

**How Cost-elastic are Remittances?
Estimates from Tongan Migrants in New Zealand***

**John Gibson[#]
David J. McKenzie^{##}
Halahingano Rohorua^{###}**

Revised December 14, 2005

Abstract:

Pacific Island economies are some of the most remittance-dependent in the world. Proposals to lower the costs of sending money across borders are a core recommendation of recent international studies that aim to enhance the development impact of remittances. The potential increase in remittances that recipient countries can expect from such policies depends critically on the sensitivity of remittance transfers to the costs of remitting. This paper provides the first estimates of the cost-elasticity of remittances, using data from a survey of Tongan migrants in New Zealand. The costs of remitting to Tonga are high by international standards and remittances are found to have a negative cost-elasticity with respect to the fixed fee component of money transfer costs. These findings suggest that Pacific Island countries can expect a more than proportionate increase in remittances from a reduction in costs.

JEL codes: F22, O15

Keywords: remittances, cost-elasticity, Tonga.

* We thank two referees, the Government of Tonga for permission to conduct the survey there, the New Zealand Immigration Service in providing us with a sampling frame for this research, and Stanford University, the Waikato Management School and the World Bank for funding. All opinions expressed are those of the authors alone and do not necessarily reflect the opinions of the World Bank, the New Zealand Immigration Service, or the Government of Tonga.

[#] University of Canterbury and Motu Economic and Public Policy Research Trust. E-mail: john.gibson@canterbury.ac.nz

^{##} Stanford University and Development Research Group, The World Bank. E-mail: dmckenzie@worldbank.org.

^{###} University of Waikato. E-mail: hala@waikato.ac.nz

1. Introduction

Most Pacific Island economies are very dependent on remittances. For example, remittances were equal to 37 percent of Tongan GDP in 2001, one of the highest rates in the world (Ratha, 2003), and contributed 19.7 percent of household monetary income (Tonga Statistics Department, 2002). Most previous research on remittances in the Pacific is concerned either with the sustainability of remittances (Simati and Gibson, 2001) or with the determinants of remittances and their intended uses (Vete, 1995; Walker and Brown, 1995; Brown, 1997). A smaller literature describes the methods migrants use to send remittances. Connell and Brown (1995) note that many remittances bypass the banking system, partly as a result of an underdeveloped financial system which does not reach the more remote regions.

This paper expands on the literature on methods of remitting by documenting the high, and variable, cost of remitting to the Pacific Islands, focusing on the case of Tonga. The elasticity of remittances with respect to the cost of remitting is also estimated, for the first time in the literature. The results show that remittance costs are substantially higher than in some of the more competitive remittance markets: between 2.5 and 3 times as expensive as transfers from the United States to Mexico, and approximately twice as expensive on average as bank transfers to a wide variety of countries from the U.S. and U.K.

The second substantive finding of the paper is that remittances have a negative cost-elasticity with respect to the fixed fee component of money transfer costs. Thus Pacific Island countries can expect a more than proportionate increase in remittances if the costs of sending money could be reduced while maintaining other features such as transfer speed and ease of use. Thirty percent of remitters in our sample would increase the amount they send if costs fall, while 70 percent would keep the amount sent the same. Overall, the cost-elasticity of

remittances with respect to the fixed cost component is -0.22, which is the average of the elasticity over those who would increase their remittances (for whom the elasticity is -0.74) and those who would not (for whom it is zero). Based on this estimate, we calculate that lowering the fixed cost of sending money through banks and money transfer operators from New Zealand to Tonga to levels close to that found in the most competitive world markets would result in a 28 percent increase in remittances from existing remitters. Lowering this fixed cost may additionally induce some non-remitters to start remitting.

These findings suggest that policies which aim to lower remittance costs through increasing access to banking services, promoting competition, and disseminating information, do offer the potential of sizeable increases in remittances received by Pacific Island countries. Our survey shows that at least in the case of Tongan migrants in New Zealand, there is rather incomplete knowledge about the different remittance channels available. Moreover, several of our enquiries to money transfer companies were met with suspicion and reluctance to answer questions on the exchange rate component of costs. Together these findings suggest that migrants may be unable to easily compare costs across remittance methods, and that there is a potential role for policies which help disseminate information.

2. Policy Background

Internationally, the large and increasing size of remittances has focused attention on policies that can maximize the potential benefits to developing countries of remittance flows. One potential policy which is almost uniformly promoted in these discussions is to reduce the cost of sending remittances (see, e.g. DFID (2005), IMF (2005), Orozco (2002), Ratha (2003)). The methods suggested to carry out this policy include the promotion of competition and

removal of barriers to entry, and better dissemination of information to migrants about the methods of money transfer available and their associated costs.

The potential gain in remittances available to recipient countries from lowering remittance costs depends on two key factors. First, what scope is there for increased competition, better banking services, and better dissemination of information to reduce costs to consumers? Evidence on this point is available from the United States, where the cost of sending money to different countries is correlated with the amount of competition in each market (Orozco, 2002), and over time, increased competition for transfers to Mexico has been associated with costs falling (Hernández-Coss, 2005).

The second factor is how migrants' remittances respond to changes in costs. If remittances are inelastic to costs, then lowering costs will pass the savings directly to recipients in the form of higher net remittances. Remittance costs average 10-15 percent for the amounts sent by many migrants (Orozco, 2002, Ratha 2003), so lowering costs to say five percent, would result in a five to ten percent increase in remittances received. Compared to the rapid growth in remittances over the past two decades, this is a relatively modest increase. However, it may be the case that remittances exhibit negative cost-elasticity, whereby lowering costs leads migrants to send more remittances. This offers more scope for gains in remittances received. Alternatively, since migrants need to send less when costs fall in order that their relatives receive a given amount of home currency, the cost-elasticity may be positive, and remittances received may increase by less than the percentage fall in costs.

3. Survey Design

The data used here are from the Tongan component of the Pacific Island-New Zealand Migration Survey (PINZMS). The PINZMS is designed to exploit the fact that some Fijians, Samoans, and Tongans migrate to New Zealand by winning a slot in an annual lottery, which the Immigration Service runs to allocate a limited number of visas over an excess number of applicants.¹ This random selection means that differences in outcomes for these migrants compared to non-migrants should reflect the act of moving rather than some unobservable characteristics of the migrants. The Tongan component is the first part of the PINZMS that has been completed.

