countries? For present purposes the Pacific rim is defined to include the Americas, East Asia and Australasia. To keep the number of countries manageable, data are presented for only the eight largest Latin American countries. Also excluded are the centrally planned economies of Indo–China and North Korea, and the many Pacific island economies, because of their very minor participation in world trade. The Pacific rim countries currently account for half the world's agricultural exports and almost a third of the world's agricultural imports.

Table 1 provides some crude proxies for relative resource endowments of Pacific rim countries. Gross National Product (GNP) per capita can probably serve as an index of capital per worker, while an index of natural resource endowments (especially agricultural land) per worker is given by land area per capita. It is clear from column (7) of the Table that most of East Asia is extremely densely populated compared with the rest of the world (which has an average of more than 3 hectares per person), and especially with North and South America and Australasia. This suggests East Asia, especially Japan and the four Asian NICs (the newly-industrializing countries of South Korea, Taiwan, Singapore and Hong Kong), can be expected to have a strong comparative disadvantage in agriculture relative to other countries with similar per capita income levels. The opposite would be expected of Australia and most of North and South America. Column (4) of Table 1 suggests that East Asia is also distinguished by extremely rapid growth over the past two decades in incomes and hence capital: labour ratios. By contrast, incomes in Australasia and the Americas (except Brazil and Ecuador) have grown at well below the average of 4.0 per cent per year for middle- and high-income countries.[5] The other major area of rapid post-war economic growth, namely Western Europe, is also extremely densely populated. Thus the resource-rich countries on the Pacific rim would have experienced a slower decline in comparative advantage

[5] Many economists would argue that the high economic growth in East Asia as compared with Latin America or South Asia can be attributed in part to the relatively high degree of openness of these economies, as shown in columns (5) and (6) of Table 2. See, for example, Krueger (1978) and Balassa (1982).

Table 1: Population, National Product, Land Endowment and Agricultural Trade, Pacific Rim Countries, 1979

	Population (million)	GNP (US$ billion)	GNP per capita		Ratio of exports to GNP (%)		Land endowment per capita (ha)			World agricultural export (import) share (%)	Net agricultural exports (US$ million p.a.)	Net food exports per capita (US$ p.a.)
			US$	Real growth rate (% p.a.)			Total	Arable and Permanent crop	Permanent pasture			
	1979 (1)	1979 (2)	1979 (3)	1960–79 (4)	1960 (5)	1979 (6)	1979 (7)	1979 (8)	1979 (9)	1977–79 (10)	1977–79 (11)	1976–78 (12)
Developed Pacific Countries—												
Australia	14	131	9 100	2.8	15	19	53.51	2.97	31.09	3.5 (.4)	4 509	244
Canada	24	228	9 650	3.5	18	28	42.12	1.87	1.00	2.8 (2.0)	1 072	28
Japan	116	1 019	8 800	9.4	11	12	.32	.04	.00	.3 (7.4)	−13 533	−62
New Zealand	3	19	5 940	1.9	23	27	8.31	.14	4.25	1.4 (.1)	2 191	352
United States	220	2 377	10 820	2.4	5	9	4.26	.87	1.10	17.5 (8.3)	14 631	26
Developing East Asia—												
China	965	219*a*	260	n.a.	4	6	.99	.10	.23	1.5 (2.4)	−1 930	−0
Hong Kong	5	19	4 000	7.0	82	98*a*	.02	.00	.00	.3 (1.2)	−1 898	−248
Indonesia	139	52	380	4.1	13	30	1.37	.12	.09	1.1 (.6)	743	−0
Korea, Rep.	37	56	1 500	7.1	30	30	.26	.06	.00	.3 (1.1)	−1 608	−19
Malaysia	14	18	1 320	4.0	54	58	2.41	.48	.00	1.7 (.5)	2 012	−30
Philippines	47	28	600	2.6	11	19	.64	.17	.02	.9 (.2)	1 152	10
Singapore	2	9	3 820	7.4	163	187	.02	.00	.00	.6 (.7)	−366	−15
Taiwan	17	24*a*	1 400*a*	6.6	11	59*a*	.21	.05	.00	.9 (1.1)	−900	n.a.
Thailand	45	27	590	4.6	17	23	1.13	.38	.01	1.4 (.2)	2 057	35
Developing Latin America—												
Argentina	26	61	2 280	2.4	10	13	10.35	1.31	5.36	2.7 (.2)	4 376	102
Brazil	123	207	1 690	4.8	15	7	6.93	.33	1.17	4.0 (.8)	5 395	36
Chile	11	18	1 690	1.2	4	23	6.94	.53	1.09	.1 (.2)	−266	−14
Columbia	26	26	1 010	3.0	16	18	4.36	.21	.67	1.3 (.2)	2 004	62
Ecuador	8	8	1 050	4.3	17	24	3.51	.32	.32	.4 (.1)	574	63
Mexico	68	108	1 590	2.7	10	12	2.91	.34	1.10	.9 (.5)	591	10
Peru	17	13	730	1.7	20	27	7.43	.20	1.57	.2 (.2)	77	0
Venezuela	14	45	3 130	2.7	32	31	6.33	.37	1.17	.1 (.7)	−1 194	−52

