Effects of Trade and Exchange Rate Policies on Pacific Island Agriculture[1]

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Prices received by agricultural producers are affected both directly and indirectly by government activities. Direct government interventions include price controls, the imposition of export taxes or quotas and the establishment of monopsonistic marketing boards. Indirect impacts occur when, for instance, measures such as import tariffs are introduced to protect industry and foster import substitution, and through the mechanism of the exchange rate. Overvaluation of the exchange rate causes exports to be more expensive relative to imports, thereby discouraging the domestic production of tradeables and weakening the trade position. Overvaluation may occur as a direct result of exchange rate policy (e.g. the 'hard kina' strategy of Papua New Guinea), or it may be caused by large inflows of foreign exchange, e.g. through aid and remittances.

The intention in this paper is to present some preliminary evidence concerning the impacts of international economic relations on the agricultural sectors of selected South Pacific island nations (Fiji, Tonga, Solomon Islands and Western Samoa). The research reported here is still in its early stages and the analyses are best regarded as exploratory - identifying relationships and testing the applicability of methods used by previous authors.

A brief review of trade and exchange rate policies in the four countries is provided in section 2. In section 3, relationships between the real exchange rate (RER), the trade balance and agricultural performance are discussed. Then an attempt is made to estimate the 'overall trade bias' and the 'incidence' of trade and exchange rate

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policies on agriculture (section 4). The paper concludes in section 5 with a discussion and identification of areas for further research.

2 TRADE AND EXCHANGE RATE POLICY IN THE SOUTH PACIFIC

2.1 Tonga

2.1.1 Trade and trade policy

Tonga is a small, open economy, heavily dependent on aid and remittance transfers. Its main exports are agricultural commodities, particularly coconut products, bananas and vanilla; there is also a limited export of labour-intensive manufactured goods. The main imports are food, manufactured goods, machinery, transport equipment and fuel. Australia, New Zealand and the United States are the major trading partners.

The Tongan balance of trade has deteriorated steadily since its last surplus in 1960. During the period of the first development plan (DPI) (1966-70), export receipts were sufficient to finance nearly 67 per cent of imports; by DPIII (1975-80) this had fallen to 26.6 per cent and by 1987 the figure was below 14 per cent (Central Planning Department 1987, Statistics Department 1988). However, the balance of payments frequently shows a small surplus as a result of large private and official transfers (remittances and aid).

Taxes on foreign trade constitute a significant proportion of the government budget - about half of total recurrent revenue during fiscal year 1987/88. Port and service tax is levied at the rate of 17.5 per cent, while the import duty rate ranges from 15 to 25 per cent for most dutiable items.

A comprehensive incentives package is in place for the industrial sector.[3] It includes reduced port and service tax and a two-year exemption from payment of duty on capital goods imports, and duty exemption for imported inputs into products which are subsequently exported. Income tax incentives and generous conditions regarding overseas repatriation of funds are also offered.

Agriculture is afforded a degree of protection by the application of tariffs to products which can be produced locally. In addition, the importation of eggs is controlled by licences which are only granted if there is a shortfall in domestic production. Agricultural inputs are generally granted exemption from import charges, including port and service tax. Taxes on agricultural exports were abolished in 1975 and income tax concessions for agricultural exporters were introduced in 1983.

Until recently, most export marketing was controlled by the Commodities Board. It had sole trading rights in copra and other coconut products and operated a copra price stabilisation scheme. It also issued licences to private exporters of vanilla and (until 1978) sundry produce. A price stabilisation scheme for sundry produce operated for a short time in the early 1980s, but 'administrative difficulties' led to its failure.[4] The participation of cooperative organisations and the private sector in export marketing has been growing in recent years, particularly since the operations of the Commodities Board were curtailed in the late 1980s due to financial difficulties.

2.1.2 Exchange rates

Between 1976 and 1991, the Tongan pa'anga was tied to the Australian dollar (A$) at par. Movements in the nominal exchange rates of the pa'anga against the New Zealand dollar (NZ$) and the United States dollar

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[3] Some commercial farmers are also eligible for these incentives, following legislation introduced in the late 1980s.

[4] Elected grower representatives on the Board insisted that prices be set so high that the fund was quickly exhausted.

(US$) are shown in Figure 2.1, along with movements in the consumer price index (CPI). The pa'anga/NZ$ rate has been somewhat volatile over time, but the trend was generally upward until 1984 and declining thereafter. Imports have a weight of 60 per cent in the Tongan CPI, and over 35 per cent of imports originate in New Zealand, so the nominal depreciation in the mid-1980s was a major cause of a local inflation rate of around 20 per cent in 1985 and 1986. Trends in the real exchange rate are described in section 3 below.

Following the establishment of the National Reserve Bank in 1989, the link between the pa'anga and the A$ was finally severed in favour of a basket of currencies of major trading partners dominated by the NZ$. It was hoped that this would help to offset some of the inflationary pressures previously caused by movements in the A$/NZ$ exchange rate.

2.2 Fiji

2.2.1 Trade and trade policy

Fijian exports are heavily dominated by sugar and molasses, while machinery, manufactured goods and fuel account for a large proportion of imports. The United Kingdom, Australia and the European Community (EC) are the main export destinations, while imports come predominantly from Australia, New Zealand and Japan.

The balance of trade tends to be in deficit, but its exact level depends largely on the fortunes of the world sugar market. The shortfall in the current account is partially offset by tourism earnings. Capital inflows generally take the form of concessional loans tied to particular projects.

Fijian trade policy until the mid-1980s was based on import-substitution, with manufacturing enterprises protected by a confusing array of import tariffs and licensing restrictions. In total, the system resulted in 'a pronounced bias against export industries ... [and] ...in some cases, ... low or negative value added' (Browne with Scott 1989,

