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REMITTANCES AND DEVELOPMENT IN THE PACIFIC: EFFECTS ON HUMAN DEVELOPMENT IN FIJI AND TONGA*

Richard P.C. Brown

* The views expressed in the paper do not imply the expressions of any opinion on the part of the United Nations Secretariat.

ABSTRACT

This paper reports the findings of recent research by the author on the impacts of migration and remittances in two Pacific island countries, Fiji and Tonga. The analysis is based on household-level survey data, and uses a variety of econometric methods including instrumental variable techniques, to examine the impacts of migration and remittances in relation to a number key aspects of human development in the two countries; remittance motivations and altruism; their effects on poverty and inequality; and their relationship to household wealth, education and health. There is strong evidence of positive effects in relation to each of these. These findings indicate that where formal social protection systems are largely absent, migration and remittances can perform a similar function informally, contributing significantly to development objectives such as those of the Millennium Development Goals. From a policy perspective these informal mechanisms might best be left alone rather than introducing measures to incorporate them into the formal financial systems.

Key words: migration, remittances, poverty, inequality, health, wealth, education, Tonga, Fiji

INTRODUCTION

Much of the literature on international migration and migrants' remittances addresses the question of how these impact on the migrant-sending countries' 'development' in relation to the use of remittances, and, very often, the extent to which they contribute towards the countries' external financial inflows (Ratha, 2004) and to savings, investment and economic growth (Chami *et al*, 2003). Perceiving remittances almost exclusively as another form of international finance alongside foreign aid, borrowing and foreign direct investment flows has contributed to a preoccupation with their impact on investment and growth and sometimes to the notion that remittances not used for productive investment are having a negative impact on the receiving economy in that they are being 'wasted' on consumption, are creating a disincentive to work by raising the reservation wage rate, fuelling 'unproductive' speculative investment in real-estate or contributing to Dutch-disease real exchange rate appreciation. Much less attention has been given to the role of migration and remittances in relation to human development objectives such as the reduction of poverty and inequality, the provision of an informal system of social protection, the financing and stimulation of investment in human capital, both health and education. Notable exceptions are those studies with a clear poverty focus such as Adams (1987; 2006), Adams and Page (2004) and a number of studies compiled by the World Bank in Ozden and Schiff (2006). It is on these more social and human development goals that this paper focuses, drawing from the on-going studies by the author and others (including Brown et al., 2006; Brown and Leeves, 2007; Brown and Jimenez, 2008a; 2008b; Jimenez, 2008; Jimenez and Brown, 2008).

Specifically, the following questions are addressed:

- To what extent are remittances driven by altruism, and thereby affording a much needed informal system of social protection in countries where formal systems are virtually non-existent?
- To what extent do the combined effects of out-migration and the inflow of remittances reduce poverty and inequality?
- To what extent do remittances contribute to the accumulation of wealth thereby providing recipient households with a more secure source of 'permanent' income to act as a buffer in times of hardship?
- To what extent do the processes of migration and remittances contribute to the education of those remaining?
- To what extent do remittances contribute to the health of those remaining?

These questions are addressed through the analysis of household-level survey data compiled by a World Bank-funded team led by the author in the Pacific island countries of Tonga and Fiji in 2005 (see World Bank, 2006a). This paper draws from and synthesizes the ongoing analysis of these datasets, where each of the five questions addressed constitutes a separate research topic in itself.[1]

The Pacific island countries are good cases for analysis of the potential developmental role of remittances in low-income countries, and have been the focus of extensive research in this area.[2] Widespread access to international migration opportunities and the ensuing remittance flows, particularly in Tonga, present a good case scenario to analyze the potential welfare gains from escalating international migration opportunities for developing countries. Obtaining reliable

remittances and migration data requires primary data collection methods that use survey instruments specifically designed for this purpose. Secondary sources and general surveys usually underestimate the number of migrants and the amount of remittances received†. Small country size and population in Fiji and Tonga facilitate considerably the implementation of specifically designed migration and remittances surveys, which may be prohibitively expensive in large and populated countries.

Moreover, exogenous factors such as the size and location of small island countries impose significant constraints on their economic growth opportunities. Indeed, with the exclusion of the largest Pacific island country, Papua New Guinea, all the Pacific island countries, including Fiji and Tonga, are classified as small and remote economies.

The rest of this paper consists of: a preliminary discussion of the data and the methodological issues and challenges in analyzing the causal relationships hypothesized here when using such cross-sectional samples (section B); the statistical results and findings in relation to each of the five questions addressed (sections C to G); and, concluding comments (section H).

METHODOLOGICAL APPROACH AND DATA

1. Methodological approach

The approach adopted in this paper is motivated by what has become known as the New Economics of Labour Migration (NELM) literature. A distinguishing feature of the NELM pioneered by Stark and Levhari (1982) has been the inclusion of potential indirect effects of migration and remittances on other sources of income and other variables of interest in the migrant-sending household (see for example the collection of studies in Ozden and Schiff, 2006).

According to the NELM, the migration decision and the subsequent remittance inflows affect the household's exposure to income risks, as well as its investment and production decisions. Migrant remittances might provide insurance and relieve the household's budget constraint which in turn might lead the remaining household members to adopt riskier or costly production techniques with higher potential returns. On the downside, remittances might also increase the reservation wage of remaining household members thus affecting their labour participation and supply decisions.

The migrants' absence and the inflow of remittances can have both direct and indirect effects on the household's income and other variables of interest. In relation to migration, income and other variables of interest in the migrant household are affected directly by the loss of income that the migrant member would have been contributing, and indirectly by how the remaining members reorganize their income-earning activities in response to the migrant's absence. In relation to remittances, the direct effect is obviously what the household gains in terms of

† Census data, used by the UN to measure the stock of international migrants, tend to exclude unauthorized migrants. The IMF balance of payments data exclude in-kind transfers as well as remittances sent through informal channels. Underestimation is also likely to occur when using general survey data since detailed migration and remittances questions are seldom included in the questionnaire.

disposable income from the migrants' remittances, but, in addition, the inflow of remittances can have other impacts on the household's income (Brown and Leeves, 2007).

In estimating the effects of international migrants' remittances on the recipient households a number of important methodological issues and challenges are now widely acknowledged in the applied economics literature (Adams, 1987; Ozden and Schiff, 2006). It follows that remittances cannot be treated as an exogenous addition to the income of the recipient household, given that this ignores both what the migrant would have earned had migration not occurred, and, the possible effects that the absence of the migrant and the subsequent inflow of remittances could have on the activities and earnings of those remaining. For this reason a major methodological challenge of recent remittances research is to estimate the counterfactual income of migrant households, from which without-migration-and-remittances estimates of income and poverty can be derived.

As it is possible that migration and remittances could also impact on the earnings of non-migrant households it is necessary to test for endogeneity in the relationship between remittances and the earnings of non-migrant households, and, if present, to adopt appropriate strategies to control for endogeneity bias in the econometric estimation, such as the use of instrumental variable techniques.

