PRIVATE INVESTMENT AND MACROECONOMIC ENVIRONMENT IN THE SOUTH PACIFIC ISLAND COUNTRIES: A CROSS-COUNTRY ANALYSIS

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Foreword

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Table of Contents

Abstract

The paper undertakes an empirical investigation of key macroeconomic factors affecting private investment in the South Pacific developing member countries (SPDMCs), namely Fiji, Kiribati, Solomon Islands, Tonga, Vanuatu, and Western Samoa. The study finds that instability in the real exchange rate had a sizeable adverse effect on private investment. This particular instability is a product of many uncertainties, reflecting the SPDMCs' structural rigidities as well as fiscal and monetary imbalances. On the other hand, growth in output had an expansionary effect on private investment, although of a low magnitude, while public investment had a contractionary influence. The SPDMCs' macroeconomic management needs vast improvements. Annual fiscal balances should be reduced and rising recurring expenditures that encroach upon domestic savings should be kept under control. These measures would contribute to maintaining low inflation and reducing the variability in inflation and the real exchange rate.

I. Introduction

Recent studies (McGregor et al. 1992; MacMaster 1993; World Bank 1993, 1995a) on the growth and development of the private sector in the South Pacific developing member countries (SPDMCs) have highlighted the dominance of the public sector. During the last decade, investment in SPDMCs averaged about 29 percent of GDP, of which about 17 percent was by the public sector and 12 percent by the private sector. Various reasons have been ascribed to this phenomenon. Foremost among them were the fact that SPDMCs' private sectors lacked the financial, managerial, and technical capabilities to develop opportunities, and a strong belief that without government investment efforts many new industries and business enterprises would not be established (Jayaraman 1995b).

Further, access to external expertise and capital provided by the bilateral donors and multilateral agencies had encouraged the governments to play a lead role in the productive sectors. However, these efforts failed to deliver the expected stimulus to private investment. Poor performance by public enterprises led to a growing fiscal burden each year, which proved to be a disincentive for private investment as price stability and maintaining the competitiveness of their exports were adversely affected. As a result, the annual average rate of growth of SPDMCs has been low, at only 2 percent.

The World Bank study (1995a) showed that while public investment displayed the characteristics of lumpiness and a long gestation period as well as occasional unproductiveness, private investment was found to be positively correlated with growth. Accordingly, a growth-oriented strategy was recommended with a stress on limiting the government role to provision of physical and social infrastructure in terms of power and transport, communications, education and health, and appropriate administrative systems and support services.

In addition, there has been a growing realization that a more conducive macroeconomic environment is critical to ensure price stability and competitiveness of exports, without which investments by the private sector are unlikely to be profitable and hence sustainable. A study of the essential components of an enabling macroeconomic environment is the focus of this paper. The objective of the paper, which is organized into three sections, is to undertake an empirical investigation of key macroeconomic factors affecting private investment in the South Pacific. The first section deals with the theoretical aspects of an enabling macroeconomic environment and presents a survey of the empirical literature; the second section examines trends in private investment in six SPDMCs, namely Fiji, Kiribati, the Solomon Islands, Tonga, Vanuatu, and Western Samoa; the third section outlines a simple econometric model for finding out the determinants of an appropriate macroeconomic environment and testing certain hypotheses identified in the first section; and the last section presents some conclusions and recommendations.

II. The Macroeconomic Environment: A Brief Survey

A. Two Main Challenges

A low rate of inflation and appropriate pricing of capital, labor, and land to maintain international competitiveness are two of the main macroeconomic challenges facing SPDMCs (World Bank 1995a). A high rate of inflation will tend to discourage private savings and investment. This calls for responsible fiscal policies which avoid persistent budget deficits as well as a disciplined approach to monetary policies, including self-denial in resorting to domestic borrowing from monetary authorities (Fairbairn 1992).

Maintenance of international competitiveness requires proactive real exchange rate management policies. Toward this objective, prudent public sector wage setting policies are needed so as to set an example for wage fixation in the private sector. These will prevent domestic resources from being overvalued and ensure that domestic investors are discouraged from investing overseas while overseas investors are encouraged to make new commitments (Siwatibau 1993).

B. Growth and Private Investment

Studies of investment behavior have shown that private investment responds strongly to fluctuations in output (Blejer and Khan 1984, Greene and Villanueva 1991). In countries where specific macroeconomic adjustment programs were implemented, private investment behavior in response to downward adjustment measures was pronounced. Recessionary developments triggered by demand management policies generally contribute to pessimistic expectations. These lead investors to postpone investment until recovery takes place. There is also a fear that such waiting may prevent the take-off of investment, especially of projects of a short gestation period, and delay recovery itself, and hence the economy might get trapped in a low-investment equilibrium (Serven and Solimano 1993).

C. Macroeconomic Policies

1. *Monetary Policy.* The user cost of capital is an important factor in investment decisions by the private sector. When the user cost is generally raised by increasing the cost of bank credit or by increasing the opportunity cost of retained earnings, which is the other main source of investment financing, private investment declines. Findings of various empirical studies are not, however, consistent. While the negative influence of interest rates on investment is confirmed by certain studies (Greene and Villanueva 1991, Solimano 1992), studies by others (Serven and Solimano 1993; van Wijnbergen 1985a, 1985b) have shown that in the repressed financial markets, credit policy affects investment directly through the stock of credit available to firms with access to preferential interest rates, rather than through the indirect interest channel. Thus, the institutional setup of the financial markets is an important factor for the transmission mechanism of the impact of monetary and credit policies on private investment. The financial markets in SPDMCs are rudimentary except in Fiji. Until very recently, regulatory measures have also seriously distorted the incentives to save and invest.

2. *Fiscal Policy.* Fiscal policy affects private investment through budgetary imbalances. Persistent fiscal deficits either push up interest rates or reduce the stock of credit available to the private sector and thus tend to crowd out private investment. A reduction of budgetary deficits or running surpluses would encourage private investment. Findings of various empirical studies on the relationship between public and private investment have, however, been conflicting. While Balassa's cross-sectional study (1988) has shown the presence of a negative relationship, Greene and Villanueva (1991) in their cross-sectional study of 23 countries have established a positive association between public investment and private investment.

It has also been shown that public investment in physical infrastructure such as power and transport is complementary to private investment, whereas other types are not (Blejer and Khan 1984). Macroeconomic adjustment programs generally consist of reductions in public investment. If such reductions lead to decreases in investments in new infrastructure facilities such as power and transport, one would expect adverse effects on private investment.