a 1978.

n.a. Not available.

Sources: World Bank, *World Development Report* and *World Bank Atlas*, Washington, D.C., 1981; Food and Agriculture Organization, *Production Yearbook* and *Trade Yearbook*, Rome, 1979.

in primary products while the resource-poor, newly-industrializing countries would have enjoyed a rapidly growing comparative advantage in labour-intensive manufactures. The emergence of OPEC-induced energy price rises in the 1970's would have reduced the comparative advantage in agriculture in those countries well endowed with energy reserves per capita but increased it for those not so well endowed with energy.

Table 2 confirms that agriculture's shares of production and employment have declined over the past two decades in Pacific rim countries, with industry's shares growing in the low- and middle-income countries but falling in the high-income countries. The extent of intersectoral change is especially rapid in the fastest growing East Asian countries.

Table 3 shows the changing export structure of each country as well as its 'revealed' comparative advantage. The latter is defined as the ratio of a particular commodity group's share in a country's exports to that commodity group's share of world exports. The more a ratio exceeds (is less than) unity, the stronger a country's apparent comparative advantage (disadvantage) in that commodity group.[6] The ratios in columns (7) to (9) of Table 3 confirm the major expectations discussed above. Japan clearly has a strong and increasing comparative disadvantage in food vis-a-vis manufacturing, whereas the resource-rich developed countries have maintained a strong comparative advantage in food despite increases (from a low base) in their manufacturing comparative advantage. The four Asian NICs, like Japan, have also increased very rapidly their comparative disadvantage in food vis-a-vis manufacturing. The picture is mixed for other Southeast Asian countries: Thailand and the Philippines have retained their strong comparative advantage in food; Malaysia has increased its comparative advantage in food at the expense of fuels, minerals and metals (though since 1977 it may have declined again with the expansion in fuel and timber exports from East Malaysia); and Indonesia has reduced its comparative advantage in food as petroleum exports have expanded. Among the East Asian countries, only Thailand and the Philippines enjoy a greater comparative advantage in food than developing countries as a whole. Conversely, all except Indonesia and Malaysia currently enjoy a greater comparative advantage in manufactures than developing countries as a whole, and all have experienced rapid rises in manufacturing export shares. By contrast, among the large Latin American countries, all have a strong comparative advantage in food except Chile and Venezuela, the latter two having a very strong comparative advantage in fuels, minerals and metals. Mexico's moderate comparative advantage in food and greater than average (for developing countries) comparative advantage in manufactures is to be expected, given its relatively high population density

[6] This concept of comparative advantage is incomplete because it does not capture the extent to which a country is an importer of particular commodities. However, since the structure of imports is often distorted because of intersectoral differences in import restrictions, a misleading impression would be given if imports were to be also considered. The concept of 'revealed' comparative advantage is due to Balassa (1965).

Table 2: Changing Structure of Production and Employment, Pacific Rim Countries, 1960 to 1979
(per cent)