The initial sample frame was successful participants in the 2002/03 and 2003/04 Pacific Access Category lotteries in Tonga, where 278 were successful out of about 3,000 applicants. However, only 92 of the successful ballots had been approved for residence in New Zealand by the time of the survey, and some of these families had not yet moved to New Zealand, giving us a sample frame of only 75 Tongan migrant families in New Zealand. We managed to locate 59 of these families, using a variety of tracking methods, including the addresses provided to the Immigration Service, details provided by family back in Tonga, and reliance on key informants in churches and other community groups. This sample is close to a full census for this randomly selected group of migrants.

The PINZMS is a comprehensive survey designed to measure multiple aspects of the migration process. It has a detailed module on remittances, recording remittances sent and received in the form of money and goods, and the channels used to send remittances. In addition to questions about knowledge and use of various methods of sending money, there

¹ New Zealand also has smaller quotas for citizens from Kiribati and Tuvalu.

were also questions about the response to hypothetical reductions in the cost of remitting, knowledge of the exchange rate, and expectations about future remittance patterns.

4. Survey Evidence on Remittance Purposes and Channels

The survey results presented in Table 1 show that 73 percent of migrant households had remitted cash in the previous 12 months (or since arriving in New Zealand if that was less than 12 months). Sending goods back to Tonga was less common, with 41 percent using that approach. Amongst remitters, the average amount remitted in the previous 12 months was NZ\$2,200 in cash and NZ\$1,400 as goods.² Averaged across both remitting and non-remitting households the combined value of cash and goods was approximately NZ\$2,200 per household.

Remittances were sent to an average of 1.2 entities per remitting household. The most common recipients for both cash and goods were remaining members of the household that the migrant had lived with before migrating (43-46 percent). Parents of either the migrant or their spouse were the next most common, accounting for 38-42 percent of recipients. The cash remittances to a majority of the recipients were (partially) ear-marked for special purposes, especially church fund-raising (*misinale*).³ Remittances of goods were less likely to be for special purposes.

Remitters were asked about the methods they either knew about or had used to send money back to Tonga. The most commonly used methods were Western Union, giving money to someone to take back, and *Melie mei Langi*, which is a church-run money transfer company

² Values are scaled up to 12 month totals for those households in New Zealand less than 12 months. Interbank exchange rates at the time of writing are: US\$1 = 1.900 Pa'anga = NZ\$1.386 (and NZ\$1 = 1.372 Pa'anga). [rates from www.oanda.com, April 15, 2005].

³ The survey only asked *whether* any of the cash given to a recipient was for a special purpose, but not how much was ear-marked for that purpose.

described below (Table 2). The most widely known method was Western Union, which 96 percent of the remitters were familiar with. Methods that were known about but not widely used were telegraphic (wire) transfers from a bank account in New Zealand to a bank account in Tonga, with 39-53 percent of remitters knowing about one or more of these bank channels. When remitters were asked about their *most frequently used method*, 54 percent listed Western Union and 30 percent listed Melie mei Langi. No other method was used frequently by more than five percent of remitters. In general, there appears to be limited knowledge of the alternatives to the channels used by the respondent.

The annual remittances reported in Table 1 appear to be achieved by migrants making many small transfers. Remitters were asked about the details of the most recent transfer. The median transfer was NZ\$200 and the mean NZ\$250. These small amounts make the overall cost of remitting especially susceptible to the burden of fixed costs.

5. The Cost of Sending Remittances to Tonga

Data on the fee charged for sending money and the exchange rate offered was collected from the major companies in New Zealand in March 2005.⁴ Table 3 reports the fee data for different methods. Four services are available from the banks:

- A *telegraphic transfer* (wire transfer) is an electronic transfer of money from a bank account in New Zealand to a bank account in Tonga. This can either be to the recipient's bank account, or to a nominated bank where it is held for the recipient to collect upon the provision of suitable identification. Funds are generally available in two to three days, although can take longer, especially when the recipient has an account in a different bank from the sender. All four New Zealand banks (ANZ, ASB,

⁴ Thanks to Chris Hector for collecting this information for us.

BNZ, and Westpac) charge a NZ\$25.00 fixed fee to send a telegraphic transfer. Only ANZ (two) and Westpac (four) have branches in Tonga.

- A *bank draft* is a bank check made out to a named person, which then must be posted overseas. Only the person named on the draft can receive money from it, and the draft can be stopped if it is lost or stolen. This method is slower than a telegraphic transfer, since it requires delivery by post, but allows money to be sent to individuals without bank accounts, or to firms to pay bills. The fee ranges from NZ\$15.00 at BNZ to NZ\$25.00 at Westpac.
- An *ATM card* from the sender's New Zealand bank account is a fast and cheap way to send money, with withdrawal fees in the range of \$5 to \$8 for most banks. Individuals with a Westpac account in New Zealand can make withdrawals from a Westpac ATM in Tonga for no fixed fee. The disadvantage of this method is that it makes it harder for the migrant to control how much is remitted.⁵ ANZ and Westpac both have four ATM locations in Tonga.
- The fourth method is to purchase *cash* and either mail this (which is risky) or take it back when traveling. The banks all charge an additional commission to exchange New Zealand dollars for Tongan pa'anga. The minimum commission is between NZ\$5 and NZ\$7.50.

Three out of the four banks use the same exchange rate for all four methods, while Westpac offers a lower exchange rate for cash than for the other three methods. For each bank we obtained the exchange rate offered on March 10, 2005, and calculated the effective exchange rate commission, R , as:

⁵ A second card is usually required as well. Westpac charges NZ\$10 for a second card. Migrants may also experience logistical costs in getting a duplicate card safely to their family member.

$$R = \frac{100 * (\text{Interbank Rate} - \text{Offered Rate})}{\text{Interbank Rate}} \quad (1)$$

For example, at the interbank rate⁶, NZ\$100 would buy 138.71 Pa'anga. However, at the exchange rate offered by ANZ Bank, one would instead receive 135.79 Pa'anga (and also have to pay the fixed fee). The exchange rate commission of 2.1 percent therefore represents the loss of Pa'anga compared to what one would receive at the interbank rate. This is the method used by Mexico's Consumer Protection Federation, PROFECO, in calculating the exchange rate commission on remittances to Mexico.⁷ The exchange rate commission on March 10, 2005 varied from 2.1 percent at ANZ and 2.7 percent at Westpac, to 4.1 percent at ASB and BNZ.