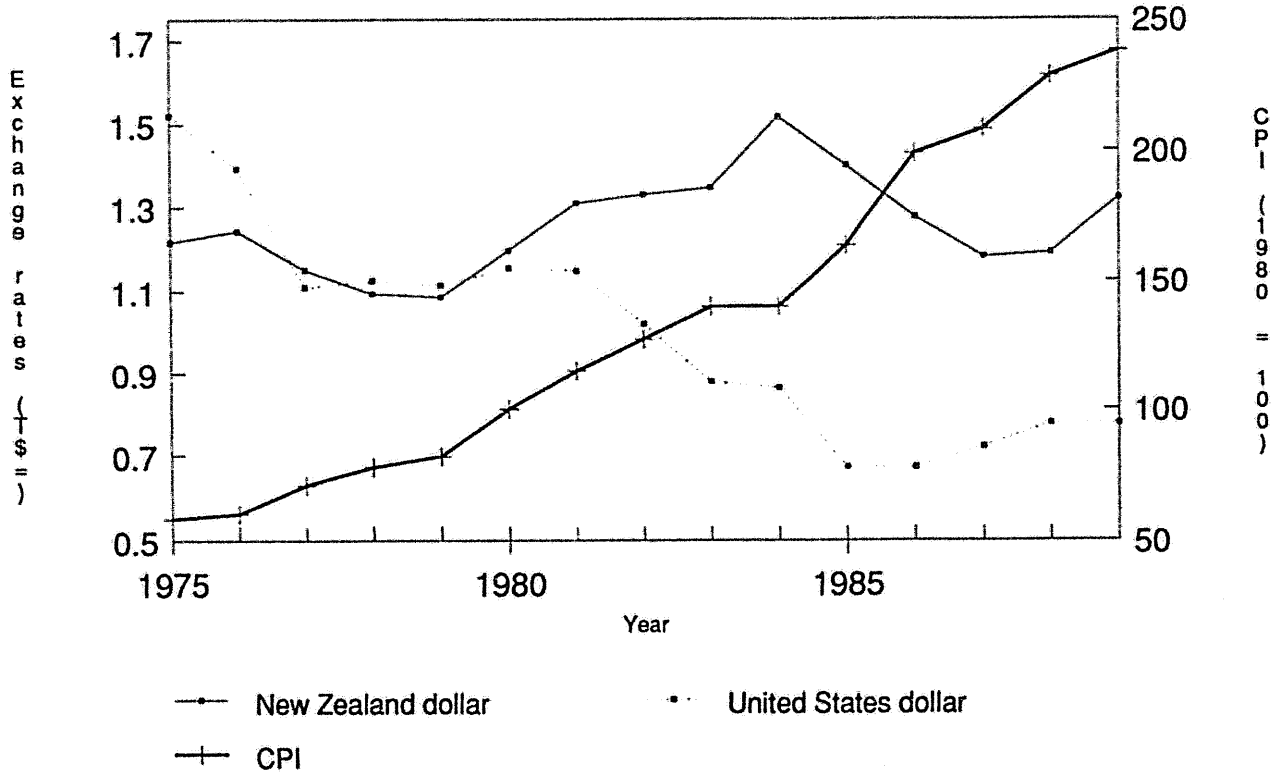

Figure 2.1 Exchange Rates and CPI, Tonga, 1975-89.

p. 35). Taxes on international transactions provided 23-30 per cent of total government revenue over the 1975-87 period.

There was a pronounced change in policy direction in the wake of the 1987 coups, with moves to foster export orientation and deregulate the economy. Import quotas were replaced by high tariffs (mostly 50 per cent, to be reduced within five years), and certain existing tariffs were lowered. Exports of manufactures were promoted by new tax concessions established in 1988. Export-oriented factories (selling less than five per cent of their output in Fiji) are now exempt from import duties on all equipment and materials and do not have to pay tax on their profits for 13 years. By mid-1990, about a hundred factories were taking advantage of these concessions, producing exports valued at F$75 million (compared to around F$200 million for sugar). However, most of the goods produced have a high import content, and the net value added in Fiji is estimated to be just 10-15 per cent of gross exports (Cole, Cotterell, Dorrance and Weisman 1990, p. 4).

Prices received by agricultural producers are controlled to some extent by government, through the Fiji Sugar Corporation (FSC) and the Copra Price Stabilisation Scheme. Sugar cultivation is undertaken by smallholders, but the FSC arranges harvesting, transportation, milling and marketing. Long-term contracts with the EC ensure a stable price for much of the output, but some is also sold on the volatile world market. The FSC retains approximately 30 per cent of the profits and distributes the remainder between the growers (Browne with Scott 1989, p. 34).

2.2.2 Exchange rates

The Fijian dollar is linked to a basket of currencies of major trading partners: Australia, New Zealand, United Kingdom, United States and Japan. The weight of each currency is determined by its share in visible trade, tourism and debt servicing (Luckett 1987, p. 94). Fluctuations in nominal exchange rates and the CPI are shown in Figure 2.2.

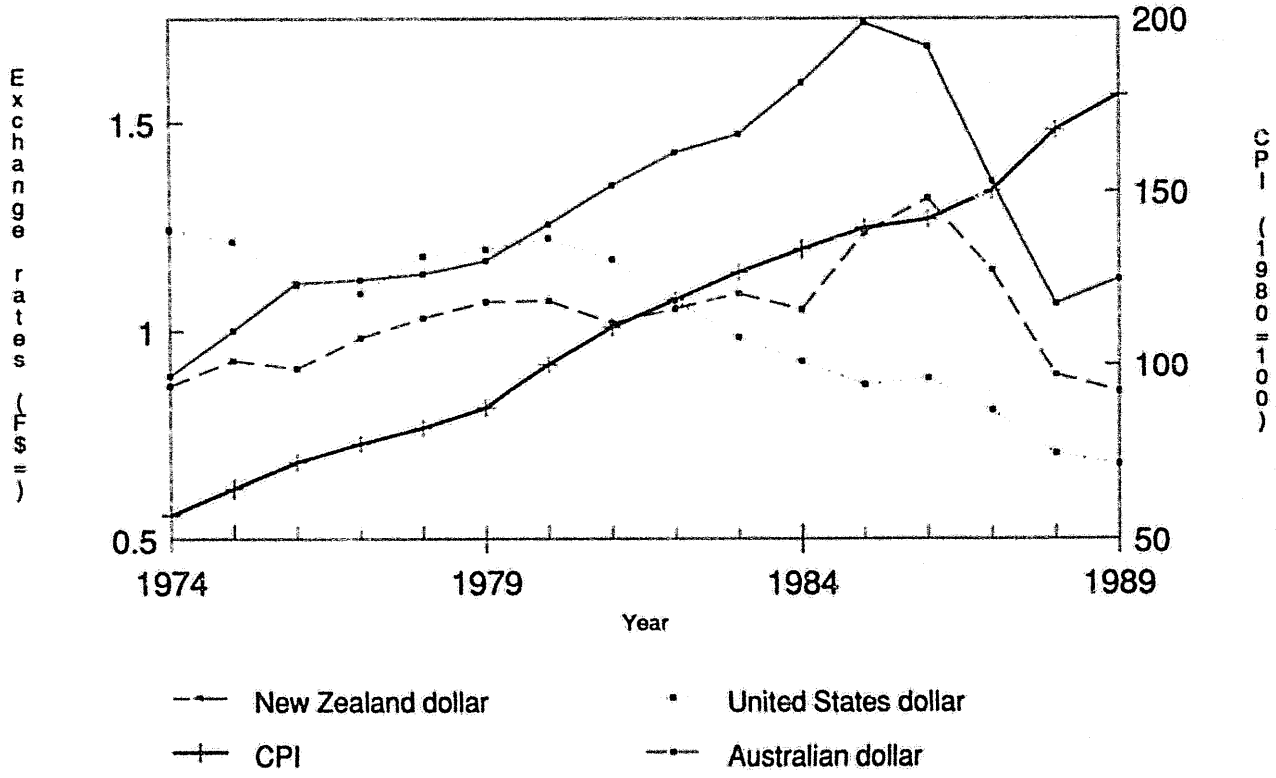

Figure 2.2 Exchange Rates and CPI, Fiji, 1974-89.