These challenges have given rise to a number of innovative methods for estimating the impacts of migration and remittances when the researcher is limited to a single, cross-sectional dataset, and does not enjoy the advantages offered by time series or panel data. The choice of methodology depends not only on the characteristics of the data being used, but also on the analyst's underlying assumptions about the relationship between migration and remittances on one hand, and the variables of interest on the other. Following recent developments in the applied economics literature, in this study Instrumental Variable (IV) techniques are used quite extensively to correct for potential endogeneity bias. Endogeneity bias may arise for several reasons including migrants' self-selection, omitted variable bias, and reverse causation. For these reasons it has become common practice in much of the recent migration and remittances research to test for endogeneity, or to work on the assumption that endogeneity in one form or another holds, especially when using household survey data. IV techniques are then used to measure the net effect of remittances upon income, poverty and inequality indicators, or other variables of interest, such as educational attainment or expenditures on various items, correcting for endogeneity bias arising from self-selection, omitted variable and reverse causation (Ozden and Schiff, 2006).

Finally, it needs to be stressed that none of the methodologies takes into account the effects of migration and remittances on the welfare of the migrants themselves. Given that in most instances the migrant is still considered to be a household member this limitation needs explicit acknowledgement, and points to the need for complementary studies of the welfare of the migrant communities in the host countries. This aspect is clearly beyond the scope of this paper.

2. The sample survey and data

The survey was prepared and conducted in the first half of 2005. (For details of the design of the survey instrument, selection of enumeration areas, sampling and survey administration, see Appendix C of Brown *et al.*, 2006.) The overall sample of 918 households was made up of 418 households in Fiji and 500 in Tonga. Information was collected, using a customized migration and remittances questionnaire, for the household as well as for each individual within the household giving a total of 4,663 sampled individuals, 1,937 in Fiji and 2,726 in Tonga.

Fiji, with a population of 836,000, comprises 322 islands, with approximately 110 of them inhabited, though the largest two islands, Viti-Levu and Vanua Levu, are home to over 94 per cent of the people. The main population centres, including the capital, Suva, are located in the main island, Viti-Levu, which accounts for over 70 per cent of the residents. However, due to budget constraints, the survey sample was drawn from Viti-Levu only, excluding Vanua Levu and the outer-islands.

The survey sample consisted of urban and rural enumeration areas, scattered across Viti-Levu. They cover the capital city, Suva; the five major towns in both provinces (Nausori, Lautoka, Nadi, Ba and Sigatoka); nine villages and twelve settlements. In total 420 households were interviewed, with only two refusing to answer the questionnaire, which left 418 households in our sample.

The Kingdom of Tonga embraces 171 islands, of which around 40 are populated. Out of the 100,000 Tongan residents, only 25 per cent live in the outer-islands, with the large majority of the population living in the main island of Tongatapu and mostly concentrated in the capital, Nuku'alofa. The capital city is home to around 50 per cent of the people. This population split is reflected in the survey sample, which was selected directly by the Department of Statistics in Nuku'alofa. The primary sampling units consist of 20 enumeration areas covering both the urban and rural population. In total, the Tongan sample consists of 500 households drawn from the capital city Nuku'alofa,, four districts of rural Tongatapu and the remaining 125 households chosen from two groups of outer-islands, Vava'u and Hapa'i.

Table 1 shows which households had received remittances in one form or another over the preceding year. The sample is split between those households with at least one migrant and those without any migrant members. As expected, most households with a migrant member received remittances: 86.8 per cent in Fiji and 97.6 per cent in Tonga. Although the high incidence of remitting migrants was to be expected from previous knowledge about remittances and migration networks in the region (Brown, 1995), what was not expected was the high proportion of households without any migrants who were also in receipt of remittances.

[insert Table 1 about here]

In Tonga, where migration- and remittances-dependency have been long established and have become almost ubiquitous, nearly 80 per cent of non-migrant households had received remittances in 2004. In Fiji, the less 'mature' migration-and-remittances economy, almost 20 per

cent of households without migrants had received remittances. Of the total sample, 90.9 per cent of Tongan and 42.0 per cent of Fiji households received remittances.

Within the two main ethnic groups in Fiji a similar proportion of migrant households received remittances: 84.7 per cent among Indo-Fijians and 89.1 per cent among Indigenous-Fijians. However, a somewhat larger proportion of Indo-Fijian households without a migrant received remittances (26.8 per cent), in comparison with Indigenous-Fijian households (14.7 per cent).

These observations are important for they suggest that as migration and remittances become more commonplace in an economy, non-migrant households can benefit more from direct access to remittances. This points to a more nuanced view on the relationship between migration, remittances and household living standards and inequality in these societies than what is generally argued in most other studies of migration and remittances where it is normally assumed that it is only the immediate family members of the migrant who stand to benefit, at least directly, from the flows of remittances. Table 2 shows the extent of mean income differences between households with and without migrants. In both countries both household income and income per capita are higher for households with migrants. However, it is also noticeable that for Tongan households the variability of income is considerably higher for migrant households, whereas for Fiji households this is the case for non-migrant households.

[insert Table 2 about here]

MOTIVATIONS TO REMIT: ALTRUISM AND EXCHANGE[3]

One important area of interest in the economics literature on private transfers, which includes remittances, has been the modeling and econometric testing of alternative motivations driving the donor's (ie migrant) behavior, in particular, 'altruism' and 'exchange'. In the case of altruism, the donor cares about the welfare of the recipient and is hence driven only by the recipient's need, and does not expect anything in return. In the case of exchange, the migrant expects to receive something in return for the remittances sent. Exchange can take various forms. For example, it could be an on-going or future service such as taking care of the migrant's assets while abroad, or, future possible material support in case of unanticipated misfortune ('insurance'), or, an 'investment' in anticipation of securing a future transfer such as a bequest. In these instances the donor is not concerned about the recipient household's welfare gains from the remittances, but only with what he/she might receive in exchange for the remittances sent.[4]

Understanding the motivations of remitters is of policy relevance, especially for low-income countries faced with severe foreign exchange shortages and where poverty alleviation is a focus of public policy and donor programs (Cox, 1987; Brown and Jimenez, 2008b; Jimenez and Brown, 2008). If altruism holds then it can be expected that as the recipient household's level of welfare improves the altruistically-motivated migrant's remittances will be less; i.e. as the recipient's need declines through public transfers private transfers from migrants would be effectively crowded-out. Moreover, foreign exchange earnings from remittances would also decline. If 'exchange' is the dominant motive it is usually argued that the opposite relationship

can be expected. As the recipient household's income increases so too will the exchange-motivated migrant's remittances increase, and remittances would be 'crowded-in'.

