Papers from the ANU-ASSA Workshop: Immigration and Australia's Population in the 21st Century

Examining the Validity of the Remittance-Decay Hypothesis from Survey Data on Pacific Island Migrants in Australia
Richard P.C. Brown
DISCUSSION PAPER NO. 353
November 1996

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EXAMINING THE VALIDITY OF THE REMITTANCE-DECAY HYPOTHESIS FROM SURVEY DATA ON PACIFIC ISLAND MIGRANTS IN AUSTRALIA

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DISCUSSION PAPER NO. 353
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ABSTRACT

There is concern that Pacific island economies dependent on remittances of migrants will endure foreign exchange shortages and falling living standards as remittance levels fall due to lower migration rates and the belief that migrants’ willingness to remit declines over time. The empirical validity of the remittance-decay hypothesis has never been tested. From survey data on Tongan and Western Samoan migrants in Sydney, this paper estimates remittance functions using multivariate regression analysis. It is found that the remittance-decay hypothesis has no empirical validity and migrants are motivated by factors other than altruistic family support, including asset accumulation and investment back home.
1. INTRODUCTION

The main focus of this paper is on the determinants of migrants' remittances, based on a study of Pacific island migrants in Australia. Of growing concern among policy makers in remittance- and foreign aid-dependent Pacific island states is the longer term sustainability of external resource flows. Two island states for which private remittance flows constitute a major source of income and foreign exchange are Tonga and Western Samoa, the subjects of this study. In both instances migrants' remittances have been the subject of extensive discussion on sustainable development in the South Pacific (Ahlburg 1991, Appleyard and Stahl, 1995, Bertram and Watters 1985, Connell and Brown, 1995; Hayes, 1991).

There is current concern that remittances are declining due to lower migration rates, recession and a decrease in migrants' willingness to remit (Ahlburg, 1991; Connell, 1990; Miles et al., 1992/66; Marcus, 1993/29; James, 1991; Campbell, 1992). The rate of growth of migration to major destinations - New Zealand, Australia and the US - has declined in recent years due to economic recession and tighter immigration controls in the host countries. Return migration has sometimes been considerable. There is also the prospect that levels of foreign aid from major OECD donors will be severely reduced. While there is a growing reliance on remittances, remittance decay is anticipated (Forsyth, 1992; Macpherson, 1992).

An important issue in this situation is whether per capita remittance levels will decline as the migrants' length of absence increases and ties to their countries of origin weaken. It has been suggested that even with continued migration the anticipated decline in remittance rates is likely to occur due to family reunification and greater integration of the migrants in the host communities. This process, it is believed, reduces migrants' ability and willingness to remit. Since migration by Pacific islanders is generally long-term, it would then follow that the aggregate level of remittances will also decline over time, unless the rate of new migration is sufficient to offset declining average remittance levels among the stock of 'older' migrants.

An attempt to substantiate the remittance-decay hypothesis empirically can be found in a study by Forsyth (1992), specially commissioned by the Forum Secretariat. This study concluded that projected remittance levels over the next decade would be inadequate to maintain living standards in a number of Pacific island countries, including Tonga and Western Samoa. (Forsyth, 1992). The study relied on secondary data for recorded balance of payments estimates of remittances and on crude estimates of migrant numbers in the principal host countries. Over the past decade there have been real declines in disposable income growth in host countries, particularly New Zealand. Foster (1995) argues that once such movements have been taken into account, there is little sign of remittance decay, even at the overall level. (See also Brown and Foster, 1995.) What appears to be remittance-decay could be explained by changes in migrants' disposable income.

The remittance-decay hypothesis (RDH) has not been subjected to rigorous empirical investigation. This paper reports the findings of a survey-based study of migrants and their remittances. The study aims to identify the main determinants of remittances and their potential responsiveness to policy interventions. In the light of the RDH, particular attention is given to the significance of migrants' length of absence. Primary data were collected from a large survey of Tongan and Western Samoan migrants in Sydney at the end of 1994, from which estimates of remittance levels and their composition were made (Brown and Walker,
1995). A remittance function was then estimated using appropriate econometric techniques for the two migrant communities.

Section II provides a brief discussion of migration and remittances in Tonga and Western Samoa, and a priori expectations for the determinants of remittance behaviour. The sample survey and estimated remittance levels are discussed in Section III. Section IV describes the Tobit regression model used to estimate the remittance functions and reports the results for the two migrant groups. Section V offers conclusions.

II. MIGRATION AND REMITTANCES IN TONGA AND WESTERN SAMOA

A. The Economic Significance of Remittances

Throughout the South Pacific region limited economic growth of domestic economies has led to a steady and domestically unimpeded emigration. In Tonga and Western Samoa this has led to the size of the domestic population being relatively unchanged for much more than a decade, despite relatively high rates of natural increase. Closely associated with the increased emigration has been a growing dependence of those remaining on the return flows of remittances. Recent trends in Tongan and Western Samoan migration and the growing importance of remittances in the migrant-sending economies have been well documented (Ahlburg 1991; Bertram, 1986; Bertram and Watters, 1985; Connell, 1983; Campbell, 1992). Remittances have raised living standards, contributed to employment (especially in the service and construction sectors) and eased balance of payments problems.

Table 1: Major Sources of Foreign Exchange: Tonga and Western Samoa
(All figures in current US$mn; % of GDP in brackets)

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<td><strong>Tonga</strong></td>
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<td>147.1</td>
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<td>Exports</td>
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<td>Net Private Transfers</td>
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<td>(8.5)</td>
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<td><strong>Western Samoa</strong></td>
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<td>Net Private Transfers</td>
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<td>(21.4)</td>
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<tr>
<td>Net Official Transfers</td>
<td>12.7</td>
<td>10.6</td>
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<td>(8.7)</td>
<td>(7.3)</td>
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Sources: IMF Balance of Payments Yearbook 45(1), 1994
IMF International Financial Statistics 48(11), 1995

2
Shankman (1976) observed as early as 1974 that remittances by Western Samoan migrants represented over 50 per cent of the national income. This situation was broadly similar in Tonga (Connell, 1983) although there was less adequate documentation of these early trends (see Campbell, 1992). Since the early 1970s remittances have remained at similarly high levels. Between 1980 and 1985 remittances to Tonga were twice as high as they had been in the previous five years (Connell, 1983, pp. 49-50; Campbell, 1992, p. 71). In 1984 a national income and expenditure survey in Tonga revealed that 90 per cent of households were remittance recipients and that remittances constituted an average of 28 per cent of household income (Ahlburg, 1991). By the mid- to late 1980s they represented almost 30 per cent of Western Samoan and 40 per cent of Tongan gross domestic product (GDP). Balance of payments data (Table 1) show that in both economies net private transfers, consisting mainly of remittances, are as important a source of foreign exchange as gross earnings from the export of goods and services. However, official estimates, based on recorded migrants' transfers grossly underestimate the true magnitude of these flows. It has been estimated that in Tonga and Western Samoa, unrecorded migrants' remittances represent anything from 25 to 60 per cent of total remittances (Brown, 1995a; Brown and Walker, 1995). Migrants' remittances are possibly greater than all other sources of foreign exchange combined.

B. Conceptualising Remittance Decay

Some analysts have been tempted to draw conclusions about the individual behavioural or motivational characteristics of migrants from studies that focus on aggregate remittance levels where these are affected by a combination of other compositional factors (Swamy 1981; Quijiba, 1986). Inferences from aggregate, secondary data analysis concerning migrants' motivations for remitting are, at the least, highly dubious. The actual time profile of aggregate remittances need not bear any relation to the profile of a typical, individual migrant's remittance function. Consider, for instance a situation in which the migrant community consists of two individuals, A and B. Individual B could have a higher level of remittances than individual A for any given number of years absence. For instance, individual B could have a higher income, or, individual A may have no surviving parent still living in the home country. In both instances the level of remittances could decline as the migrant's length of absence increases. However, at any given point in time it is possible that individual B's remittances could be lower than individual A's if B has been away for a longer period of time than A. The aggregate level of remittances in this community (of two migrants) will therefore depend on how long each person has been away, and, because both remittance functions decay over time, with the passage of time the aggregate level of remittances must decline, ceteris paribus.

If it is now assumed that there are many more members of the migrant community, where each of these share the same characteristics as A or B, with one exception; the length of absence varies among group members. The average level of remittances for the community (group A plus group B), at any given point in time, will depend on (i) how the total community is distributed between the two groups, and (ii) what the average length of absence is for each group. The larger the proportion in group B, the higher the average remittance level will be, and the "older" the average cohort, the lower the group's level of remittances will be. Provided the size and composition of the two groups does not change with the passage of time, the aggregate level of remittances must fall, given the negative slope of each group's remittance functions.
When some migrants leave the community, perhaps they return home or die, other new cohorts join the community, or, the characteristics of some existing cohorts change, perhaps they marry, a parent dies or is united with them, or their occupational status or income level changes, the aggregate level of remittances could move in any direction. If the total size of the community remains unchanged but its composition changes in such a way that there is now a larger proportion of migrants in group B than before, the negative decay effect due to the passage of time could be more than offset by a positive composition effect. The opposite scenario is also worth considering. If each group's remittance function is upward sloping, but the composition shifts towards those with a lower remittance level, the aggregate level of remittances could fall over time. In other words, a negative composition effect could more than offset a positive time effect.