	Distribution of GDP						Distribution of Labour Force						Real Production Growth Rate (%p.a.)					
	Agriculture		Industry		Services		Agriculture		Industry		Services		Agriculture		Industry		Services	
	1960	1979	1960	1979	1960	1979	1960	1979	1960	1979	1960	1979	'60–70	'70–79	'60–70	'70–79	'60–70	'70–79
Developed Pacific Countries—																		
Australia	12	n.a.	37	n.a.	51	n.a.	11	6	40	33	49	61	2.7	n.a.	4.6	n.a.	4.0	n.a.
Canada	6	4	34	33	60	63	13	5	35	29	52	66	2.5	2.2	6.8	3.5	5.5	4.7
Japan	13	5	45	42	42	13	33	13	30	38	37	49	4.0	1.1*	10.9	5.6	11.7	4.9
New Zealand	n.a.	11	n.a.	31	n.a.	58	15	9	37	35	48	56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States	4	3	38	34	58	63	7	2	36	32	57	66	0.3	0.9	5.2	2.7	4.3	3.4
Developing East Asia—																		
China	n.a.	31	n.a.	47	n.a.	22	n.a.	71	n.a.	17	n.a.	12	1.6	3.2	11.2	8.7	3.1	3.7
Hong Kong	4	1	34	n.a.	62	n.a.	8	3	52	57	40	40	n.a.	−11.0	n.a.	4.3	n.a.	10.1
Indonesia	54	30	14	33	32	37	75	59	8	12	17	29	2.7	3.6	5.2	11.3	4.8	9.2
Korea, Rep.	37	20	20	39	43	41	66	36	9	30	25	34	4.4	4.8	17.2	16.5	8.9	8.8
Malaysia	37	24	18	33	45	43	63	51	12	16	25	33	n.a.	5.0	n.a.	9.9	n.a.	8.4
Philippines	26	24	28	35	46	41	61	47	15	17	24	36	4.3	4.9	6.0	8.4	5.2	5.4
Singapore	4	2	18	36	78	62	8	2	23	38	69	60	5.0	1.7	12.5	8.6	7.7	8.5
Taiwan	28	10*	29	48*	43	42*	56	37*	11	37*	33	26*	3.4	1.6*	16.4	12.9	7.8	4.1
Thailand	40	26	19	28	41	46	84	77	4	9	12	14	5.5	5.4	11.6	10.4	9.0	7.7
Developing Latin America—																		
Argentina	16	13	38	46	46	41	20	13	36	28	44	59	2.2	2.5	5.9	2.4	3.4	2.5
Brazil	16	11	35	38	49	51	52	40	15	22	33	38	n.a.	5.0	n.a.	9.6	n.a.	8.7
Chile	11	8*	38	37	51	55	30	20	20	20	50	60	2.6	3.5	5.0	0.3	4.5	2.8
Columbia	34	29	26	28	40	43	51	27	19	21	30	52	3.5	4.8	6.0	5.0	5.7	7.2
Ecuador	33	15	19	37	48	48	57	52	19	18	24	30	n.a.	0.7	n.a.	13.4	n.a.	8.6
Mexico	16	10	19	38	55	52	55	37	20	26	25	37	3.8	2.2	9.1	6.4	6.9	4.7
Peru	10	18	33	43	49	47	53	38	19	20	28	42	3.7	0.1	5.0	3.7	5.3	3.6
Venezuela	6	6	22	47	72	47	35	19	22	27	43	54	5.8	3.8	4.6	3.1	7.3	7.2
All Industrial Market Economies	6	4	40	37	54	59	16	6	39	38	45	56	1.3	.09	6.2	3.2	4.8	3.4
All Middle-Income Countries	22	14	30	38	47	48	58	43	17	23	25	34	3.6	3.0	7.4	6.5	5.5	6.0
All Low-Income Countries	51	34	17	36	32	30	76	71	10	14	14	15	2.5	2.0	6.6	4.2	3.8	4.5

* 1978.
Source: World Bank, *World Development Report*, Washington, D.C., 1981.

Table 3: Changing Export Structure and 'Revealed' Comparative Advantage, Pacific Rim Countries, 1960 to 1979