Prior to 1986, exchange rate policy was constrained by the system of wage fixing, whereby workers received full compensation for CPI increases brought about largely through higher import prices (Browne with Scott 1989). Wage fixing guidelines took no account of the decline in export income brought about by deteriorating terms of trade, declining productivity and unfavourable climatic factors such as cyclones and drought. This changed in 1985-86, with an economy-wide wage freeze followed by the introduction of a new set of wage guidelines. Whereas the real effective exchange rate had been kept virtually static during 1983-84 (by making periodic small adjustments in the nominal rate), in 1985-86 there was a gradual depreciation of about 15 per cent.

The coup in May 1987 prompted a surge of foreign exchange outflows. Attempts to control this through a tightening of credit policies had limited success, and the Fiji dollar was devalued, first by 18 per cent in June, then by a further 15 per cent in October. Foreign exchange dealings were also severely restricted.

2.3 Western Samoa

2.3.1 Trade and trade policy

The major export commodities of Western Samoa are coconut products, cocoa, bananas and taro. New Zealand, Germany and Australia are the main export markets, while imports came predominantly from New Zealand, Australia and Japan. Falling commodity prices and massive destruction caused by Cyclone Ofa in 1990 have contributed to a sharp decline in export earnings in recent years. However, deficits in the balance of trade are generally more than offset by private remittances and aid, resulting in an overall balance of payments surplus.

Import duties provide a large proportion of central government revenue (over 40 per cent in 1990) and account for over half of total tax revenue. Some income is also obtained from levies on exports and foreign exchange transactions. Duty rates were revised during 1983-85 to give more uniform rates of effective protection to import-competing enterprises. Other measures to support industrial development were

introduced via the Enterprise Incentives and Export Promotions Act, which provides for fiscal incentives such as tax concessions. Import duties on raw materials were reduced from 42 to 35 per cent in 1990.

Agricultural development has been give a boost by measures introduced in the 1990 budget statement. These include the elimination of (a) import duties on agricultural machinery and inputs and (b) all export taxes and stabilisation scheme levies (stabilisation schemes for cocoa and copra were established in 1982). Moreover, government involvement in agricultural production and marketing is being greatly reduced. The Western Samoa Trust Estates Corporation (WSTEC) is being privatised, and the Copra Board, Cocoa Board and Produce Marketing Division (which have been described as 'the principal cause of slow export growth' (Asia Pacific Economics Group 1991, p. 162)) have been dismantled.

2.3.2 Exchange rates

The Western Samoan currency, the tala, is tied to a basket of currencies of its major trading partners. Western Samoa pursued an active exchange rate policy during the 1970s in order to improve export performance. However, supporting policies to restrict domestic demand were not introduced. Therefore, as is evident from Figure 2.3, nominal depreciations led merely to price and wage increases, which meant that the real exchange rate changed little or even appreciated. The pattern was finally broken in mid-1984 with a slowing of the inflation rate to seven per cent in spite of a twelve per cent depreciation. International competitiveness gradually improved, assisted by increases in world commodity prices. Although the latter had declined again by 1986-87, the external position was strong enough to avoid the need for further depreciations. However, the inflation rate soared again as a result of domestic food shortages following the cyclone in early 1990.

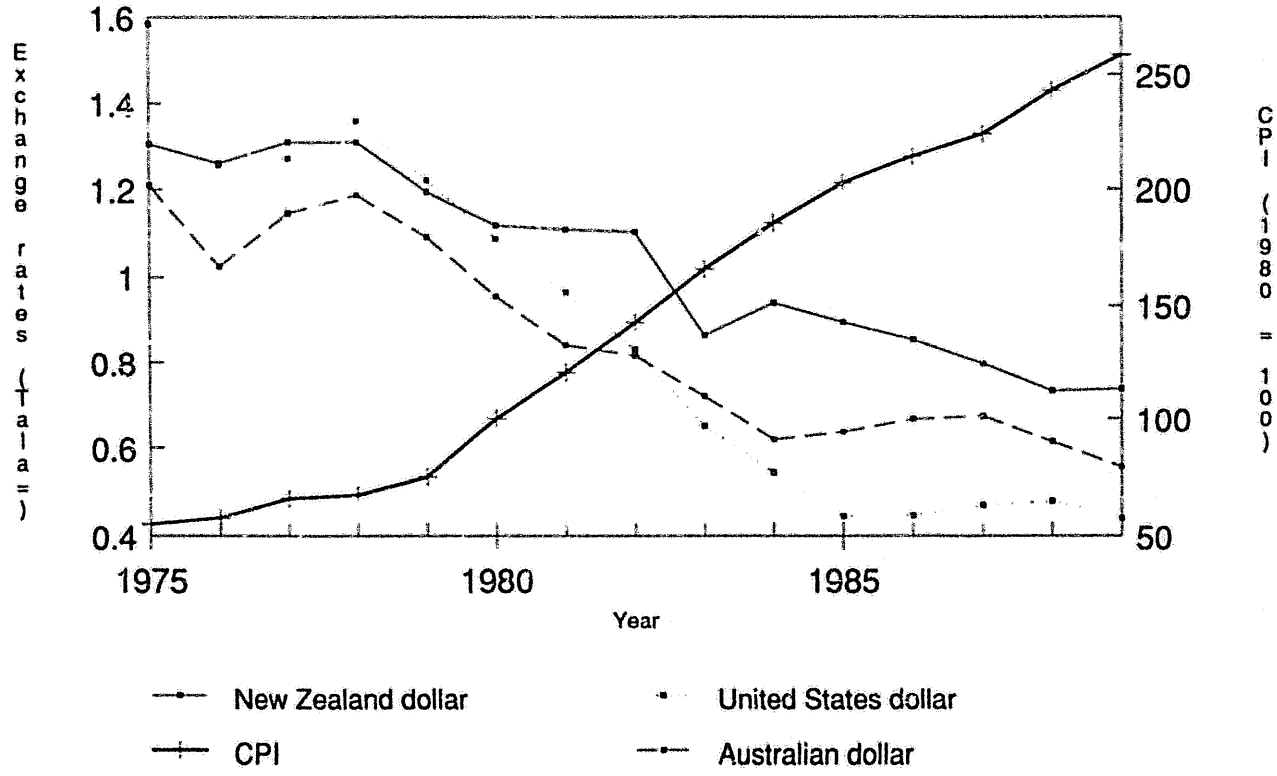

Figure 2.3 Exchange Rates and CPI, Western Samoa, 1975-89.