Finally, if the rate of net migration is positive, an increase in the total number of remitting migrants could offset any decline caused by a negative composition and/or time effect, and vice versa. The aggregate level of remittances, and changes in this level over time, can therefore be interpreted as the product of these three effects; the time effect, the composition effect, and the size effect. Nothing can be inferred about the remittance behaviour of the individual migrant from observations of aggregate remittances over time. Nor can anything be concluded about movements in aggregate levels of remittances exclusively from knowledge of individual remittance behaviour. To explain and predict changes in aggregate remittance levels and to identify policy measures to influence the level of remittances over time it is necessary to separate out the three different effects.

In the South Pacific migration literature, concern about remittance decay appears to stem from beliefs about trends in and interactions between two of these variables, viz; the size and the time effects. First, there is valid concern that a combination of tighter immigration controls in the traditional destination countries and increasing migration flows from other Asia-Pacific countries, migration and employment opportunities for Pacific islanders are declining. Second, there is a belief, not substantiated by any empirical evidence, that the longer migrants stay away from their home countries the weaker their ties and remittance propensities become, resulting in a negative time effect. If both suppositions are correct, there is every likelihood that the aggregate level of remittances will begin to decline, unless other structural changes result in an offsetting, positive composition effect.

On the other hand, a decline in the rate of new migration would only result in a negative size effect if migration rates were to fall so low that the total stock of migrants began to decline. If there is no evidence of a negative time effect it would take it would require a negative net migration rate to bring about a fall in aggregate remittances, unless, other composition effects are also negative.

The purpose of this study is to twofold; to identify the main compositional variables, that influence, positively and negatively, a migrant community's remittance levels; and, once the effects of the significant compositional characteristics have been isolated, to determine how is a migrant's remittance behaviour is affected by the passage of time.

C. Determinants of Remittances

A belief in remittance decay at the level of the individual migrant is perhaps to be expected. The longer the migrant is away, social ties and distant perceptions of needs and wants are
likely to decline. Successful migrants may be followed by others from the same family. Initial savings targets (where they existed) will have been met and investment in the host, rather than source, country seem to be more rational as the probability of return declines. Although migrants face a life cycle of obligations to their home areas, these obligations are likely to lose their immediacy, to compete with new obligations and to be increasingly ignored. It has also been argued that temporary migrants are able to remit more, partly because many of their expenses are met by permanent migrants, and partly because their temporary visas ensured that their return was imminent. It has been found that migrants permanently overseas are under less pressure to remit as their village commitments became less intense and less significant (Shankman, 1976:59-60) and they had also acquired financial commitments in their host country. On the other hand it has been suggested that the peculiarities of the 'complex inter-relationships and social obligation patterns of the islanders' could imply a continuation of remittances by permanent migrants over the longer term, albeit at possibly lower levels (COA, 1989).

However, advocates of the RDH in the South Pacific draw support for their arguments mainly from studies of migrants in other countries4. Forsyth's (1992) study for the Forum Secretariat postulates a remittance decay function for the South Pacific based largely on evidence from an OECD study of remittance behaviour in Europe (OECD 1987). The longer the duration of the migrants' stay abroad, and the greater the associated decline in the number of dependents at 'home', the weaker the migrants' motivations to remit are assumed to become. This, it is conjectured, explains the so-called 'remittance decay function'. According to Forsyth:

Sustained high rates of remittance tend to be characteristic of migrants who intend staying in the host [country] for a relatively brief period and then returning home.... But such rates are unlikely to be sustained if the period of residence is extended ...[which] suggests a profile over time ... with remittances reaching a peak soon after arrival in the host country then gradually declining (1992:39)

Alternatively, other studies find little evidence of remittance decay. Standing (1984) cites three studies of Indian migrants which revealed that the level of their remittances did not decline with time, but rather plateaued at some positive, constant level.

Until recently there as been only limited data on which to conduct further investigation, beyond simple extrapolations based on unreliable, secondary time series data and other evidence often of a more anecdotal nature. Indeed it is surprising how relatively little is known about the Pacific island migrant communities in Australia and elsewhere; their demography, education and occupation levels, socio-economic status, and information pertaining to their remittance behaviour and associated factors. Since remittances can take many forms, including informal transfers in cash or in-kind, and can pass through many different channels and networks, there are clear obstacles to making definitive assessments of remittance behaviour. This is not to deny the importance of other work that has been attempted in recent years. Unfortunately, the available data remain fragmentary and often inadequate for statistical analysis. Most of the existing studies were undertaken using rather small sample surveys among pockets of Pacific island migrants, where the sample size was constrained by limited budgets available to the researchers who were most often, research students. As a consequence, previous studies of this sort have failed to produce data sets sufficiently large for purposes of rigorous statistical analysis. Vete (1995) has found that for

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Tongans in New Zealand there was a correlation between the number of dependents in Tonga and the amount of remittances. Broadly the same pattern was found by Tongamoana (1987) amongst Tongans in Sydney. The level of remittances increased during the first few years of migration, up to around seven years, but then began to decline, although migrants who had been in Australia for more than 18 years still sent remittances (Tongamoana, 1987:101-105). On the other hand, Loomis found little evidence of remittance decay among Cook Islanders in New Zealand (1990:67). All of these studies were both based on small samples which cannot be considered statistically reliable and, relied on cross-tabulations which cannot isolate the effects of other variables from the effect of the migrant's duration of absence.

What other characteristics can be expected to affect a migrant's remittance behaviour? Unfortunately, as Stark and Lucas (1985) note there is surprisingly little statistical evidence on the motives for remitting, and the few studies that have appeared are not couched in terms of testable hypotheses derived from a theoretical framework. (Lucas and Stark 1985: 902). It is therefore necessary to rely on the limited amount empirical and theoretical work available to identify possible variables for inclusion in a more formal, multivariate regression model. Two closely related motivational characteristics that stand out in other studies of Pacific island migrants are the strength of the migrant's ties to the home versus host community, and the migrant's intentions to return. Variables related to these which other studies have found to be significant include, (a) whether permanent residence had been gained (which, it could be argued influences the probability of return migration); and, (b) whether former dependents had joined the migrants living overseas (Tongamoana, 1987). Walker and Brown (1995) found that the presence of a surviving parent or spouse in the home country increased the migrant's propensity to remit, while the larger the number of dependents of the migrant living in Australia, the less likely the migrant was to be remitting. Where both determining factors had occurred remittances were virtually non-existent (Vete, 1995). Generally, as in the case of Fijians in Sydney (Stanwix and Connell, 1995), the volume and regularity of remittances was found to be a positive function of intent to return. This is also well-documented in the case of Tongans and Cook Islanders overseas (Loomis, 1990).

As family ties have found to be important determinants of remittances, it is commonly believed that migrants are unlikely to remit for purposes other than altruistic family consumption support. However, others have suggested that migrants' remittances are motivated by other factors as well which could offset any weakening of the altruistic motive. In his analysis of alternative theories of migration and remittance behaviour Stark (1991a) advances what he labels the implicit co-insurance approach. He argues that the migration and remittance decision is best understood as part of the family's risk reduction or "family co-insurance arrangement" which he likens to the portfolio-investment strategy of a firm and in which there is an intertemporal contractual agreement between the migrant and "home". (See also Hodlmögl, 1992; Poitine, 1995). The unit of analysis is the family which acts initially as the insurer, investing in the education and establishment costs of the migrant family member. Once the migrant has secured stable employment and income, he/she is expected to become the insurer, remitting to the family in order to cover the premiuum on investment in other, risky, productive investments in the domestic economy. There is also an element of self-interest in the migrant honouring the contract as later, on the migrant's eventual return home, he/she might expect to become a beneficiary of family inheritance and, possibly, a recipient of remittances from the family's subsequent cohorts of migrants, especially if some of his/her remittances were used for the education of the younger cohorts of migrants in the family.
Following Johnson and Whitelaw (1974) and Rempel and Lobdell (1978), Lucas and Stark (1985) argue that remittances are often a repayment of the expenditure by family in the migrant’s education and are thus directly related to the migrant’s educational level. It is suggested that the household may even consciously persuade and sponsor various members to migrate as an insurance in times of hardship, and in anticipation of eventual repayment.