The two large international money transfer companies, Western Union and Moneygram, both offer money transfer in under one hour. Western Union charges a \$20.00 fixed fee, while Moneygram and Travelex use an escalating fee structure, charging \$20.00 for amounts under \$250, \$35 for amounts between \$251 and \$500, and \$50 for \$501-750. While these fixed fees are slightly lower than the \$25 bank draft fee, both companies charge much higher exchange rate commissions: 7.3 percent in the case of Western Union and 10 percent in the case of Moneygram. Western Union has an extensive network in both countries. It operates through the Post Shops in New Zealand and has more than 500 branches. In Tonga there are 18 locations, with remittances to the outer islands through the Tonga Development Bank. Moneygram has a less extensive network, using the Westpac Bank of Tonga as its agent in Tonga. This has 5 locations.

Another important remittance channel is the *Melie mei Langi*, which is run by the Tokaikolo Fellowship church but can be used by people of any denomination. A fixed fee of NZ\$5 is

⁶ Obtained from www.oanda.com.

⁷ See www.profeco.gob.mx.

charged for amounts under \$1000 and \$10 for other amounts. These fees are doubled for transfers to the outer islands. This money transfer is also under one hour. The money can be received at two branches in Tongatapu and at branches in Vava'u, Ha'apai and 'Eua. There is currently one branch of *Melie mei Langi* operating in Auckland, although more branches had previously been open in New Zealand cities. Although the fixed cost of *Melie mei Langi* is considerably cheaper than for the large international money transfer companies the exchange rate commission is approximately 11 percent.⁸

*Cost of Receiving Remittances*⁹

The final amount received by the recipient also depends on whether they encounter a cost to receiving remittances. Westpac Bank of Tonga charges a fee of 5 Pa'anga to receive a telegraphic transfer, 10 cents to deposit a bank draft from Westpac, and 5 Pa'anga to deposit a bank draft drawn on another bank. ANZ Bank in Tonga charges no fee to receive a telegraphic transfer direct to the recipients bank account, but charges 5 Pa'anga if the recipient does not have an ANZ Bank account. They charge no fee to deposit a bank draft from ANZ, but apply a fee to bank drafts drawn on other banks. There is no charge to the recipient for Western Union or Moneygram transfers.

Figure 1 plots the effective cost of remitting as a percentage of the amount remitted for a selection of the methods given in Table 3. We include the cost of receiving a telegraphic transfer in the Westpac TT cost and the cost of airmail postage in the ANZ bank draft. The presence of fixed fees causes the percentage cost to fall with the amount remitted, with this

⁸ There is some uncertainty about the exchange rate used by *Melie mei Langi*. An exchange rate of 1.20 was quoted by the Auckland office in late March, which is consistent with the reports of a majority of the survey respondents who used *Melie mei Langi*. However, the Tongatapu office quoted an exchange rate of 1.31 in mid-April (an exchange rate commission of 5%).

⁹ Costs collected by Hala Rohorua in Tonga on 14 January 2005.

effect largest for amounts under NZ\$200. The exception is Moneygram, where the step function in the fees causes the percentage cost to jump upwards between \$250 and \$251.

According to Figure 1, it costs between 19-31 percent to send \$100 by any method except the ATM card. For sending \$200 the costs are between 15-20 percent, and for \$300 between 11-22 percent (excluding the ATM card). An ATM card is always the cheapest method. Melie mei Langi and Western Union are the next cheapest for amounts under the median transfer of \$200, after which point the bank draft becomes cheaper. Bank drafts and telegraphic transfers are the cheapest apart from ATMs for larger amounts.

6. International Comparisons of the Cost of Remittances

The costs of remitting to Tonga can be compared with cost data from other countries in order to assess whether these costs are expensive relative to international levels. In Table 4, we use detailed cost data from Profeco (2005), Mexico's national consumer protection agency, which together with the Mexican consulates in nine U.S. cities collects weekly data on the costs of sending money to Mexico. Costs of sending money from the U.S. to Mexico have fallen rapidly since 1999, and the large number of firms providing remittance services provides a competitive environment. Transferring US\$300 through the banking system costs US\$8-11, compared to US\$26-\$27 for bank transfers from New Zealand to Tonga. Likewise, Moneygram and Western Union charge US\$13-18, which is substantially cheaper than the US\$37-\$56 they charge for transfers from New Zealand to Tonga.

The costs of sending money from the U.S. to Tonga are also expensive, for most channels. Western Union charges a US\$29 fixed fee and 4.9 percent commission for transfers from the

U.S. to Tonga¹⁰, so that it costs US\$43.74 to send US\$300 from Washington D.C. to Tonga, compared to the US\$36.64 to send the same amount via Western Union from New Zealand to Tonga. Wells Fargo bank charges a US\$39.14 fee to send \$300 from Washington D.C. to Tonga, and US\$36.14 fee to send the same amount from California to Tonga. Cheaper services are available. For example, Ikobo.com offers an internet-based money transfer system attached to a debit card, through which US\$300 can be sent for \$12.58.

Table 5 compares the costs of sending from New Zealand to Tonga with data from an international comparison of remittance costs undertaken by Orozco (2002). Note that this data is from almost three years ago, so we would expect competition and technological improvements to have lowered costs further. Despite this caveat, we see that costs of sending from New Zealand to Tonga are higher than all the countries listed, for both banks and for money transfer operators. Orozco reports an average cost of 5 percent for bank to bank transfers, and 12 percent for transfers for money transfer operators, which is almost half the cost of a bank transfer for the same amount from New Zealand to Tonga.