2.4 Solomon Islands

2.4.1 Trade and trade policy

Unlike many of its small island neighbours, Solomon Islands managed, until recently, to maintain its trade approximately in balance. However, the devastation of Cyclone Namu in 1986 and strong import growth thereafter have led to a widening trade deficit in recent years.

Japan and the EC are the main export markets, while Australia and Japan are the major suppliers of imports. The main export commodities are fish, timber, copra and palm oil. These are produced through large-scale joint ventures with foreign enterprises. Copra is also grown by smallholders, with marketing controlled by the Commodity Export Marketing Board.

Taxes on international transactions increased in importance during the 1980s, providing 43 per cent of central government revenue in 1980 and 56 per cent in 1987. Import duties now account for the greater part of this income: 80 per cent in 1987, compared with 55 per cent in 1980. Non-oil import duties were increased by 20 per cent in 1981 and increased further in 1982 and 1986. The fishing industry was accorded some assistance in 1986, following the disruption of Cyclone Namu, with a reduction in export taxes and reduced import duties on fuel and other inputs.

2.4.2 Exchange rates

The Solomon Islands dollar was introduced in 1977, replacing the A$ which had previously been used as the domestic currency. The exchange rate is determined in relation to a basket of trading partner currencies. Initially, it was maintained at parity with the A$, until it was appreciated by five per cent in 1979 in an attempt to offset inflationary pressures caused by high import prices. However, a deterioration in the country's external position forced a nominal depreciation of six per cent in 1981. This failed to achieve a real depreciation because domestic inflation rose (Figure 2.4). A further nominal depreciation of 10 per cent (on a trade-weighted basis) took place in 1982, followed by another

depreciation in 1983. There was a brief respite in 1984, due to a strong improvement in the terms of trade. However, between 1985 and 1987, further depreciations totalling about 30 per cent in real terms were deemed necessary.

3. EFFECTS OF EXCHANGE RATES ON TRADE BALANCE AND agricultural PERFORMANCE

The above description of exchange rate experience in the four Pacific islands suggests that there is unlikely to be any simple relationship between the exchange rate and the performance of the agricultural sector. Government attempts to alter relative prices are frequently thwarted by events outside their control, such as declining international commodity prices and devastating cyclones. Moreover, nominal depreciations have little effect unless simultaneous measures are taken to control inflation.

The offsetting effects of inflation can be accounted for by using a real exchange rate (RER) measure for analytical purposes. Several variations exist for computation of the RER (Helmers 1988a). Probably the most commonly used is:

$$(3.1) \qquad RER = (E_n/P_d)/(US\$1/P_w)$$

where E_n is the nominal exchange rate (domestic currency units per US$),

P_d is the domestic CPI and

P_w is the US wholesale price index. This index is comprised largely of tradeable goods and therefore is an accepted proxy for international prices.

'Simply put, the real exchange rate is the price in real terms of a real dollar a country uses for its international transactions'. A slight variant of the above formula is a trade-weighted RER, which reflects 'the competitive position of the country with regard to its main trading partners' (Helmers 1988a, p. 395).

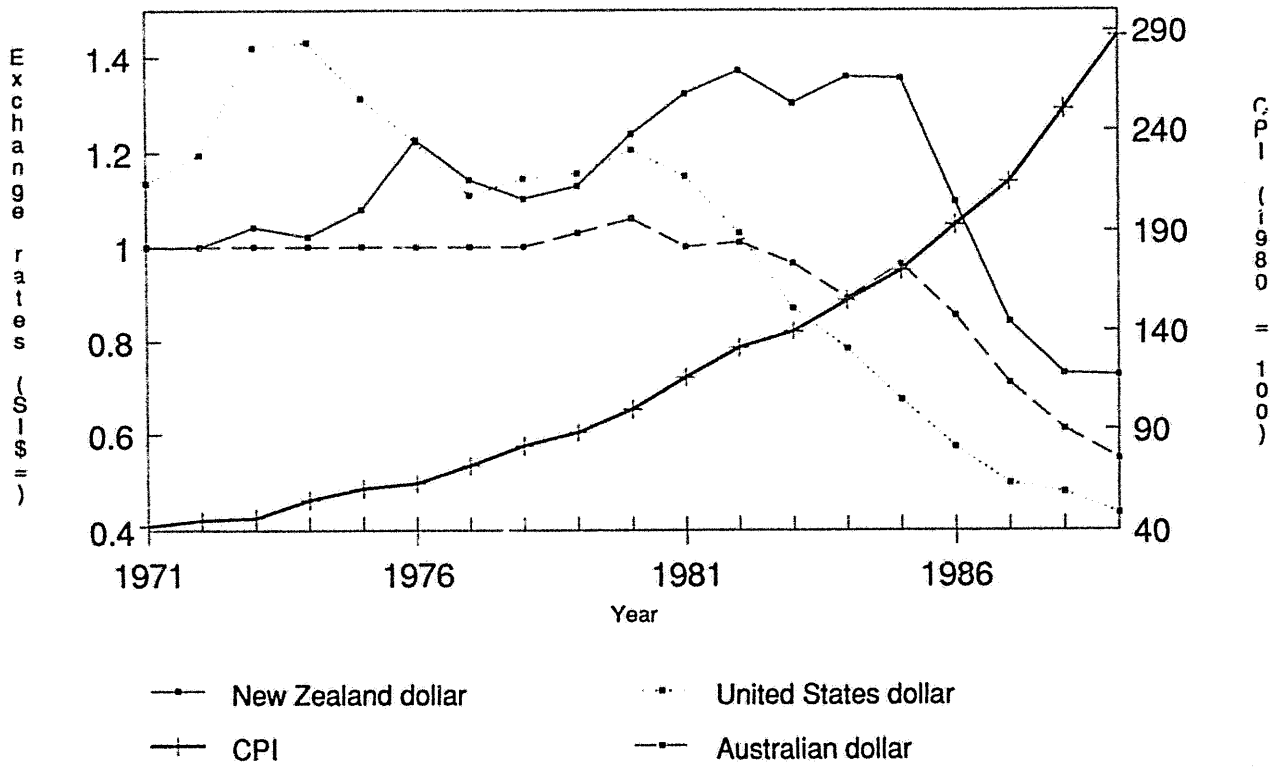

Figure 2.4 Exchange Rates and CPI, Solomon Islands, 1971-89.