Poirine (1995) questions the general applicability of Stark’s postulate that the migrant’s remittances are invested by the family in physical capital, favouring instead an approach that he terms, *an informal loan agreement*. For Poirine (1995) remittances have to be understood in the context of various informal loan agreements between the migrant and non-migrant family members through which the investment in the migrants’ human capital is financed (the loan) and later repaid by the working migrant (the remittances). The would-be migrant borrows (informally and implicitly) to finance his/her educational costs before migrating. On securing secure employment, the migrant’s remittances constitute loan repayments to the family, in what he terms, the first stage. Later, the second stage, the migrant remits not as a loan repayment, but as part of a loan advancement to finance the education of the next cohort of potential migrant members of the family. Finally, in the third stage, when the migrant has returned home, he/she becomes a recipient of remittances which constitute the repayment of the loan advanced earlier. One of the main conclusions that Poirine (1995) draws from this model is that remittances will not necessarily decline over time, as loan repayments come to be replaced by loan advances.

There is also some consensus that these alternative hypotheses of remittance motivations should not be considered mutually exclusive. Stark (1991a) quite explicitly favours an eclectic theoretical model which allows for the total amount remitted can be disaggregated into separate parts, each being driven by a different motivational characteristic. Self-interest can also play a part in the migrants’ decision-making framework, either in terms of inheritance-seeking behaviour or as rational investors. From studies of migrants in Botswana, India and the Philippines, Stark (1991a; 1991b) found evidence of remittances which were motivated by ‘tempered altruism or enlightened self-interest’. He suggests that ‘considerations such as an aspiration to inherit, maintenance of rural investments, and the intentions to return mean that the migrant retains a vested interest in his original home beyond altruism’ (1991b: 40). An inheritance seeker will continue to remit in order to stay in favour with family. In his study on Kenyan internal migration Hodinott (1992) found that if the migrant was a son there was a positive relationship between the parent’s owning land and the amount of remittances sent. If there was more than one son the effects were stronger.

Empirical studies from other countries have found that migrants are often ‘target savers’ who retain much of their savings abroad only remitting them on, or over a period of time shortly before, their final return (Piere 1979; Quibria and Thant 1988). In such cases one could anticipate a remittance profile that is positively sloped over the latter part of the migrant’s stay. Anjul (1986) suggests that this factor may explain why, in the case of Pakistan, remittance levels did not decline as the RDH would suggest. Studies from the Caribbean Basin countries reported in Díaz-Briquets and Weintraub (1991) found strong links between remittances and small business development in the remittance-receiving economies, indicative of some investment-motivated behaviour. Helweg (1983: 440-41), reporting on the uses of remittances in a Punjabi village describes an evolution of remittance use beyond altruistic family support to what he terms the ‘business investment stage’.
For the South Pacific, Brown and Walker (1995) found strong evidence that migrants can be motivated to remit for reasons of saving and investment in their country of origin. Remittances in kind and the practice of selling remitted goods as part of an informal business operation is prevalent in Tonga (Brown and Connell, 1993). Such behaviour has been described in terms of a *transnational corporation of kin*, seeking to maximise extended household incomes across different continents (Marcus, 1981; Bertram, 1986). In another study Foster (1995), using an econometric analysis of secondary data on savings and real interest rate differentials, that Tongan and Western Samoan migrants' remittances were responsive to financial incentives in the remittance-receiving countries. However, there has yet been no attempt to estimate a remittance function for Pacific island migrants. In this study, an attempt is made to estimate a remittance function for Pacific island migrants in which all the possible motivational characteristics considered above are allowed for in a multivariate regression model, using household survey data.

D. Policy Significance

Future trends in remittance levels as well as their uses are of great significance from an economic policy perspective for both the source and host countries. There is little doubt that policy makers in the migrant-sending countries need to ensure the best possible use of both remitted funds and domestic savings to safeguard the economic sustainability of Pacific island populations in the future. (See Brown, Connell and Foster, 1995; Brown and Foster, 1994 and 1995.) It has been increasingly apparent within Pacific island countries and in international organisations serving those countries that there has been inadequate information on remittances and their use, and hence on their real and potential contribution to economic development. If individual remittance rates are found to decay rapidly over the earlier years of migration, then aggregate remittance levels can be expected to respond almost immediately to changes in the average length of absence of the migrant community. Also, if the average length of absence of the migrant community does affect remittance levels significantly it becomes necessary for the *rate* of new migration to be maintained, if a decay in remittance levels is to be prevented. On the other hand, if migrants continue remitting on a regular basis throughout their lives, total remittance levels will not decline provided the rate of new migration is at least sufficient to offset the decrease in the total migrant numbers arising from death or return migration; ie. provided the total 'stock' of migrants does not decrease.

If remittances are motivated mainly for family consumption support, as suggested by the RDH, it can be expected that they lead directly to increased imports of consumption goods with little impact on the generation of productive investments at home. If, on the other hand, remittances are found to be determined, at least in part, by the migrants' saving and investment portfolio choice, they become potentially responsive to policy intervention by governments eager to attract higher levels of remittances and to channel these into domestic investment.

The dependence of the Tongan and Western Samoan economies on migration and remittances is well recognised by their governments, which have urged governments of host countries to liberalise their immigration policies to facilitate emigration (Appleyard and Stahl, 1995; COA, 1989; Cuthbertson and Cole, 1995). Indeed, it has been suggested that in the context of reduced foreign aid allocations to Pacific island states, more liberal immigration policies could be used to support their economies. Two issues arise here. First, the extent to which remittances are found to decline with the migrant's length of absence away will
determine the extent to which immigration policies in the host countries will need to be directed towards increasing the intake of new migrants to compensate for remittance-decay and reductions in foreign aid. Second, the extent to which remittances are found to be potentially responsive to variables other than the needs of the dependents in the source country will determine the scope that exists for host governments policy intervention. For instance, they could consider introducing supply-side policies to encourage higher levels of remittances and the channelling of these into savings funds or investment projects in the source countries. The use of selective immigration policy as a complement to foreign aid is a contentious issue. Cuthbertson and Cole (1995) argue that there is little evidence that the safety-valve of international migration enabled sending countries to gain significantly from a reduction in domestic population or to have benefited from the receipt of remittances to restructure their economies. In the Australian context they argue against introducing policies to grant Pacific islanders easier entry as migrants on the grounds that this would discourage domestic economic development in their home countries. For Cuthbertson and Cole (1995), migration and remittances have become substitutes for domestic development. However, they provide no empirical evidence to support their assertions.

III. SURVEY ESTIMATES OF REMITTANCES

A. The Sample Survey

From late September to early December 1994 a total of 982 households from the Tongan and Western Samoan communities in Sydney were surveyed. This sample represents about 22 per cent of the total Tongan-born population in Australia and approximately 15 per cent of the Western Samoan-born population as estimated by the 1991 Australian census. Australian Bureau of Statistics census data provides a breakdown of Sydney’s Tongan- and Western Samoan-born population groups by suburb (Statistical Local Authority, or SLAs) where each of these is ranked on the basis of an Index of Relative Socio-Economic Advantage, and then classified under one of four strata. The sample was stratified using these data, on the assumption that the distribution of migrants by socio-economic stratum of suburb of residence reflects the distribution of the community by income level. In the absence of a proper sample frame it was necessary to rely on Pacific islander church congregations and other community-based organisations to locate the migrant households. The Key Informant sampling methodology was adopted using members of the migrant communities themselves as interviewers. To minimise sample bias a number of other procedures were followed. As the sampled migrant households could not be selected on a purely random basis, neither the probability of the sampling error nor reliable confidence intervals could be calculated. It is believed that any biases resulting are largely off-set by the size of the sample which amounted to approximately one-third of the total Sydney population of Tongan and Western Samoan migrants.

The survey was conducted by interviewers from the migrant communities themselves. To minimise sample bias a number of other procedures were followed. With the Western Samoan community, a quota system was used to ensure that the numbers of respondents were apportioned across the different church congregations in accordance with their estimated relative sizes, thereby establishing a representative balance amongst all of the churches. With the Tongan community where the chosen interviewers were community leaders who had
access to confidential community lists from other sources, it was considered unnecessary to follow the same church-based quota system.

The available budget for the survey limited the target sample to 1,000 households. The target number of households to be surveyed was set at 600 from the Tongan community and 400 from the Western Samoan community, which reflects the relative size of their populations in the 1991 Australian census. When selecting households for inclusion in the sample the interviewers were unable to pre-select on the basis of the respondents' actual socio-economic situation. Interviewers were therefore assigned a quota of households to survey from each of the four strata, on the assumption that this would ensure a representative cross-section of income levels in the overall sample. Interviewers were instructed to apportion their samples across the 41 SLAs on the basis of the proportions of migrants in each of the strata, from ABS data.

B. Estimating Remittance Levels

Remittances can take different forms, some of which are not accounted for in the official balance of payments remittance estimates in either the sending or receiving country. Remittances are defined here as inclusive of the following forms of international resource transfer by the migrant household to households or other parties overseas:

A. money transfers sent via the formal banking system to households;
B. money transferred informally in cash (bills) or via an informal agent to households;
C. the value (in Australia) of all goods sent to households;
D. payments made by the migrant on behalf of households;
E. donations by the migrant to other institutions or organisations; and,
F. deposits made into bank accounts held by the migrant overseas.