It has been recognized in the literature that an individual need not be driven exclusively by one motive; a donor's transfers could be driven by either altruism or exchange, with the dominant motive depending on the circumstances of the recipient at the time of the transfer (Cox, 1987; Cox *et al*., 2004). Altruism becomes dominant when the potential recipient's pre-transfer welfare is low, and exchange takes over when the recipient's pre-transfer welfare rises above some threshold level. This model of 'mixed motives' can be represented graphically by the non-linear 'V-shaped' relationship shown in figure I. Other studies have shown that when a non-linear function is allowed for in econometric testing of private transfers motivations, a much stronger relationship is found, especially for lower income households below the threshold. This suggests that the crowding-out of private transfers by successful poverty alleviation interventions might be considerably stronger than previously thought. In other words, if the migrant's home country household is in poverty, then altruism is assumed to apply. The deeper in poverty the household is, the higher the level of remittances received and *vice versa*, as shown by the curve to the left of the threshold 'K' in figure I. Once income rises above the poverty level and exchange becomes the dominant motive, the curve becomes positive.

This model was tested econometrically using data from Fiji and Tonga (Brown and Jimenez, 2008b; Jimenez and Brown, 2008). In both cases the results show strong support for the mixed motives model. A statistically significant negative coefficient was found for both countries on the income gap variable which indicated that below the threshold, altruism applied. However, for Fiji, although the coefficient for income above the threshold was positive and statistically significant, indicating a switch in motivations at the threshold, the slope of the curve was close to zero indicating a weaker exchange relationship in this case. In other words, the estimated relationship for Fiji was more akin to an L-shape than the hypothesized V-shape.

In Tonga's case, for which the predicted values from the estimation are plotted in figure II, the results indicated that US$100 decrease in income below the threshold level leads to US$30 to US$47 increase in remittances increase in Tonga and US$8 to US$9 in Fiji. When income rises above the threshold, a US$100 increase in income leads to US$11 to US$6 increase in remittances in Tonga, but only US$1 in Fiji.

The implications of these findings are that households below the poverty line with migrants can be expected to receive more remittances the poorer they are. To this end migration and remittances provide an important source of informal, family-based social protection to the poorest. On the other hand, government transfers and poverty alleviation programs that benefit the poorest are likely to reduce the inflow of remittances which will also impact on the country's foreign exchange earnings. The results also showed other important relationships reinforcing the role of remittances in providing a source of social protection in Tonga, the more mature migration-oriented case (Jimenez, 2008). For instance; the presence of an old person increased remittances by US$562; the occurrence of a major social ceremony in the household such as a wedding or a funeral increased remittances by US$1,518; and, the presence of a household member with a medically-related incapacity lasting 30 days or more increased remittances by US$300.

[insert Figures I& II about here - both on same page]

POVERTY AND INEQUALITY[5]

1. Methodology

A distinguishing feature of the NELM literature has been the inclusion of potential indirect effects of migration and remittances on other sources of income in the migrant-sending household. The migration decision and the subsequent remittance inflows affect the household's exposure to income risks, as well as its investment and production decisions. Migrant remittances might provide insurance and relieve the household's budget constraint which in turn might lead the remaining household members to adopt riskier or costly production techniques with higher potential returns. As a consequence, the focus of the migration and remittances literature more recently has been on the development of a methodology to estimate a *counterfactual income* for households with migrants and remittances (Adams, 1989; 2006; Barham and Boucher 1998; Acosta *et al.,* 2007). This allows the analyst to estimate what the household's level of welfare would have been, as measured by income or consumption, in the absence of migration. Counterfactual income is then used to estimate what the poverty and inequality indicators would have been in a hypothetical scenario of no-migration, which are then compared with actual income including remittances. In this approach the focus is on determining whether poverty and inequality levels are lower in the actual scenario, with migration and remittances, than in a hypothetical counterfactual scenario without migration and remittances. The core of the methodology consists of estimating what the migrant household's income would be in the 'counterfactual household income'. The method for estimating counterfactual household income needs to remove both the direct[6] and indirect[7] effects of migration on the earnings of remaining household members, while imputing the home earnings of migrants had they not migrated. However, it should be noted that this methodology implicitly assumes that the labour market conditions are unaffected by the outflow of migrants and subsequent inflow of remittances. In other words, the labour market conditions that prevail in the with-migration scenario are assumed to be the same for the counterfactual without-migration scenario.

2. Poverty and inequality indicators in the actual and counterfactual scenarios

The results of the income regressions for the sub-sample of non-migrant households were used to estimate income, for migrant households.[8] In order to construct what household income would be in the no-migration scenario, a mean regression of natural log incomes of non-migrant households was estimated (Brown and Jimenez, 2008a). Under the assumption of no self-selection, the resulting parameters were used to predict the expected natural log income of migrant households. This imputed income, which sets remittances to zero, is then used to calculate per capita household income adjusted by adult-equivalent scales. This estimation incorporates all household members including migrants and non-migrants and assumes that one child under 14 is equivalent to 0.5 of an adult[9].

For comparability purposes, the Gini Coefficient was used as a measure of inequality, while the poverty analysis used the Poverty Headcount Ratio and the Poverty Gap indicators. Due to non-availability of official data to estimate per capita poverty lines and the questionnaire design was also customized to construct a poverty line. The questionnaire included a minimum cash income question, which asked respondents how much money a family like theirs required 'just to get by'. Household subsistence income, also derived from the survey, was added to this amount to estimate the total income that each household considered the minimum to get by. Once the total required income had been estimated for each household, this amount was divided by the adult-equivalent number of household members, where each child was counted as equivalent to 0.5 adults. Following the procedure used commonly in the poverty literature, the poverty line was then estimated as the median of the required per capita adult-equivalent income in the sample. A poverty line of US$765 in Fiji and US$879 in Tonga were thus derived.10

Table 3 presents the results for the analysis of poverty and inequality indicators, which were estimated using the household-level data weighted by household size. The table shows the estimated poverty and inequality indicators under each scenario, as well as their percentage change when compared against the indicators obtained using actual household income, including remittances. To calculate the Gini Coefficient, a bootstrap procedure was used to derive confidence intervals for the Gini Coefficients (95 per cent confidence intervals) across the different scenarios. These bias-corrected confidence intervals are reported in the rows below the Gini Coefficients in table 3.

[insert Table 3 about here]

REMITTANCES AND WEALTH[11]

The analysis of the relationship between remittances and wealth is much neglected in the migration and remittances literature. In recognition that households move in and out of poverty over time, with transitory income and expenditure being susceptible to volatility and fluctuations from exogenous shocks, this section reports the results of our compilation and analysis of an index of household wealth. This provides a better indication of household 'permanent income' and longer-term financial security than transitory income recorded for a given, survey year.

The questionnaire collected information on 22 types of assets and housing characteristics. These included agricultural and non-agricultural land, buildings, and household consumer durables such as white-goods and vehicles. Characteristics of the household's dwelling contained information about: number of rooms; floor, roof and wall materials; sources of water and lighting; and, type of toilet. Data on these assets and dwelling characteristics were used to build a linear index to serve as a proxy for household wealth. In constructing this index, Principal Components Analysis (PCA) was applied, following Filmer and Pritchett (2001).