One potential critique is that the volume of remittances being sent to Tonga is lower than is sent to many of these comparison countries, and therefore differences in scale might explain the higher fees in Tonga. We therefore also compare costs to those of sending money from the United Kingdom to Ghana, and from South Africa to Mozambique, since Ghana, Tonga, and Mozambique receive very similar total volumes of remittances.¹¹ The cost of sending 100 British pounds (approximately US\$176) to Ghana was under 5 percent for 7 money operators

¹⁰ Costs from the U.S. collected by David McKenzie in Washington D.C. on 24 March 2005.

¹¹ Source: World Bank GDF/WDI database. In 2003, Ghana received 65 million USD, Tonga 66 million USD and Mozambique 69 million USD in remittances.

in the U.K. in July 2005, while the cost of a bank transfer from South Africa to Mozambique is only 1 percent.¹²

Based on these comparisons, it appears that money transfer from New Zealand to Tonga is between 2.5 and 3 times as expensive as transfers from the United States to Mexico, and approximately twice as expensive on average as bank transfers to a wide variety of countries from the U.S. and U.K, including countries with similar volumes of remittances as Tonga. However, it is slightly cheaper to transfer money to Tonga from New Zealand than it is from the United States.

7. The Effects of Cost Responsiveness of Remittances

The cost of sending money to Tonga is seen to be cheaper through the banking system than through money transfer operators. It is also significantly more expensive than sending money to many other countries. This suggests the potential for policies which foster competition and lead to the expansion of banking services and ATM machines to cut the cost of remitting. A key question of interest in estimating the likely effects of such policies is how sensitive the amount remitted is to the cost. The amount remitted here is the gross amount, inclusive of transfer fees, while the amount received will be net of these costs.

Three scenarios are possible. First, if the amount remitted is strongly inelastic with regard to the cost of remitting, then any reduction in costs will pass one-for-one into remittances received. This would be the case, for example, if migrants aim to send a constant amount of New Zealand dollars home each month. The percentage gain in remittances received in Tonga will then depend on the size distribution of remittances sent. For example, cutting the

¹² DFID (2005) [July 2005 update for Ghana], and World Bank (2005).

costs of money transfer from Western Union prices to the ANZ ATM cost would lead to a 20 percent jump in remittances received by individuals with family members sending NZ\$100, but only an 8 percent jump in remittances received by individuals whose family members send NZ\$500. Based on our observed transactions, where the median amount sent is NZ\$200, this suggests scope for a 13 percent increase in remittances received from lowering remittance costs to the level of the ATM card.

A second possibility is that the cost-elasticity of remittances is positive, in which case the amount sent will fall as the costs of remitting decline. An example of this would be if migrants desire to remit a constant amount of Tongan pa'anga each month, and adjust the amount of New Zealand dollars they send to accomplish this. Cutting the costs of money transfer will then result in less of an increase in remittances received than in the case where remittances are inelastic to costs. Note that in this case the migrant also benefits from the reduction in costs. Yang (2004) provides some indirect evidence for this in the case of Filipino migrants, who reduced remittances in foreign currency terms when the Philippines peso depreciated during the Asian financial crisis (which lowered the cost of a recipient receiving a given amount of pesos).

The possibility that offers most potential for increasing remittances is that the cost-elasticity of remittances is negative. In this scenario, a reduction in costs would lead to an increase in remittances sent. This may occur at both the intensive and extensive margins. At the extensive margin, individuals who were not sending money because the cost of remitting was too expensive may now decide to send remittances. This is likely to be most important for small amounts. As seen in Figure 1, remitting NZ\$50 results in an effective cost of over 50 percent, which is likely to dissuade migrants from sending such amounts. Lowering the cost

of remitting is therefore likely to result in more small transactions.¹³ At the intensive margin, individuals who were remitting may start sending more remittances. The rationale for this is that the cost of remitting effectively acts as a “tax” on altruism, or on investment in the home village, raising the price of services “purchased” with the remittances and thereby leading migrants to underinvest. Lowering the cost of remittances therefore may have a price effect, causing migrants to reallocate expenditure in New Zealand towards remittances. A negative cost-elasticity of remittances therefore would lead to a more than proportionate increase in remittances received from a given reduction in remittance costs.

8. A Framework for Estimating the Cost-Elasticity of Remittances

The cost of transferring money through most methods is seen to consist of a fixed fee (at least up to some ceiling), which we will denote by F , and an exchange rate commission on each dollar sent, denoted R . The cost structure is then a two-part tariff, whereby the cost of remitting an amount X of New Zealand dollars to Tonga is given by:

$$Cost(X) = F + R * X \quad (2)$$

There are many potential motivations for sending remittances. Docquier and Rapoport (2005) provide a recent survey. This leads to a reduced form equation for the amount of remittances X sent by migrant i :

$$X_i = G(F, R, Motive_i, Z_i) \quad (3)$$

where Z_i are characteristics of the migrant, such as age, education and number of family members in Tonga which might affect the amount remitted. Based on equation (3), we then have that the elasticity of remittances with respect to the fixed fee is:

$$\frac{\partial X_i}{\partial F} = G_1(F, R, Motive_i, Z_i) \quad (4)$$

¹³ This may also occur because migrants may change the frequency of sending, breaking a larger transfer into two smaller transactions.

and likewise, the elasticity of remittances with respect to the exchange rate commission is:

$$\frac{\partial X_i}{\partial R} = G_2(F, R, Motive_i, Z_i) \quad (5)$$

Equations (4) and (5) show that the elasticity of remittances with respect to the two components of cost will, in general, depend on the motive for remitting and the characteristics of the migrant. A migrant sending money to pay for school fees or for the hospital fees of a relative is likely to be very cost inelastic, whereas a migrant sending a regular monthly transfer home may be more sensitive to costs.