The official balance of payments estimates refer almost exclusively to categories A and F (and possibly E), although in Western Samoa a proportion of cash foreign exchange deposits is assigned to remittances. In Tonga these are treated as revenues from tourism. In either case they eventually end-up in the banking system and as current account receipts, unless of course they are subsequently used to settle foreign exchange transactions (or, simply deposited in off-shore bank accounts) through informal channels.

Migrant transfers in-kind, mainly in the form of goods are sent mostly to households as 'gifts' or 'personal effects' and are often not recorded as imports and escape any duties. A significant amount of these end-up in informal sector flea-markets (Brown and Connell, 1993). Most of these transfers would therefore be unrecorded, either as remittances or as imports, in the balance of payments statistics.

It has also been found that migrants remit to other institutions and organisations, mainly churches (see Brown, 1994; 1995b; Brown and Walker, 1995). Donations are often collected by the churches in the host countries and are held in bank accounts there, to be transferred overseas or used to settle international payments on behalf of the church in the country of origin. If these transactions show up at all in the balance of payments records, they will not appear as migrants remittances.

Migrants sometimes also make payments on behalf of relatives or others in their country of origin. These consist of payments for services such as insurance premiums paid to Australian or New Zealand-based companies, schooling and other educational expenses, or most commonly, payments for international airfares made directly to the airlines. In most
instances the airfare enabled the relative to visit the migrants in their host countries. This usually also implies that all other travel costs and living expenses are born by the migrant. Although all such payments should be treated as effective 'remittances', as they amount to foreign exchange savings to the country in which the traveller lives, only the estimated cost of airfares paid by the migrant household in Australia are included in the calculations of remittances in view of the difficulties in making reliable estimates of other costs incurred, such as board and lodging expenses.

Finally, it has been found that migrants also transfer money to their country of origin for the purpose of acquiring assets there on their own behalf (Brown, 1995a; Walker and Brown, 1995). These could be financial savings deposits with banks, or other physical assets such as land, housing, farm equipment and supplies, inventories for small businesses, and so on. These transfers can be made directly and via the formal network, but are often undertaken indirectly via a third party or agent on an informal basis.

In this section remittance levels are reported using two different bases; a 'Sample Average' and a 'Remitters' Average'. The former refers to the average for the entire sample, including those who did not remit at all during the previous financial year11. The 'Remitters' Average' is based on the total number of respondents who sent remittances in at least one of the above identified forms; i.e. it does not include those who did not remit in any form. Table 2 shows the two averages for each form of remittance for both migrant groups.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Composition of Remittances (All figures in AS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Households</td>
</tr>
<tr>
<td></td>
<td>Money transferred</td>
</tr>
<tr>
<td><strong>Tonga</strong></td>
<td></td>
</tr>
<tr>
<td>Sample average</td>
<td>900</td>
</tr>
<tr>
<td>Remitters' average</td>
<td>1,003</td>
</tr>
<tr>
<td><strong>Western Samoa</strong></td>
<td></td>
</tr>
<tr>
<td>Sample average</td>
<td>1,120</td>
</tr>
<tr>
<td>Remitters' average</td>
<td>1,487</td>
</tr>
</tbody>
</table>


Two important findings emerge from these data. First, it is evident for both migrant groups that money transferred to households through the formal banking system represents only part of total remittances. For the average Tongan household, AS$900 out of a total of AS$2,952 sent to household members (approximately 30 per cent), and for Western Samoans, AS$1,120 out of a total of AS$2,334 sent to household members (50 per cent)12. For Western Samoans, these formal bank (or post office) transfers were the largest single component, while, for
Tongans, money sent or carried informally was the largest component (A$1,100). For both groups remittances in kind were substantial, amounting to A$768 per Tongan and A$685 per Western Samoan household respectively. However, indirect transfers through payments on behalf of households in Western Samoa were almost as important as remittances in kind (A$514 per household).

The implication of this is that all other estimates of total remittances to Tonga and Western Samoa significantly understate the actual levels. This includes Forsyth’s (1992) estimates for the Forum Secretariat which appear high on a per migrant basis. What do these estimates imply in terms of total remittance levels? In 1992 total recorded remittances to Tonga and Western Samoa were US$27.2 and US$43.4 million respectively. In both cases remittances represented almost 90 per cent of total exports of goods and services; 20 per cent of estimated GDP in the case of Tonga and 30 per cent in the case of Western Samoa. If the remittance behaviour of all Tongan and Western Samoan migrants is similar to those living in Sydney, and, if it is assumed that all remittances sent to other (non-household) recipients pass through the formal banking system, the 1992 remittance estimates would need to be increased to approximately US$90 million in both cases. Adjusted remittances would then represent approximately two-thirds of 1992 GDP in both Tonga and Western Samoa, although it needs to be recognised that the GDP estimates themselves would also need to be revised upwards.

It is also important to note the magnitude of the difference between the sample and remitters’ averages for the two groups. From Table 3 it is evident that the average level of remittances per remitting household is very similar for the two groups.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Sample Averages and Propensities</th>
</tr>
</thead>
<tbody>
<tr>
<td>(All figures in A$ unless otherwise indicated)</td>
<td></td>
</tr>
<tr>
<td>Country of Birth</td>
<td>Tonga</td>
</tr>
<tr>
<td>(n=)</td>
<td>(609)</td>
</tr>
<tr>
<td>Remitters’ average</td>
<td>3,525</td>
</tr>
<tr>
<td>Incidence of remitters (% HH)</td>
<td>89.7</td>
</tr>
<tr>
<td>Sample average</td>
<td>3,162</td>
</tr>
<tr>
<td>Average propensity to remit (%)</td>
<td>9.3</td>
</tr>
</tbody>
</table>

HH = Household; Average propensity to remit = mean remittances/ mean income x 100


It should be borne in mind that the average Western Samoan household (and number of potential income earners) is larger. However, the sample average remittances per household is lower for the Western Samoans, indicating that a smaller proportion of households remit. This is verified by the data in Table 3 which indicate that 90 per cent of Tongan households and 75 per cent of Western Samoan households remitted during the previous 12 months. In relation to total household disposable income the Tongans remit, on average, a slightly larger
proportion of income despite their higher average per capita income levels; 9.3 per cent in comparison with the Western Samoans 8.0 per cent. It is conceivable that factors such as the higher incidence of step migration and unemployment among Western Samoan migrants account for their lower average propensity to remit. These and other possible explanatory variables are tested econometrically in the next section.

Table 3 also provides remittances data for the small sub-sample of second-generation Western Samoan households. It is remarkable that more than half of these remitted during the previous year, at an average level of A$1,440 per remitting household. This suggests that earlier estimates by Aihburg (1991) which suggested that only 30 per cent of higher-order generation Pacific islanders remit, are perhaps too low. His estimate was based on studies of Loomis (1990) and Bedford (1984) who had used significantly smaller samples.

C. Time Profile of Remittances

In the absence of reliable time series data for remittances the survey estimates of average total remittances per household were calculated for six 'Length of Absence' sub-samples, or cohorts, with a view to constructing a remittance function. These data, summarised in Table 4, provide an initial indication of the relationship between the level of household remittances and length of time the migrant has been away. They suggest that for both migrant groups, there is little evidence of remittance decay. The remittance functions, showing the relationship between average levels of remittances and length of absence from country of origin, are shown graphically for the two migrant groups in Figure 1.

