Aid and Economic Growth in Pacific Island Countries: An Empirical Study of Aid Effectiveness in Fiji

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Abstract

Pacific island countries (PICs), ever since their independence during the second half of the last century, have been among the world's top ten recipients of official development assistance (ODA) on a per capita basis. Until the mid 1990s, most of them were receiving aid from their erstwhile colonial masters for budgetary support. With the introduction of reforms in ODA delivery in the late 1990s with focus on program and project-tied aid, it was expected that aid would directly facilitate creation of much-needed growth enhancing infrastructures, physical as well as social, since domestic savings were found to be insufficient to finance them. However, continued stagnation in some PICs and deterioration in some others have been causing concerns. This paper seeks to examine the effectiveness of aid by undertaking a case study of Fiji, which has a longer time series data needed for econometric investigation. Based on the study's findings, the paper lists some policy conclusions relevant to the region.

Keyword(s): Pacific Islands, Fiji, foreign aid, growth, cointegration, error-correction model.

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1. Introduction

The debate on the effectiveness of foreign aid is now nearly half a century old. Academic investigations began with Friedman (1958), who was critical of large bureaucracies enjoying economic rents in aid-recipient countries. Recent literature surveys by Addison, Mavrotas, and McGillvray (2005) and Cassen and Associates (1994) have summarized the findings of more than three-dozen global cross-country studies during the last 50 years. The findings range from the absence of any link between aid[1] and growth to existence of a positive relationship in respect to a few countries. Under certain circumstances with the rise in the volume of aid there were diminishing returns along with the presence of a conditional, positive relationship. While Clemens, Radelet, and Bhavnani (2004) indicated the existence of a positive relationship between aid and growth, a study by Rajan and Subramanian of IMF (2005) found no evidence of aid having either a positive or a negative effect on growth. This study, along with another study by Raghuram and Subramanian (2005), indicated that aid-receiving countries would have been under the influence of the well-known "Dutch disease effect," which is reflected in the appreciation of real exchange rate, adversely affecting the competitiveness of exports, thereby weakening their economic growth.

Most of the available empirical studies focused on developing countries in Africa and Asia. There is no similar definitive and comparable study on Pacific island countries (PICs), which have been known for a long time as recipients of substantial aid. In addition to pure bilateral grants, loans on concessional terms were provided by multilateral agencies, including the World Bank (WB) and Asian Development Bank (ADB), during the last three decades. Changes in priorities following the end of the Cold War in the late 1980s led the aid providers to reconsider their budget allocations of aid. The two major donors in the region, Australia and New Zealand, were reluctant to be the first to pronounce any judgment on the effectiveness of bilateral aid to their former colonial possessions, leaving the initiative to the multilateral aid agencies.

Consequently, WB in its comprehensive study on Pacific island economies observed that PICs, despite high per capita aid, performed dismally in comparison to the similarly placed island countries in the Caribbean and

[1] This term refers to official development assistance (ODA), which is defined as pure grants and concessional flows from bilateral governments and their agencies as well as multilateral financing agencies to the developing countries at low rates of interest with maturity periods of a long-term nature, all of them containing a grant element of at least 25%.

Indian Ocean regions. During 1970-2003, per capita gross domestic product (GDP) in the Caribbean island countries, for which data are available, grew at 2.8% annum, while the corresponding rate in ten PICs, for which comparable data are available, was 1%. Poor growth in PICs marked by stagnation in per capita incomes in the midst of plentiful aid over two decades came to be looked upon as a "Pacific Paradox" (World Bank 1993). Following the adverse findings of the WB study, comprehensive reform programs were initiated in several PICs in the late 1990s, with loans and technical assistances from ADB.

However, progress has been slow and uncertain. Further, some PICs in the late 1990s went through economic and political crises of sorts, most of which were traced to poor governance. Against this background, an Australian non-government think-tank institution, the Centre for Independent Studies (CIS), issued a critical report with a provocative title: *Aid Has Failed in the Pacific* (Hughes 2003). The criticism is based on the observation that poor growth performance was due to ineffective use of aid during the past 30 years, which totaled US$50 billion and that most of the aid money was spent on consumption[2] by elites in the governments and bureaucracies, diverting from the intended purposes, as aid was fungible. The CIS study also stressed that aid flows resulted in wastage and often led to corruption in high places.[3]

The CIS followed up with another report in 2004, this time with the title: *The Pacific Is Viable* (Gosaraevski *et al.* 2004). Much of the criticism of the earlier report was toned down, and there was considerable stress on reforms in aid delivery and implementation. A much more recent study released by AusAid (2005) as part of its exercises relating to a White Paper on Aid observed that PICs were not on track to meet the Millennium Development Goals (MDGs), as they failed to register a per capita income growth at a rate above 2 percent per annum during the last ten years (1995-2004), which was indicated as the required rate for reducing poverty, based on a WB study (Dollar and Kraay 2001). The CIS studies and preparatory exercises for the Australian White Paper on Aid to PICs (2005) acknowledged that data deficiencies relating to

[2] A large part of consumption appears to be non-tradables, raising domestic price level and in the process raising the real exchange rate and consequently hurting competitiveness of limited exports, an effect falling under the description of Dutch Effect, referred to by Rajan and Subramanian (2005).

[3] Winters (2005:94) refers to this as "capture of aid," as small, undiversified economies are often prone to such abuse of power by special interests, as these are relatively larger and have to deal only with a small number of opponents. Most of these special-interest groups are from those with special status or with current economic power.

the availability of reliable data, especially in terms of comparable time series prevented fuller analyses that would encourage undertaking a time-series and cross-sectional country analysis.

