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The Impact of Remittance Fees on Remittance Flows: Evidence from a Field Experiment Among Salvadoran Migrants

Diego Aycinena
Francisco Marroquin University

Claudia Martinez A.
University of Chile

Dean Yang*
University of Michigan

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Abstract

The remittances that migrants send to their home countries are one of the largest international financial flows to the developing world. A common policy recommendation is that remittance transaction fees should be lowered. This paper provides the first empirical evidence on the causal impact of remittance transaction fees on remittance flows via a field experiment among migrants from El Salvador in the Washington D.C. area. In partnership with a local money transmitter, we randomly assigned migrants differently-sized discounts on remittance transaction fees. Reductions in remittance fees led to large increases in remittances sent to the migrant's home country. A $1 reduction in fees led migrants to send $25 more remittances per month via our partner institution. Increases in remittances occurred via increases in the frequency of transactions, and not on funds sent per transaction. There is no evidence that this increase in remittances represents shifting of funds previously sent via other remittance channels, funds sent on behalf of others, or intertemporal substitution of funds that would have been sent later.

Keywords: international migration, remittances, transaction costs
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Introduction

Between 1965 and 2010, individuals living outside their countries of birth grew from 2.2% to a projected 3.1% of world population, for an estimated total of more than 200 million people in the latter year.[1] The remittances that these migrants send to origin countries are one of the largest international financial flows destined for developing nations, about as large as foreign direct investment in recent years and far exceeding foreign aid flows. In 2008, migrant remittances sent to developing countries amounted to US$338 billion (Ratha et al 2009). Improvements in remittance data collection and continued immigration flows to developed countries have generated substantial recent interest in the remittance phenomenon, as evidenced by a proliferation of recent policy-oriented reports.[2]

Recent research in the economics of migration has documented several beneficial impacts of remittance flows on household well-being and investments. Households in the Philippines experiencing exogenous increases in remittances become more likely to leave poverty status, to send their children to school, and to invest in new entrepreneurial enterprises (Yang and Martinez 2005, Yang 2006, Yang 2008b). In El Salvador, households receiving more remittances have higher rates of child schooling (Cox-Edwards and Ureta 2003). In Guatemala, households receiving remittances tend to invest more in education, health and housing (Adams 2005), and international remittances are associated with lower depth and severity of poverty (Adams 2004). In Mexico, households with migrants invest more in small businesses than households without migrants (Woodruff and Zenteno 2007). In addition, remittances appear to serve as insurance, rising in the wake of negative shocks (Yang and Choi 2007, Yang 2008a).

[1] Estimates of the number of individuals living outside their countries of birth are from United Nations (2008).
[2] Reports funded by the Multilateral Investment Fund of the Inter-American Development Bank include Pew Hispanic Center (2002) and Terry and Wilson (2005). The World Bank has also funded substantial publications on the topic, such as World Bank (2006) and World Bank (2007).

To date, however, we know very little about what determines migrants' remittance-sending decisions. In particular, little is known about the importance of one of the most basic and prominent aspects of the remittance transaction: the fee that money transmission institutions charge for the service. A typical fee structure is that a migrant pays a fee per remittance transaction that sometimes has a variable component (varying with amount sent) and that can also vary by the origin and destination of the remittance.[3] A very frequent policy recommendation is that remittance transaction fees should be lowered, so as to free up funds that can be spent by relatively low-income migrants and their families, as well as to potentially encourage migrants to remit more.[4]

We are aware of only two other research papers that seek to shed light on the impact of remittance fees on remittance flows. First, Freund and Spatafora (2006) use cross-country data to show that remittance fees are negatively correlated with total remittance flows at the country level. Second, Gibson, Mckenzie, and Rohorua (2006) document that migrants report – in response to a hypothetical question – that they would send more remittances if the fixed component of remittance fees were lowered. While these existing studies are a useful start and are suggestive that reductions in remittance fees might lead to increases in remittance flows, they have important limitations. First, cross-country studies face substantial challenges in establishing the direction of causality: correlations between remittance fees and remittance flows at the country level could very well be due to omitted variables (e.g., country income, say) or reverse causation (high flows leading to lower fees). Second, it is unclear what the relationship is between responses to hypothetical questions and actual remittance decision-making.

[3] See Orozco (2004) and Orozco (2006).
[4] See, among others, de Luna Martinez (2005), Frias (2004), Orozco (2002), Orozco and Wilson (2005), Orozco and Fedewa (2006), Pew Hispanic Center (2002), Ratha (2005), Ratha and Riesberg (2005), World Bank (2006) and World Bank (2007).