		Sectoral Share of Total Merchandise Exports (per cent)						'Revealed' Comparative Advantage [g]		
		Cereals (Including feedstuffs) [a] (1)	Livestock Products [b] (2)	Total Food [c] (3)	Nonfood Agriculture [d] (4)	Fuels, Minerals and Metals [e] (5)	Manufactures [f] (6)	Food [c] (7)	Fuels, Minerals and Metals [e] (8)	Manufactures [f] (9)
Developed Pacific Countries—										
Australia	1960	12	13	39	40	10	11	2.2	.5	.2
	1970	11	13	33	18	27	21	2.3	1.7	.3
	1979	13	14	33	13	28	26	2.8	1.1	.4
Canada	1960	11	2	21	16	30	33	1.2	1.5	.6
	1970	6	1	12	10	26	51	.8	1.6	.8
	1979	5	1	11	12	25	52	.9	1.0	.9
Japan	1960	..	..	7	3	1	88	.4	.1	1.6
	1970	1	..	4	2	2	93	.3	.1	1.5
	1979	..	..	1	1	1	97	.1	.0	1.6
New Zealand	1960	..	52	55	42	..	3	3.2	0	.1
	1970	1	53	58	28	1	12	4.0	.1	.2
	1979	1	38	46	28	6	20	3.9	.2	.3
United States	1960	10	1	21	6	8	65	1.2	.4	1.2
	1970	8	1	16	5	9	70	1.1	.6	1.1
	1979	12	1	19	5	7	69	1.6	.3	1.2
Developing East Asia—										
China	1968	..	..	91	9	..	..	..	..	..
	1978	..	..	..	38	13	49	..	.6	.8
Hong Kong	1960	1	..	11	4	2	83	.6	.1	1.5
	1970	..	..	4	2	2	93	.3	.1	1.5
	1979	..	..	3	2	2	93	.3	.1	1.6
Indonesia	1960	1	..	17	46	37	..	1.0	1.8	..
	1970	2	..	20	35	44	1	1.4	2.7	..
	1979	1	..	10	18	69	3	.8	2.8	.1
Korea, Rep.	1960	12	2	40	16	24	19	2.3	1.2	.4
	1970	..	..	10	7	7	77	.7	.4	1.2
	1979	..	..	8	2	1	89	.7	..	1.5

Table 3: *Changing Export Structure and 'Revealed' Comparative Advantage, Pacific Rim Countries,* 1960 *to* 1979—continued

		Sectoral Share of Total Merchandise Exports (per cent)						'Revealed' Comparative Advantage [g]		
		Cereals Including feedstuffs) [a] (1)	Livestock Products [b] (2)	Total Food [c] (3)	Nonfood Agriculture [d] (4)	Fuels, Minerals and Metals [e] (6)	Manufactures [f] (6)	Foodl Food [c] (7)	Fuels, Minerals and Metals [e] (8)	Manufacture [f] (9)
Malaysia	1960..	..	..	10	54	30	5	.6	1.5	.1
	1970..	1	13	48	29	10	.9	1.8	.2	
	1977..	..	19	39	27	15	1.5	1.1	.3	
Philippines	1960..	..	60	26	10	5	3.4	.5	.1	
	1970..	6	..	44	26	23	8	3.0	1.4	.1
	1978..	3	..	44	8	14	34	3.5	.7	.5
Singapore	1960..	..	..	18	34	18	30	1.0	.9	.6
	1970..	3	1	16	28	25	31	1.1	1.5	.5
	1979..	1	..	8	14	26	52	.7	1.1	.9
Taiwan	1960..	..	..	45	6	3	46	2.6	.2	.9
	1970..	..	..	19	3	2	76	1.3	.1	1.2
	1977..	..	..	12	1	2	85	1.0	.1	1.4
Thailand	1960..	38	3	53	34	9	4	3.0	.5	.1
	1970..	31	1	51	24	15	11	3.5	.9	.2
	1978..	20	1	51	12	11	26	4.1	.5	.4
Developing Latin America—										
Argentina	1960..	29	26	72	23	2	3	4.1	.1	.1
	1970..	36	25	74	11	1	14	5.1	.1	.2
	1977..	25	13	65	7	1	27	5.2	..	.4
Brazil	1960..	..	..	71	16	9	3	4.1	.5	.1
	1970..	8	4	63	12	11	14	4.3	.7	.2
	1979..	9	2	47	42	11	36	3.9	.5	.6
Chile	1960..	..	..	7	3	87	3	.4	4.4	.1
	1970..	..	..	5	3	88	4	.3	5.4	.1
	1977..	5	..	14	8	67	6	1.1	2.8	.1
Columbia	1960..	..	..	77	4	15	3	4.4	.8	.1
	1970..	1	6	75	6	11	8	5.1	.7	.1
	1977..	1	4	71	6	4	19	5.6	.2	.3

Table 3: Changing Export Structure and 'Revealed' Comparative Advantage, Pacific Rim Countries, 1960 to 1979—continued