D. Exchange Rate Policy

Exchange rate management has clear implications for private investment. To correct external imbalances from time to time, real depreciations of domestic currency have been resorted to by SPDMCs (Jayaraman 1995a, 1995e). In the empirical literature (Dornbusch 1988, Serven 1990, Serven and Solimano 1993), three main channels through which a real depreciation affects private investment have been identified: (i) real cost of capital goods, (ii) real interest rate, and (iii) real output. A real depreciation leads to a rise in the import cost of capital goods and this leads to contraction of nontradable activities. The higher the dependency on imported capital and intermediate goods and the lower the proportion of the traded goods sector in the country's total economic activities, the greater would be the adverse impact of a real depreciation on the level of private investment.

In the case of an unanticipated devaluation as well as under the assumption of interest rates being determined by market forces, devaluation of the currency raises the price level through a rise in the costs of imported capital and intermediate goods and wages under indexation. In these circumstances, given the money supply, real money balances will fall, leading to increases in interest rates and, consequently, investment would fall. If the devaluation was already anticipated and if it has succeeded in eliminating the expectations, then it may result in an investment expansion, since the required return on capital would tend to fall reflecting the reduction in the anticipated rate of depreciation. Serven (1990) notes that this would however depend upon the degree of capital mobility and also on the import content of investment.

The impact of a depreciation on the level of output is through its impact on aggregate demand. Generally, the effect of a depreciation on aggregated demand is contractionary as the net effect of slow-acting substitution and the immediate income effects arising from real depreciation is generally contractionary. Accordingly, aggregate demand will be reduced. In addition, a real depreciation has in the short run, adverse supply-side effects that lead to output contraction, such as the increased real cost of imported inputs (in terms of domestic goods) and the rise of working capital costs due to increased interest rates (Serven and Solimano 1992). The resultant impact is contractionary and private investment will fall in the short term. However, in the medium term, with a

sufficiently strong impact of the devaluation on net exports, an expansionary outcome is a likely result and hence investment will pick up. The supporting measures which are, therefore, needed for sustaining the positive medium-term effects are strong commitments to end uncertainties.

E. Ending Uncertainties

Uncertainties arise out of weak implementation of the declared policies. Dornbusch (1988) and Rodrik (1989) underscore the importance of investors' perceptions about the government's willingness to carry out a private sector-oriented growth strategy. It has been noted that a very important source of uncertainty is the imperfect credibility of policy reforms. For example, if a trade reform is perceived as temporary or if it is half-heartedly spelled out or implemented, private investors would postpone investment in the traded and nontraded sectors and would wait to obtain additional information or check whether the signals they get are contrary or confirmatory ones (van Wijnbergen 1985b).

Two of the uncertainties which have been noted in the empirical literature that are of importance relate to changes in the price level and movements in real exchange rate. Indications of a firm and irreversible approach to meet the situations would reduce the negative impact of relative price and real exchange rate uncertainties on investment. If the investment incentive structure designed for encouraging private investment is firmly based on credibility, stability, and predictability, policy measures including real depreciation will end all uncertainties and they can have strong impacts on aggregate investment.

F. Institutional Reforms

In addition to policy reforms, the subject of stability in institutions for promoting investment and growth has been receiving increasing attention. Broadly defined, institutions include rules, regulatory and legal frameworks, and social norms governing the ways by which economic transactions take place between firms and individuals. North (1990) stresses that transaction costs are significant and that complexity, uncertainty, and limited information facing individuals and firms in decision making increase transaction costs. Institutional reforms seek to reduce these costs.

Williamson (1994) points out there are differences in the nature and level of investment and the characteristics of contracting. Where general investments are assets that can be redeployed, spot markets are the flexible form of exchange. Where investments are related to production processes of products, long-term contracting is required. Long-term contracts need regulatory procedures and an independent, effective, and speedy judicial system to enforce observance of regulations, settle disputes, and implement a strong commitment to abide by judicial decisions. Where these conditions are not fulfilled, transaction costs will increase and both the volume and types of investment will be adversely affected. Generally, investors would shift to more mobile, footloose, and less durable assets and in particular, they would prefer a lower level of technological production processes, which entail less investment expenditures.

III. Private Investment and Economic Reform in the South Pacific

This section deals with the trends in private investment for the six selected countries in the South Pacific. While the national accounts data on income and investment for Fiji are available from the early 1970s and are fairly up to date and complete, the relevant data for the other five countries (Kiribati, the Solomon Islands, Tonga, Vanuatu, and Western Samoa) are available only from the early 1980s up to 1990. Table 1 provides a comparative picture of private and public investment for an eight-year period (1983-1990). For all the six SPDMCs, the average gross investment rate (defined as ratio of gross investment to GDP) during the eight-year period was about 29 percent. The public investment rate was on average 17 percent and private investment was 12 percent. There has however, been considerable variation among the six SPDMCs in regard to the relative importance of private investment as compared to public investment. In Western Samoa, Kiribati, and Tonga, the public investment rate was much higher than the private investment rate. In Fiji and the Solomon Islands, both private and public investment rates have been very similar. In Vanuatu, the private investment rate has been higher than the public investment rate.

TABLE 1
Average Investment Rates in Six Selected SPDMCs, 1983-1990

Country	Gross Investment/GDP (ave. percent per year)	Private Investment/GDP (ave. percent per year)	Public Investment/GDP (ave. percent per year)	Rate of Growth (ave. percent per year)
Fiji*	18.1	9.2	8.9	2.4
Kiribati	31.0	12.0	19.0	0.8
Solomon Islands	30.7	15.1	15.6	3.2
Tonga	30.0	10.4	19.6	2.1
Vanuatu	32.4	20.4	12.0	2.8
Western Samoa	32.1	5.6	26.5	1.0

* 1983-1990

Source: World Bank (1995a).

A. Fiji

1. *Trends in Private Investment.* Table 2 presents trends in the investment rates and the annual growth rates of the economy over a 20-year period (1975-1994). But private and public investment rates have fallen since the early 1980s. From 25.4 percent in 1980, the gross investment rate fell to a record low figure of 12.5 percent in 1994, which is considered the lowest among all SPDMCs. A major reason for this was a decreasing trend in the rate of public investment after 1981 as most of the infrastructure construction activities initiated during the early 1970s were completed by 1985 (Treadgold 1992).

TABLE 2
Fiji: Ratio of Private, Public, and Total Investment to GDP (%)

Year	pi	gi	i
1975	12.6	8.0	20.6
1976	13.0	8.5	21.5
1977	11.7	9.5	21.2
1978	13.7	9.1	22.8
1979	17.4	10.1	27.5
1980	13.7	11.7	25.4
1981	12.4	14.2	26.6
1982	10.2	13.4	23.6
1983	9.8	11.1	20.9
1984	10.3	6.8	17.1
1985	12.2	6.0	18.8
1986	9.9	4.8	14.7
1987	9.8	5.8	15.6
1988	6.8	7.2	14.0
1989	5.7	7.7	13.4
1990	6.1	12.0	18.1
1991	6.0	7.7	13.7
1992	6.5	6.7	13.2
1993	4.7	8.9	13.6
1994	4.7	7.8	12.5

pi = PI/GDP
gi = GI/GDP
i = I/GDP

Source: World Bank (1995a, 1995b).