To estimate the cost elasticities based on equation (3), variation in the costs faced by migrants is needed. The ideal data set for this would be panel data on migrants in different locations, in a situation where the costs of remitting have changed by different amounts in different locations over time. At present no such data set exists anywhere in the world. For example, the fees charged by banks and money transfer companies in New Zealand do not vary from one location in New Zealand to another, so we are also unable to use geographic differences in costs of sending.¹⁴

Instead we take a direct approach to the estimation of cost-elasticities, based on equation (4). We asked migrants in our sample the amount sent during their most recent remittance transaction via their most frequent remittance method, and the cost of sending this money. Based on the survey answers, all the migrants interpreted the cost as the fixed commission fee F , and did not incorporate the cost of the exchange commission. Migrants were then asked “If the fees had only been one-half as large, how much would you have sent?” A 50 percent

¹⁴ It is true that the availability of different channels may vary across locations, so that the effective cost bundle available to migrants could vary. However, given the strong geographic clustering of Tongan migrants in Auckland and the small size of our sample, we do not attempt to identify the cost-elasticity from geographic differences in costs.

reduction in fees would roughly bring costs down to the average levels reported in Table 5.

Based on the answer to this question, we can calculate the dependent variable in equation (4)

as:

$$\frac{\partial X_i}{\partial F} = \frac{\text{Hypothetical Amount} - \text{Actual Amount}}{\frac{1}{2}F - F} \quad (6)$$

and thereby directly estimate the elasticity of remittances with respect to the fixed cost as:

$$\frac{\partial X_i / X_i}{\partial F / F} = \frac{2(\text{Actual Amount} - \text{Hypothetical Amount})}{\text{Actual Amount}} \quad (7)$$

From equation (7) we can see that if the migrant doesn't change the amount they would send, the elasticity is zero (perfectly inelastic), if they would increase the amount sent when costs fall, the elasticity is negative, and if they would decrease the amount sent when costs fall, the elasticity is positive. This cost elasticity is estimated only along the intensive margin, that is, for migrants who are already remitting. There was no question directed at migrants who are not remitting about whether they might start remitting if costs were lower.

9. Estimates and Interpretation of the Cost Elasticity of Remittances

At the intensive margin, 30 percent of remitters in the sample would send more money if costs fall, while 70 percent would keep the amount sent the same. Overall, the cost-elasticity of remittances with respect to the fixed cost component is -0.22, with a standard error of 0.06 (Table 6). This is effectively the average of the elasticity over those who would increase their remittances (for whom the elasticity is -0.74) and those who would not (for whom it is zero).

The cost elasticity is also estimated for sub-samples based on the migrants' self-described remittance sending pattern. The elasticity is -0.08 for the 14 percent of remitters who try and send a constant amount of Tongan pa'anga each month, -0.15 for the 48 percent who only

send money for special occasions, and -0.36 for the 39 percent who try and send a constant amount of New Zealand dollars each month. A t-test of equality between the cost elasticity for those who send a constant amount in Tongan pa'anga and those who send a constant amount in New Zealand dollars has a p-value of 0.09. Given the small sample size, this is somewhat supportive of the intuition that remitters who want their families to receive a certain amount in Tongan currency (whether as a usual payment or for special purposes such as school fees or village taxes) will be less responsive to changes in the cost of remitting.

A simulation can show how this cost elasticity can be interpreted. Recall from the above discussion that the median remittance sent is NZ\$200. The cost of sending this amount is 17.0 percent using a telegraphic transfer at Westpac. Consider then what would happen if Westpac keeps its exchange rate premium the same, but lowers the cost of sending a telegraphic transfer to NZ\$10 and removes the fee for receiving a telegraphic transfer. Several banks in the U.S. charge a fee of US\$5 to wire money to bank accounts in Mexico, so this proposed fee (approximately US\$7) is still above costs in some remittance channels. This would reduce the effective cost of sending NZ\$200 to 7.7 percent. Based on the estimated cost elasticity of -0.22, this 65 percent fall in the fixed cost of remitting would lead the average migrant to send NZ\$228.6 instead of NZ\$200, a 14.3 percent increase in the amount remitted. The receiving household would then receive 295 pa'anga instead of 231 pa'anga, a 27.5 percent increase in remittances.

10. The Likely Response of Remittances to the Exchange Rate Component of Costs

The response of remittances will also depend on the elasticity with respect to the exchange rate component of costs. There is only indirect evidence from the survey about this elasticity. But based on this evidence it is likely that, on average, remittances will be close to inelastic

with respect to exchange rate costs, making the response to the fixed component of costs the more important one. The hidden nature of the exchange rate cost, and the fact that migrants seem very aware of the fixed cost component, also supports this conclusion. Moreover, since the exchange rate cost is proportional to the amount sent, whereas the fixed fee is a lump sum, we would expect changes in the fixed fee to have a much greater impact on the decision to remit at all than would lowering the exchange premium.

The reason for expecting an inelastic response to the exchange rate component of costs is that there is roughly offsetting groups with negative and positive elasticities, who may cancel out. Specifically, just over one-half (62 percent) of remitters aim to provide a given amount of Tongan pa'anga, and so these migrants are likely to display positive elasticity with respect to exchange rate costs. This group includes those migrants who describe their usual pattern of sending money as either sending a constant amount in Tongan Pa'anga or sending money only for special occasions.¹⁵ The remaining 40 percent of remitters choose an amount to remit based on New Zealand dollars. This group is likely to have a negative elasticity of remittances with respect to exchange rate costs if the migrants know what the exchange rate cost is and therefore consider it as a tax on the amount sent.

To see how well remitters know the exchange rate cost, the survey asked respondents for their best estimate was of the exchange rate between the Pa'anga and New Zealand dollar on the day of the interview. Table 7 reports the mean and standard deviation for the actual interbank exchange rate and for migrants' estimates of the exchange rate. The New Zealand Dollar – Pa'anga exchange rate was very stable over the sample period, with an average rate of 1.365 Pa'anga per NZ Dollar (a standard deviation of 0.014), which was almost unchanged

¹⁵ The reason for including the special occasion group is that it is likely that requests from family for specific amounts may be denominated in Tongan pa'anga, as might contributions sent for school fees and the *misinale*.

from the previous period. Nevertheless, the mean estimate from respondents is 1.226. There is some clustering of responses, with 33 percent of respondents giving a rate of 1.2 and 12 percent giving a rate of 1.3 (the remainder reported a rate to two decimal places). This error does not just represent rounding error (no one reported 1.4 as the rate). As Table 7 shows, the mean absolute reporting error is approximately 10 percent.