		Sectoral Share of Total Merchandise Exports (per cent)						'Revealed' Comparative Advantage [g]		
		Cereals (Including feedstuffs) [a] (1)	Livestock Products [b] (2)	Total Food [c] (3)	Nonfood Agriculture [d] (4)	Fuels, Minerals and Metals [e] (5)	Manufactures [f] (6)	Food [c] (7)	Fuels, Minerals and Metals [e] (8)	Manufactures [f] (9)
Ecuador	1960..	..	..	3	..	96	1	..	2	5.5	..	..
	1970..	..	..	37	..	94	3	1	2	6.4	.1	..
	1977..	..	..	35	..	46	2	50	2	3.7	2.1	..
Mexico	1960..	..	..	3	5	36	24	24	16	2.1	1.2	.3
	1970..	..	..	14	9	40	9	19	32	2.7	1.2	.5
	1977..	..	..	..	3	33	6	32	29	2.6	.13	.5
Peru	1960..	..	..	..	..	38	21	41	1	2.2	2.1	..
	1970..	..	..	..	..	44	6	49	1	3.0	3.0	..
	1977..	..	..	..	..	37	8	47	8	2.9	2.0	.1
Venezuela	1960..	..	..	..	..	1	..	93	6	.1	4.7	.1
	1970..	..	..	..	..	2	..	97	1	.1	6.0	..
	1977..	..	..	..	..	1	..	97	2	.1	4.1	..
Industrial Market Economies—												
	1960..	..	..	..	..	15	8	10	68	.9	.5	1.3
	1970..	..	..	3	..	12	5	9	74	.8	.6	1.2
	1978..	..	..	3	..	12	4	8	76	.9	.4	1.2
Developing Countries—												
	1960..	..	..	..	..	36	18	31	15	2.1	1.6	.3
	1970..	..	..	3	..	26	10	44	17	1.8	2.7	.3
	1978..	..	..	2	..	16	5	57	22	1.3	2.7	.4
World—												
	1960..	..	..	..	..	17	9	20	54	1.0	1.0	1.0
	1970..	..	..	2	..	15	6	16	63	1.0	1.0	1.0
	1977..	..	..	2	..	12	4	24	60	1.0	1.0	1.0
	1978..	..	..	2	..	13	4	21	62	1.0	1.0	1.0
	1979..	..	..	2	..	12	4	24	60	1.0	1.0	1.0

[a] SITC 04,081,221.4.
[b] SITC 00 to 02 (excludes inedible products).
[c] SITC 0, 1, 22, 4.
[d] SITC 2 excluding 22, 27, 28.
[e] SITC 27, 28, 3, 68.
[f] SITC 5 to 9 excluding 68.
[g] Defined as ratio of share of commodity group in a country's exports to that commodity group's share of world exports.
Sources: World Bank, *World Tables*, Washington, D.C., 1980, and *World Development Report*, Washington D.C., 1981; United Nations, *Yearbook of International Trade Statistics*, New York, various issues; Food and Agriculture Organization, *Trade Yearbook*, Rome, various issues.

by Latin American standards and also its large petroleum export surplus. Latin American comparative advantage in manufacturing has apparently increased in the 1970s only in Argentina, Brazil and Columbia, but from a low base and at a much slower pace than in the resource-poor Asian NICs.

There are also marked differences between Pacific rim countries in their structures of comparative advantage within agriculture. Cereals, for example, are major primary export items for Australia, Canada and the United States among the high-income countries but are of export significance only to Thailand and Argentina among the region's major developing countries. Livestock exports are even more highly concentrated, primarily in Australia, New Zealand and Argentina (columns (1) and (2) of Table 3). This picture is what might be expected given the extreme per capita endowments of arable and pasture land in these countries, as shown in columns (8) and (9) of Table 1. Many food-surplus countries of the region are net cereal importers because much of their arable land is used for apparently more profitable cash crops. Table 4 shows that coffee is the prime agricultural export of six of the eight large Latin American countries, while timber, rubber and sugar rather than food staples feature prominantly in Southeast Asian agricultural exports. This pattern persists despite the fact that in many of these countries the export-oriented cash crops are subject to considerably more taxation than food staples.