Land ownership was discarded as a component of the wealth index in both countries, since it did not appear to be positively correlated to ownership of other assets and affected the internal coherence and robustness of the wealth index. Therefore, it appears that the assumption that household long-term wealth is the determinant of variation in household ownership of assets does not hold regarding land in Fiji and Tonga. This is not altogether surprising, when taking into account the land ownership regimes in both countries. In Fiji, Indo-Fijians do not usually own land but lease land from Indigenous-Fijan landowners, whereas Indigenous-Fijians have access to land owned by kin-based land owning groups (mataqali). In Tonga land is owned by individual households, and in principle, all adult males have an equal entitlement to a piece of land.

The wealth index was also used to classify households in three categories, as shown by table 4. The first columns in table 4 show the asset variable mean for those at the bottom 40 per cent of the wealth index distribution (the poorest 40 per cent), while second and third columns present the mean for the middle 40 per cent and the wealthiest 20 per cent of households, respectively. Thus, while only 7 per cent of the poorest households in Fiji have a landline telephone, 47 per cent of the middle and 74 per cent of the wealthiest do. In Tonga, landline telephone penetration is higher across the three groups, with 20 per cent of the poorest, 75 per cent for the middle and 96 per cent of the wealthiest having access to landline telephones. On the other hand, as can be seen from the last row in the Fiji panel of table 4, the average wealth index for the poorest group of households is 4.49 lower than for the middle and 7.92 lower than for the richest.

[insert Table 4 about here]

Figure III compares the average wealth index for households that received remittances with those that did not[12].

[insert Figure III about here]

As these figures show, in both countries the average wealth index for households that received remittances was higher than for those that did not. The index for the remittance recipient households was 2.20 points higher in Fiji, and 2.77 in Tonga. Notwithstanding the usual caveats regarding the possibility of an endogeneity problem, these results point towards a positive relationship between remittances and households' long term wealth.

REMITTANCES AND EDUCATION

There has been an understandable tendency in policy debate and economics literature to focus on the negative aspects of international migration in relation to a country's losses from brain-drain. It is often the case that all out-migrating human capital is treated as a loss, on the implicit assumption that that same amount of human capital would otherwise have been available for employment in the domestic economy. For migration-oriented, remittance-dependent countries the sustainability of income and welfare depends heavily on maintaining adequate levels of investment in human capital for export. It also depends on ensuring that that this investment is directed towards appropriate, internationally-tradeable forms of human capital. There is evidence that households in migration and remittance-oriented countries like the Philippines and Pacific islands are encouraging training for and employment in certain areas, such as the health sector, because this enables a career that gives scope for migration. The quantity and occupational composition of investment human capital in an economy will then be influenced by the households' perceptions of what forms of human capital maximize their opportunities for migration. In relation to the nursing profession, for example, it cannot be assumed that in the absence of strong international migration prospects for nurses, that there would have been the same number of Filippinas or Pacific islanders choosing nursing as a profession, nor the same level of investment in nurse training. In a WHO-funded survey, Brown and Connell (2004) investigated the migration status and motivations of Pacific island skilled health professionals from Fiji, Tonga and Samoa. A significant proportion of the sample stated that a major reason for entering the healthcare profession was to enhance their income earning potential through migration.

It is also to be expected that the migrant nurse community will be dominated by those who chose to invest in this education and training with a view to enhancing their prospects for international migration. Indeed it has become evident that Pacific island nurses are choosing nursing as a career precisely because it offers migration opportunities, in the same way that has been previously observed in the Philippines (Ball, 1996).

It is not only households that respond to opportunities for migration. Governments are also investing in training of specific skills for human capital export purposes. In the South Pacific in Kiribati and Tuvalu merchant seamen are trained for the international labour market. Indeed, in the northern Pacific, the 'Philippines model' of training an excess of health workers for the 'global care chain' provides a possibility for smaller island states. Consequently the level and occupational composition of investment in human capital (public and private) will not be the same in economies where there is a strong orientation towards migration, compared with those where there is not.

In the NELM literature it has been shown formally that where migration offers additional employment possibilities there can be a net gain in human capital, "brain-gain", despite the losses from "brain drain" (Stark, 2004; Stark, et al., 1997; 1998; Docquier and Rapoport, 2006). The argument is as follows. While individuals and their families invest more than otherwise in human capital, with a view to enhancing their prospects for migration, not all will necessarily succeed in finding jobs abroad, and, some will eventually return home bringing back with them the additional human capital acquired both before leaving and while working abroad.

In this section the same 2005 Fiji and Tonga datasets were used to explore the relationships between remittances and educational attainment of the households are analysed in relation to two aspects of educational attainment.[13] First, for educational attainment of school-aged household members a dummy variable was created for all children aged between 14 and 17, which takes on a value of one for those who have obtained more than eight years of education and zero for all other children.[14] The analysis using this variable sought to examine if migration and remittances were linked to extra investment in schooling, beyond the free years of education. The results reported from this analysis relate only to the Fiji sample.

The second aspect of the relationship between migration and education that was investigated is the impact of migration on tertiary education of the migrant household's members. Here the sample was all non-migrant individuals in the household aged over 21 years. An individual was identified as having tertiary education if his or her years of education was in excess of 13 (ie. beyond completion of secondary education). This analysis was undertaken for both countries in the dataset and sought to examine whether a household with stronger migration-orientation invested more in tertiary education.

In the regressions the relationships between migration, remittances and educational attainment were analysed taking into account the possible endogeneity of the relationships using appropriate instrumental variables. In the first equation, level of remittances (in all forms) was used as the primary regressor with the dependent variable the dummy for 'extra education' as discussed above. Remittances rather than number or presence of migrants was used as the regressor as it was found earlier that many households without migrants had received remittances. Furthermore, it was hypothesized that at this, optional level of education, for which there are both direct educational costs as well as other opportunity costs, remittances could alleviate the household's budget constraint, allowing the children to acquire more years of education before entering the labour force. Endogeneity tests showed that the remittances variable was not exogenous. The model was accordingly estimated using an instrumental variable (IV) probit model. The results are reported in tables 5.

[insert Table 5 about here]

The coefficient on the remittances variable is positive and statistically significant. This indicates that remittances influence whether a student will acquire education beyond the eight years provided by the government. Due to the small sub-sample size for those aged 14 to 17 years in each of Fiji's main ethnic groups, it was not possible to re-estimate the 'Extra Education' equations by ethnicity. A dummy variable for Indo-Fijian ethnicity was therefore included in the regression. This was also positive and statistically significant.