Available empirical studies on PICs (Gounder 2001, 2003), which examined the nexus between aid and growth, did not go beyond establishing the presence of a bi-directional Granger causality. In these empirical studies and in various official reports, there has been much discussion on the need for institutional improvements and raising the quality of governance with emphasis on reducing wastage and corruption in the use of public funds, including aid money. Since the mid 1990s, bilateral and multilateral agencies have been providing technical assistance in terms of consultancy services towards strengthening public financial management in the relevant spending ministries and agencies and in the overseeing ministry of finance and audit organization. Under the assumption that these technical assistance projects funded from time to time in terms of preparation of budget manuals and training on the job would have resulted in quality improvements in budget preparation and expenditure control over time, this paper uses the budget data relating to recurrent and capital expenditure, for undertaking an empirical analysis of effectiveness of aid in Fiji. The rest of the paper is organized as follows: The second section gives a brief background of aid flows, growth and general budget situation in PICs; the third section outlines the methodology adopted for the study; the fourth section reports the results of the empirical analysis; and the fifth and final section presents conclusions along with policy implications.

2. Pacific Island Countries: A Brief Economic Review

The 14 PICs,[4] which are formal members of the regional organization known as Pacific islands Forum, are spread over the Pacific Ocean some 10,000 kilometres (kms) from east to west and 5,000 kms from north to south, with a combined exclusive economic zone (EEZ) of about 20 million sq. km. The total land area is just over 500,000 sq. km, of which Papua New Guinea (PNG) accounts for 88%, and Fiji, Solomon Islands and Vanuatu for 11%, with the other 10 countries making up the remain-

[4] The 14 members of the Pacific Islands Forum, with its headquarters located in Fiji, are Cook Islands, Fiji, Kiribati, Republic of Marshall Islands, Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. All PICs are independent sovereign countries. In addition, there are eight territories, being either possessions of or enjoying a free association status with major powers, including the United Kingdom and France. All the 22 entities form part of the Pacific Community with its Secretariat located in New Caledonia.

ing 1%. The population of the PICs is about seven million people, of which over five million are in PNG.

Constraints to Growth

There are serious constraints to growth and development, which stem from their geographical characteristics (Urwin 2004). These include:

- Remoteness and insularity: Being located far from major markets and comprising widely dispersed multi-island micro-states, resulting in high international and domestic transportation costs, arising from both the distances to be covered and the low volume of cargo. Further, the development of even a small domestic market is constrained by distances between settlements and infrequent internal transport services.
- Susceptibility to natural disasters: Being frequently affected by adverse climatic and other natural events that typically affect the entire population and economy.
- Small population size: Being limited by small population size, it affects institutional capacity and increases unit costs of services, and also restricts the potential for private sector growth and investment.
- Limited diversification: Having narrow resource base and small domestic markets necessarily results in being relatively undiversified in production and exports, and also limits capacity in the private sector.
- Openness: Relying heavily upon external trade and foreign investment to overcome inherent scale and resource limitations. This leaves states vulnerable to external economic and environmental shocks.

Key indicators are given in Table 1, which also includes information on similarly placed islands in two other regions, the Caribbean and the Indian Ocean.

Urwin (2004) observed that economic development in PICs since their independence was characterized by the dominant role played by large public sectors. Despite substantial aid, there has been a great variability in economic performance. As table 1 shows, several years there was negative economic growth. Since 1998, some PICs for which GDP data are available, have suffered negative economic growth at some time, excepting Samoa, Tonga, and Tuvalu (Urwin 2004).

According to an IMF study (2005) on the basis of aid per capita—(2000-2003 average in 2002 prices)—three PICs are among the top 10 aid recipients headed by Timor-Leste (US$260): there are three PICs: Kiribati received US$180 (ranked third); Vanuatu, US$170 (ranked fourth): and Solomon Islands, US$140 (ranked sixth).

Table 1

Selected Key Indicators

	Population ('000) 2002	Per Capita GDP (Current Prices) in US$ 2002	Human Dev Index Ranking 2003	Aid per capita in US$ 2002	Aid % of GDP 1990	Aid % of GDP 2002
Caribbean Region						
Antigua and Barbuda	76	10,449	60	192.1	1.2	1.9
Bahamas	314	15,797	50			
Barbados	270	9,423	30	12.8	0.2	0.1
Belize	256	3,382	91	88.6	7.6	2.6
Dominica	79	3,438	70	381.7	11.9	12.1
Dominican Republic	8745	2,514	95	18.2	1.4	0.7
Grenada	80	4,060	66	117.5	6.3	2.3
Guyana	765	937	107	84.9	42.6	9.0
Haiti	8132	415	153	8.9	5.9	4.5
Jamaica	2651	3,008	98	9.2	5.9	0.3
St. Kitts and Nevis	42	7,745	49	683.8	5.1	8.0
St. Lucia	1419	4,124	76	226.5	3.1	5.1
St. Vincent and the Grenadines	120	4,060	87	40.1	7.8	1.3
Suriname	436	2,199	86	26.9	15.5	1.2
Trinidad and Tobago	1303	7,384	57	5.6	0.4	0.1
Indian Ocean						
Maldives	280	2,182	96	88.9	9.8	4.4
Mauritius	1211	3,740	65	19.8	3.7	0.5
Seychelles	82	8,320	51	97.8	9.8	1.1
The Pacific						
Cook Islands	19	2,651	62	490.9	NA	28.0
Fiji	799	2,281	92	41.4	3.9	1.8
Fed States of Micronesia.	114	1,864	120	702.0	NA	37.4
Kiribati	85	530	129	203.3	22.5	18.6
Papua New Guinea	5,099	523	137	36.4	12.8	7.2
Republic of Marshall Islands.	51	2,008	121	823.3	NA	49.6
Samoa	175	1,484	74	214.2	42.6	14.5
Solomon Islands	418	541	128	56.8	21.7	11.0
Tonga	98	1,347	54	217.2	26.3	16.4
Tuvalu	11	345	118	260.0	47.2	45.0
Vanuatu	183	1,138	118	133.0	33.0	11.7

Notes: 1. Population and per capita GDP figures for the Caribbean are for 2003.
2. Population and per capita GDP figures for the Indian Ocean and the Pacific regions are for 2001.
3. Human Development Index for 2002.
NA = Not Available.