3.1 RER and Trade Balance

Helmers (1988b, p. 27) has demonstrated graphically the relationship between the RER and the real trade balance in five countries: Argentina, Brazil, Indonesia, Korea and Mexico. Similar comparisons for the four South Pacific countries are shown in Figure 3.1 (using the US$-based RER of equation 3.1). Visual inspection suggests that a relationship does exist; it appears particularly strong in the case of Fiji. However, as noted above, exogenous 'shocks' are also clearly important.

These points were borne out following estimation of a simple regression model:

$$(3.2) \qquad \ln(X/M) = a + b \ln(RER)_{-1} + c \ln(FY)$$

where X = total exports,

M = total imports,

RER_{-1} = the RER lagged one year, and

FY = foreign income, with the GDP for OECD countries (in constant prices) being used as a proxy.

The FY variable was later dropped, because in the one case where it proved significant, the relationship appeared purely coincidental - i.e. a steady downward trend in Tonga's trade balance matched a steady upward trend in OECD GDP.

The resulting estimates had very poor explanatory power, except perhaps for Fiji, where the T-ratio for the lagged RER was just under 1.6. According to this result, a one per cent increase in the RER (real depreciation) is associated with a 1.05 per cent increase in the ratio of exports to imports.

3.2 RER and Agricultural Performance

The above regression equation may appear trivial, but it is modelled on one discussed in a recent journal article. Diakosavvas and Kirkpatrick (1990) analysed the relationship between agricultural export performance and exchange rate policy in 28 countries of sub-Saharan

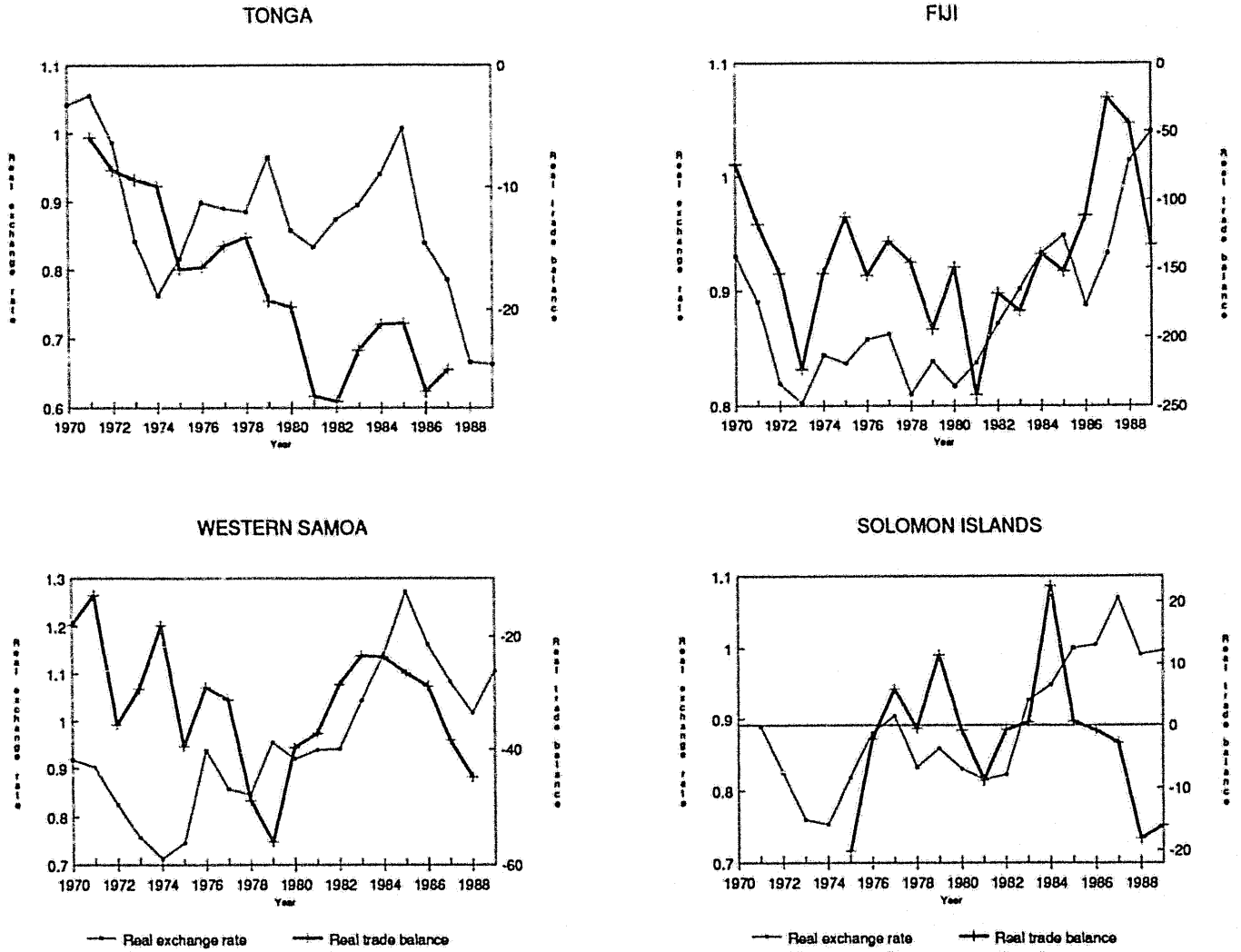

Figure 3.1 Real Exchange Rates and Real Trade Balance

Africa over the 1974-87 period. Their regression model was as follows (p. 36):

$$(3.3) \qquad \ln(X/Q) = a + b \ln(RER)_{-1} + c \ln(FY)$$

where X = agricultural exports (volume),
Q = agricultural production (volume), and
other variables are as defined above.