In the second model in which the effect of migration intentions on attainment of tertiary qualification was analysed, two alternative principal regressors were tested; remittances and a variable to capture the 'migration orientation'. The latter was chosen to test the hypothesis that the accumulation of human capital at this level is migration-induced rather than credit constrained. Migration-orientation was captured through a variable indicating the presence of a household member who intended to migrate in the near future. Again the possibility of endogeneity between migration orientation and tertiary education was accounted for in the estimation procedure. Endogeneity tests showed that for the Fiji sample the migration-orientation variable was endogenous, requiring estimation using an instrumental-variable probit model. With Tonga, on the other hand, as the tests showed that there was no endogeneity the model was estimated using a regular probit model. The regression results are reported in table 6.

[insert Table 6 about here]

In Fiji a positive, statistically significant relationship was observed between the household's migration-orientation and the probability that individuals within that household have acquired tertiary level education, controlling for other factors. Moreover, those of Indo-Fijian ethnicity appeared less likely to have acquired tertiary education.

For Tonga, on the other hand, there was no statistically significant relationship between migration-intentions and acquiring tertiary education. This is somewhat surprising given the longer migration history and heavier dependence on migration and remittances. This could be explained by Tongan families having relatively easier access to the two main destination countries, Australia and New Zealand, through family networks and their ability to qualify for residency under the 'family reunion' category that is not education or occupation related. These possibilities require further investigation.

REMITTANCES AND HEALTH

This section reports the results of our preliminary and on-going analysis of the relationship between remittances and the level of health of the remittance receiving households.[15] It has already been noted that in our analysis of the determinants of remittances it was found in the case of Tonga that the presence of a household member with a medically-related incapacity lasting 30 days or more increased remittances by US$300. However, there is a need also to examine the relationship between remittances and the longer term health situation of the recipient household. This requires analyzing the indirect relationship between the remittances and household wealth, and, between wealth and health over the longer term. Indeed, very little research has been undertaken on the effects of wealth on health in developing countries in general. Although economic welfare indicators such as income and wealth have been used traditionally to assess how equitably health outcomes are distributed, reverse causality and other sources of endogeneity have inhibited researchers from isolating the causal effects specifically from economic welfare to health.

We used an instrumental variable strategy to examine the extent to which wealth affects household health as measured by a subjective indicator (Jimenez, Correa-Velez and Brown, 2008). For this purpose we used household data collected by the authors in Viti-Levu, the main island of Fiji, in 2005. The geographic conditions of this small island allow us to isolate the impact of wealth under the hypothesis that for households living in Viti-Levu geographic distance is not a barrier to access health services. (Mullholland et al., 2008).

In the health economics literature there has been increasing focus on the relationship between wealth and health. This has been associated with the increasing interest in the analysis of inequality in the distribution of access to health services and therefore of health outcomes across different socio-economic groups, particularly in developing countries (Victora et al., 2003; Mullholland et al., 2008). If there is a causal relationship between economic welfare and health, income transfers might be one of the keys to improve the health status of the poor (Meer et al., 2003). Given that in many poor countries income transfers occur mainly through informal private and usually family-based mechanisms, rather than through formal, public welfare systems, migrants' remittances could constitute an important source of improved health outcomes, to the extent that (i) they contribute positively to the recipients' permanent income as measured by material wealth; and (ii) there is indeed evidence of a strong positive relationship between material wealth and health outcomes.

It was shown earlier that a strong relationship exists between remittances and household wealth (section E). However, it is possible that the positive effects of wealth as a determinant of health outcomes might be overestimated, given that it ios not always possible to disentangle the effects of other factors, such as geography (distance and access to health services) and ethnicity which may be of greater importance, but which might also be strongly correlated with wealth. For instance, poorer people usually live in rural and remote areas.

We therefore used a sample from one, geographically relatively small island, Viti Levu (10,429 Km2) the main island of Fiji, using the same 2005 household survey data from which we had also constructed a wealth index as discussed in section E. We were also able to construct a household-level (self-reported) health index from the same survey, using responses to a question

on the number of household members unable to carry out their daily duties for more than 30 days in the preceding year. Respondents were asked to identify household members who, due to illness and poor health in general were unable to perform their usual daily activities such as working, cooking, or attending school.

From these data a dummy variable was created indicating whether or not the household had at least one member who had been incapacitated for 30 days or more. Because of the high likelihood of reverse-causality we used an instrumental variable strategy to control for endogeneity in the form of an IV probit model, with the health dummy as the dependent variable, and the household's wealth index as one of the independent variables, along with other controls for household size, dependency ratios, female-male ratios, living in the capital city, educational level, and ethnicity. The preliminary results indicate a strong statistically significant negative relationship between the household wealth index and the probability that in the household one or more persons was incapacitated. The estimated marginal effect of the wealth index had a value of approximately –0.04, which implies that for every unit increase in the household's wealth, the probability of one or more household members becoming incapacitated in a given year decreases by 4 per cent. Given that the wealth index has a range of approximately 10 points between the wealthiest and the poorest household, this indicates someone in a poorest household is approximately 40 per cent more likely to have been incapacitated for health reasons, in any one year, in comparison with someone in the wealthiest household. It therefore appears from this preliminary analysis that through their positive impact on household wealth, remittances are also likely to make an important contribution to household health outcomes.

CONCLUDING COMMENTS

This paper reported the findings of recent research on the impacts of migration and remittances in two Pacific island countries, Fiji and Tonga. The analysis was based on single cross-sectional household-level survey data, and used a variety of econometric methods including instrumental variable techniques, to examine the impacts of migration and remittances in relation to a number key aspects of human development in the two countries.

It was found that remittances are motivated mainly by altruism, the implication of which is that when households' income falls below some threshold 'poverty' level, migrants increase their remittances. This has important implications as it indicates that remittances constitute an effective, informal, family-based system of social protection for their families in times of financial hardship. However, the other important implication of this is that if public, poverty-alleviation programs are effective, remittances are likely to decrease; a 'crowding out effect'. But, it was also found that in the case of Tonga, once a household's income rises above the threshold poverty level, remittances increase, indicating a significant exchange-motivated relationship. Although weaker than the altruistic motive, this nevertheless indicates that crowding-out will be somewhat offset by a crowding-in effect among the better off-households. Consistent with this finding it was also found that remittances contribute significantly to the reduction of poverty in terms of both incidence and depth, but, the effect on inequality is uncertain, a could possibly increase it.

There was also strong evidence of remittances contributing towards household material wealth which is important as this is a better indicator of permanent income and thus the households' capacity to absorb negative income shocks. Similar conclusions were drawn in relation to household education and to health, confirming the positive effects across most aspects of human development in the two countries. It is in relation to these benefits that the costs of out-migration, not considered in this paper, need to be weighed.