Source: *ADB (2004), IMF (2004b), UNESCAP (2004).*

Aid and Growth Performance in PICs

A comparative analysis of aid flows to the island countries in the Caribbean, with which PICs share many commonalities (Fairbairn and Worrell 1996), and those in the Indian Ocean region shows PICs received far greater aid in terms of percentage of their respective GDP than their counterparts (Table 1). In 2002, aid to Marshall Islands was the highest, followed by Tuvalu. On the other hand, Mauritius in the Indian Ocean region received aid at less than 1% of its GDP.

The growth performance of PICs during this period was not only less than that of the Caribbean and Indian Ocean countries but also was subject to high variability. However, aid has provided substantial support to annual budgets as it is generally reflected in low fiscal deficits, with some PICs running budget surpluses in some years (Table 2). Further, as most of their imports were sourced from Australia and New Zealand, which were targeting low inflation, inflation levels in PICs have also remained low.

Despite some of these favorable macroeconomic indicators, growth in per capita incomes has been elusive. One of the obvious reasons, which have been singled out, is the generally high rate of population growth, especially in Melanesian countries, which include Papua New Guinea, Solomon Islands, and Vanuatu. In addition, as Hughes (2002) argued, aid funds being fungible were used for maintaining large bureaucracies, with wages and salaries dominating the recurrent budget. Thus, utilization of funds was diverted towards consumption and less was spent on income-generating assets, not to speak of operation and maintenance of existing assets such as roads and jetties and ports. Budget allocations over a period indicate that the ratio between two components—one relating to recurrent expenditures, which include wages and salaries and housekeeping expenses, and the other relating to capital expenditures, which include investments in growth-enhancing assets—is 70 to 30, indicating that emphasis has been more on government consumption.

Table 2

Output Growth and Variability

	1990-2003 Average Growth Rate (%)	SD	1990-1997 Average Growth Rate (%)	SD	1998-2003 Average Growth Rate(%)	SD
Caribbean Region						
Antigua and Barbuda	3.2	3.0	3.0	3.6	3.3	0.8
Bahamas	0.4	3.8	0.9	3.5	2.2	1.4
Barbados	0.4	3.6	0.1	4.1	1.4	2.8

Table 2 (*cont.*)

	1990-2003 Average Growth Rate (%)	SD	1990-1997 Average Growth Rate (%)	SD	1998-2003 Average Growth Rate(%)	SD
Belize	6.7	4.3	5.7	4.1	7.2	4.6
Dominica	1.4	2.3	2.7	1.4	0.5	3.1
Dominican Republic	4.7	4.0	3.9	4.6	5.0	2.2
Grenada	3.6	3.0	2.8	2.7	3.9	1.8
Guyana	3.3	5.2	5.9	4.1	0.5	3.2
Haiti	–0.4	5.4	–0.4	6.5	0.6	1.7
Jamaica	1.0	2.0	0.2	2.4	1.0	0.9
St. Kitts and Nevis	3.7	2.1	4.5	2.3	2.3	1.1
St. Lucia	1.7	3.2	2.7	2.4	0.8	4.8
St. Vincent and the Grenadines	3.2	2.5	3.3	3.0	2.7	1.7
Suriname	2.1	5.3	0.7	6.2	2.4	1.7
Trinidad and Tobago	2.9	2.6	2.0	2.3	4.2	1.6
Indian Ocean						
Maldives	7.7	3.1	8.4	3.6	6.7	2.3
Mauritius	4.6	2.2	4.7	2.4	4.4	2.0
Seychelles	3.6	2.9	4.0	3.3	2.7	2.1
The Pacific						
Cook Islands	3.3	4.2	2.7	4.6	3.5	5.3
Fiji	1.6	3.7	2.6	2.4	2.7	4.2
Fed States of Micronesia.	1.8	4.0	2.3	5.1	0.2	4.6
Kiribati	2.9	5.8	3.0	2.8	5.0	4.5
Papua New Guinea	3.2	6.2	5.6	8.4	–0.2	3.9
Republic of Marshall Islands.	2.3	7.9	–0.9	7.7	0.3	4.6
Samoa	0.5	7.6	–8.1	11.2	3.9	2.1
Solomon Islands	0.1	5.6	2.9	3.8	–3.7	6.0
Tonga	2.5	2.8	3.3	3.5	2.3	2.1
Tuvalu	3.8	5.4	5.6	6.2	4.8	4.5
Vanuatu	2.1	3.7	4.4	4.0	0.8	3.4

Source: *Author's Calculations.*
IMF (2004), ADB (2004), UNESCAP (2004)