As incomes rise in developing countries, the demand for livestock products and fruit and vegetables tends to rise by at least the same proportion while the demand for staples rises much more slowly. Fruit and vegetable production and intensive livestock production (pork, chicken, eggs) require relatively little land per dollar of output. Fresh fruit and vegetables, in addition, often enjoy natural protection from foreign competition because of their perishable nature, as does fluid milk.[7] Thus countries facing a declining comparative advantage in agriculture in general may nonetheless be able to profitably switch some farm resources into these activities. While this would reduce the need to import these items, it is likely that a large-scale expansion in intensive livestock production would necessitate increased dependence on imported feedgrains. In Northeast Asia, for example, exactly these types of changes have occurred, as is clear from Table 5: the shares of livestock products and fruit and vegetables in the gross value of agricultural production have increased substantially at the expense of cereals over the past 25 years, and self-sufficiency of intensive livestock products has been maintained at close to 100 per cent while that of feedstuffs, especially corn and soybean, has fallen dramatically (as it has for wheat and for beef to a lesser extent). Similar trends have also occurred in other countries. Mexico in particular has expanded its production of fruit and vegetables to satisfy not only domestic demand growth but also growing United States import demand. In this case production is occurring close to the land border and the lower labour costs in Mexico provide it with a considerable comparative advantage over the United States in producing these relatively labour-intensive foods.

[7] Canned, dried and frozen fruit and vegetables and powdered and UHT vacuum-packed fluid milk are of course close substitutes for the fresh product and can be traded internationally. The c.i.f. price of imports of such substitutes would thus determine the ceiling on domestic prices of the fresh products in the absence of import restrictions.

Table 4: Major Commodity Shares of Agricultural [a] Exports, Pacific Rim Countries, 1977–79

	Agricultural Share of Total Trade (%):		Share of Agricultural Exports from:
	Exports	Imports	
Developed Pacific Countries—			
Australia	42	10	Wool 26%, Beef 20%, Wheat 20%.
Canada	28	10	Timber 21%, Oils and fats 17%, Wheat 13%.
Japan	2	27	.....
New Zealand	71	8	Wool 26%, Dairy products 19%, Sheepmeat 17%.
United States	24	14	Maize 16%, Soybean 15%, Wheat 12%.
Developing East Asia—			
Hong Kong	5	21	.....
Indonesia	25	20	Timber 40%, Rubber 24%, Coffee 18%.
Korea, Rep.	11	19	Fish products 41%, Fruit and vegetables 8%.
Malaysia	52	19	Rubber 26%, Timber 23%, Oil palm 16%.
Philippines	51	9	Coconut product 39%, Sugar 16%, Timber 14%.
Singapore	13	13	.....
Taiwan	11	16	Fish products 20%, Canned food 17%, Sugar 7%.
Thailand	63	8	Rice 24%, Rubber 16%, Sugar 10%.
Developing Latin America—			
Argentina	73	10	Maize 12%, Beef 10%, Wheat 9%.
Brazil	55	12	Coffee 28%, Cocoa 6%, Sugar 6%.
Chile	22	16	Fish meal 18%, Timber 13%.
Columbia	80	12	Coffee 79%, Cotton 4%, Bananas 3%.
Ecuador	48	10	Coffee 31%, Bananas 22%, Cocoa 6%.
Mexico	32	16	Coffee 24%, Fruit and vegetables 23%, Cotton 14%.
Peru	27	16	Coffee 33%, Fish meal 30%, Sugar 9%.
Venezuela	1	14	Coffee 35%, Cocoa 34%.

[a] SITC 0, 1, 2, 4 excluding 27, 28 (that is, including forestry and fishery products).

Sources:

World Bank, *Commodity Trade and Price Trends*, Washington, D.C., 1981;
United Nations, *Yearbook of International Trade Statistics*, New York, 1980;
Food and Agriculture Organization, *Trade Yearbook*, Rome, 1979.

Table 5: Commodity Composition of Agricultural Production and Self-Sufficiency Ratios, Japan, Korea and Taiwan, 1955 to 1979 (per cent)

	Share of Gross Value of Agric. Production [a]				Self-sufficiency Ratios [b]							
	Cereals	Live-stock products	Fruit and vege-tables	Other	Wheat	Maize	Soybean	Beef	Pork	Chicken	Eggs	Milk products
Japan—												
1955–59	58	12	17	13	37	15	34	95	100	100	100	91
1960–64	50	18	20	12	33	4	20	97	99	99	100	87
1965–69	46	20	21	13	20	1	8	94	98	96	99	85
1970–74	37	25	26	12	7	0	4	77	93	96	98	86
1975–79	38	26	26	10	5	0	4	73	87	95	97	85
Korea, Rep.—												
1955–59	na	na	na	na	38	54	82	100	100	100	100	100
1960–64	78	7	6	9	28	22	89	100	100	100	100	100
1965–69	60	13	13	14	21	40	94	100	100	100	100	100
1970–74	57	14	15	14	9	15	81	99	102	100	100	100
1975–79	53	16	22	11	3	6	66	78	99	100	100	95
Taiwan—												
1955–59	56	20	7	17	13	60	29	100	100	100	100	22
1960–64	55	22	9	14	11	83	29	100	102	100	100	20
1965–69	46	26	13	15	6	24	20	100	101	100	100	18
1970–74	39	33	18	10	..	5	9	88	104	100	101	17
1975–79	34	36	20	10	..	5	5	45	105	100	101	16

[a] Valued at current domestic prices.