For both Western Samoan and Tongan migrants the average level of remittances per household increases after five years of absence (see Figure 1). For the Tongan group the average level of remittances rises more sharply and then levels out, fluctuating within a reasonably narrow band between A$3,000 to A$3,500 per annum. For the Western Samoan group there is a more gradual but steady increase in the average remittance level up to the A$3,000 level, which is then followed by a sharp decline to A$2,000 when the length of absence exceeds 20 years, and a subsequent recovery to the A$3,000 level for those who had been away more than 25 years. It also is noticeable that the incidence of remitting Western Samoan households is highest among the most recently arrived migrants (94 per cent) and decreases quite sharply with the length of their absence, to as low as 63 per cent for the group who had been away for 20 to 25 years (see Figure 1b). By contrast, the incidence of Tongan remitters increases (also to over 90 per cent) until the length of absence exceeds 15 years, and never falls below 80 per cent. The average level of remittances per remitting household (see Figure 1c) shows a positive trend for both groups until the length of absence exceeds 20 years for Western Samoans, and 25 years for Tongans. Thus, it is only when this and the incidence of remitters decline together, after 20 years of absence, that the Western Samoans' average remittance level shows a significant drop. When both the incidence of remitters and the remittance level per remitting household show an increase when the length of absence extends beyond 25 years, the remittance function kinks up again.
<table>
<thead>
<tr>
<th>Country of birth</th>
<th>Tonga</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Western Samoa</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-5</td>
<td>5-10</td>
<td>10-15</td>
<td>15-20</td>
<td>20-25</td>
<td>25+</td>
<td>0-5</td>
<td>5-10</td>
<td>10-15</td>
<td>15-20</td>
</tr>
<tr>
<td>Remitters' average</td>
<td>1,995</td>
<td>3,321</td>
<td>3,647</td>
<td>3,502</td>
<td>4,315</td>
<td>3,162</td>
<td>1,875</td>
<td>2,823</td>
<td>2,918</td>
<td>4,280</td>
</tr>
<tr>
<td>Incidence of remitters (% HH)</td>
<td>78.9</td>
<td>91.0</td>
<td>92.6</td>
<td>87.0</td>
<td>81.0</td>
<td>95.7</td>
<td>94.1</td>
<td>77.0</td>
<td>73.5</td>
<td>74.7</td>
</tr>
<tr>
<td>Sample Average</td>
<td>1,574</td>
<td>3,022</td>
<td>3,377</td>
<td>3,047</td>
<td>3,495</td>
<td>3,026</td>
<td>1,764</td>
<td>2,174</td>
<td>2,239</td>
<td>3,197</td>
</tr>
<tr>
<td>Average propensity to remit (%)</td>
<td>5.4</td>
<td>10.2</td>
<td>9.9</td>
<td>8.2</td>
<td>8.5</td>
<td>7.4</td>
<td>7.2</td>
<td>7.0</td>
<td>6.9</td>
<td>11.1</td>
</tr>
</tbody>
</table>

HH = Household
Average propensity to remit = remittances/ mean income * 100

Figure 1a Absolute Remittance Functions

Length of Absence (years)

Remittances ($AUD$)

Figure 1b Incidence of Remitters

Length of Absence (years)

Incidence of Remitters (%)

Figure 1c Remitters’ Remittance Functions

Length of Absence (years)

Remittances per Remitter ($AUD$)
Another important finding concerns the behaviour of those who had been away for more than 25 years. In both instances the incidence of remitters rises very sharply (see Figure 1b) reaching 90 and 95 per cent for the Western Samoans and Tongans respectively. This finding needs to be investigated further as it suggests a significant change in the migrants' remittance behaviour, reversing the negative trend (with both groups) in the incidence of remitters, and compensating, in the Tongan case, for a decline in the average level of remittances per remitting household. If the factors explaining such shifts can be identified, some useful policy implications could emerge.

The propensity to remit was also calculated, where this is defined as the average level of remittances per sampled household expressed as a percentage of average household income. Again, these were calculated for each of the sub-groups. These calculations are also reported in Table 4 and shown graphically in Figure 2.

It can be seen that the average propensity to remit of the two communities is of a similar magnitude, moving around a the eight per cent level (see Figure 2a). For the Tongans, it increases sharply after five years of absence (to over 10 per cent) and thereafter shows a steady decline to 7.4 per cent. With the Western Samoan group however, the average propensity to remit is relatively stable, at around seven to eight per cent, with the exception of the sub-group that had been away for 15 to 20 years. For them the average propensity to remit rises sharply to over 11 per cent. It is also noticeable that the average income level of this sub-group is very low (see Figure 2c), suggesting that income level is not a significant determinant of remittance level. For the Tongan group on the other hand, these data suggest that as average income levels increase with the migrants' length of absence (see Figure 2c), the average propensity to remit declines (see Figure 2a).

Although these data show little evidence of remittance decay, extreme caution needs to be exercised in drawing any conclusions from the pre-coding descriptive analysis. As argued in section II(B), it is necessary to isolate three different effects: the size effect, the composition effect, and the time effect. It is possible that the remittance levels of the different time cohorts are influenced by compositional effects. In other words, it cannot be assumed that the compositional structure of each cohort is the same. Differences in average remittance levels between time cohorts cannot necessarily be attributable to differences in the average length of absence between the cohorts. Indeed, the volatility of the plotted remittance functions in Figures 1 and 2 suggests that factors other than length of absence could be important determinants of remittances. To identify the most important compositional characteristics, and then assess the significance of length of absence while controlling for all other potential determinants of remittances, a multivariate regression analysis was undertaken.

IV. REGRESSION ANALYSIS OF REMITTANCE DETERMINANTS

A. The Tobit Model

Estimating the determinants of remittances using OLS regression analysis may be problematic due to a restriction on the values taken by the regressand (remittances) given that the sample consists of both remitters and non-remitters. If the migrant does not remit we have no data on their remittance levels, although, in this instance we do have data on the regressors. The dependent variable is a mixture of discrete (zero remittances) and continuous (positive
remittances) parts and is therefore censored at zero. This is an example of the censored regression problem as highlighted by Tobin (1958). Many studies have ignored this censoring problem, paying no special attention to the zero observations. (See for instance, Johnson and Whitehead, 1974, Rempel and Lobell, 1978, and Lucas and Stark, 1985). The use of linear OLS in this context clearly leads to biased and inconsistent estimates. Some analysts recognising this problem have attempted to avoid it by restricting their sample to those observations with values greater than zero (Knowles and Anker, 1981). In this case, this would involve using only the sub-sample of remitting migrants. However, this too can be shown to yield estimates of the parameters that are both biased and inconsistent (Gujarati, 1995; AMEMIYA, 1984).

The problem of censoring was first raised in the migration and remittances literature by Banerjee (1984) who pointed out that, whether or not the analyst models the decision to remit explicitly as a two-stage, sequential process, or, as a one-stage simultaneous process, OLS should not be used. In a two-stage sequential decision process one could first model the discrete decision whether or not to remit using a probit model, and then model the decision on how much to remit using the OLS method with a correction made for potential sample selection bias. This method of modelling the remittance decision, together with the estimation approach of Heckman (1979), is followed by Banerjee (1984) and Hoddinott (1992) in their analyses of remittances in the context of rural-urban migration in India and Kenya respectively. The advantage of this approach is that it allows for the possibility of a regressor affecting the decision to remit or not differently to how it affects the level of remittances. Indeed, there could be some variables which affect one part of the decision but not the other.

An alternative to the two-stage approach would be to assume that there is only one remittance decision in which the two stages (whether or not to remit, and at what level) occur simultaneously. This one-stage decision process can be modelled as a single equation and estimated by Tobit analysis using data on both remitting and non-remitting migrants. Using the Tobit maximum likelihood method yields consistent parameter estimates. In this model there is total dependence between the variables determining the two parts of the remittance decision. In other words, each regressor has the same effect on the probability of a migrant being a remitter and on the level of remittances. The convenience of this approach is that it enables the analyst to identify one set of variables that are most significant in influencing 'remittance behaviour'. Some would argue that a Tobit, one-stage model may be considered overly restrictive in forcing the regressors to have the same effect on both the decision to remit and how much to remit (Banerjee, 1984; Hoddinott, 1992). However, as Hoddinott (1992,290) has noted, in none of the theoretical literature on migration and remittances is a distinction made between factors influencing the decision whether or not remit and the level of remittances. It is therefore assumed here that the remittance decision is a one-stage process.

The Tobit model can be specified:

\[ R_i^* = \beta' X_i + u_i, \quad u_i \sim (0, \sigma^2) \]

where

\[ R_i = \begin{cases} R_i^*, & \text{if } \beta' X_i + u_i > 0 \\ 0, & \text{otherwise} \end{cases} \]

(18)
letting \( R^* \) denote the dependent variable ('remittance behaviour') and \( R \) the recorded value of remittances from the available data. This tells us that only when \( R^* > 0 \) will \( R = R^* \). When \( R^* \leq 0 \) the observed value of remittances (\( R \)) will be zero. The objective is then to estimate \( \beta \) and \( \sigma \) using the maximum likelihood method, where \( X_i \) the vectors of parameter estimates and independent variables, and \( \nu \) is a random variable that may be interpreted as the collection of all the unobservable variables that affect \( R^* \).

Following Hodlinott (1992), the remittance function to be estimated can then be specified as:

\[
R_i^* = \beta' X_i + \epsilon_i^*
\]

where, \( \beta' \) is a vector of parameter estimates, \( X_i \) is a vector of regressors and \( \epsilon_i^* \) is the error term. For those migrants who remit \( R_i^* \) is the actual amount of remittances, while for those who do not \( R^* \) is an index of their willingness to make remittances.