Table 3

Pacific island Countries: Macroeconomic Indicators

Pacific Island Countries	Exchange Rate Regime	Overall Fiscal Balance (% of GDP)		Inflation (%)		Growth Rate (%)	
		(1990-97)	(1998-03)	(1990-97)	(1998-03)	(1990-97)	(1998-03)
Cook Islands	Dollarised	−4.0	−1.4	2.7	3.5	3.0	3.5
Fiji	Fixed Peg	−3.2	−3.4	2.6	2.7	4.3	2.7
Fed States of Micronesia.	Dollarised	−15.9	−7.8	2.3	0.2	3.3	0.2
Kiribati	Dollarised	6.8	4.2	3.0	5.0	4.2	5.0
Papua New Guinea	Independently Floating	−2.7	−2.1	5.6	−0.2	7.4	−0.2
Republic of Marshall Islands.	Dollarised	−20.3	11.1	−0.9	−0.3	6.0	0.3
Samoa	Fixed Peg	−2.8	−0.6	−3.1	3.9	5.7	3.9
Solomon Islands	Fixed Peg	−5.1	−3.6	2.9	3.7	10.8	−3.7
Tonga	Fixed Peg	0.1	−1.0	3.3	2.3	4.6	2.3
Tuvalu	Dollarised	−6.1	18.0	5.6	4.8	2.9	4.8
Vanuatu	Fixed Peg	−4.0	−1.8	4.4	0.8	3.4	0.8

Source: *IMF (2004b), ADB (2004), Sahay (2004), UNESCAP (2004).*

The Case of Fiji

Fiji, which has a relatively greater manufacturing capacity as well as larger skilled human resources, is the recipient of the lowest aid per capita. Further, aid as per cent of its GDP is the least among all PICs. Bilateral aid forms more than 90% of total aid, with two countries, Australia and Japan, being the major sources of assistance (Table 4). By 1988, Fiji was the first among the PICs to introduce reforms. Soon after the two military coups in 1987, the interim government composed of technocrats took steps towards liberalizing the economy and dismantling of subsidies and other restrictive measures.

Table 4

Net ODA: Georgraphical Distribution of Sources
(US$ Million Current Prices)

	1997	1998	1999	2000	2001	2002
Bilateral	39.1	35.8	38	28.7	24	31.3
Japan	16.9	19.2	20.9	15.1	12.7	18.7
Australia	13.9	11.2	11	10.7	8.5	8.6
Multilateral	4.4	0.6	−3.6	0.2	1.8	2.5
Total	44.5	36.8	34.9	29.1	286	34

Table 4 (*cont.*)

	1997	1998	1999	2000	2001	2002
Aid per capita (current prices)						
US$	56.50	46.19	43.29	35.91	31.90	41.17
FJ$	81.57	91.77	85.26	76.43	72.63	90.04

Source: *OECD (2004).*

The return to democracy witnessed, aside from the approval of a program loan for fiscal adjustment and reforms in agricultural and other sectors, implementation over the next ten years of substantial technical assistance projects on grant basis from ADB and AusAid through provision of expatriate expertise in several fields. The latter included public expenditure management and imparting of skills through on-the-job training, preparation of manuals and enactment of a Public Financial Management Act. Table 5 provides details on budget allocation for recurrent expenditures, including wages and salaries. Recurrent expenditures, which formed 85% of total budget expenditures during 1985-89 decreased to around 75% in the 2000s. Wages and salaries have been a major component, and they are still around 50% of total budget expenditures. Both aid per capita and aid as percent of GDP have declined over time. The overall budget balance had been negative all along. Counter-cyclical measures undertaken in 2001, 2002, and 2003 to offset the fall in private investment subsequent to the coup of 2000 contributed to further widening of annual budget deficits, which were financed by domestic borrowing.

Table 5

Fiji: Aid, Growth and Budget Details

Years	Real Per capita GDP F$	Real Per Cap Aid F$	Aid/GDP Ratio %	Budget Balance % of GDP	Ratio of Current Expenditures to Total Budget (%)	Ratio of Wages & Salaries to Total Budget (%)	Annual Inflation (%)	Annual per capita GDP Growth (%)
1970-79 (Ave)	1863.39	62.18	3.4	5.6	73.2	50.9	12.2	2.7
1980-84 (Ave)	2034.48	61.81	3.0	−11.3	77.7	58.3	8.9	−0.5
1985-89 (Ave)	1968.81	72.19	3.7	−6.4	85.1	52.2	6.0	1.0
1990-94 (Ave)	2234.28	79.53	3.6	−4.6	82.2	51.9	5.1	1.3
1995-99 (Ave)	3021.34	70.18	2.2	−4.7	76.2	50.5	3.3	1.3
2000	3220.07	57.96	1.8	−3.2	79.4	52.4	1.1	−3.3
2001	3288.23	51.30	1.6	−6.5	77.9	49.9	4.3	2.1

Table 5 (*cont.*)

Years	Real Per capita GDP F$	Real Per Cap Aid F$	Aid/GDP Ratio %	Budget Balance % of GDP	Ratio of Current Expenditures to Total Budget (%)	Ratio of Wages & Salaries to Total Budget (%)	Annual Inflation (%)	Annual per capita GDP Growth (%)
2002	3384.55	62.62	1.8	−5.6	75.3	49.3	0.8	2.9
2003	3461.64	NA	NA	−6.0	74.4	50.6	4.2	2.3
2004	3566.64	NA	NA	−3.2	77.4	50.7	4.1	3.0

Source: Asian Development Bank 2005, UN ESCAP 2006.
IMF (2005).
Personal Communication with Ministry of Finance, Government of Fiji for figures relating to 1970 to 1975.
NA = not available.