At the outset of this paper it was argued that the perception of remittances, along with foreign aid and FDI and debt for potential, as an important source of external funding for development, has led to a pre-occupation with the potential use of remittances as a source of saving and investment, and hence, their contribution to economic growth. From this perspective, the contribution of remittances to consumption is often perceived negatively, as forgone saving and investment. Similarly, the extensive use of informal transfer channels is perceived as problem to be addressed by introducing measures to channel remittance flows through formal banking channels. This perspective ignores the valuable role that remittances play in providing an informal, family-based system of social protection and poverty alleviation, which the findings of the research reported here have shown. Furthermore, it has also been shown that remittances contribute positively to other social development goals such as education and health. Where formal, public systems of social protection are effectively absent, and where there is a dire need for the financing of education and health services, these development roles of remittances are all that more important.

These findings raise the important question of whether analysts and policy makers focused on progress towards meeting development objectives, such as those laid down by the Millennium Development Goals, should be concerning themselves with how remittances might be re-directed through formal financial into 'more productive', growth-oriented investment. At least in relation to the two Pacific island cases examined here, it might be preferable that the existing, informal remittance mechanisms be left alone to continue their valuable, informal role in these countries' social and economic development.

APPENDIX 1

CONSTRUCTING THE WEALTH INDEX

In constructing the wealth index data on 14 assets and 9 dwelling characteristics were used. It should be noted that some assets, such as tractors, and some dwelling characteristics, such as roofing materials, were excluded from the index, as there was not enough variation among the sampled households. Table A.1 present the main results from the construction of the wealth index for Fiji and Tonga. The first column shows the Scoring Factors for each asset, obtained from the PCA; the second and third column present the mean and standard deviation for the corresponding asset variables and fourth column shows by how much the index varies between a household that owns an asset and one that does not16.

From the fourth column of table A.1 it can be observed that for a Fiji household, owning a fridge would increase the wealth index by 0.60, while having a low quality floor would decrease the index by 0.50. Likewise, a Fiji household that owns a gas stove would have a wealth index 0.60 higher than a household that does not, while not having flush toilet would lower the index by 0.60 (table A.1). In Tonga, owning kitchen appliances would increase the index by 0.88 and a gas stove would raise it by0.84. In contrast, low quality floor materials would reduce the index by 1.41, while low quality wall materials would decrease it by 1.21 and not having flush toilet will decrease the index by 0.87 (table A.1).

NOTES

[1] Apart from the World Bank (2006) report and the subsequent analysis written-up in the various papers cited here, this paper also draws heavily on the completed PhD thesis of Eliana Jimenez (2008) who is also co-author of most of the papers cited and whose invaluable work through all stages of this research this author acknowledges.

[2] For an extensive overview of Pacific island migration and research, see Connell and Brown (2005).

[3] This section draws mainly from Brown and Jimenez (2008b) and Jimenez and Brown (2008a).

[4] For a recent review of the remittances motivations literature see Rapoport and Docquier (2006).

[5] This section draws mainly on Brown and Jimenez (2008a).

[6] The direct effects of migration on household income as measured by the amount of remittances received.

[7] As previously discussed, indirect or spill-over effects might arise due to insurance provision, loosening of liquidity constraints and increasing the reservation wage of remaining household members.

[8] These regressions assume that remittances received by non-migrant households have no indirect effects in their income.

[9] Similar results were also obtained when poverty and inequality indicators were calculated using per capita household income, without adjusting for adult-equivalent scales.

[10] These convert to approximately F$1,362 and T$1,749 respectively at the nominal exchange rate.

[11] This section draws heavily on Brown *et al.* (2006).

[12] It should be noted that as previously detailed a much larger proportion of Tongan households (with and without migrants) received remittances, in comparison with Fiji.

[13] This sections draws mainly on Brown *et al* .(2006).

[14] An alternative measure often used for attainment is the expected years of education a child should have for that age. This is commonly identified in the development literature as 'schooling for age' or *SAGE*. If a child is attaining his/her expected education level he/she is identified by a one and zero otherwise and this is used as the dependent variable. In this study a regression analysis using the SAGE variable was undertaken to test whether the presence of a migrant in the household influences the rate of educational progress of children in the migrant's household. No statistically meaningful results were found, most probably because, in both countries, children at the primary level who perform poorly are not held back from promotion to the next grade.

[15] This section draws from Jimenez, Correa-Velez and Brown (2008).

[16] This applies to all variables used (except rooms) which are dummies that take only the value of 1 or 0.

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Table 1. Households Receiving Remittances: Fiji and Tonga, 2004

Migrants in HH?	Fiji			Tonga		
	Received Remittances?			Received Remittances?		
	No	Yes	Total	No	Yes	Total
No	220	54	274	45	164	209
(%)	80.29	19.71	65.55	21.53	78.47	41.80
Yes	19	125	144	7	284	291
(%)	13.19	86.81	34.45	2.41	97.59	58.20
Total	239	179	418	52	448	500
(%)	57.18	42.82	100	10.40	89.60	100

Source: Brown and Jimenez (2008a), Table 5.

Table 2. Summary Statistics for Household Income, With and Without Migrants

	Fiji		Tonga	
	Mean	Std. Dev.	Mean	Std. Dev.
HH with Migrants				
HH Income	7,248.65	6,565.97	6,643.31	12,839.66
Income/capita	1,869.75	1,793.38	1,757.96	4,869.00
Income/capita Adult Equiv	2,040.29	1,967.53	1,910.28	4,926.78
HH without Migrants				
HH Income	6,364.67	9,506.45	4,718.59	4,512.47
Income/capita	1,580.89	2,289.70	946.63	789.97
Income/capita Adult Equiv	1,732.042	2,370.044	1,138.95	972.61

Source: Brown and Jimenez (2008a), Table 6.

Table 3. Poverty and Income Inequality Indicators with and without Remittances

	Without Migration Counterfactual		With Migration Observed
	(Method 1)	(Method 2)	
	Observed income without remittances	Counterfactual income	Observed Income Including Remittances
Poverty Headcount Ratio			
Fiji	38.4%	42.9%	34.1%
Tonga	54.7%	62.1%	32.4%
Poverty Gap Ratio			
Fiji	18.2%	17.3%	15.1%
Tonga	27.5%	27.1%	11.6%
Gini Coefficient			
Fiji	0.51	0.47	0.50
Bias Corrected+	0.47 – 0.54	0.43 – 0.52	0.47 – 0.54
Tonga	0.53	0.42	0.46
Bias Corrected+	0.47 – 0.59	0.39 – 0.47	0.42 – 0.51

+ At 95% confidence interval

Source: Brown and Jimenez (2008a), Table 8.