During 1981-1985 as the rate of public investment decreased, private investment rose to 12.2 percent in 1985 after an initial slump in the early 1980s and steadied to around 10 percent in 1986 and 1987. It is uncertain whether the two military coups of 1987, which represented a major economic and political watershed for Fiji, had any permanent adverse effect on private investment. However, it is generally recognized that there has been a perceptible downward trend in the gross investment rate and the decline in the rate of private investment was pronounced (Fallon and King 1995, Hunt and Chandra 1995).

2. *Economic Reforms.* A promising period of proactive exchange rate policy management and deregulation measures marked the post-coup years. Primarily with a view to stemming the capital outflows in the wake of political and economic uncertainties, two massive devaluations by about 35 percent were resorted to in 1987. Despite the surge in domestic prices in 1987 and 1988, these two nominal devaluations resulted in substantial depreciation of the real exchange rate. In addition, wage settlements below the variation in the consumer price index not only improved the competitiveness of exports but also encouraged new export industries such as garments and consumer goods including processed primary goods (Siwatibau 1993). However, more recent trends are disturbing. The upward drift in the real exchange rate, fuelled by high relative domestic inflation rates in 1994 and 1995 have left the private sector facing a steadily increasing disincentive to invest and expand (Hunt and Chandra 1995).

Deregulation measures including reforms in the financial sector, which were introduced in the late 1980s, encouraged the determination of interest rates by market forces. Restrictions on capital movements were slowly relaxed and the country's outward looking strategy was further supported by tax reforms including the introduction of a broad-based value-added tax to replace cumbersome commodity trade taxes. Import licenses were replaced by low tariff rates.

On the fiscal front, the government stressed fiscal stability and reducing annual budget deficits (Jayaraman 1995c). Measures for the privatization and corporatization of public enterprises were set in motion. Although progress has been slow, the government's commitment is widely known and the private sector has seen the signals. Deregulation in the labor market is on the reform agenda. This is yet another area where implementation of planned reforms is not easy, thereby leaving wage levels to be market-determined and linked to productivity.

The emergence of new industries such as garments in 1988 and 1989 kept the private investment rate at close to 10 percent. The introduction of Tax Free Factory/Tax Free Zone schemes in 1989 also encouraged foreign direct investment activity. However, in the next four years, the private investment rate declined. A step-up in public investment during 1987-1990 failed to inspire private investment which continued to remain sluggish at 6 to 6.5 percent of GDP. Since the domestic saving rate of Fiji is fairly healthy at about 18 percent of GDP, which is the highest among all SPDMCs (Jayaraman 1996), a lack of domestic resources or institutional arrangements for their channelling into investment in the face of well-established development finance agencies cannot be identified as reasons behind the lackluster private investment activity. Obviously, there are other factors which appear to have determined the observed private investment behavior. These include continuing political uncertainty, the price of labor, and the high value of the Fiji dollar (Hunt and Chandra 1995).

B. Kiribati

1. *Trends in Private Investment.* Kiribati's investment environment is constrained by the country's remoteness and limited infrastructure. As the domestic market is narrowly based, even production through import substitution of simple consumption goods has not attracted private sector investments of a sizeable nature. The only potential for growth in investment is tourism and marine fisheries. Public sector investment in airport construction activities, including the upgrading of existing airports and infrastructure facilities is critical. Some of the major components of public investment include reopening the Kanton airport after improvements and upgrading the Bonriki airport.

Besides the major investments in public infrastructure, the public sector has been heavily involved in communications and other commercial activities, on the ground that there is no effective private entrepreneurship within the country. The gross investment rate during 1983-1990 averaged at 31 percent with public investment at 19 percent and private investment at 12 percent. But this average masks dramatic changes in the composition of gross domestic investment in 1986, with private investment plummeting, and public investment growing dramatically. In 1989 and 1990, there was a further deterioration in the investment climate due to uncertainty and a rise in the price level, with the result that private investment was negative.

2. *Economic Reforms.* Economic reforms under implementation include provision of an appropriate incentive and regulatory framework for attracting private investment. There appear to be some immediate possibilities for encouraging indigenous entrepreneurship and long-term prospects of attracting direct foreign investment (DFI) and joint ventures. Downsizing public sector activities through steps such as contracting to local small-scale entrepreneurs for repair and maintenance is under consideration. Through DFI, besides tourism, exploitation of marine fishery resources which is the mainstay of the economy offers substantial potential for growth and the emergence of small-scale private sector ancillary activities. About 12 nonperforming public enterprises have already been identified by a restructuring committee for privatization. In view of the shortage of skills, joint ventures with foreign investors are being encouraged.

On the fiscal front, budgetary controls have proved effective in recent years. Recurrent expenditure has been maintained within the bounds of domestic revenue and drawdowns of interest from the Revenue Equalization Fund. The development budget is fully covered by external grants. Total expenditure has been brought down from 110 percent in the mid-1980s to 87 percent of GDP. Careful management of public finances has been the reason for modest inflation, which averaged about 5 percent since 1988. Kiribati has no monetary authority of its own and its currency is the Australian dollar. The monetary discipline imposed by these circumstances have also contributed to monetary stability. Given the favorable macroeconomic situation, improvements in incentives and regulatory reforms initiated recently, including the preparation of an investment code, are expected to encourage the investment environment.

C. Solomon Islands

1. *Trends in Private Investment.* A high level of private sector operations matched by the public sector characterizes capital investment during 1983-1990. While most of the private investment was in logging, tree crop plantations, and commercial fishing, public investment has been in infrastructure including road and transport sectors and power generation, besides joint ventures with foreign investors in fisheries. While the gross investment has been more than one-third of GDP throughout the study period, there has been a declining trend during the late 1980s. From a high rate of 35 percent in 1988, the gross investment rate decreased to 29 percent in 1990 and notably, public investment also declined significantly. The private investment rate increased during the corresponding period from 10 percent in 1988 to 15 percent in 1990.

However, it has been noted by studies including the World Bank (1993, 1995a) and AUSAid (1991) that the problem in the Solomon Islands has been inefficient public investment. A considerable proportion of public investment has been of long gestation, whose full returns have not yet been realized. Further, most of the public sector agencies implementing the investment projects such as transport and power have weak institutional capacities and inappropriate incentives. Added to these deficiencies, there has been a clear tendency of public investment to crowd out private investment. Fiscal expansion during 1980-1988 reflected recurrent expenditures such as frequent wage increases and the steady rise in annual subsidies to nonperforming public enterprises, in addition to increases in capital spending. Overall budgetary deficits during these years were financed by borrowing, both from the banking system and monetary authority. The resultant double digit inflation for a continuous period of five years from 1985 to 1990 led to a sharp decline

in credit for the private sector as well as an appreciation of the real exchange rate, hurting exports (Jayaraman 1995a).