Reforms in public expenditure management should have led to the much-desired improvements in financial management, accountability and discipline. Annual reports of the Auditor-General exposing several scams in various ministries, resulting in the siphoning off of substantial sums, widely reported in detail by local newspapers, have made the public increasingly aware of rising corruption in public life. However, the legal proceedings have been slow, as they are handicapped by lack of expertise in prosecuting the white-collar criminals.[5] Thus, enforcement of accountability through awarding deterrent punishments has been weak. Further, inadequate monitoring and supervision of expenditures within the budgeted limits often led to excesses resulting in supplementary budgets each year. Most of these expenditures happened to be nonessential expenditures, including overseas travel, which were diverted more from the fungible aid moneys meant for soft programs such as empowerment of women and the like,[6] since project-tied aid projects offered less scope for such diversion.

3. Data and Methodology

The aid-growth linkage assumes that aid positively contributes to eco-

[5] These white-collar crimes include alleged reimbursement claims by ministers and bureaucrats of business class travel expenses, when actual travel was reportedly undertaken by economy class as well as "double-dip" reimbursement of attending conferences from both international agencies hosting such conferences and from government ministries. These are often alleged to be committed in collusion with domestic travel agencies.

[6] Hughes (2003) comes down heavily on many soft aid programs of the kind referred to, as their impact has been observed to be minimal and diffused. Expenditures in these aid projects are reported to include needless travel and conferences and seminars, which are heavily consumption oriented.

nomic growth. Recent research studies (Radelet *et al.* 2004; Clemens *et al.* 2004; Rajan and Subramanian 2005) have attempted to capture this phenomenon by incorporating aid into a well-established aid-growth regression using the per capita real GDP (PCGDP) as the dependent variable. We used data covering a 33-year period (1970-2002), which are available on a consistent basis.[7]

Since no detailed data on aid inflows meant for use under different categories of aid funds exists, such as physical and social infrastructural projects, we are constrained to use total aid, converted into Fiji dollars, adjusted for inflation and then include in the analysis as the real aid per capita (PCAID). With a view toward exploring whether returns from aid over time are subject to diminishing returns, we include the variable real per capita aid squared ($PCAID^2$) in our analysis. Also included are two variables, one representing allocational nature of total budget funds, into wages and salaries, and the other representing housekeeping expenditures, namely, the ratio of recurrent expenditures to total expenditures (CETE) and an interaction term between real aid per capita and the ratio of recurrent expenditures to total expenditures (PCAID*CETE). In addition, we include real exchange rate index, which is the outcome of prudent fiscal and monetary policies, as the competitiveness of exports in an open economy is critical for economic growth.

The model is written as follows:

$$PCGDP = F(PCAID,\ PCAID^2,\ CETE,\ PCAID * CETE,\ REER) \qquad (1)$$

For the application of multivariate cointegration procedure developed by Johansen and Juselius (1990), equation (1) can be expressed in the following linear logarithmic regression form:

$$LPCGDP_t = \beta_0 + \beta_1 LPCAID_t + \beta_2 LPCAID^2{}_t + \beta_3 LCETE_t + \beta_4 LPCAID_t * LCETE_t + \beta_5 LREER_t + \varepsilon_t \qquad (2)$$

where L represents the natural logarithm of the relevant variable and ε is the usual white noise error term.

4. Results of Empirical Study

The investigation of the aid-growth relationship in a cointegration framework should start with an examination of the integration properties of

[7] Consistency by itself does not ensure quality. As the series are often revised and announced from time to time, the quality, as well as reliability of data, has often been questioned by researchers, including those from the major user, Reserve Bank of Fiji (Morling and Williams 2000).

the variables under study. If the variables are integrated of order one, I(1), then we can proceed to the cointegration technique. Once the cointegrating vector or long-run equilibrium relationship is established, as a further step, the Granger causality test within vector error correction modeling (VECM) is applied to examine the short-run causality effect between aid and growth.

Unit Root Tests

The unit root test employed in this study is the Phillips and Perron (1988) unit root procedure. The Phillips-Perron (PP) test, which accounts for possible correlation in the first differences of the time series using non-parametric correction, is more powerful than the ADF unit root test, especially in the small sample size, and the test is simpler to be estimated relatively. The results of the unit root test are reported in Table 6. From the PP test, it is found that all variables, except *LPCAID* and $LPCAID^2$, are non-stationary at level. However, these variables are stationary after first differencing.

We also resorted to another complementary unit root procedure proposed by Ng and Perron (2001) to confirm the order of integration of each variable. According to Perron (1989), the usual unit root tests may have low power when the root is very close to the unity circle—that is, estimated coefficient is close to one—and decreases as deterministic factors are added. In order to avoid these problems, Ng and Perron (2001) modified the Phillips-Perron's (PP) Z tests and constructed a group of unit root tests, called GLS-MZ tests, with good size and power. The new tests have high power in the local frontier to unity in the presence of different estimates for deterministic factors. Results given in the last two columns of Table 6 confirm that all variables are integrated of order one.[8]

Table 6

Results of Unit Root Tests

Variables in logs	PP Test		Ng and Perron Test, MZa	
	Level (Constant with Trend)	First Difference (Constant without Trend)	Level (Constant with Trend)	First Difference (Constant without Trend)
Sample period: 1970-2002				
LPCGDP	−1.54 (3)	−6.87** (2)	−5.15 (0)	−15.53** (0)
LPCAID	−4.58** (3)	−11.92** (2)	−13.93 (0)	−13.55** (0)
$LPCAID^2$	−4.44** (3)	−11.48** (3)	−13.88 (0)	−12.30** (0)
LCETE	−2.11 (1)	−6.24** (2)	−4.85 (0)	−17.47** (0)

[8] We also conducted KPSS unit root test to examine the properties of the variables. The results of the test statistic provide convincing evidence to support Ng-Perron's findings.