Table 4. Asset Ownership Mean by Wealth Index: Fiji and Tonga

	Poorest 40%		*Middle 40%*		*Wealthiest 20%*	
	Fiji	**Tonga**	**Fiji**	**Tonga**	**Fiji**	**Tonga**
Fridge	0.27	0.36	0.96	0.98	1.00	1.00
Gas stove	0.23	0.64	0.92	1.00	0.99	1.00
Kitchen appliances	0.36	0.91	0.92	1.00	1.00	1.00
Washing Machine	0.08	0.29	0.78	0.85	0.98	0.97
Fans	0.10	0.33	0.66	0.55	0.98	0.92
CD Player	0.59	0.92	0.92	1.00	0.99	1.00
TV	0.45	0.49	0.95	0.96	1.00	1.00
Vehicle	0.05	0.20	0.22	0.62	0.76	0.98
Computer	0.01	0.01	0.01	0.03	0.62	0.43
Handicrafts	0.45	0.67	0.35	0.89	0.48	0.98
Jewellery	0.25	0.46	0.71	0.68	0.94	0.90
Land line phone	0.07	0.20	0.47	0.75	0.74	0.96
Mobile	0.15	0.29	0.62	0.57	0.93	0.89
Sports Equipment	0.02	0.01	0.14	0.01	0.41	0.15
Tiles floor	0.01	0.01	0.07	0.03	0.43	0.22
Low quality floor	0.20	0.05	0.04	0.00	0.00	0.00
Electricity	0.58	0.89	0.99	1.00	1.00	1.00
Rooms	3.45	4.69	5.74	6.43	7.43	8.51
Own flush toilet	0.31	0.58	0.95	0.99	1.00	1.00
No flush toilet	0.61	0.31	0.01	0.00	0.00	0.00
Cement wall	0.13	0.13	0.36	0.20	0.87	0.43
Low quality wall	0.66	0.07	0.29	0.00	0.05	0.00
No tap water	0.36	0.17	0.07	0.01	0.04	0.02
Average Wealth Index	**-3.09**	**-0.23**	**1.40**	**1.09**	**3.43**	**2.45**

Source: Brown *et al*. (2006), Table 3.27.

Table 5. Schooling and Remittances IV Probit Results: Fiji (p-values in brackets)

	Extra Education
Remittances (instrumented)	0.0003
	(0.08)
Indo-Fijian	0.8956
	(0.01)
Observations	158
Wald Chi-sq (p-value)	36.69
	(0.00)

Source: Brown *et al*. (2006), Table 3.20

Table 6. Tertiary Education and Migration Probit Results: Fiji and Tonga (p-values in brackets)

	Fiji (IV probit)	Tonga (probit)
Migration Intentions	0.2546	-0.09
	(0.00)	(0.43)
Indo-Fijian	-0.3377	
	(0.02)	
Wald Ch-sq	111.26	48.76
	(0.00)	(0.00)
Observations	1121	1376

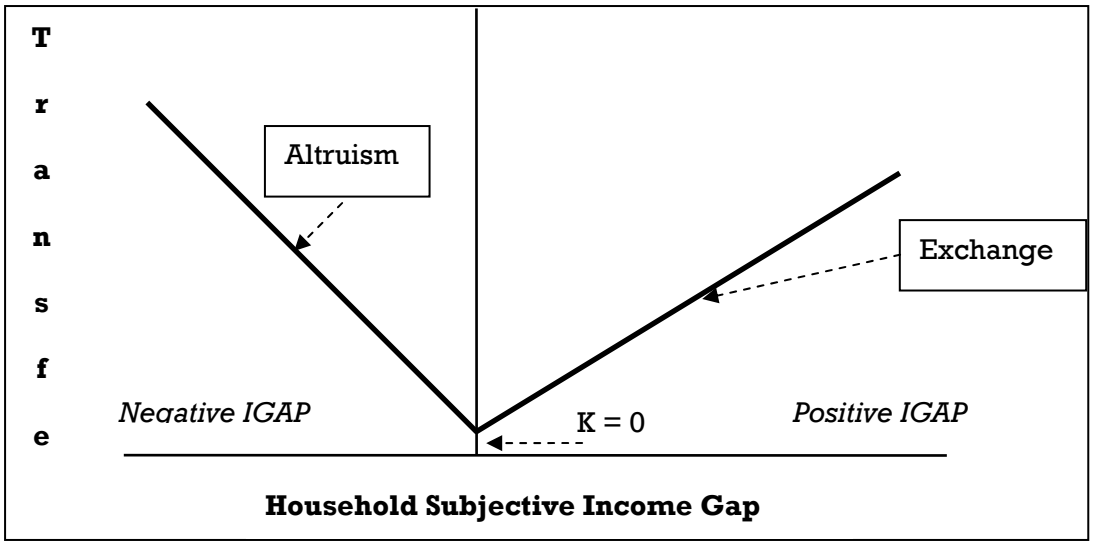
Source: Brown *et al*. (2006), Table 3.21

Appendix Table A.1 Wealth Index (Principal Components Analysis Results)

	Score		Mean		Standard Deviation		Score/ St.Dev	
	Fiji	**Tonga**	**Fiji**	**Tonga**	**Fiji**	**Tonga**	**Fiji**	**Tonga**
Fridge	0.28	0.30	0.69	0.73	0.46	0.44	0.60	0.67
Gas stove	0.26	0.30	0.65	0.86	0.48	0.35	0.55	0.84
Kitchen appliances	0.22	0.16	0.71	0.96	0.45	0.19	0.49	0.88
Washing Machine	0.26	0.24	0.54	0.65	0.50	0.48	0.51	0.51
Fans	0.25	0.17	0.50	0.53	0.50	0.50	0.49	0.35
CD Player	0.18	0.10	0.80	0.96	0.40	0.19	0.46	0.56
TV	0.25	0.29	0.76	0.78	0.43	0.42	0.58	0.68
Vehicle	0.18	0.22	0.26	0.52	0.50	0.50	0.36	0.44
Computer	0.16	0.13	0.13	0.10	0.36	0.30	0.44	0.45
Handicrafts	0.00	0.15	0.41	0.82	0.49	0.39	0.00	0.38
Jewellery	0.21	0.18	0.57	0.63	0.50	0.48	0.42	0.38
Land line phone	0.19	0.24	0.36	0.57	0.48	0.50	0.40	0.49
Mobile	0.22	0.18	0.49	0.52	0.50	0.50	0.44	0.37
Sports Equipment	0.12	0.08	0.15	0.04	0.36	0.19	0.34	0.41
Tiles floor	0.13	0.10	0.12	0.06	0.32	0.23	0.40	0.44
Low quality floor	-0.15	-0.20	0.10	0.02	0.30	0.14	-0.50	-1.41
Electricity	0.23	0.24	0.83	0.96	0.38	0.21	0.62	1.16
Rooms	0.25	0.26	5.15	6.15	2.32	2.32	0.11	0.11
Own flush toilet	0.27	0.28	0.70	0.83	0.46	0.38	0.59	0.74
No flush toilet	-0.26	-0.29	0.25	0.12	0.43	0.33	-0.60	-0.87
Cement wall	0.18	0.10	0.37	0.22	0.48	0.41	0.37	0.25
Low quality wall	-0.19	-0.19	0.39	0.03	0.49	0.16	-0.39	-1.21
No tap water	-0.15	-0.11	0.18	0.07	0.39	0.26	-0.39	-0.42