While the fiscal expansion went unabated and the Central Bank of the Solomon Islands was unable to limit government borrowing, the only option open to the monetary authority was to restrain credit, which hurt the private sector as the availability of credit was severely restricted. On the exchange rate front, the Central Bank acted decisively by resorting to devaluation of the nominal exchange rate on a periodical basis to maintain the competitiveness of exports. The monetary authority's actions were not matched by equal fiscal restraint, although the public investment rate was reduced during 1989 and 1990. Recurrent expenditures were on the increase as the size of the public sector was still relatively high and steady rise in public sector consumption nullified any positive action to restore macroeconomic stability (Jayaraman 1994b).

2. *Economic Reforms.* Fiscal discipline is a priority item in the agenda of possible government actions to return to a more conducive macroeconomic environment for growth, with a greater role for the private sector. This calls for careful expenditure control measures in the short run, including civil service wage policy and restraint in recurrent expenditures of a wasteful nature. In the medium term, downsizing of the public sector including privatization of many nonperforming public enterprises should be given serious consideration. The composition of public investment also requires attention. Investments of a shorter gestation period and in essential infrastructure are needed, rather than of a long-term nature with doubtful returns.

Some of the recent measures undertaken to mobilize greater revenues for meeting recurrent expenditures and reducing borrowing from the banking system to meet investment expenditures in the public sector are encouraging, as they will reduce the crowding-out nature of public investment. However, sustained stabilization measures, including reform of incentives and procedures for encouraging the private sector to play a greater role are required (World Bank 1995a). In this regard, continuing difficulties of an administrative nature and implementation problems have been pointed out by a recent study. Although a total of 35 new applications worth SI$762 million of foreign investment properties were approved by the Foreign Investment Board in 1994, only SI$28 million worth of investment had been implemented in the year (Temu 1995).

D. Tonga

1. *Trends in Private Investment.* The gross investment rate during 1983-1990 clearly has been on a downward trend from 31 percent in 1983 to 21 percent in 1990. The private investment rate also recorded a decline over the same period. From a high of 15 percent in 1986, it fell to a negative rate in 1990. On the other hand, the public investment rate has hovered around 20 percent. Part of the stable nature of public investment has been ascribed to steady aid flows which have enabled the public sector to keep up its level of investment (Jayaraman 1995d). However, measures to encourage the private sector by maintaining a fully convertible currency policy and through the provision of tax incentives and the setting up of industrial estates with common infrastructure facilities and minimal regulations have not proved successful. The virtual disappearance of manufacturing during recent years has left Tonga even more dependent on a narrow primary production base (Hunt 1995).

On the fiscal front, prudent budgetary policies aided by external grant assistance to government have kept the overall deficits at a modest level. However, domestic wage pressures, imported inflation, and monetary expansion contributed to inflation in the early 1990s. The recession in Australia and fiscal restraint in later years eased the price situation. However, the reason behind the poor performance of the private sector has been ascribed to the loss of competitiveness of traditional exports and the relatively high costs of operations which made exports of knitwear and leather products less attractive. The emergence of niche markets for specialized crops like squash has partly alleviated the problem. Constraints to the emergence of a vigorous private sector lie in the structural deficiencies, including the continued dominance of public sector operations in many activities, which could be handled by the private sector, including hotels and duty-free shops.

2. *Economic Reforms.* Economic reforms initiated in the mid-1980s include the liberalization of tariff policies and promoting competition in the banking and financial sector. These measures are expected to divert remittances now going toward the building of church and other such construction activities to more productive investment. Also required are steps such as greater control of budgetary expenditures, greater mobilization of revenues for meeting recurrent expenditures, and wage restraint in the public sector. Further, major public sector measures are required to hand over many commercial activities from the public sector to the private sector. Although there has been a steady depreciation of the real exchange rate, signifying an improvement in competitiveness, there are deep-rooted structural deficiencies discouraging private investment.

E. Vanuatu

1. *Trends in Private Investment.* A relatively high profile of private sector activity marks the eight-year period under study. In the early 1980s, more than 80 percent of gross investment was in the private sector. Most of the investment has been in tourism-related activities as well as cattle ranches and plantation activities. Gross investment rose from a modest 26 percent in 1983 to 44 percent in 1990. The private investment rate reached its highest level at near 28 percent in 1986. After a slight decline, it recovered in the subsequent years to reach 25 percent in 1990. Although the public investment rate was modest at less than 10 percent until 1986, it rose to around 24 percent in 1989, and subsequently declined to 19 percent in 1990.

Conservative fiscal policies placed emphasis on balanced recurrent budgets and the development budget fully covered by external grants (Jayaraman 1993b, 1994c). Adoption of these policies has until recently contributed to the maintenance of a favorable economic environment for the private sector to play a significant role. Inflation, which was about 11 percent in 1983, was successfully brought down to a very modest level of around 2 percent over the years. Added to these prudent policies of fiscal restraint, the special tax haven status enjoyed by Vanuatu since the mid-1970s, with no direct taxation of any kind and with a total absence of any control on external monetary transactions and complete freedom to hold deposits in any currency for its citizens and expatriate residents, contributed to the emergence of Vanuatu as the most liberal economy among all SPDMCs.

Despite these seemingly attractive incentives, the environment for private investment is deteriorating. One of the major reasons has been the serious erosion of investor confidence, following certain arbitrary actions by the government in 1992 and

thereafter in regard to terminating business licenses without any legal remedies to the aggrieved parties. Further, there has been no clarity in policy guidelines for promoting investment in the private sector and an investment code which has been due now for more than four years has not yet been finalized and approved by the Council of Ministers. Besides these uncertainties, certain distortions in the economy themselves proved to be serious impediments to further investment by the private sector. These relate to the high costs of energy, communications, and labor. The public utilities supplying the critical inputs are in the hands of private sector monopolies which are subject to no controls.

Since the tax system has to rely on indirect taxes for generating revenues, additional imposts have to be levied mostly on commodities, and nearly 90 percent of consumption goods happen to be imports. The heavy reliance on import duties has weakened the international competitiveness of Vanuatu's exports, including beef and copra. In addition, they have also been responsible for the high operating costs of tourist facilities and restaurants. Although the monetary authority can pursue a proactive exchange rate policy by periodically devalueing the nominal exchange rate, concern for keeping the domestic consumer price level down has always been in conflict with the goal of maintaining the competitiveness of exports and tourist services.