Table 6 (*cont.*)

Variables in logs	PP Test		Ng and Perron Test, MZa	
	Level (Constant with Trend)	First Difference (Constant without Trend)	Level (Constant with Trend)	First Difference (Constant without Trend)
LPCAID*LCETE	−2.49 (2)	−6.26** (1)	−6.89 (0)	−15.27** (0)
LREER	−3.13 (2)	−4.32** (0)	−5.90 (0)	−15.80** (0)

Note: The PP critical value at 5% level is −2.96 and −3.56 for constant without trend and constant with trend regressions, respectively. These critical values are based on Mckinnon. The optimal lag is selected on the basis of Akaike Information Criterion (AIC). The Ng and Perron critical value is based on Ng and Perron (2001) critical value and the optimal lag is selected based on Spectral GLS-detrended AR based on SIC. The null hypothesis of the test is that a series has a unit root. The asterisk ** denotes the rejection of the null hypothesis at the 5% level of significance. The figures in brackets denote number of lags.

Testing for Cointegration

Having found that all variables are integrated of order one, the Johansen-Juselius (JJ) multivariate cointegration test is used to examine the long-run relationship among the variables. The vector autoregression (VAR) model is generally used for forecasting a system of interrelated macroeconomic time series and for analyzing the dynamic impact of random disturbances on the system of variables. Following Johansen and Juselius (1990) and Johansen (2000), we specify that sampling distribution for the aid-growth regression, as stated in equation (2), is supposed to be of six variables. Let $\mathcal{Z}_t$ = ($LPCGDP_t$, $LPCAID_t$, $LPCAID^2{}_t$, $LCETE_t$, $LPCAID_t$*$LCETE_t$, $LREER_t$), be generated from a VAR(k) model with a constant term φ and Gaussian errors $\varepsilon_t \sim niid\ (0, \Sigma)$.

$$\mathcal{Z}_t = \Pi_1\mathcal{Z}_{t-1} + \Pi_2\mathcal{Z}_{t-2} + \ldots + \Pi_k\mathcal{Z}_{t-k} + \varphi + \varepsilon \tag{3}$$

Then, we rewrite equation (6) in the error correction form:

$$\Delta\mathcal{Z}_t = \Pi\mathcal{Z}_{t-1} + \Gamma_1\Delta\mathcal{Z}_{t-1} + \Gamma_2\Delta\mathcal{Z}_{t-2} + \ldots + \Gamma_{k-1}\Delta\mathcal{Z}_{t-k+1} + \varphi + \varepsilon_t \tag{4}$$
$$\Pi = I - \Pi_1 - \Pi_2 - \ldots - \Pi_k$$

where $\Delta\mathcal{Z}_t$ contains the growth rates of the variables, the parameters ($\Gamma_1, \ldots, \Gamma_{k-1}$) define the short-run adjustment to the changes of the process and are estimable parameters, whereas $\Pi = \alpha\beta'$ defines the short-run adjustment (α), and the long-run relations (β). Johansen (2000) proves that if $\mathcal{Z}_t \sim I(1)$, Π has the reduced rank of r and can be represented as $\Pi = \alpha\beta'$. The parameterization in $\Pi = \alpha\beta'$ facilitates the investigation of the r linearly independent stationary relations between the levels of the variables and the p-r linearly independent non-stationary relations. Thus,

the representation of $\Pi = \alpha\beta'$ implies that the process ΔZ_t is stationary, ΔZ_{t-1} is non-stationary, but also that $\beta' Z_{t-1}$ is stationary (Johansen 2000). We, therefore, can interpret the relation $\beta' Z_{t-1}$ as the stationary relationship among non-stationary variables, that is, as cointegrating relations. Therefore, we can exploit the idea that may appear co-movements in their behavior and possibilities that they will move together towards a long-run equilibrium state. Johansen (1991, 2000) and Johansen and Juselius (1990, 1992) developed the likelihood procedure for estimating the parameters and testing the order of cointegration rank and the various hypotheses on the restrictions of parameters.

The results of JJ technique are reported in Table 7. The testing strategy starts with p = 0. Applying both trace and maximum eigenvalue test statistics, one can reject the null hypothesis of p = 0 against its alternative p = 1. The test statistics, however, do not reject the null p ≤ 1 against its alternative p = 2, which suggests the presence of one cointegrating vector between *LPCGDP, LPCAID, LPCAID*^{2}*, *LCETE*, and the interaction term between *LPCAID* and *LCETE* and *LREER*.

Table 7

Results of Johansen and Juselius Multivariate Procedure
(VAR with 1 lag)

Variables: *LPCGDP LPCAID LPCAID*^{2} *LREER LCETE LPCAID*LCETE*
Sample Period: 1970-2002 (33 observations)

I. Eigenvalue
0.7964 0.5503 0.5183 0.2762 0.1182 0.0567

	Trace		Maximum Eigenvalue	
Ho:rank = p	**Test Statistic**	**95%**	**Test Statistic**	**95%**
p = 0	108.87*	95.75	47.74*	40.07
p ≤ 1	61.12	69.81	23.97	33.87
p ≤ 2	37.14	47.85	21.91	27.58
p ≤ 3	15.22	29.79	9.69	21.13
p ≤ 4	5.52	15.49	3.77	14.26
p ≤ 5	1.75	3.84	1.75	3.84

II. Normalized cointegrating coefficients (standard error in parentheses)

LPCGDP	LPCAID	LPCAID^2	LREER	LCETE	LPCAID*LCETE
−1.0000	33.9522***	−3.9421**	−0.4652***	−125.0732***	69.0916***
	(6.7123)	(1.9632)	(0.1021)	(17.3504)	(9.6625)

Table 7 (*cont.*)
III. Diagnostic Checking
VEC Residual Serial Correlation LM Tests
H_0: no serial correlation at lag order h

Lags	LM-Stat	Lags	LM-Stat
1	34.30 [0.5493]	3	29.56 [0.7670]
2	27.97 [0.8292]	4	39.98 [0.2975]

VEC Residual Normality Tests
H_0: residuals are multivariate normal
Jacque-Bera Normality = 31.85*** [0.0015]

Notes: ** and *** indicate significant at 5% and 1% levels. Figures in bracket [ ] refer to probability value. Figures in square parentheses ( ) refer to standard error.