To distinguish the various categories of determinants it is possible to specify the estimated remittance function as:

\[
R_i' = \eta_0 + \sum_{j=1}^{J} \beta_j D_{ij} + \sum_{k=1}^{K} \gamma_k S_{ik} + \sum_{p=1}^{P} \alpha_p M_{ip} + \sum_{q=1}^{Q} \delta_q T_{iq} + \epsilon_i^*
\]

where;

- \( \eta_0 \) is a constant
- \( D_{ij} \) denotes the \( j \)th demand-side characteristic of the \( i \)th individual
- \( S_{ik} \) denotes the \( k \)th supply-side characteristic of the \( i \)th individual
- \( M_{ip} \) denotes the \( p \)th motivational characteristic of the \( i \)th individual
- \( T_{iq} \) denotes the \( q \)th length of absence characteristic of the \( i \)th individual

The main purpose of the Tobit analysis, as applied in this context, is to identify which of the variables are most significant, especially with a view to testing for remittance decay. As total dependence is assumed to hold between the variables determining both the value of the dependent variable \( R^* \) and whether or not an observation is in the uncensored region, the Tobit model, as applied here, effectively identifies the variables that are significant with respect to both whether or not a migrant remits and how much is remitted.

Some caution needs to be exercised in the interpretation of the parameter estimates as the interpretation depends on the particular purpose of the model (Greene, 1993). The Tobit parameter estimates generated by most software packages apply to the uncensored subsample of observations, where

\[
\beta = \frac{\partial E[R'|\nu]}{\partial \nu}
\]

and \( E \) is the conditional variance.
In this instance $\beta$ indicates the marginal effects of the variables on the sub-sample of remitting migrants. If we are concerned with the parameter estimates for the migrant community as a whole, accepting that there are always some who are non-remitters (the censored observations) it is necessary to compute adjusted parameter estimates which effectively scale the Tobit parameters by the probability of the observation falling in the uncensored sample; ie. of being a remitting migrant\textsuperscript{17}. These are given by

$$\frac{\partial E[R'|x_i]}{\partial x_i} = \beta \Phi \left( \frac{E[R_i|x_i]}{\sigma} \right)$$

where $\Phi(.)$ is the standard normal cumulative distribution function.

From these adjusted Tobit estimates it is then possible to draw some conclusions about the marginal effects of changes in particular variables on the remittances of the migrant community as a whole; not just on the remittances of the remitting sub-sample. In this case the independent variable has two effects; it affects the probability of the migrant falling in the remitting sub-sample, and, how much the migrant remits.

B. Selection of Variables

The main purpose of the Tobit regression analysis used here is to identify which of the variables are most significant determinants of remittance behaviour, where remittance behaviour consists of two elements; whether or not to remit, and, if so, how much to remit. The dependent variable in the regression model is the value of remittances in Australian dollars\textsuperscript{18} in all forms over the 12 month period preceding the survey.

From the earlier discussion of remittance decay and the literature on the motivations and determinants of remittances in section II, three broad categories of factors affecting a migrant’s remittance behaviour can be distinguished, apart from the affect of duration of absence alone.

First, there are factors that influence the strength of the demand-side pressures on a migrant from the receiving end, in particular, family and community ties. Second, there are the supply-side factors that affect the migrant’s capacity to remit, such as income and net wealth. Thirdly, there are the various behavioural characteristics that influence the migrant’s motivations to remit, such as self-interest.

Four demand side variables are included in the model:

(i) whether the head of household and spouse still have at least one living parent in country of origin (\textit{PARENT});

(ii) whether the head of household is married with spouse still in the home country (\textit{SPOUSE});

(iii) whether the household had received house-guests to stay during the preceding 12 months which is an indicator of continued family or community ties (\textit{VISITOR});

(iv) whether the head of household step-migrated to Australia via a third country (New Zealand), which again is a proxy for the migrant’s degree of remoteness from the original home community (\textit{STEP}).
Three supply-side variables are included in the model:

(i) Household income level, expressed in Australian dollars, after tax, as declared by the head of household for the 12 month period preceding the survey (INCOME);

(ii) Value of assets held by the household in Australia less the value of debts, expressed in Australian dollars (ASSETS);

(iii) The number of persons living in the household (HOUSNUM).

Eight behavioural or motivational variables are included in the model:

(i) whether the head of household considers that his or her parents are poor, which would, if significant and positive indicates that the migrant is motivated by altruism (POOR);

(ii) whether the head of household intended to return to his or her country of origin which if significant and positive indicates that those planning to return one day remit more than those who don't (INTENT);

(iii) whether the head of household is 55 years of age or more and intends to return home which if significant and positive indicates that returning retirees can be expected to remit more than other returnees (SENINT);

(iv) whether the head of household expected to inherit assets from a parent still living in his or her country of origin, which would be significant and positive if the migrant is motivated by inheritance-seeking self interest (INHERIT);

(v) whether the head of household owned non-land assets in his or her country of origin, which would be significant and positive if the migrant's remittances are motivated by continued maintenance of land assets at home (LAND);

(vi) whether the head of household owned non-land assets in his or her country of origin, which would be significant and positive if the migrant's remittances are motivated by business investment (OVSASS);

(vii) the head of household's level of education attained before migrating, at four possible levels; pre-secondary schooling, secondary schooling, technical training, and university education which, if significant and positive indicates if Poirine's (1995) human capital version of this hypothesis applies (SECOND, TECHNICAL, UNIV) with the omitted control category having pre-secondary education only);

(viii) whether the head of household received financial assistance from relatives at home for migration purposes, which ought to be significant and positive if Stark's (1991a) informal loan hypothesis holds (HELPED).

The treatment of length of absence

The model allows the migrant's length of absence to affect remittance levels in a number of ways, captured by the following set of time-interacted variables:

(i) the number of months since the migrant first emigrated, which if significant and negative would indicate underlying remittance decay (TIME);

(ii) the number of months since the migrant first emigrated squared, which allows for a possible non-linear (quadratic) decay function (TIME²);
(iii) an interaction of number of months since migration with the existence or not of a surviving parent, which, if significant would allow for the possibility of different rate of decay for migrants who still have dependent parents at home (PARTIM);

(iv) the preceding variable squared, which allows for a possible non-linear (quadratic) decay function (PARTIM²).

(v) an interaction of number of months since migration with the intention to return or not, which, if significant would allow for the possibility of different rate of decay for migrants who intend returning (INTIM);

(vi) the preceding variable squared, which allows for a possible non-linear (quadratic) decay function (INTIM²).

The dependent variable ADJREM is the value of remittances in all forms excluding the amount spent on visitors' airfares. The sample means and standard deviations are given for all variables (excluding the interacted terms) for all migrants and the sub-sample of remitting migrants in Table 5\textsuperscript{20}. The values for the dummy variables indicate the proportion answering "yes" while all monetary values are in Australian Dollars (AS). For information purposes the means of TOTREM (the total value of remittances in all forms) and SREMIT (the dummy for whether a migrant remits or not) are also given. Neither of these was used in the regression model.

C. The Results

The regression analysis was performed separately for the Tongan and Western Samoan subsamples using the SAS statistical software package. The results are shown in Table 6. In both instances likelihood ratio tests (LR) indicate that the overall model is significant at the one per cent level. From the results it is evident that for both Tongan and Western Samoan migrants, remittance behavior is determined by a combination of supply-side, demand-side and motivational variables. On the demand side it is evident that migrant's remittances are positively related to the existence of a surviving parent or spouse (both at the one per cent level for both communities) in the migrant's home country, and to the variable VISITOR (at the one per cent level for both communities) which is a proxy for the strength of ties to the home community\textsuperscript{21}. The results do not support the hypothesis that the strength of ties are weaker (and hence remittances lower) among migrants who have step-migrated to Australia from New Zealand. For the Western Samoan community, a much larger proportion of whom did step migrate (80 per cent), the variable STEP is not significant (at the 10 per cent level), while for the Tongan community it is significant (at the five per cent level) but positive in sign, indicating that step migrants have a higher propensity to remit.
<table>
<thead>
<tr>
<th>Variable</th>
<th>All Migrants</th>
<th>Remitting Migrants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tonga (n=533)</td>
<td>Western Samoa (n=298)</td>
</tr>
<tr>
<td>TOTREM*</td>
<td>3219.51 (3658.21)</td>
<td>2610.07 (3210.15)</td>
</tr>
<tr>
<td>ADJREM*</td>
<td>3049.53 (3603.04)</td>
<td>2072.15 (2568.81)</td>
</tr>
<tr>
<td>SREMIT*</td>
<td>0.90 (0.30)</td>
<td>0.75 (0.43)</td>
</tr>
<tr>
<td>PARENT</td>
<td>0.61 (0.49)</td>
<td>0.60 (0.49)</td>
</tr>
<tr>
<td>SPOUSE</td>
<td>0.10 (0.29)</td>
<td>0.06 (0.24)</td>
</tr>
<tr>
<td>VISITOR</td>
<td>0.26 (0.44)</td>
<td>0.35 (0.48)</td>
</tr>
<tr>
<td>STEP</td>
<td>0.20 (0.40)</td>
<td>0.93 (0.26)</td>
</tr>
<tr>
<td>TIMEP</td>
<td>159.09 (67.44)</td>
<td>203.45 (91.99)</td>
</tr>
<tr>
<td>INCOME</td>
<td>35722.70 (14827.04)</td>
<td>31651.01 (13744.25)</td>
</tr>
<tr>
<td>ASSETS</td>
<td>21906.38 (55720.61)</td>
<td>10838.95 (50453.37)</td>
</tr>
<tr>
<td>HOUSNUM</td>
<td>4.10 (1.81)</td>
<td>5.06 (1.76)</td>
</tr>
<tr>
<td>POOR</td>
<td>0.24 (0.43)</td>
<td>0.39 (0.49)</td>
</tr>
<tr>
<td>INTENT</td>
<td>0.10 (0.30)</td>
<td>0.10 (0.30)</td>
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<td>INHERIT</td>
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<td>0.07 (0.26)</td>
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<tr>
<td>OVSASS</td>
<td>0.29 (0.45)</td>
<td>0.07 (0.26)</td>
</tr>
<tr>
<td>LAND</td>
<td>0.57 (0.50)</td>
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<tr>
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<tr>
<td>UNIV</td>
<td>0.03 (0.18)</td>
<td>0.03 (0.17)</td>
</tr>
<tr>
<td>HELPED</td>
<td>0.37 (0.48)</td>
<td>0.24 (0.43)</td>
</tr>
</tbody>
</table>