[b] Production divided by production plus net imports minus change in stocks, expressed as a percentage.

na Not available.

Source: Australian National University's agricultural trade data tapes, based on official government publications.

Future Prospects and Implications for Australia

Overall, the trade trends in Pacific rim countries are consistent with the theory of changing comparative advantage. This is so despite the fact that numerous price and trade policies in various countries tend to distort the patterns of production and trade from those which would emerge if free market prices operated. Northeast Asia, for example, has had a dramatic transformation of its food trade situation in spite of extremely large increases in farm price supports and protection from food imports (see Table 6). Other developing countries, especially those relying increasingly on imports of food staples, are also raising incentives to domestic producers of staples relative to other agricultural products.[8] Thus many of the recent trends in food production and trade in the region might be expected to continue over the next decade or so, assuming relative economic growth rates continue as in the recent past. Japan and the four Asian NICs will become ever-larger importers of wheat and feedgrains as well as tropical agricultural products. The extent of increase in their imports of rice, beef and dairy products, however, will hinge crucially on the rate of increase in protection of domestic producers of these commodities. The continuing industrial growth in Southeast Asia and parts of Latin America is likely to further reduce these countries' comparative advantage in agriculture. The resource export boom expected in a number of resource-rich Pacific rim countries once the world economy comes out of recession will weaken agricultural comparative advantage in these countries. The extent to which North America and Australasia can retain their strong comparative advantage in agriculture will also depend on their rates of farm relative to nonfarm technological advance compared with those rates in the rest of the world. In all countries, including those able to maintain their comparative advantage in agriculture, agriculture's share of national production and employment are likely to continue to decline as incomes rise because of the required expansion of the service sector. However, these declines will be more marked in the newly-industrializing countries where the relative importance of the manufacturing sector is still expanding.

Table 6: *Estimated Nominal Rates of Agricultural Protection*[a], *Japan, Korea and Taiwan* 1955 *to* 1980 (*per cent*)

	1955–59	1960–64	1965–69	1970–74	1975–79	1980-82
Japan	44	68	87	110	147	151
Korea, Rep. ..	−15	−5	9	55	129	166
Taiwan	−21	2	2	17	36	55

[a] The nominal rate is the percentage by which the domestic price exceeds the border price. The above estimates are the weighted averages for grains, soybean and meats. Weights are are based on domestic production valued at border prices. The producer rather than wholesale price was used as the domestic price for grains and soybean (to compute the producer price subsidies), which underestimates the rate of protection by the producer-to-wholesale marketing margin.

Sources: Saxon and Anderson (1982), Anderson (1981, 1983) and Shei and Anderson (1983).

[8] Three examples discussed in recent papers are Columbia (Garcia Garcia 1981), Malaysia (Wells and Meyanathan 1982) and Mexico (Meissner 1981).

In the light of the conclusions that the agricultural sector of each economy will decline in relative and possibly absolute terms and that, for most countries, comparative advantage in agricultural trade will also decline, what policy responses might be forthcoming? It is clear that Northeast Asia has chosen a defensive policy approach of increasingly raising agricultural protection to slow the decline in food self-sufficiency and the pace of adjustment that would be required if free market forces operated. The prime objectives of this approach are to maintain farm family incomes at levels close to the rapidly-rising incomes of urban families and to slow the deterioration in perceived food security.[9] Other rapidly-industrializing countries may well take a similar approach as their farmers lose competitiveness, following the examples not just of Northeast Asia but the majority of advanced industrial countries.[10] There may well be politico-economic reasons why such a trend, from taxing to subsidizing agriculture in the course of economic development, is inevitable. Even so, it may be possible to reduce the extent of increase in agricultural protectionism by adopting more positive policy approaches. Many countries underinvest in rural education and in agricultural research. Future public expenditure in these areas may not only boost economic growth but also facilitate adjustment by farmers to changing economic circumstances: better education will help those farmers leaving the land to obtain jobs in the nonfarm sector, while it together with appropriate production and diffusion of new farm technologies will help the remaining farmers to profitably alter their farm input and output mixes.