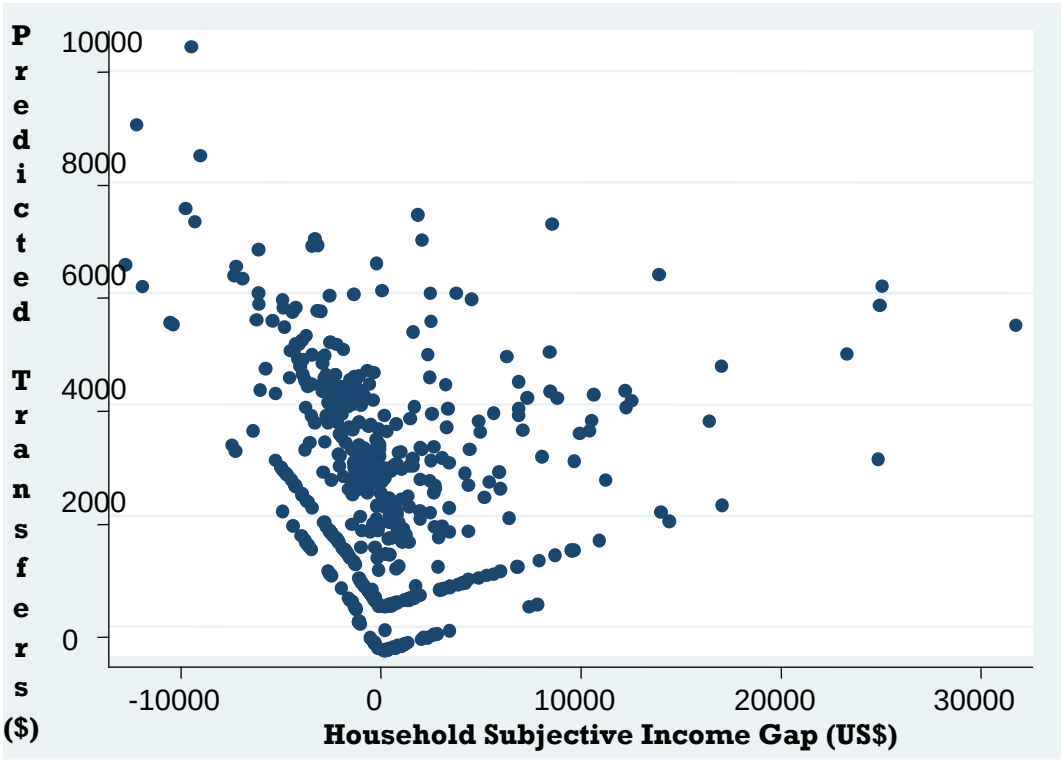
Source: Brown *et al*. (2006), Table 3.26

Figure I. Relationship between Transfers and the Subjective Income Gap



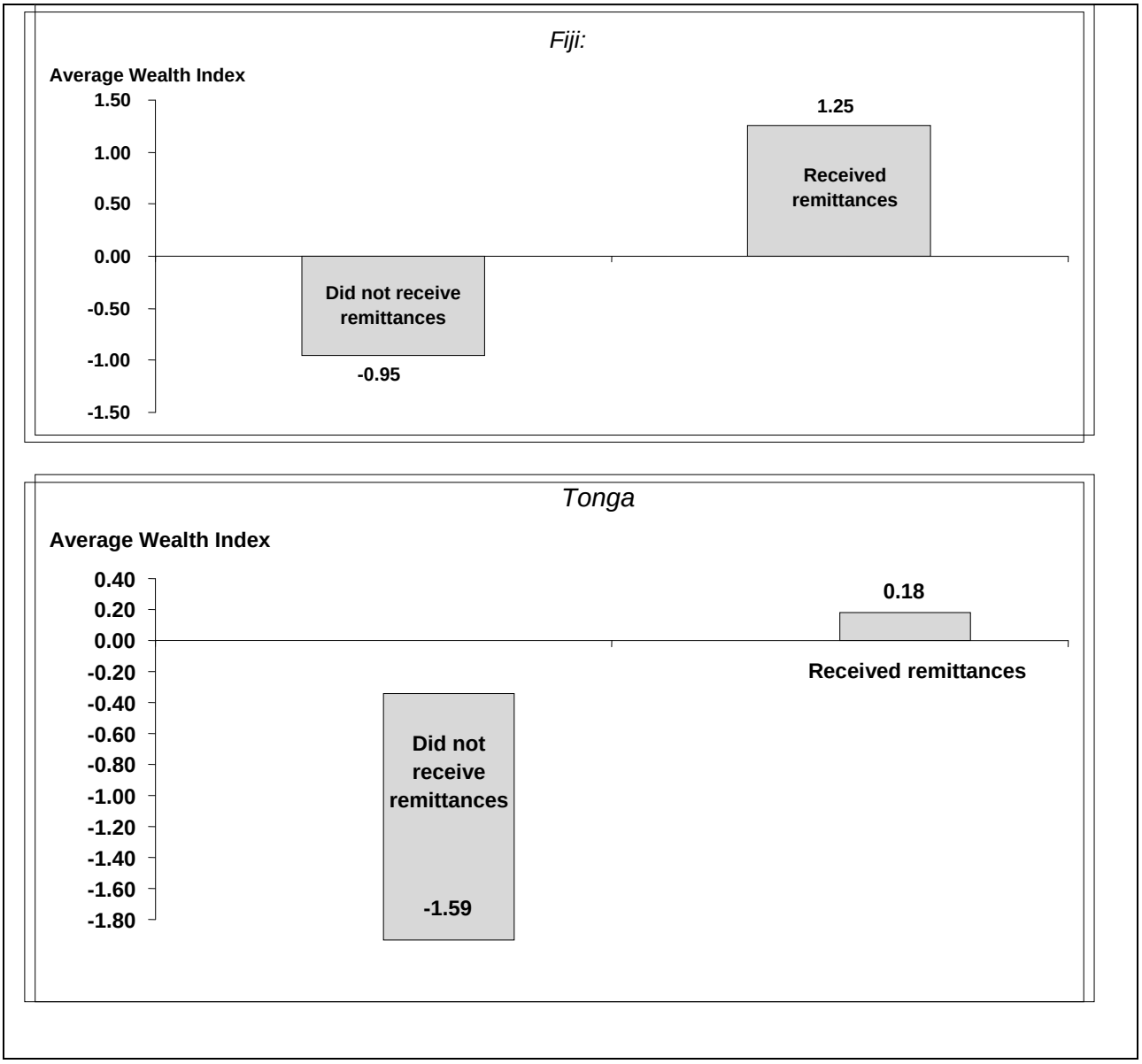
Source: Brown and Jimenez (2008b), Figure 1.

Figure II. Predicted Transfers and the Subjective Income Gap: Tonga



Source: Brown and Jimenez (2008b), Figure 2.

Figure III. Average Wealth Index by Remittances (Non-)Recipients



Source: Brown *et al.* (2006), Figure 3.14