However, the effective exchange rate faced by migrants using a particular remittance method is not the interbank exchange rate, but the rate charged by the method. Comparing migrants estimates of the exchange rate to the effective rate charged by the two most common methods - Western Union and Melie Mei Langi – shows absolute errors of 4-5 percent in the exchange rate. This suggests that migrants have a fairly good knowledge of the exchange rate they are actually paying. In other words, consumers do seem well aware of the exchange rate they actually pay for a remittance transaction, so it is possible that remittance transfers which are thought of by migrants in New Zealand dollar terms may increase when exchange rate costs fall.

11. Conclusions

The cost of sending money from New Zealand to Tonga is high by international standards, comprising 15 to 20 percent of the amount sent for the median remittance transaction of NZ\$200. Migrants are found to be aware of some, but not all, of the alternative methods available for sending remittances, and may be unaware of the extent of the exchange rate commission charged. This suggests scope for lowering the costs to migrants of sending money by disseminating information about remittance methods and costs to migrants, as is done by the Mexican consulates in the United States and as DFID (2005) proposes in the

U.K. We estimate that remittances have negative cost-elasticity, so that lowering costs will lead to a more than proportionate increase in remittances received by households in Tonga.

The negative cost-elasticity also suggests that a money transfer operator who lowers costs is likely to experience an increase in remittance volume from existing customers. However, the total increase in remittance volume experienced by this company is likely to be greater still, since a change in costs will attract remitters who had been using other channels to transmit money, and may also lead to an increase in the number of migrants sending money through any channel. In a competitive environment, there is therefore ample incentive for money transfer companies to compete through lower prices. Why then are costs not lower?

It may be that the information gaps among migrants that are revealed by the survey act as a barrier to competition among existing firms and the lack of market information may limit the extent of new entry into the remittance market. Data on the size, characteristics, and potential remittance behaviour of migrant communities is still rare. There is therefore a potential role for research to solve the coordination and information issues which limit the provision of remittance services to migrants.

Cost is not the only (and perhaps not even the most important) factor in the choice of remittance method. The most commonly used methods in our survey, Western Union and Melie Mei Langi, both have faster transfer times than banks and greater accessibility in the outer islands of Tonga. Our hypothetical question aimed to hold these other factors constant when estimating cost elasticity, and can be interpreted as asking whether an existing user of a service would send more or less money when the costs of that service are lowered. Speed and convenience are also important components of the effective cost of transferring money to

migrants, and a future survey could also examine the rate at which migrants are willing to trade-off direct costs against speed and ease of access.

REFERENCES

- Brown, Richard P.C. (1997) "Estimating Remittance Functions for Pacific Island Migrants", *World Development* 25(4): 613-626.
- Brown, Richard P.C. (1995) "Hidden Foreign Exchange Flows: Estimating Unofficial Remittances to Tonga and Western Samoa", *Asian and Pacific Migration Journal* 4(1): 35-54.
- Connell, John and Richard P.C. Brown (1995) "Migration and Remittances in the South Pacific: Towards New Perspectives", *Asian and Pacific Migration Journal* 4(1): 1-34.
- Department for International Development (DFID) (2005) *Sending Money Home? A Survey of Remittance Products and Services in the United Kingdom*, www.sendmoneyhome.org [accessed 10 April 2005].
- Docquier, Frédéric and Hillel Rapoport (2005) "The Economics of Migrants' Remittances", in L.A. Gerard-Varet, S-C. Kolm and J.M. Ythier (eds.) *Handbook on the Economics of Altruism, Reciprocity and Giving*, forthcoming, North-Holland: Amsterdam.
- Hernández-Coss, Raúl (2005) *The U.S.-Mexico Remittance Corridor: Lessons on Shifting from Informal to Formal Transfer Systems*, The World Bank: Washington D.C.
- International Money Fund (IMF) (2005) *World Economic Outlook: Globalization and External Imbalances*, April 2005, IMF: Washington D.C.
- Orozco, Manuel (2002) "Worker Remittances: The human face of globalization", Working Paper commissioned by the Multilateral Investment Fund of the Inter-American Development Bank.

- Profeco (2005) “Quién es Quién en el envío de dinero: Los Angeles a México” (Who is who in sending money: Los Angeles to Mexico”, Procuraduría Federal del Consumidor, www.profeco.gob.mx, March 7, 2005 data.
- Ratha, Dilip (2003) “Workers’ Remittances: An Important and Stable Source of External Development Finance”, Chapter 7 in *Global Development Finance 2003*, World Bank: Washington D.C.
- Simati, Aunese and John Gibson (2001) “Do Remittances Decay? Evidence from Tuvaluan Migrants in New Zealand”, *Pacific Economic Bulletin* 16(1): 55-63.
- Statistics New Zealand (undated) “Tongan People in New Zealand”, <http://www.stats.govt.nz/analytical-reports/pacific-profiles/tongan/default.htm> [accessed March 24, 2005].
- Tonga Statistics Department (2002) *Report on the Household Income and Expenditure Survey 2000/01*, Tonga Statistics Department: Nuku’alofa, Tonga.
- Vete, Mele Fuka (1995) “The Determinants of Remittances among Tongans in Auckland”, *Asian Pacific Migration Journal* 4(1): 55-68.
- Walker, Adrian and Richard P.C. Brown (1995) “From Consumption to Savings? Interpreting Tongan and Western Samoan Sample Survey Data on Remittances”, *Asian and Pacific Migration Journal* 4(1): 89-115.
- World Bank (2005) *Global Economic Prospects 2006: Economic Implications of Remittances and Migration*, The World Bank: Washington, D.C.
- Yang, Dean (2004) “International Migration, Human Capital, and Entrepreneurship: Evidence from Philippine Migrants’ Exchange Rate Shocks”, Mimeo. University of Michigan.