The underlying political forces that tend to lead to increases in agricultural protection as an economy grows are not well understood. They may simply be narrowly-focused vested rural interest group pressures aimed at preserving the status quo for farmers. But insofar as there is in addition a genuine concern by society that food security is important and is synonomous with food self-sufficiency, there may be scope for reducing this source of protectionist pressure if societies can be convinced that the two are *not* synonomous. A change of attitude may require a greater use of institutional arrangements to decrease the risk associated with depending more on food imports. Arrangements that come to mind are long-term contracts, futures markets and the possibility of borrowing from the IMF in times of high world prices or low domestic yields. In addition, restraint by major food exporters in the use of food trade as a foreign policy instrument would reduce the insecurity of depending on imports.

Scope may also exist for reducing agricultural protection in a context of Pacific regional trade liberalization negotiations, Regional trade bargaining would be facilitated by the high regional shares of each Pacific rim country's trade. Negotiations could aim to liberalize trade, or to seek assurances that there would be no further increases in protection, in not only food items but also

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[9] Japan and Korea appear to have more than succeeded in the first of these objectives. According to official statistics, the ratio of farm household incomes to urban wage and salary earners' household incomes have moved as follows during the past 25 years:

	1955–59	1960–64	1965–69	1970–74	1975–79
Japan	.90	.86	1.00	1.10	1.17
Korea, Rep. ..	.77	.90	.74	.84	.97

[10] For cross-sectional evidence on the extent of agricultural protection in developed countries, see Bale and Lutz (1981). Time series evidence is provided in Gulbrandsen and Lindback (1973) and Yeats (1981).

those processed primary products and manufactures in which Pacific rim countries are the major suppliers to the region. Concessions could then be given on a most-favoured-nation basis but with the selection of commodities ensuring that the opportunities provided for export expansion would be available mainly to participants in the regional trade negotiations. In this way each country's vested interests in export expansion would be brought into conflict with, and so help to offset, vested interests in protection. And an international agreement involving reciprocal assurances on market access and supply would reduce concerns in each country that trade-dependent growth and food security might be undermined at some future time by changes in trade policies abroad. The formation of a Pacific community organization aimed at building trust and sharing perspectives on international economic policy issues among the countries of the region might be an important first step in moving towards such negotiations.[11]

Finally, what are the implications for Australia in particular? One of the main determinants of Australia's agricultural comparative advantage in the 1980's will be the timing and magnitude of developments in the mining sector. Should a large boom in resource investment and exports occur following world economic recovery, an appreciation of the Australian dollar would be likely with consequent negative effects on the comparative advantage of other tradable sectors including agriculture, *ceteris paribus* (Corden 1982). But the same world economic recovery is likely to boost industrialization in Japan and developing East Asia, so reducing comparative advantage in agriculture there too. The extent to which this is reflected in increased agricultural imports from Australia depends not only on the above-mentioned protectionist policies of these countries but also on Australia's own protection policies. This is because, at least in Northeast Asia, bilateral trade imbalances have become an issue in trade negotiations. In recent years Japan has given way to pressure from the United States to reduce the U.S.-Japan trade imbalance by liberalizing its food imports. But it has done this in a way which benefits the United States largely at the expense of Australia (with whom it has a large bilateral trade deficit): between 1976 and 1981, the share of Japan's agricultural imports from the United States rose from little more than twice to almost four times Australia's share. [12] Korea and China also have expressed concern at their trade deficits with Australia, which they attribute largely to Australia's barriers to labour-intensive manufactures. In an environment where multilateral trade negotiations seem for the moment to be replaced by bilateral discussions, Australia may need to be prepared to reduce its manufacturing protection if it is to retain its agricultural markets in East Asia.[13]

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[11] One set of recent high-level discussions about such an organization is reported in Crawford (1981).

[12] Australia's share of Japan's agricultural imports fell from 13.3 to 8.7 per cent between 1976 and 1981, while the U.S. share rose from 29 to 38 per cent (George 1983).

[13] For further discussion of Australia's trade prospects with East Asia, see Anderson and Garnaut (1983).

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