The original intention for the purposes of this paper was to replicate the Diakosavvas and Kirkpatrick study for as many as possible of the South Pacific island nations. However, the need for one major modification soon became apparent. The dependent variable, ln(X/Q), may be an appropriate measure of agricultural export performance, but it is not very helpful as an indicator of the overall capacity of the agricultural sector both to meet domestic food requirements and to generate export revenue. For this purpose, the ratio of agricultural export value to food import value (Hardaker, Delforce, Fleming and Sefanaia 1988, p. 3), is preferable. Moreover, data on export and import values tend to be more readily available than the volume data required for the X/Q ratio.

Since agricultural commodities are a major component of total exports, and foodstuffs of total imports, graphs of agricultural performance and RER fluctuations closely resemble those presented in Figure 3.1. Regression estimation also yielded similar results to those reported above, except that the T-ratio of the lagged RER variable in the Fiji equation declined well below significant levels.

Diakosavvas and Kirkpatrick (1990) likewise had limited success in their analysis of the impact of exchange rate policy on agricultural export performance in sub-Saharan Africa. They concluded that 'the results obtained are not inconsistent with the view that "the exchange rate matters" ... [but]... other supportive measures are equally important' (p. 40).

Further pursuit of relationships between the RER and agricultural performance will involve experimenting with modifications of the

Diakosavvas and Kirkpatrick approach. First, it is possible that a trade-weighted RER index might be a more meaningful measure of the international competitiveness of South Pacific islands than the US$-based RER used thus far. Second, Martin and Nguyen (1989) have pointed out that flucturations in the terms of trade affect the appropriateness of the various RER measures; this aspect may also be worth investigating. Third, there may be alternative indicators of agricultural performance which prove to be more responsive to RER fluctuations than the one used here.

4. TRADE BIAS AND THE 'INCIDENCE' OF PRICE DISTORTIONS

A rather more comprehensive approach to the impact of government policy on the agricultural sector is provided in several IFPRI reports (Garcia 1981, Cavallo and Mundlak 1982, Oyejide 1986, Tshibaka 1986, Bautista 1987, Dorosh and Valdes 1990) and by a recent World Bank research project (Krueger, Schiff and Valdes 1988). These studies all deal with the combined effects of agricultural pricing, exchange rate and trade policies on the pattern of incentives faced by agricultural producers. Further work along these lines is planned for the future (see section 5). For the purposes of this paper, some preliminary analyses are presented, following the methods of Oyejide (1986), Tshibaka (1986), Bautista (1987) and Dorosh and Valdes (1990).

4.1 Overall Trade Bias

According to Bautista (1987), the overall trade bias (OTB) indicates 'the extent to which the trade regime encouraged or discouraged the production of exportables relative to importables' (p. 30). He defined OTB as:

(4.1) $$\text{'OTB} = (P_x/P_m)/(P_x^*/P_m^*)$$

where P_x and P_m are the domestic prices of exportables and importables, and P_x^* and P_m^* are their respective border prices' (p. 30).

If OTB < 1, there is anti-trade bias, characterised by policies favouring import-substitution; conversely, OTB > 1 indicates that government policy favours export promotion (pro-trade).

An equivalent expression is

$$(4.2) \qquad OTB = EER_x/EER_m = (1-t_x)E/(1+t_m)E,$$

where EER_x and EER_m are the effective exchange rates for exports and imports, t_x and t_m are the implicit export tax and import tariff rates and E is the nominal exchange rate.

If there are no quantitative trade restrictions (import or export quotas), t_x and t_m can be calculated using actual tax revenues and trade values (Dorosh and Valdes 1990, pp. 23-4). More generally, they are calculated with reference to domestic and world prices (equation 4.1). However, as pointed out by Dorosh and Valdes (p. 24), 'calculating the implicit import tariff or export tax when quotas are binding and tax rates are not uniform across commodities requires detailed data on world and domestic prices of all traded goods'. Obtaining such data for the islands under review here would be a major undertaking, outside the scope of the present study. The possibility of using actual tax revenues and trade values was therefore investigated. In Tonga, the only quantitative trade restriction in place applies to egg importation, the quota for which is set at zero unless domestic supplies fall short of requirements. Since eggs are a relatively minor part of domestic food purchases, the quota is unlikely to have a major effect on overall price levels. In Western Samoa, a ban on taro exports (except to American Samoa) was implemented following the 1990 cyclone, but there do not appear to have been any major quantitative trade restrictions prior to that. Similarly, there is no mention in recent literature of import or export quotas in Solomon Islands. In Fiji, on the other hand, a variety of trade restrictions, including quantitative barriers, were in place prior to the post-1987 reforms. It therefore appears that actual tax revenues as a percentage of trade flows may be a reasonable approximation of the implicit tax and tariff rates in Tonga, Western Samoa and Solomon Islands, but not in Fiji. The calculations for three countries (excluding Fiji) are shown in Table 4.1.

Table 4.1

Calculation of Overall Trade Bias (OTB)

Year	Exports			Imports			OTB
	Duty	Value	t_x	Duty	Value	t_m	
Tonga							
1974	382	4407	.087	2018	11819	.171	.780
1975	234	4380	.053	2228	12963	.172	.808
1976	0	3100	0	1802	11656	.155	.866
1977	0	6207	0	2705	17697	.153	.867
1978	0	4750	0	2957	22318	.132	.883
1979	0	6267	0	3026	26210	.115	.897
1980	0	6910	0	3549	30135	.118	.894
1981	0	6330	0	4064	35089	.116	.896
1982	0	3646	0	4808	41205	.117	.895
1983	0	5842	0	4855	41664	.116	.896
1984	0	9996	0	5508	46614	.118	.894
1985	0	7170	0	7044	58929	.119	.894
1986	0	8711	0	6944	59616	.116	.896
Average			.011			.132	.87[illegible]
Western Samoa							
1974	0	7675	0	5506	15909	.346	.743
1975	0	4541	0	5845	23160	.252	.799
1976	0	5447	0	6739	23627	.285	.778
1977	151	11577	.013	9271	32225	.288	.766
1978	350	8170	.043	9300	38567	.241	.771
1979	324	15340	.021	10200	55100	.185	.826
1980	600	15800	.038	10100	52300	.193	.806
1981	200	11200	.018	10100	53300	.189	.826
1982	200	16300	.012	11000	54600	.201	.823
1983	300	27200	.011	17500	67900	.258	.786
1984	300	33600	.009	27900	83800	.333	.743
1985	1300	36100	.036	32500	104600	.311	.735
1986	700	23500	.030	30400	95400	.319	.735
1987	600	25000	.024	38700	118300	.327	.735
1988	700	31400	.022	38700	142500	.272	.769
1989	600	29500	.020	42900	172900	.248	.785
Average			.019			.265	.777
Solomon Islands							
1975	700	11282	0.062	2300	21770	0.106	0.848
1976	900	19244	0.047	2500	21090	0.119	0.852
1977	1800	28806	0.062	3000	25750	0.117	0.840
1978	2500	31813	0.079	3400	30740	0.111	0.830
1979	6500	58356	0.111	4400	50360	0.087	0.81[illegible]
1980	4400	60170	0.073	5600	61540	0.091	0.350
1981	4400	56802	0.077	9300	65970	0.141	0.809
1982	4500	55334	0.081	13100	57490	0.228	0.748
1983	4100	70263	0.058	12600	70630	0.178	0.799
1984	4500	115700	0.039	17300	82840	0.209	0.795
1985	11000	101240	0.109	20300	102660	0.198	0.744
1986	7900	111760	0.071	25800	104450	0.247	0.745
1987	6900	124400	0.055	31100	134940	0.230	0.768
1988	8400	164470	0.051	40800	203300	0.201	0.790
1989	12600	165230	0.076	44400	262390	0.169	0.790
Average			0.070			0.162	0.802