This paper provides the first empirical evidence on the causal impact of remittance transaction fees on remittance flows via a randomized field experiment among migrants from El Salvador in the Washington D.C. area. In the context of remittances to El Salvador, the typical remittance transaction cost involves a flat fee of $9 or $10 for any remittance at or below a value of $1,500 (which accounts for the vast majority of remittance transactions). In partnership with a local money transmitter, we randomly assigned Salvadoran migrants different discounted fees on remittance transactions that were under this $1,500 ceiling, ranging in unit increments between $4 and $9. We assessed impacts by tracking remittance frequency and amounts using administrative data of our partner institution, alongside a follow-up survey of migrants to establish impacts on use of other remittance channels, total remittance flows, and savings.

Our experimental approach avoids both shortcomings of the existing literature on the topic. First, randomized allocation of remittance fees allows us to credibly establish the causal impact of fees on remittance behavior. Second, the remittance fee variation we induce is not hypothetical, but actual: we are able to observe actual real-life remittance decisions in response to real price changes. It is also worth mentioning that we are fortunate to be able to work with data on actual remittance activity using administrative records of our partner money transmission institution, which avoids pervasive problems with measurement error and misreporting associated with survey data.[5]

We find that reductions in remittance fees led to large increases in remittances sent to the migrant's home country. A $1 reduction in fees led migrants to send $25 more remittances per month via our partner institution. Increases in remittances occurred via increases in the frequency of transactions, and not on funds sent per transaction (which remained relatively constant).

[5] That said, we do find it important to complement the administrative data with survey data to examine behaviors that are unavailable in the administrative data.

Additional analyses indicate that the price reductions led to an increase in total remittances sent: analysis of the follow-up survey provides no indication that the increased remittances sent via our partner institution were simply shifted from other remittance channels, or were simply funds sent on behalf of others (to take advantage of the discount). In addition, the time-pattern of the price-induced increase in remittances is not consistent with intertemporal substitution (shifting future remittances to the present to take advantage of the time-limited discount).

The remainder of the paper proceeds as follows. In the next section we discuss the experimental design. Then we present the estimation strategy and describe key variables and data sources. The next section presents and discusses the empirical results, and the final section concludes.

Experimental Design

The study sample consists of migrants from El Salvador in metro Washington DC who received a marketing visit carried out by a study team member. To screen out individuals who were likely to have relatively weak ties to the home country, enrollment into the study was limited to Salvadorans who had made their first entry into the U.S. within the last 15 years, and who had sent a remittance to someone in El Salvador within the last 12 months. Survey and treatment protocols are described in more detail in the Appendix.

To implement this study, we partnered with a money transmission institution, Banagricola, that has 11 branch locations in the metro Washington, DC area. Banagricola is a U.S. subsidiary of a Salvadoran financial institution, Banco Agricola (which is El Salvador's

largest bank). In much of this paper we refer simply to Banagricola simply as "the partner institution".

Fees charged by Banagricola for remittance services in the DC area are generally in line with those charged by competing money transmitters such as Western Union, Moneygram, and the DC affiliates of other large Salvadoran banks. Throughout the duration of our project, Banagricola charged a flat fee for any remittance to El Salvador amounting to $1,500 or less. The flat fee was $10 if the remittance was to be retrieved in cash by the remittance recipient. (In this case the remittance recipient in El Salvador would pick up the cash – after providing a unique numeric code – from a teller at one of Banco Agricola's branch locations). The flat fee was $9 if the remittance was sent directly into a Banco Agricola bank account. El Salvador uses the U.S. dollar as currency, so there are no additional costs to the sender arising from foreign currency exchange.

Our experiment involved randomly assigning migrants in the sample to one of six flat fees for remittance transactions amounting to $1,500 or less: $9, $8, $7, $6, $5, or $4.[6] Study participants had a 50% chance of being assigned to the $9 price, which was the usual price for a remittance sent into a Banco Agricola bank account, and a $1 discount off the price to send a remittance that would be retrieved in cash from a teller. Each of the remaining five price points had a 10% probability of being assigned. Randomization was carried out after first stratifying the sample on the basis of the following variables: gender (male/female), having a US bank account

[6] Fees for remittances above $1,500 were unaffected by our intervention. For remittances retrieved from a teller in cash, these fees were $15 for remittances in the range of $1,501-5,000, and $25 for remittances from $5,001-10,000. (For such remittances, $10,000 was the maximum remittance.) For remittances sent into a Banco Agricola bank account, owned by the remittance sender, the fee was $10 for any remittance above $1,501 (with a maximum of $25,000). For remittances sent into a Banco Agricola bank account owned by someone other than the remittance sender, the fees were $13 for remittances in the range of $1,501-5,000, $20 for remittances from $5,001-10,000, and $29 for remittances from $10,001-25,000.