Figure 1: Remittance Costs as a Percentage of the Amount Remitted

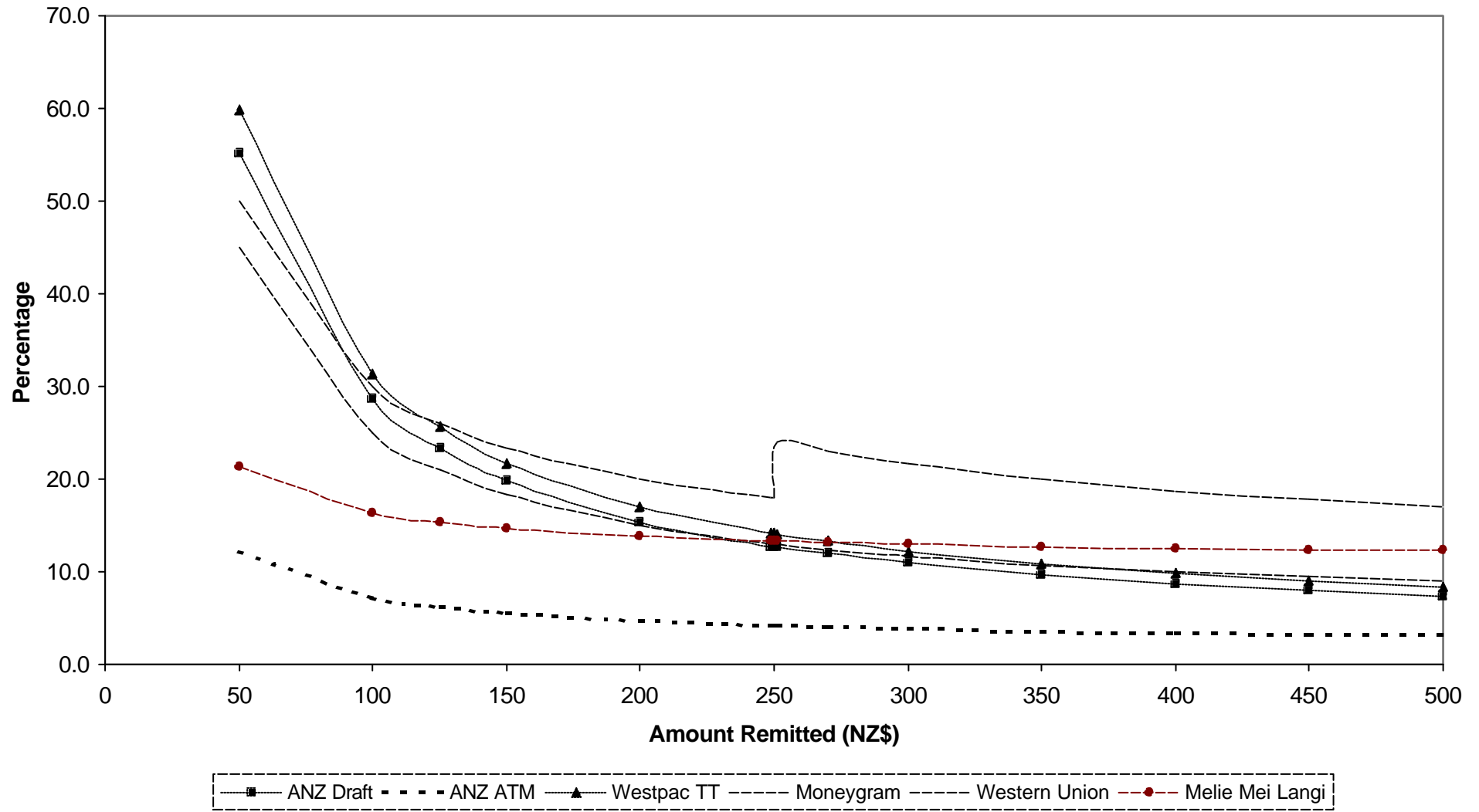


TABLE 1: CHARACTERISTICS OF REMITTANCES

| | Cash | Goods |
|--|---------|---------|
| % of migrant households remitting | 72.9% | 40.7% |
| Annual remittance, for remitters | \$2,214 | \$1,438 |
| Annual remittance, all households | \$1,613 | \$585 |
| Number of recipients per remitting household | 1.2 | 1.1 |
| % of recipients receiving ear-marked remittances | 69.8% | 30.9% |

Note: all amounts are in New Zealand Dollars (\$US1 = \$NZ1.39)

TABLE 2: KNOWLEDGE AND USE OF DIFFERENT REMITTANCE CHANNELS

| | Knowledge | Use |
|--|-----------|-------|
| Paying directly for an airfare of a relative or friend | | 6.8% |
| Taking money back when travelling to Tonga | | 4.5% |
| Giving money to family or friends visiting in NZ | | 13.6% |
| Giving money to someone to take back to other family | | 45.5% |
| Sending money through my church in NZ | 9.1% | 2.3% |
| Travellers Cheque | 2.3% | 0.0% |
| Bank Transfer through ANZ | 47.7% | 0.0% |
| Bank Transfer through Westpac | 52.3% | 4.5% |
| Bank Transfer through Other Banks | 38.6% | 2.3% |
| Western Union/NZ Post Office | 95.5% | 77.3% |
| Travelex | 6.8% | 6.8% |
| Moneygram/Money Exchange Ltd | 6.8% | 2.3% |
| Melie mei Langi | 47.7% | 47.7% |
| ATM card or credit card given to relative | 2.3% | 2.3% |

Notes:

Results are only for remitters (75 percent of the sample)

It was assumed migrants had knowledge of the first four categories.