Note: Duty and trade figures are in thousands of local currency units.

However, there is one further complication: the activities of the export marketing boards which exist(ed) in all four countries. At this stage, data have not been acquired which would allow quantification of the effects of these bodies on the domestic prices of exports, but it is almost certain that exports have been effectively taxed. Therefore, the OTB figures in Table 4.1 are underestimates of the bias against exports inherent in the trade regimes of these countries.

In all three countries, there was only a slight variation in OTB over the period indicated. The extent of anti-trade bias declined slightly in Tonga, increased in Solomon Islands and declined in Western Samoa following a peak in the late 1970s and early 1980s. The average for Tonga over 13 years was 0.874; in Solomon Islands over 15 years the average was 0.802, and in Western Samoa over 16 years it was 0.777. This implies that Western Samoa pursued somewhat more import-substitutionist policies than Tonga (which eliminated export taxes in 1975) or Solomon Islands. None of these countries had the extreme trade bias of the Philippines during 1950-61, when the OTB averaged 0.388 (Bautista 1987, p. 32-3). Nevertheless, the figures show that export subsidies averaging 13.2 per cent in Tonga, 16.2 per cent in Solomon Islands and 26.5 per cent in Western Samoa would have been required to offset the price distortions favouring the import-competing sector over the period shown. Moreover, as noted above, the highly simplified method used here for calculating OTB takes no account of the impacts of marketing boards. The 'true' OTB levels are probably well below those shown in Table 4.1.

Further work is clearly required to improve the accuracy of the OTB estimates for these three countries and to construct a similar series for Fiji. Ideally, estimation would be based on domestic and border prices (P_x, P_m, P_x^*, P_m^*), but at the very least, some account needs to be taken of price-distorting factors other than explicit customs duties. Investigation of relative incentives among various categories of tradeable goods (e.g. 'traditional' versus 'new' exports; 'essential' versus 'non-essential' imports, major agricultural commodities), as done by Bautista (1987), would also be worthwhile, data permitting.

4.2 The Incidence of Trade and Exchange Rate Policies

Several of the IFPRI studies cited above include regression estimation of the 'incidence' of trade and exchange rate policies. Earlier studies (e.g. Little, Scitovsky and Scott 1970, Balassa and Associates 1971, Krueger, Lary, Monson and Akrasanee 1981) had focused on effective rates of protection (ERPs), estimated in a partial equilibrium framework. However, there is evidence that the bias against agriculture caused by industrial protectionism is only partially captured in such measures (Oyejide 1986, p. 44). The 'incidence' literature follows from the work of Dornbusch (1974) and Sjaastad (1980), which 'established that trade and exchange rate policies often have global economywide repercussions substantially different from that intended by policymakers' (Oyejide 1986, p. 44).

The analytical model is of a simple open economy producing exportables, importables and nontraded (home) goods. As explained by Oyejide (1986, pp. 44-5),

> The domestic nominal prices of the tradable goods are determined by their foreign prices, the nominal exchange rate, import duties, and export taxes or subsidies. The domestic nominal prices of nontraded goods are determined by domestic demand and supply factors, which are, in turn, influenced by trade and exchange rate policies through the tradable goods markets.... The analytical framework provides a methodology for isolating and quantifying the sectoral effects of any combination of import tariffs, export taxes, or subsidies in a given trade and exchange rate regime.

The derivation of the empirical model from the analytical framework will not be described here (see instead Sjaastad 1980, Oyejide 1986, Tshibaka 1986 or Bautista 1987). Briefly, trade and exchange rate policies are analysed in terms of their effects on relative prices. Any policy change will bring about relative price changes and substitution effects. The impact of these changes on the various sectors in the economy is measured through the incidence parameter, w (omega). 'The numerical value of w reflects the proportional change in the price of home goods relative to the price of exportables as a function of the proportional change in the price of importables relative to the price of

exportables' (Oyejide 1986, p. 47). It is estimated via the following regression equation:

$$(4.3) \qquad \ln(P_h/P_x) = a + w \ln(P_m/P_x) + \ln Y + BT$$

where P_h, P_x and P_m are the price levels in the home goods, exportable and importable sectors, respectively, Y is income as measured by GDP and BT is the (real) trade balance. The last two parameters are necessary so as to avoid violating the model assumptions of constant income and productive capacity and a balanced external account.

The above regression equation was estimated for Tonga, Fiji and Western Samoa using 16, 19 and 13 annual observations, respectively. For Tonga, P_x was derived from an export price index published by Statistics Department (1983) and updated by Delforce (1990), while P_h and P_m are the local and imported goods components of the CPI. For Fiji, import and export price indexes have been published by the World Bank (1990), and the housing component of the CPI was used as a proxy for home goods prices. For Western Samoa, the export price index found covered only 1982-89, but separate indexes for copra and cocoa are available from 1951 to 1987. Unfortunately, these could only be matched with P_m and P_h indexes (from the CPI) from 1975 to 1987. For Solomon Islands, export and import unit values are available for several years, but the CPI prior to 1984 contains no appropriate 'home goods' component, so estimation for this country has been deferred for the time being.