2. *Economic Reforms.* Vanuatu enjoyed a reputation for balanced budgets until 1991. The decline in external aid flows since the late 1980s and the withdrawal of budgetary support by bilateral agencies for the recurrent budget, and some populist measures such as the reduction in school and hospital fees have made it difficult for the government to balance its annual budgets. A marginal overall deficit, which emerged in 1992, was about 1.3 percent of GDP. Breaks to government spending, facilitated by the reduction in payments for civil service salaries following the prolonged civil servants' strike led to a small surplus in the 1994 budget. The expenditures recorded further increases in 1995, which was an election year and the overall budgetary deficit still persisted (Temu 1995).

Public sector commodity price support schemes for copra and other primary exports have become increasingly unprofitable, in the light of falling international prices. Early revamping of the Vanuatu Commodities Marketing Board, the only public sector commodity board in the South Pacific, needs critical attention. In addition, there are a number of public enterprises in commercial activities such as coffee and cocoa plantations and fishing, operating with losses, which need to be privatized. Steps have been taken in recent years for downsizing the civil service and public sector reforms are under way. A Restructuring Commission has already recommended a reduction in the civil service by 20 percent. A reluctance to impose direct taxation and introduce tax reforms with a view to encouraging savings and investment as well as removing distortions in the economy and reducing the unintended protective effects of revenue measures have been major hurdles for private sector development.

F. Western Samoa

1. *Trends in Private Investment.* A striking feature of investment trends in Western Samoa is that the private investment rate has all along been rather low, at about 5 percent except in 1987, when it was about 7 percent, leaving the lion's share of investment to the public sector. The gross investment rate has been less than 30 percent, except in 1987, when it was 35 percent. In 1990, 1991, and 1992, cyclone rehabilitation and reconstruction

expenditures in the public sector resulted in high gross investment rates for the three-year period. The private investment rate steadily decreased from 7 percent in 1987 to 3 percent in 1990.

Private investment was limited to small-scale manufacturing until 1992, when an export-oriented automotive wiring assembly plant started. Production from this plant is now contributing about 4 percent of GDP and accounting for about 20 percent of manufacturing production. With the decline in world prices of copra and coconut products, manufacturing activities relating to the processing of coconut milk and oil, which were confined to the public sector, had to be closed and a rapid privatization of government commercial enterprises is presently ongoing. On the other hand, there were difficult choices in regard to the prestigious national airline, which was in serious difficulties with mounting losses. Bailing out the airline imposed severe budgetary pressures and led to serious external debt liabilities, including servicing problems. A complete restructuring and limiting of airline schedules to profitable routes have temporarily alleviated the problem.

On the fiscal front, the early 1980s witnessed overall budgetary deficits (Jayaraman 1994a). Annual inflation rates were in double digits until 1984. Determined policies to control deficits and inflationary pressures yielded favorable results. Overall budgetary balances became surpluses from 1986 onwards. Inflation was brought down to a single digit during 1986 to 1989. However, cyclone rehabilitation expenditures in 1990 in the public sector gave rise to budgetary deficits in 1990. Total government expenditure more than doubled over the period 1989-1993. While the completion of the major cyclone rehabilitation has seen total capital expenditure fall substantially, recurrent expenditure was rising due to the high government wage bill (Jayaraman 1993a). The failure of Polynesian Airlines necessitated a drawdown of external reserves and a rise in external debt in 1994; further increases in drawdowns and external debt are expected in 1995 and 1996, unless the national airline registers a recovery. Shortages also developed in the country as a result of taro blight affecting the staple food crop which further aggravated inflationary pressures. A new inflationary peak was reached in 1994 at 18 percent, fuelled by the effects of a goods and services tax introduced early that year. The monetary authority was under pressure to allow a depreciation in the nominal exchange rate to maintain the competitiveness of exports.

2. *Economic Reforms.* Fiscal discipline continues to remain a serious problem. Nonperforming government enterprises remain on the list for early privatization. Recommendations made under the Bank's technical assistance projects[1] are now under consideration. The government has also passed significant legislative measures to attract overseas investment and to facilitate domestic investment. These include legislation passed in 1993 in regard to leasing of customary land to investors and a special Enterprises Incentives and Export Promotion Act in 1993 which grants duty and income tax concessions to domestic and export-oriented enterprises. Reforms are still required in the financial sector. These would include strengthening the institutional capacity of the Development Bank of Western Samoa. Infrastructure support has been stepped up with the completion of

[1] TA No. 1234 for Privatization of State-owned Enterprises for $365,000 approved on 28 November 1989 and completed in 1992, and TA No. 1631 for Implementation of Privatization Exercises for $320,000 approved on 24 December 1991 and completed in 1994.

a major power project with Bank assistance[2] and appropriate institutional pricing policies are now required to finance the maintenance of the infrastructure.

An efficient proactive exchange rate policy has been the major redeeming feature of macroeconomic management in the country. A historically high rate of inflation in the past decade did not produce an upward rise in the real exchange rate (Hunt 1995). Devaluations in the 1980s and periodical downward revisions in the nominal exchange rate have contributed to the steady maintenance of the competitiveness of exports (Jayaraman 1996). It is expected that these policies will continue in the future.

IV. An Empirical Investigation

A. Data Constraints

Among the six SPDMCs, only Fiji has a well-run Bureau of Statistics set up in the early 1970s from which the national accounts are available for years up to 1994. The other five SPDMCs established their statistical offices in the early 1980s but the national income data relating to consumption, savings, and investment are not up to date beyond 1990[3]. In the light of greater efforts being undertaken to promote private sector activities in SPDMCs, data of more recent years on a consistent basis would have been more desirable for analytical purposes. Although Fiji's data are more recent covering up to 1994, the empirical investigation methodology proposed to be adopted for a pooled cross-section time series analysis requires balanced data for all SPDMCs, in terms of both identical period of coverage and number of observations. Hence, the quantitative analysis is constrained to cover only up to 1990.

Accordingly, in the context of paucity of data, empirical analysis is to be confined to a limited period of eight years (1983-1990) under a restrictive assumption that the observed trends in private investment and public investment rates in the six SPDMCs during the eight years would have continued at least up to the mid-1990s. In fact, the assumption appears to be valid based on the findings of the recent World Bank studies (1992, 1995a) that despite the attempts by SPDMCs to promote the role of the private sector, no significant progress has been recorded and the past observed trends in the late 1980s have been persisting. For these reasons, a simple model is employed for the investigation of determinants of private investment in SPDMCs utilizing the data relating to the eight-year period (1983-1990).

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[2] Loan No. 813 for Afulilo Hydroelectric Project approved on 4 December 1986 for $5.4 million and Loan No. 1228 for Afulilo Hydroelectric Power (Supplementary) approved on 22 April 1993 for $2.0 million and completed in 1995.