* TOTREM is all forms of remittances (AS) and ADJREM excludes payments for airfares
+ proportion of remitting migrants in sample
| in months

23
<table>
<thead>
<tr>
<th>Variable</th>
<th>TONGA</th>
<th>WESTERN SAMOA</th>
</tr>
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<tr>
<td></td>
<td>Estimate</td>
<td>Estimate</td>
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<tr>
<td></td>
<td>(absolute t-value)</td>
<td>(absolute t-value)</td>
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<tr>
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<td></td>
<td>(6.07)*</td>
<td>(6.63)*</td>
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<td>SPOUSE</td>
<td>2402.0293</td>
<td>1323.6271</td>
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<td></td>
<td>(4.38)*</td>
<td>(1.97)*</td>
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<tr>
<td></td>
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<td>(4.17)*</td>
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<td>STEP</td>
<td>1093.5670</td>
<td>321.9047</td>
</tr>
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<td></td>
<td>(2.54)*</td>
<td>(0.49)</td>
</tr>
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<td><strong>SUPPLY-SIDE VARIABLES</strong></td>
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<td></td>
</tr>
<tr>
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</tr>
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<td></td>
<td>(6.86)*</td>
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<td>ASSETS</td>
<td>0.0018</td>
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<tr>
<td></td>
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<td>HOUSNUM</td>
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<td></td>
<td>(0.34)</td>
<td>(0.77)</td>
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</tr>
<tr>
<td></td>
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<td>(0.94)</td>
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</tr>
<tr>
<td></td>
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<td>(5.31)*</td>
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<tr>
<td></td>
<td>(3.40)*</td>
<td>(1.97)*</td>
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<td></td>
<td>(0.32)</td>
<td>(0.10)</td>
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<td>OVSASS</td>
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<tr>
<td></td>
<td>(0.71)</td>
<td>(1.27)</td>
</tr>
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<td>LAND</td>
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<tr>
<td></td>
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<td>(0.60)</td>
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<td></td>
<td>(0.36)</td>
<td>(1.05)</td>
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<td>446.7594</td>
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<tr>
<td></td>
<td>(1.13)</td>
<td>(0.36)</td>
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<td>UNIV</td>
<td>-1136.7447</td>
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<td></td>
<td>(1.15)</td>
<td>(1.20)</td>
</tr>
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<td>HELPED</td>
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<td></td>
<td>(0.14)</td>
<td>(2.25)*</td>
</tr>
<tr>
<td><strong>TIME VARIABLES</strong></td>
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<td>-0.8214</td>
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<tr>
<td></td>
<td>(0.17)</td>
<td>(0.14)</td>
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<td>0.0082</td>
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<tr>
<td></td>
<td>(0.37)</td>
<td>(0.71)</td>
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<td>2440.10</td>
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<tr>
<td></td>
<td>(30.63)*</td>
<td>(20.14)*</td>
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<td>Log Likelihood (LR)</td>
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<td>-2080.94</td>
</tr>
<tr>
<td></td>
<td>(135.21)*</td>
<td>(155.30)*</td>
</tr>
</tbody>
</table>

* indicates significant at 0.01 level; + indicates significant at 0.05 level; # indicates significant at 0.10 level
On the supply side the migrant’s level of income is significant (at the one per cent level) for both groups, and the parameter estimates suggest a marginal propensity to remit of approximately seven per cent and three per cent for the Tongan and Western Samoan groups respectively. This result is important for it indicates that if there is remittance decay, this could be offset by rising average income levels over time. Two further observations can be made here. First, household size and, therefore, the number of dependents is not a significant factor in either case. This implies that the number of dependents living in the migrant households have no affect on the migrants’ remittances to dependents or others in their country of origin. Second, although household income earned is significant for both groups (at the one per cent level), asset ownership does not appear to influence remittance behaviour. This suggests that remittances could be responsive to cyclical fluctuations in household income as this varies with the economic conditions and employment opportunities in the host country.

There is also evidence that motivations other than altruism are important determinants of remittance behavior. First, in both communities there is evidence of self-interest as a significant motivational factor. Migrants who intend to return home have a significantly higher propensity and level of remittances than those who do not. This indicates that the prospect of return-migration will be associated with a higher than otherwise transfer of remittances, which again is supportive of a self-interest motive. However, there is one important difference between the Tongan and the Western Samoan communities. With the Tongan community it is only migrants who are in the 55 years and older age group whose remittance behavior is positively related to the intention of returning (SEVINT, which is significant at the one per cent level) while in the Western Samoan community migrants in that age category remit less than others intending to return. (While INTENT is significant at the one per cent level and has a positive sign, SEVINT which is also significant at the one per cent level has a negative sign). One possible explanation would be that Tongan migrants prefer to hold their savings in Australia, transferring their "nest-eggs" over a short period of time as they approach retirement. This would also account for the upward kinked remittances profiles observed by Brown and Walker (1995). Western Samoans, on the other hand, could prefer to move their savings into assets in their home country as they save, but, as they approach retirement age, they prefer to accumulate more in Australia. The reasons for these differences are not obvious and require further investigation. It is possible that they reflect different economic conditions and investment opportunities in the two migrant-sending countries, which would be consistent with Foster’s (1995) finding, from an econometric analysis of Tongan and Western Samoan time series data, that remittances are sensitive to real interest rate differentials between the sending and host country. Again, this conclusion suggests that remittance behavior could be responsive to changes in economic policy and the personal investment climate in the migrants’ home country.

Second, there is evidence that financial obligation, or indebtedness, to the home community are also of importance among Western Samoans. The significance of the variable HELPED (at the 5 per cent level) indicates that having received financial assistance from relatives at home to migrate positively affects a migrant’s subsequent remittance behavior. However, it is also apparent that the level of educational attainment before migrating is not associated with any differences in the migrants remittance behavior. In other words, there is no evidence that in situations where parents have invested more in a migrant's education that this will induce a higher than otherwise level of remittances, after taking level of income and other related
variables into account. This is not supportive of the hypothesised implicit co-insurance model (Stark, 1991a) or informal loan agreement (Poirine, 1995).

Perhaps the most significant result of the regression analysis is the lack of any evidence of remittance decay for either migrant community. If remittance decay were present the variable TIME, and those which are interacted with TIME (PARTIM, INTIM) would need to statistically significant, either individually, or jointly, allowing also for non-linear (quadratic) relationships (TIME², etc). The results show that in the case of the Tongan community, while the sign of TIME is negative, it is not statistically significant, even at the 10 per cent level. For the Western Samoan community it is significant at the 10 per cent level, but is positive in sign, which indicates that the level of remittances increases with the migrants' length of absence, controlling for changes in all other variables. In other words there is no evidence that the remittance functions of migrants are downward sloping.

V. CONCLUSIONS

Migration and migrant earnings are vital not only to the livelihoods of the migrants and their accompanying dependents but also to the non-migrant relatives and communities remaining in the migrants' country of origin. The survey results show that remittances are of far greater significance than the official balance of payments data suggest. The possible decline in remittances as opportunities for immigration and employment in the main OECD host countries decrease is of concern to policy makers in the migrant-sending countries and should be of concern too to policy makers in the host countries which are also significant aid donors in the region. The unrequited private transfers of migrants need to be considered by host country governments as complementary to official aid flows. The design of policies to increase remittances either by increasing employment opportunities for migrants, or by encouraging them to remit more should be on policy-makers' agendas in both the migrant-sending and OECD host and donor countries.

Whether or not remittances can be expected to decline and, the design of appropriate government policy to prevent this depend on our knowledge of what factors most affect migrants' remittance behaviour and what motivational characteristics policy makers ought to consider in their choice of policy instruments to stimulate greater remittance flows. Changes in the aggregate level of remittances were identified as the product of three effects; the size effect which is determined by the rate of net migration and natural attrition in the migrant community; the composition effect which is determined by changes in the composition of the community in terms of those (non-temporal) characteristics which most influence their remittance behaviour and, the time effect, which is the effect that length of absence alone has on remittance behaviour.