The results for Tonga, Fiji and Western Samoa are summarised in Table 4.2. The extremely open nature of these economies is confirmed by the strong relationship which exists between the two price ratios, P_h/P_x and P_m/P_x. In all cases, the adjusted R^2 is above .92 and the incidence parameter is highly significant. In fact, it appears from the results that a one per cent rise in the domestic price of home goods relative to exportables (P_h/P_x) is associated with an increase of over one per cent (nearly 1.5 per cent in the case of Fiji) in the domestic price of importables relative to exportables in each country. If this is correct, it implies that any price distortion (e.g. tariff, quota) which increases the domestic price of importables is effectively paid for (and more) by

Table 4.2

Regression Results: 'Incidence' Equations

Independent Variable	Country			
	Tonga	Fiji	Western Samoa	
			Copra	Cocoa
Constant	-0.058	6.278	5.820	2.291
	(-0.115)	(7.459)	(1.434)	(0.399)
$\ln(P_m/P_x)$	1.015	1.485	1.046	1.160
	(12.305)	(20.825)	(11.116)	(6.591)
ln Y	0.000	-0.907	-1.366	-0.570
	(0.003)	(-7.009)	(-1.452)	(-0.438)
BT	0.001	0.001	-0.002	-0.002
	(0.258)	(1.711)	(-0.288)	(-0.364)
R^2 (adj.)	0.929	0.971	0.969	0.954

Note: The numbers in parentheses are T-ratios.

producers of exportables, most of whom are farmers. In Western Samoa, where the effects on the copra and cocoa sectors are estimated separately, cocoa is shown to bear a greater burden of implicit taxation than copra.

More work needs to be done to test the robustness of these estimates, especially given that the IFPRI work referred to earlier yielded omega estimates no greater than 0.9. However, it does seem plausible that the small, open economies of the South Pacific would have even stronger connections between the prices of importables and home goods than those found in Nigeria (Oyejide 1986), Zaire (Tshibaka 1986) and the Philippines (Bautista 1987).

5 DISCUSSION AND AREAS FOR FURTHER RESEARCH

As explained in the Introduction, this paper is the very preliminary product of an investigation of the nature and effects of trade and exchange rate policy in the South Pacific. Three analytical techniques have been applied: (a) regression analysis of the impact of the real exchange rate on trade balance and agricultural performance; (b) calculation of a (simplified and approximate) measure of overall trade bias; and (c) regression estimation of the incidence of trade and exchange rate policies. The least useful of the three exercises was the first: clearly, there are so many factors affecting overall trade and agricultural 'performance' (however measured) that it would be naive to expect the exchange rate to exert much influence. Even when considering agricultural <u>export</u> performance, previous researchers have found only tenuous links (Diakosavvas and Kirkpatrick 1990), so the situation with regard to <u>total</u> production (for subsistence, domestic marketing and export) is understandably even less clearcut.

The methods used in the IFPRI studies produced rather more interesting results. Although, as noted, a rigorous analysis has not been possible with the data currently available, the estimates nonetheless serve to highlight the (often unintended) consequences of policies which change import prices. For instance, the OTB measure shows how a policy aimed at protecting local industry is, in effect, equivalent

to a tax on exporters. The incidence equations show the extent to which the various sectors of the economy bear the burden of such policies.

Possibilities for improving and extending each of the analyses presented here have been discussed earlier in the paper. In addition, there is clearly much else that could be done in the area of trade and exchange rate policy in the South Pacific. For instance, the recent World Bank study of 'The Political Economy of Agricultural Pricing Policies' (Krueger et al. 1988) involved estimation of the direct and indirect impacts on agricultural incentives of the pricing, trade and exchange rate policies of 18 countries. The countries studied included five in Latin America, four in Africa, seven in Asia and two in Europe, but none in the South Pacific region.

The first stage in the World Bank analyses was to estimate a time series of domestic producer, consumer and border prices for each of the main export- and import-competing agricultural commodities in the study countries. The researchers then estimated the effective rates of protection (ERPs) and/or domestic resource costs (DRCs) of these commodities. Next, they analysed the indirect effects of macroeconomic variables such as the exchange rate, foreign capital inflows and industry protection. The authors

> had to estimate the real exchange rate which would have kept the current account at a sustainable level - taking into account normal capital flows - if all quantitative and tariff protection against imports and interventions affecting exports had been removed. This involved estimation of the equivalent tariff of import protection and of foreign exchange demand and supply elasticities and comparison with the actual real exchange rate to estimate the amount of real exchange rate change needed to yield the sustainable current account level (Krueger et al. 1988, p. 258-9).

Once the equilibrium exchange rate had been estimated, the 'no-intervention' border prices of agricultural export commodities and purchased inputs were calculated using that rate. The resulting price and value-added estimates were then compared with the 'no-intervention' non-agricultural price index (also calculated using the equilibrium exchange rate). This gave a measure of the indirect effects of

interventions on agricultural prices and value added (relative to non-agriculture).

In the World Bank study, levels of foreign capital inflows were taken into account in the assessment of the 'sustainable' current account balance. In view of the importance of aid and remittances in the Pacific islands, it would be useful to look even more closely at the impacts of capital inflows. For instance, it should be possible to estimate the equilibrium exchange rate which would be required to keep the current account at a sustainable level in the absence of aid and remittances.

The analyses just described may be somewhat ambitious for a research project due to last only eight more months, especially in view of the need to rely on secondary data. However, given that no study comparable to those undertaken by the World Bank or IFPRI has been carried out in the small Pacific islands, any contribution would be worthwhile.

On the other hand, partial equilibrium approaches, as adopted by the World Bank, have severe limitations when dealing with macroeconomic policy issues which affect the whole economy. As Lloyd (1991, p. 119) commented recently, 'agricultural economists can ignore general equilibrium only at their peril'.

Macroeconomic models now exist for Papua New Guinea (NCDS 1990), Fiji (Sturton 1989a), Vanuatu (Sturton 1989b) and Tonga (Sturton forthcoming). These could serve as a basis for developing purpose-built models focusing on a disaggregated agricultural sector within the whole-economy framework. To be plausible, such models would have to include subsistence agriculture - a sorely neglected area in macromodelling. There are very few 'pure' subsistence producers in the South Pacific; most farmers who provide food for their own needs also participate in the market economy to some extent. Thus, changes in the relative prices of importables, exportables and home goods affect agricultural producers' decisions on how to allocate output between own consumption and the domestic and export markets.

Very little work has been done on the linkages between subsistence agriculture and the macroeconomy. Fritz-Krockow (1989) included the subsistence sector (linked via copra prices) in his analysis of money demand in Solomon Islands, but this was in a partial equilibrium setting. Research proposed for the future (1993-95) is aimed at developing techniques for integrating subsistence agriculture into general equilibrium models, using PNG, Fiji and Tonga as case studies. The resulting models would then be used to analyse the impacts of government policies and international economic conditions on all agricultural production - commercial and subsistence-oriented.

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