[3] Under the Bank's Regional Technical Assistance No. 5220, four SPDMCs were assisted to compile their national income accounts up to 1989. Although various attempts were subsequently made following the completion of the RETA, not all SPDMCs were successful in undertaking their national accounts compilation on their own for years beyond 1990. Most recent information available relates only to growth rates of the economy and the estimates are being updated from time to time by the International Monetary Fund in connection with their annual reports under Article IV consultation exercises.

B. Theoretical Basis for the Model and Related Empirical Evidence

It is postulated that the private investment rate is a function of growth rate of the economy, public investment rate, and uncertainties associated with instability in the economy. The theoretical basis for the model is as follows: A buoyant economy reflected in its rising real growth rate would boost private sector expectations and as a result, the real output growth rate would have had a positive effect on private investment. The empirical evidence gathered by Blejer and Khan (1984), Greene and Villanueva (1991), and Serven and Solimano (1993) from the cross-sectional studies of about 70 countries in Asia and Latin America showed that private investment responded strongly to fluctuations in real output and the recessionary development policies which were triggered by the restrictive economic management policies contributed to pessimistic expectations and declines in private investment rates.

As regards the relationship between public and private investment, the general observation is that increases in public investment lead to competition between private and public sectors for limited domestic savings and hence, the dominant public sector might give rise to the crowding out of the private sector. On the other hand, it is held that as long as public investment measures are in support of private investment and the types of public investment are in terms of services such as power generation and distribution, and transport and communications, increases in the public investment expenditures should contribute to a rise in private investment as well. The empirical evidence gathered in this regard is, however, not categorical and the nature of relationship between the two is ambiguous. While Balassa (1988) in his cross-sectional study of 30 countries showed the presence of a statistically significant negative relationship between private investment and public investment, Greene and Villanueva (1991) in their study of 23 countries established a positive association between them. The latter finding was also confirmed by Blejer and Khan (1984) when they specifically dealt with impact of public investment in physical infrastructure.

Instability in the economy which is generally quantified by either of two measures, namely, coefficients of variation in the rate of inflation and real effective exchange rate, is expected to affect profitability of private sector operations, especially in an open economy. Since inflation, both domestic and in the rest of the world, do affect the real effective exchange rate of an open economy, it has been suggested in theoretical literature (Fry 1990) that a better and comprehensive measure of instability is the coefficient of variation in the real effective exchange rate. Further, external shocks which are beyond the control of an economy, such as terms of trade, do affect the real effective exchange rate. In an empirical study undertaken by Serven and Solimano (1993), it was established that there exists a negative relationship between the coefficient of variation in the real effective exchange rate and the private investment rate.

C. The Model

Based on the above reasoning, the model can be written as:

$$pi_{nt} = f(GR_{nt}, gi_{nt}, CVR_{nt}) \quad (1)$$

where

pi = private investment rate (PI/GDP)
GR = growth rate in percent
gi = public investment rate (GI/GDP)
CVR = coefficient of variation in real effective exchange rate
n = country
t = year

D. Data Sources and their Nature

The empirical analysis utilizes the official and published data. Since there is no detailed information relating to the components of public investment, thereby distinguishing between those relating to physical infrastructure and other supportive investments from those of a general nature, only aggregate data on government investment have been used. The publication sources include *International Financial Statistics* and *World Tables* published by the International Monetary Fund (1995) and the World Bank (1995b) respectively, besides the official statistical bulletins of the SPDMCs under study. The data are provided in Table 3. The data on ratios of private investment and public investment to GDP and the growth rates are in percent. The coefficient of variation in real effective exchange rate is defined as the ratio of standard deviation of the past three years' real effective exchange rate index numbers to the arithmetic mean of the real effective exchange rate index numbers of the same past three years. The data given in Table 3 are used in levels and are not differentiated.

TABLE 3
Data Used in the Analysis

Country	Year	pi (percent)	gi (percent)	GRL (percent)	CVR
FIJ	1983	9.8	11.1	-5.9	0.016
	1984	10.3	6.8	-4.2	0.002
	1985	12.2	6.0	8.2	0.004
	1986	9.9	4.8	-3.4	0.009
	1987	9.8	5.8	7.8	0.046
	1988	6.8	7.2	-7.0	0.108
	1989	5.7	7.7	0.7	0.133
	1990	6.1	12.0	13.7	0.050

(continued next page)

Table 3: Data Used in the Analysis *(cont'd.)*

Country	Year	pi (percent)	gi (percent)	GRL (percent)	CVR
KIR	1983	27.7	5.6	6.8	0
	1984	6.4	7.7	-1.0	0
	1985	22.9	8.6	5.3	0.015
	1986	7.0	27.0	-6.4	0.018
	1987	3.0	27.4	2.8	0.124
	1988	2.6	26.8	-2.9	0.175
	1989	-2.1	28.4	10.9	0.083
	1990	10.5	35.4	-3.1	0.072
SOL	1983	18.9	13.4	2.8	0.006
	1984	14.7	8.3	13.0	0.009
	1985	15.2	11.1	1.2	0.009
	1986	13.4	17.8	0.8	0.010
	1987	10.0	24.0	-1.7	0.012
	1988	13.7	21.1	2.4	0.014
	1989	15.5	13.5	3.5	0.013
	1990	15.2	13.9	7.8	0
TON	1983	10.0	21.2	10.9	0
	1984	13.2	20.7	1.1	0.169
	1985	10.6	25.5	2.4	0.151
	1986	15.0	18.0	5.6	0
	1987	14.4	16.0	3.2	0.030
	1988	11.0	20.7	1.7	0.032
	1989	9.9	18.9	-3.5	0.047
	1990	-0.8	22.9	0.7	0
VAN	1983	20.4	5.3	10.7	0
	1984	19.5	4.4	5.6	0.067
	1985	22.3	6.1	6.8	0.056
	1986	27.6	6.9	1.1	0.052
	1987	2.0	14.3	-2.0	0.054
	1988	14.9	15.8	0.3	0.109
	1989	13.4	23.8	0.5	0.056
	1990	24.5	19.1	4.4	0.008
WS	1983	6.0	21.4	-1.1	0.011
	1984	2.4	27.1	0.4	0.009
	1985	5.3	25.3	1.3	0.001
	1986	4.4	24.0	3.9	0.010
	1987	7.1	28.1	5.5	0.011
	1988	4.0	22.2	0.5	0.011
	1989	4.8	22.0	-1.4	0.011
	1990	3.3	31.1	3.7	0.012

pi = private investment/GDP
gi = government investment/GDP
GRL = real GDP growth rate lagged by one year
CVR = coefficient of variation in real effective exchange rate

Sources: IMF (1995); World Bank (1995b).