The normalized cointegrating vector is shown in Panel II, Table 7, and summarized as follows:

$$\begin{aligned} LPCGDP = {} & 33.95\ LPCAID^{***} - 3.94\ LPCAID^{2**} - 125LCETE^{***} \\ & (6.71) \qquad (1.96) \qquad (17.35) \\ & +69.09LPCAID*LCETE - 0.46LREER^{***} \qquad (5) \\ & (9.66) \qquad (0.10) \end{aligned}$$

**** indicates significance at 1 per cent level*

(The figures in parentheses are standard errors.)

The existence of a unique cointegrating vector between these variables reflects a stable equilibrium relationship to which the variables have a tendency to restore from a deviation in the long-run.

The results confirm (i) aid contributes positively to growth and is subject to diminishing returns; and ii) a higher ratio of recurrent expenditures to total expenditures has a negative effect on growth; and (iii) a competitive real exchange rate policy promotes growth.

Contribution of aid to growth is accompanied by diminishing returns of aid to growth and indicates that benefits from aid increase with initial inflows but after achieving a certain level, they begin to decline so that the country would actually be better off with less aid. Prudential policies towards lessening aid can be beneficial for growth and at the same time raise the effectiveness and efficiency of aid (Lensink and White 2000). This phenomenon is defined as the aid Laffer curve. Griffin (1970) in a pioneering study indicated the possibility of a negative effect of aid on productivity and then on growth. He argued that aid would reduce the productivity of investment so that, if this effect were sufficiently large, aid would reduce growth. This circumstance occurs because good policies and aid are "substitutes" in this case (Burnside and Dollar 2000).

It is important to know the break-even, or turning point in the per capita aid above which more aid has a negative marginal impact on growth. The break-even point can be calculated through the following calculations:

$$LPCGDP = 33.9522LPCAID - 3.9421LPCAID^2$$

$$\frac{\partial LPCGDP}{\partial LPCAID} = 33.9522 - 7.8842LPCAID = 0$$

$$LPCAID = 4.3064$$

$$anti\ln(4.3064) = e^{4.3064} = 74.17$$

Based on our calculations, the turning point of per capita aid is F$74.17. This means that if Fiji's foreign aid reaches about F$74.17, rate of economic growth will crawl to zero; and if aid exceeds this value, there would be a negative impact of aid on economic growth, as the law of diminishing returns would operate. In line with Lensink and White's (2000) findings, we conclude that there is strong evidence of aid Laffer curve in the Fijian economy. The turning point in Fiji's case is much higher than the current average per capita aid (F$67.18) over the period 1970-2002.

The positive magnitude and statistical significance of the coefficient of the interaction term between per capita aid and the ratio of wages and salaries to total expenditure (PCAID*CETE) imply that aid is effective when government consumption is under control.

$$LPCGDP = 33.95LPCAID - 69.09LPCAID*LCETE)$$

$$\frac{\partial LPCGDP}{\partial LPCAID} = 33.95 - 69.09LCETE = 0$$

$$LCETE = -0.49$$

$$anti\ln(-0.49) = e^{-0.49} = 61.18$$

In the long run, if the *CETE* were more than 61.18%, aid effectiveness would be negative. This has a policy implication that government has to control its consumption expenditure and release more funds for development expenditure.

Granger Causality Test within Vector Error Correction Model (VECM)

After examining and confirming the presence of the long-run equilibrium relationship, an error correction term (ECT) has to be incorporated into the short-run model in estimating causality (Engle and Granger, 1987). This procedure is needed because, according to the standard Granger causality tests, it is possible to find no causal relationship between two or more variables that are cointegrated (Granger, 1988). The inclusion

of ECT reintroduces the information lost in the differencing process, thereby allowing for long run equilibrium as well as short-run dynamics. On expanding equation (4), the model can be expressed as follows:

$$\Delta Z_t = \varphi_1 + \sum_{t=1}^{p} \beta_1 \Delta\, LPCGDP_{t-p} + \sum_{t=1}^{p} \beta_2 \Delta LPCAID_{t-p} + \sum_{t=1}^{p} \beta_3 \Delta LPCAID^2_{t-p} + \sum_{t=1}^{p} \beta_4 \Delta LECETE_{t-p} + \sum_{t=1}^{p} {}_5\Delta LPCAID*LCETE_{t-p} + \sum_{t=11}^{p} \beta_1 \Delta LREER + \delta ECT_{t-1} + \varepsilon_t \quad (6)$$

Where $Z_t = (LPCGDP_t,\ LPCAID_t,\ LPCAID^2_t,\ LCETE_t,\ LPCAID_t*LCETE_t,\ LREER_t)$

ECT_{t-1} is the lagged one error correction term, and ε_t is the Gaussian disturbance term. Equation (6) exhibits the intertemporal interaction between economic growth, per capita aid, ratio of recurrent expenditure to total expenditure, the interaction term and real effective exchange rate in the aid-growth hypothesis.