The results of this study demonstrate that none of the assumptions about migrants' remittance behaviour on which the doomsday, remittance decay scenario is based, is valid. There is also much less cause for pessimism concerning the sustainability of remittance levels. The multivariate regression analysis showed that while demand side variables affecting the need for family support are significant, it was found that remittances are also driven by supply-side factors, particularly the migrants' income level and motivations to transfer their saving balances and invest in their countries of origin. Most significantly, it was found that once all other variables are controlled for, the passage of time itself does not have a significant effect on migrants' remittance behaviour. In other words, if there is no change in the size or composition of the migrant community, there is no reason to believe that the aggregate level of
remittances will fall. Provided net migration does not become negative, the size of the migrant community will not fall.

However, it is conceivable that the composition of the community will change which makes it important to identify those compositional characteristics that most affect remittance behaviour. Provided the composition of the migrant community does not move away from those who continue to maintain strong family and community ties to the home country, and who retain the belief that they will return home at some future date, there is no reason to believe that the aggregate remittance function will shift downwards in such a way to cause an otherwise increasing level of remittances to decline. As the level of income is highly significant and as there is also evidence that remittance behaviour is motivated by material self-interest, remittance levels can also be expected to respond positively (i) to changes in the economic environment affecting employment opportunities and income levels in the host countries; and (ii) to policy changes their home country which enhance the relative attractiveness of holding financial assets there rather than in the host countries.

There is therefore more scope for positive policy intervention and co-ordination on the part of governments in the host and migrant-sending countries to stimulate the flow of remittances. If remittances were to decline because of a decrease in migrant stocks in OECD economies in the region, the effects would be severe. From a host country policy perspective these findings reinforce the view that migration and remittances need to be considered as a major form of economic assistance to Pacific island economies, and that immigration and foreign aid policy should not be considered in isolation of each other. Policy needs to be addressed towards harnessing more of migrants' remittances for development investment, and not towards reducing reliance on remittances by curtailing migration opportunities.
This is the permanent secretariat of the South Pacific Forum, an organisation of the heads of Government of the independent and self-governing countries of the South Pacific, which began as the South Pacific Bureau for Economic Co-operation in 1983, and was renamed the Forum Secretariat in 1988.

A recent econometric analysis byStraubhaar (1986) of remittances data from Turkey over the period 1963-
1983 compared Swamy’s (1981) earlier findings, suggesting a hierarchy of determinants in which the economic environment in the host country was found to be the most influential variable.

Strictly speaking the net change in the stock of migrants should also take into account the decrease in migrants due to natural attrition; i.e. death.

For an good overview of the literature on migration and remittances in the Third World, see Russell (1986).

Tongamoa (1985) surveyed 45 Tongan households in Sydney, while Otai (1991) surveyed 150 households. There are no similar studies of Western Samoan migrants and remittances in Australia. Fuka (1985) surveyed the Tongan community in Auckland, while Loomis (1990) surveyed just over 200 households in Auckland in 1981, and 111 in 1985. None of these samples can be considered sufficiently large for reliable statistical analysis, especially when comparisons are made between sub-samples which in some instances have as few as 5 observations (Loomis, 1990:67).


He suggests that the profile of remittances over time is more likely to follow the "M" shape as empirically observed for Pacific island migrants by Brown and Walker (1995). He also concludes that in this situation, where the most productive form of investment for the family is in human capital, it is to be expected that the remittances will be "consumed", as family educational and housing expenditures, rather than invested in other "productive" spheres of economic activity in the local economy.

However, Rempel and Lobdell (1978), in their econometric analysis of urban-rural remittances in Kenya found no significant difference in remittance levels between those who intended to return and those who did not.

This calculation is based on the total Tongan- and Western Samoan-born migrant populations as reported in 1991 census. (See Brown and Walker, 1995: Table 1.1, p-4). As the survey was undertaken on a per household basis, it was necessary to multiply the number of households surveyed by the average number of household members born in Tonga and Western Samoa; viz. 2.2 and 2.5 respectively. This implies that the survey covered 1,340 Tongan-born migrants, out of 6,168 in Australia in 1991, and 855 Western Samoan-born migrants, out of 5,742 in Australia in 1991.

For further details of the sample and survey methodology, including the questionnaire, see Brown and Walker (1995).

This excludes those respondents who either did not answer this question at all or who answered "Don’t Know".

The exchange rate was approximately A$1.00 = US$0.72.

Nevertheless, it is conceivable that a migrant is receiving remittances from others, in which case the regressands assigned zero values could, in principle, take on negative values. It is strictly in this sense that the sample can be said to be censored (Maddala, 1992:341-2).

The author is also guilty of this (see Walker and Brown, 1995) and is grateful to Dennis Ashburg, University of Minnesota, for first bringing it to his notice.

This was first used by the economist James Tobin in 1958 to analyse household expenditure on durable goods taking account of the fact that there are several observations where the expenditure is zero (Tobin, 1958). For a discussion of Tobit models, see Greene (1993), Ch. 22; Gujarati (1995), Ch. 16; Maddala (1992), Ch. 8. See also Amemiya (1984) for a useful survey of applications of the Tobit model.

It is possible to test whether the restrictions of the Tobit model are statistically significant. To do this an alternative remittance function would need to be estimated using the Heckman two-stage approach which could then be compared formally with the Tobit model, using a likelihood ratio statistic (LRS) to determine which is more appropriate (Greene, 1993; Hoddinott, 1992).

See Greene (1993).

The functional form of the regression model is discussed in Appendix A.

The treatment of time effects are potentially problematic. In the immigration and assimilation literature much attention has been paid to the possible biases resulting from "cohort" or "period" effects. In a single cross-section data set as the one used here, the problem is one of identifying those effects that are truly reflective of the passage of time, and are thus attributable to the vintage of the migrant, from those that
are attributable to some unobservable characteristics that differ between the different cohorts of migrants (Borjas, 1995; LaLonde and Topel, 1992). These could be associated with particular unobserved "quality" differences between cohorts that cause the remittance propensity of each successive cohort to change in a particular direction, or, with changing economic circumstances in the host country that affect each new migrant cohort's remittance propensity differently (Begg and Chapman, 1988; Chiswick and Miller, 1985). Without longitudinal data these effects cannot be separated. The author thanks Lou Will, Centre for Economic Policy Research, Research School of Social Sciences, ANU, for bringing this important point to his notice.

Due to missing values for some of the regressors in the sample, the final sample sizes are smaller than the original sample on which the descriptive statistics are based. It is therefore possible that there is some degree of sample selection error in the regression results.

All three are significant at the 1 per cent level in both the Tongan and Western Samoan models.

In view of the very high proportion of remitting migrants in each sample - 91 per cent and 75 per cent - the marginal effects on the overall sample are very close to the \( \beta \) estimates for the remitting group. This probably also explains why the results obtained using an OLS model, although methodologically incorrect, are very similar to the Tobit results. It is also worth noting that the diagnostic tests performed with the OLS analysis indicated neither multicollinearity nor heteroscedasticity.

This is consistent with the findings of Foster (1995) who used secondary, time series data to analyse Tongan and Western Samoan remittances.

Asset ownership in the migrants' home country does not appear to motivate a higher than otherwise level of remittances although it is noteworthy that in the Tongan community, there is some evidence that remittance behavior is positively related to the ownership of land, but this variable is significant only at the 10 per cent level.

The likelihood ratio test statistics for the joint significance of the variables \( \text{TIME} \) and \( \text{TIME}' \) are 3.12 and 3.68 for the Tongan and Western Samoan models respectively. Neither is significant at the 10 per cent level. In preliminary runs the models were also estimated with the variables \( \text{PARTIM}, \text{PARTIM}', \text{INTIM}, \text{INTIM}' \) included to test for a possible remittance decay among migrants with and without surviving parents at home, and those who intended to return or not. None of these variables was significant at the 10 per cent level, individually or jointly. (The values of the likelihood ratio test statistics for the joint significance of the time-interacted variables are 0.60 and 0.42 for the Tongan and Western Samoan models respectively, with four degrees of freedom. Detailed results are available from the author.)

It could be argued that the absence of remittance decay is to be expected once the variables \( \text{PARENT} \) and \( \text{SPOUSE} \) are controlled for as it is likely that these variables are also closely related to the passage of time; ie. the longer the migrant has been away the lower the likelihood that there will be a surviving parent, or, that the migrant has not been united with his/her spouse. If this is the case then omitting \( \text{PARENT} \) and \( \text{SPOUSE} \) from the model should result in the length of absence variables becoming significant, indicating remittance decay. However, with these restrictions a likelihood ratio test indicates that there is still no evidence of remittance decay at the 10 per cent level.
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