E. Need for a Pooled Analysis

Since annual observations relating to the data for each of the six SPDMCs (Fiji, Kiribati, Solomon Islands, Tonga, Vanuatu, and Western Samoa) cover only eight years and the degrees of freedom therefore are small for each country, individual country regression

analysis cannot provide sharp inferences about the estimated parametric coefficients. Following the well-recognized practice in applied econometric work to pool all data and fit a common regression, a pooled cross-section time series analysis appears to be justified.

Under certain conditions and specifications, pooling provides more efficient estimation, inference, and possibly prediction (Vinod and Ullah 1981, Gujarati 1995) (see Appendix). Specifically, there appear to be valid reasons for pooling the data: (i) all the six SPDMCs have a high degree of commonalities of a structural nature; (ii) all of them are open economies and subject to external shocks of an identical nature; and (iii) their data are of short time series with auto-correlation possibilities and hence, the absence of a sufficient number of degrees of freedom does not permit separate estimates of auto-correlation for each country.

F. Results of Pooled Cross-Section Time Series Analysis

The pooling technique and the estimation steps follow the procedure suggested by Kementa (1986, 616-85). A generalized least square (GLS) estimation procedure was adopted for correcting three different sources of error correlations: (i) heteroskedasticity among cross-sectional data for the six countries, (ii) time series autocorrelation among each cross-section, and (iii) contemporaneous correlation or cross-sectional dependence. The computer package used was Shazam, which has a special program for estimating Kementa's cross-sectionally heteroskedastic and time series autoregressive corrected model.

In the actual estimation procedure, with a view to avoiding the simultaneity problem, the procedure adopted by similar empirical studies including the recent one by Serven and Solimano (1993) was followed, according to which instead of the current real output growth rate as an explanatory variable, the growth rate lagged by one year was employed as an explanatory variable. In a way, such a procedure would mean that in a given year, future expectations regarding the growth of the economy would significantly influence the private investment rate. Since future growth expectations cannot be effectively quantified, a proxy measure would be the growth rate of the economy in the immediate past year. Accordingly, the growth rate lagged by a year seems appropriate as a substitute variable for the current year growth rate. The model continues to be a static model, without any dynamic properties, since the lagged dependent variable is not used as an explanatory variable.

The results are presented in Table 4. In the estimated equation, all the parametric coefficients of the included independent explanatory variables emerged with high degrees of statistical significance, signified by high two-tailed 't' ratios which are greater than their respective critical values at the 5 percent level, the chosen level of significance. While the lagged annual real GDP growth rate is positively associated with private investment rate, the public investment rate is negatively related with private investment. The nature of negative relationship has been unambiguously established by the two-tailed 't' ratio test. It is also found that the coefficient of variation in the real effective exchange rate had the theoretically expected negative sign, confirming that instability in real effective exchange rate, which is a product of domestic inflation, external shocks, and adverse terms of trade, had a dampening effect on private investment.

TABLE 4
Results of Cross-Section Time Series Analysis*

Number of countries: 6
Number of observations for each country: 8
Total number of observations: 48

Dependent Variable: Private Investment Rate (pi_{nt})

Variable	Coefficient	Standard Error	t-ratio	Elasticity
Constant	23.728	1.544	15.370	-
GR_{nt-1}	0.103	0.032	3.207	0.022
gi_{nt}	-0.695	0.071	-9.810	-1.068
CVR_{nt}	-11.971	5.892	-2.032	-0.041

R^2 = 0.729
standard error of estimate = 0.722
F-ratio = 195.59
D-W statistic = 1.581 Von Neumann ratio = 1.615 Rho = 0.088

Jarque-Bera Asymptotic LM Normality Test Chi-Square = 2.089 (df 2)
R^2 between observed and predicted values = 0.866

Model Selection Tests

Akaike Final Prediction Error = 0.565
Akaike Information Criterion = 0.572
Schwartz Criterion = 0.659
Craven-Wahba Criterion = 0.568
Shibata Criterion = 0.558

*The results are a summary of the computer output using the Shazam computer program package.

pi = private investment/GDP
GRL = growth rate of the economy lagged by one period
gi = government investment/GDP
CVR = coefficient of variation in real effective exchange rate
n = country
t = year

R^2 is coefficient of determination under the Generalized Least Squares procedure (Buse 1973).

The overall goodness-of-fit measure, as represented by R^2 which is the coefficient of determination for estimating the equation by GLS for a cross-section time series model (Buse 1973), was high at 0.729. Thus, about 73 percent of variation in the dependent variable is explained by interaction of all the included explanatory variables.

The estimated regression equation is :

$$pi_{nt} = \underset{(15.370)}{23.728} + \underset{(3.207)}{0.103\, gr_{nt-1}} - \underset{(-9.810)}{0.695\, gi_{nt}} - \underset{(-2.032)}{11.971\, CVR_{nt}}$$

(figures in parentheses denote calculated 't' values)

R^2 = 0.729
Standard error of the estimate = 0.722
SSE = 22.943
F-ratio = 195.59

G. Diagnostic Tests

In accordance with the model selection test procedures suggested by Judge et al. (1985, 242) and Ramanathan (1992, 166), diagnostic tests were conducted. The Akaike (1969) Final Prediction Error (FPE), also known as Amemia Prediction Criterion (PC) was 0.565, whereas the Akaike Information Criterion was 0.572. The Craven-Wahbha (1979) generalized cross validation (GCV) was 0.568 and Shibata criterion was 0.558. As these values were on a low side, the model selection has been confirmed appropriate.

The Jarque-Bera asymptotic logrange multiplier (LM) normality test result yielded the Chi-square value equal to 2.089 with two degrees of freedom, which was found to be lower than the critical value of 5.991. Hence, the null hypothesis that the residuals are normally distributed cannot be rejected. The GLS estimation procedure correcting time series and cross-section autocorrelation yielded the Durbin-Watson (DW) statistic and the Von Neumann ratio at 1.581 and 1.615 respectively, with Rho at 0.088 confirming that there was no serial correlation error of a serious nature remaining. The model results were utilized to determine the R^2 between the observed and simulated values. The value of R^2 was as high at 0.866 which showed that the model employed was quite close to reality.

H. Interpretation of Results

Since the lagged real GDP growth rate is positively associated with the private investment rate, there is a convincing direct relationship between the rate of growth in output and the private investment rate. The public investment rate is inversely related to the private investment rate. Further, the estimated coefficient is found to be significant by two-tailed 't' test indicating the absence of any ambiguity about its negative sign. Thus, it is clearly established that public investment in SPDMCs has been competitive with rather than complementary to private investment. Instability in the real effective exchange rate which is represented by its variability had a significant negative influence on private investment. It may be recalled from our earlier discussion in Section II that the variability in the real effective exchange rate index is a product of many factors. Important among them are domestic budgetary imbalances, wage rigidities, and shortages which give rise to excess demand; the resultant increases in the price levels; and situations of inflexibility in the manipulation of the nominal exchange rate to keep pace with changes in the real effective exchange rate index.