Once the equilibrium conditions represented by the cointegrating relations are imposed, the VECM describes how in each time period, the economic growth is adjusting towards its long-run equilibrium state. Because the variables are supposed to be cointegrated, then in the short term, deviation of output from its long-run equilibrium path will feed back on its future changes in order to force its movement towards the long-run equilibrium state. The coefficient of the error-correction term, however, represents the proportion by which the long-run disequilibrium in the dependent variables is corrected in each short-term period. Using the model developed in Equation (6), Granger causality tests between the variables can be examined through a joint *F*-test or a Wald test applied to the coefficients of each explanatory variable in one equation.

Table 8 presents the results of the error correction models. The appropriate lag length for each regression was selected based on the Akaike Information Criteria. In Table 8 (last column), the results indicate that the error correction coefficients in the per capita GDP (*LPCGDP*) and per capita aid (*LPCAID*) specifications are statistically significant at 1 per cent level. The magnitudes of 0.0256 and 0.0022 in the per capita GDP and per capita aid regressions indicate adjustment towards the long-run relationship is about 2.56% and 0.22% cent per annum, respectively. This factor implies that any deviation from the long-run equilibrium is corrected rather slowly for the per capita GDP and per capita aid equations in the following year.

Table 8

Summary of Temporal Causality Results based on Vector Error-Correction Model

Dependent Variables	ΔLPCGDP	ΔLPCAID	ΔLPCAID^2	ΔLCETE	ΔLPCAID* ΔLCETE	ΔLREER	**Lagged ECT (t-statistics)**
			Short-run lagged differences (F-statistics)				
ΔLPCGDP	–	6.05**	9.39**	7.04***	8.32***	7.26***	–0.0256*** (–4.88)
ΔLPCAID	0.75	–	5.41**	820.65***	2725.62***	1.56	–0.0022*** (–3.27)

Note: The ECT was derived by normalizing the cointegrating vector on *LPCGDP* (*LPCGDP* equation) and *LPCAID* (*LPCAID* equation). Figures presented in the last column are estimated *t*-statistics testing the null that the lagged ECT is statistically insignificant for each equation. All other estimates are asymptotic Granger *F*-statistics. The VECM was estimated including an optimally determined (Akaike's FPE) lag structure of 3 for all lagged-difference terms and a constant.
*, ** and *** indicate significance at 10%, 5% and 1% levels.

The *F* statistics for the joint significance test show that for per capita GDP specification, the null hypothesis that changes in the per capita aid did not influence per capita GDP can be rejected at the 5% level. This suggests that changes in per capita aid Granger cause per capita GDP. In contrast, per capita GDP does not appear to Granger cause changes in per capita aid. This, together with the significance of the error correction term in the per capita GDP equation, provides strong evidence in favor of the aid-led growth hypothesis.

Statistically satisfactory results are obtained with good adjusted R-squared. These two equations pass the diagnostic tests (normality, heteroskedasticity, autocorrelation, and misspecification tests) at the 5% level, and the Recursive residuals and CUMSUM of squared tests do not detect the presence of structural instability.

5. Summary and Conclusions

This paper examined aid effectiveness in the Pacific island countries. The focus of examination was on public financial management since aid funds are channeled through governments. As aid is fungible, there is growing criticism that aid was often diverted to government consumption, defeating the purpose behind aid, which was to supplement inadequate domestic savings for financing growth-enhancing investment. The hypothesis is that better expenditures control and monitoring of the budgeted expenditures and keeping the recurrent expenditure covering wages and salaries and travel and other housekeeping components lower relative to total budgeted expenditures would ensure proper use

of aid funds and contribute to higher growth represented by real GDP per capita.

Since Fiji, like all other PICs is an open economy with heavy dependence on imports for fuel, machinery, and intermediate products as well as basic necessities, there is all round recognition that export earning capacity for paying a growing import bill has to be stepped up by having a competitive real exchange rate. The latter represents the outcome of sensible monetary and fiscal policies, as budget deficits, if financed through domestic borrowing or monetization by central banks, result in domestic inflation. Prudent policies would contribute to lessen the impact of Dutch Effect, which is attributed to rise in the prices of non-tradable and consequent appreciation of real exchange rate.

Fiji was chosen for a case study, as it offered a longer time series of data on aid and budget allocation for a meaningful econometric investigation. A simple model was formulated with real GDP per capita as dependent variable. The explanatory variables included real aid per capita; ratio of recurrent concurrent expenditures to total expenditures; and real exchange rate. The unit root tests revealed that the data of all variables were non-stationary in levels but stationary in first differences and hence a cointegration procedure was adopted and an error correction model estimated. As the results indicated the presence of one cointegrating vector, the cointegrating equation with real GDP per capita as dependent variable showed that growth is positively associated with aid. However, aid is subject to diminishing returns. The results also confirmed that a lower ratio of recurrent expenditure to total expenditure contributes to growth, indicating that aid funds when not diverted to government consumption are better utilized for capital expenditure. The study also estimated the threshold ratio of recurrent expenditure to total expenditure. The current level of 70 percent is higher than the threshold ratio of 62 per cent. The results also showed that real exchange rate is negatively associated with growth confirming that sensible policies keeping inflation low contributed to growth.

The policy implications are clear: Stronger management of public expenditure is critically needed. Thanks to the past and present technical assistance projects funded by bilaterals and ADB, the region is sufficiently littered with manuals and guidelines on public financial management, "aside from the locally owned good policies" (AusAID 2005), not to speak of the near permanent presence of expatriate consultants in the ministry of finance. The problem is not only a lack of clear focus on implementation of good policies but also an absence of a serious commitment on the part of administration in the recipient countries and of adequate monitoring by and coordination among the donors.

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