TABLE 3: COST OF SENDING MONEY TO TONGA

Costs on March 10, 2005 (All amounts in New Zealand Dollars)

| | ANZ Bank | ASB Bank | BNZ Bank | Westpac Bank | Travelex Moneygram | Western Union | Melie mei Langi |
|-------------------------|-------------------------|-------------------------|-------------------------|---------------------------------------|---|-----------------------------|--|
| Telegraphic Transfer | Yes | Yes | Yes | Yes | No | No | No |
| Fee | \$25.00 | \$25.00 | \$25.00 | \$25.00 | | | |
| Delivery Time | 48 hours | 2-3 days | n.a. | 72 hours | | | |
| Bank Draft | Yes | Yes | Yes | Yes | No | No | No |
| Fee | \$22.00 | \$20.00 | \$15.00 | \$25.00 | | | |
| Delivery Time | postage | 21 days | postage + 1 day | postage | | | |
| ATM Card | Yes | Yes | Yes | Yes | No | No | No |
| Fee | \$5.00 | \$5.00 | \$7.50 | no fee if Westpac \$8.00 others | | | |
| Cash | Yes | Yes | Yes | Yes | No | No | No |
| Fee | 1% or \$7.50 minimum | 1% or \$5.00 minimum | 1% or \$5.00 minimum | 1% or \$6.00 minimum | | | |
| Money Transfer | No | No | No | No | Yes | Yes | Yes |
| Fee | | | | | \$20 for <\$250 \$35 for \$251-500 \$50 for \$501-750 | \$20.00 (limit \$10,000) | \$5 for <\$1000 ^b \$10 for >\$1000 |
| Delivery Time | | | | | < 1 hour | < 1 hour | < 1 hour |
| Exchange Rate: | 1.3579 | 1.3298 | 1.3300 | 1.3500 ^a | 1.2485 | 1.286 | 1.2 |
| Effective Exchange Rate | | | | | | | |
| Commission (%): | 2.1 | 4.1 | 4.1 | 2.7 | 10.0 | 7.3 | 11.3 |
| Number of branches: | 150 | n.a. | n.a. | 400+ | n.a | 536 | n.a. |
| Branches in Tonga: | Yes | No | No | Yes | Yes | Yes | Yes |

a. Westpac offers a lower exchange rate for cash, so that the exchange rate commission is 5.4% for cash.

b. Rates for sending money to Tongatapu. Rates are double this for sending money to the Outer Islands.

Exchange rate commission based on March 10 Interbank rate of \$1 NZ=1.3871 Pa'anga from Oanda.com

Postage to Tonga is NZ\$1.50 for regular airmail and NZ\$10.00 for a registered packet.

TABLE 4: COST OF SENDING US\$300

| | US\$ cost |
|--|-----------|
| Los Angeles to Mexico: | |
| Citibank Global Transfer: Account to Account | \$7.75 |
| Citibank Global Transfer: Account to Cash | \$10.75 |
| Bancomer/US Postal Service | \$9.00 |
| Moneygram | \$10.36 |
| Western Union: next day service | \$13.01 |
| Western Union: money in minutes | \$18.01 |
| New Zealand to Tonga: | |
| ANZ Draft | \$25.90 |
| ANZ ATM | \$9.90 |
| Westpac Telegraphic Transfer | \$26.70 |
| Moneygram | \$55.84 |
| Western Union | \$36.64 |
| Melie Mei Langi | \$37.60 |
| United States to Tonga | |
| Western Union: same day (Washington D.C) | \$43.74 |
| Wells Fargo Wire Transfer (Washington D.C.) | \$39.14 |
| Wells Fargo Wire Transfer (California) | \$36.14 |
| Ikobo.com Person-to-person transfer | \$12.58 |

Sources and Notes:

Cost includes exchange rate premium.

Los Angeles to Mexico data from Profeco (2005), for March 7, 2005

New Zealand to Tonga data based on Table 3, March 10, 2005

United States to Tonga data collected March 224, 2005

March 10, 2005 exchange rate of US\$1 = NZ\$1.353 from oanda.com used to convert New Zealand dollars to US dollars.

TABLE 5: PERCENTAGE COST OF SENDING US\$200 BY COUNTRY

| | Banks | Money Transfer Operators |
|--|---------------|--------------------------|
| Pakistan (from Saudi Arabia, U.S., U.K.) | 0.4% | 13.0% |
| Mozambique (from South Africa, U.S.) | 1.0% | n.a. |
| Turkey (from Germany, U.S.) | 3.1% | 9.5% |
| Portugal (from France, U.S.) | 3.4% | 12.3% |
| India (from Saudi Arabia, U.S., U.K.) | 6.0% | 13.8% |
| Greece (from Germany, U.S.) | 6.8% | 9.5% |
| Philippines (from U.S.) | 8.0% | 10.3% |
| Mexico (from U.S.) | 8.6% | 10.6% |
| El Salvador (from U.S.) | n.a. | 7.2% |
| Dominican Republic (from U.S.) | n.a. | 8.5% |
| Tonga (from New Zealand) | 12-13% | 15-23% |

source:

Orozco (2002, Tables 7 and 14)

New Zealand to Tonga data based on Table 3, March 10, 2005

March 10, 2005 exchange rate of US\$1 = NZ\$1.353 from oanda.com used to convert New Zealand dollars to US dollars.

n.a. not available

TABLE 6: COST-ELASTICITY OF REMITTANCES

| | Elasticity | Std. Err. |
|--------------------------------------|------------|-----------|
| All Remitters | -0.22 | 0.06 |
| Remitters who would respond to cost | -0.74 | 0.13 |
| Remitters who do not respond to cost | 0.00 | n.a. |
| NZ Dollar Remitters | -0.36 | 0.13 |
| Pa'anga Remitters | -0.08 | 0.08 |
| Special Occasion Remitters | -0.15 | 0.07 |

TABLE 7: MIGRANT'S KNOWLEDGE OF EXCHANGE RATE (Pa'anga/NZ Dollar)

| | Exchange Rate | | Mean absolute value of error (as a percentage) compared to: | |
|--|---------------|-------|---|--------|
| | Mean | S.D. | Interbank | Method |
| Interbank Exchange Rate | 1.365 | 0.014 | | |
| <i>Migrants' estimates of exchange rate:</i> | | | | |
| All Remitters | 1.226 | 0.062 | 10.1 | |
| Western Union remitters | 1.223 | 0.061 | 10.2 | 4.6 |
| Melie Mei Langi remitters | 1.214 | 0.064 | 11.3 | 3.7 |

Notes: mean error for method calculates mean absolute error compared to exchange rate of 1.2 for Melie Mei Langi and Western Union exchange rate of a 7.9 percent premium on the interbank rate. Interbank rates from oanda.com.