The elasticity coefficients of the respective independent variables as estimated at their means are also shown in Table 4. Holding others constant, an increase in output growth rate by one percent in the previous year would lead to a rise in the private investment rate by 0.02 percent. On the other hand, a one percent rise in public investment rate would lead to a reduction in private investment rate by 1.1 percent. Similarly, an increase by one percent in the variability of the real exchange rate would contribute to a decrease in the private investment rate by 0.04 percent.

V. Summary and Conclusions

A. Summary

The analysis of trends in private investment in six SPDMCs for an eight-year period from 1983 to 1990 shows that the ratio of total domestic investment to GDP has been generally on the rise except for Fiji, where the decline is pronounced. A cross-country time series econometric analysis shows that instability in the real exchange rate did have a sizeable adverse effect on private investment. This particular instability measure itself is a product of many uncertainties reflecting structural rigidities as well as fiscal and monetary imbalances.

On the other hand, growth in output had an expansionary effect on private investment, albeit of a low magnitude. In regard to the effect of public sector investment on private investment, it has been clearly established that public investment had a contractionary influence on the private sector. Obviously, public investment has been more competitive than complementary and thus, it has had a crowding out effect on private investment.

B. Conclusions

The policy implications of the foregoing conclusions are clear: the SPDMCs' macroeconomic environments need vast improvements. Annual fiscal imbalances should be reduced and the rising recurrent expenditures which encroach upon domestic savings have to be kept under control. These measures would contribute to maintaining a low rate of inflation and reducing the variability in inflation and real exchange rate. Almost all SPDMCs have made clear their commitment to a greater role for the private sector. However, their declared goals for privatization of many of their public enterprises, as well as many of their promotional steps including several incentive schemes, have to be matched by credible and sustained macroeconomic policy reforms.

C. Relevance to Bank Operations

The Bank's operational strategy for SPDMCs stresses the importance of the private sector's role in the future growth of the island nations, with the public sector's role being limited to performing minimal but essential regulatory functions as well as supportive services in regard to provision of power and transport and other critically needed facilities. Further, the strategy lays emphasis on greater assistance to capacity building in key government ministries and agencies in areas such as macroeconomic policy formulation and analysis and financial and economic management.

Accordingly, the Bank's loan assistance during 1996-1999 has been programmed to focus on the critically important physical and social infrastructure sectors which will be complementary to private investment. Specifically, the loan projects include transport and port development and urban infrastructure, including water supply and sanitation. The planned loan assistance program also includes development financing, providing on-line credit to the development banks for lending to indigenous entrepreneurs in SPDMCs.

In regard to capacity building, technical assistance projects will be directed toward strengthening the pivotal ministries in the areas of macroeconomic and fiscal management. Notable technical assistance projects which were approved during 1995 and 1996 include those for Cook Islands, Tonga, and Western Samoa for strengthening their ministries of finance/treasury departments in policy analysis, budget systems, and financial and economic management.[4] Earlier, in 1993, the Bank funded a study for development of capital markets in Fiji.[5] The Bank will also provide similar technical assistance to other SPDMCs, including Vanuatu during 1996-1999. It is expected that these measures would contribute to enhancing the capacities to monitor, analyze, and take required corrective actions to improve and maintain a conducive environment for facilitating greater private investment in SPDMCs.

[4] Cook Islands: TA No. 2424 for Strengthening Institutional Capacity for Financial and Economic Management for $892,000 approved on 17 October 1995; Tonga: TA No. 2528 for Improved Budget Systems and Economic Management for $600,000 approved on 31 January 1996; and Western Samoa: TA No. 2442 for Strengthening Capacity for Macroeconomic Analysis, Planning and Policy Formulation in the Treasury Department for $600,000 approved on 13 November 1995.

[5] Toward financial sector reforms in Fiji, the Bank has funded a capital markets study: TA No. 2046 for Development of the Capital Market for $450,000 approved on 23 December 1993.

Appendix

A. Notes on Cross-Country Time Series Analysis

1. Pooled Regression Analysis

When sample sizes of each cross-country and time series data are small, sharp inferences cannot be drawn about the coefficients estimated on the basis of individual regressions. In such cases, it is a normal practice to pool all data and estimate a common regression (Gujarati 1995). If the model is properly specified, pooling provides more efficient estimation, inference, and possibly prediction (Vinod and Ullah 1981).

The model for such pooled analysis can be written as:

$$Y = a_{nt} + b_{nt}X + e_{nt}$$

where

Y = dependent variable
a = constant
b = vector of coefficients of nonstochastic explanatory variables, X's
e = stochastic error term
n = cross-sectional unit (i = 1...n)
t = time period (i = 1...t)

2. Assumptions

There will be in all n x t observations. Usual estimation by ordinary least squares (OLS) methodology assumes regression parameters do not change over time (temporal stability) and do not differ between various cross-sectional units (cross-sectional stability). Also assumed is that error-variance for each of the estimated cross-sectional regressions is homoskedastic and error in one cross-sectional regression at time t is uncorrelated with error term at time t in the regression estimated for another unit of cross-sectional data. Although these are highly restrictive assumptions, there are ways of incorporating them in the estimation procedure (Gujarati 1995). Specifically, the computer program package which has been designed for cross-section time series analysis, known as *Shazam*, meets these requirements (White et al. 1990).

B. The Model

A simple model is proposed for undertaking a pooled six cross-country time series analysis. The data in regard to private investment and other variables for 1983-1990 are complete for six selected SPDMCs (Fiji, Kiribati, the Solomon Islands, Tonga, Vanuatu, and Western Samoa). Thus, there will be in all 48 observations for the pooled analysis.

The proposed model is :

$$pi_{nt} = f(GR_{nt-1}, gi_{nt}, CVR_{nt})$$

where

pi = private investment rate in percent
GR = annual rate of growth in percent
gi = public investment rate in percent

CVR = instability in real exchange rate
n = SPDMC
t = year

Since the number of annual observations *(t)* is the same for all elements of cross-sections *(n)* included in the model, resulting in balanced data (*n* times *t* observations), we can conduct analyses taking care of all three possible different sources of error correlations by detecting them as well as correcting them. The sources of error correlations include : (i) cross-sectional heteroskedasticity, (ii) time series auto-correlation for each country, and (iii) any cross-sectional dependence. A Generalized Least Squares (GLS) procedure suggested by Kementa (1986) is adopted for empirical estimation.

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