(yes/no), relationship to remittance recipient (parent/child/spouse/other), and years in US category (0-5 years/6-10 years/11-15 years).[7]

During an initial face-to-face marketing visit, study participants were told that within the next few weeks they would receive a special Banagricola "VIP Card" in the mail at their U.S. address. Marketing visits occurred between November 2007 and July 2008 inclusive. Study team members administering the marketing visit did not know the price to which migrants had been assigned. Migrants were instructed to bring their VIP Card to a Banagricola branch, where a branch teller would inform them of the price to which they were randomly assigned by deciphering a code printed on the VIP Card. The name of the VIP Card holder was printed on the card and it could only be used by the individual to whom it had originally been assigned; study participants were required to show proof of identification each time it was used. The VIP Card discount would apply until June 2009, and migrants knew this in advance. The VIP Card could be used for an unlimited number of remittance transactions during the validity period.

This randomization of remittance prices was carried out alongside a separate cross-randomized intervention intended to stimulate savings in transnational migrant households (household composed of the US-based migrant and family members remaining behind in El Salvador). That intervention randomly assigned study participants to either a control group (with 25% probability) or one of three savings treatment groups (labeled 1, 2, and 3, each also with 25% probability). In brief, these savings interventions encouraged migrants to open bank accounts with Banco Agricola in El Salvador, and to save money in those accounts. Study participants could deposit funds into these accounts by sending remittances into them. The savings treatments differed in the degree of monitoring and control that migrants would have

[7] In other words, we randomly assigned prices among observations within cells representing unique combinations of the stratification variables.

over the savings accounts offered. In savings treatment 1, migrants were offered assistance opening a bank account in the name of a remittance recipient in El Salvador. Savings treatment 2 involved offering an account that was jointly owned by the migrant and remittance recipient. Savings treatment 3 was identical to treatment 2 but added the offer of a bank account in the name of the migrant alone. (For further details on the savings intervention and results of that companion study, see Ashraf, Aycinena, Martinez, and Yang (2010).)

Estimation

The primary outcome of interest is remittances sent to El Salvador (expressed as a monthly average over a given period). Let Y_i be the dependent variable of interest. Let P_i be the price to which migrant *i* was assigned. The most straightforward estimate of the impact of the randomized price involves estimating the following regression:

$$Y_i = \delta + \alpha P_i + \mu_i \qquad (1)$$

The coefficient α, is the impact of a $1 increase in price on remittances sent per month. This is appropriately interpreted as a causal impact because price is randomly assigned and therefore uncorrelated on average with the error term, μ_i.

We also examine specifications that include a vector $\boldsymbol{X_i}$ of baseline control variables (the variables used for stratification, plus pre-treatment remittance activity at the partner institution) and fixed effects for month of treatment and for the marketer (study team member) who administered the initial marketing visit:

$$Y_i = \delta + \alpha P_i + \boldsymbol{X_i}'\boldsymbol{\phi} + \mu_i \quad (2)$$

Due to the price randomization, this specification should not affect the coefficient α and is mainly useful for absorbing residual variation and obtaining more precise coefficient estimates on the price variable.

We also examine specifications where the linear price variable is replaced by 1) five indicators for each separate price point (excluding the $9 base price point), or 2) an indicator for the assigned price being equal to or less than $8 (a threshold effect specification).

Key variables and data sources

Our main dependent variable of interest is average monthly remittances sent via our partner institution in the 9-month period in the 3rd through 11th calendar months after the treatment visit.[8] We calculated this outcome variable using remittance data provided by our partner institution from their internal administrative databases, and so should be as close to error-free as one can achieve in studies of consumer financial decision making.

We choose to measure remittances starting the 3rd calendar month post-treatment because migrants did not receive their VIP Cards in the mail until a few weeks after the marketing visit. We choose to have the 11th post-treatment month be the last month of the reference period because individuals who received the marketing visits in the last intervention month (July 2008) would be in their 11th post-treatment month in the month the VIP Card expired, June 2009. This end-month choice allows us to maximize our analytical sample size, at 1,400 observations. We refer to this 1,400-observation sample as our "full sample".

[8] For example, if the migrant's marketing visit occurred in April 2008, the 3rd through 11th post-treatment calendar months were July 2008 through March 2009.

Data on the baseline stratification variables (gender, indicator for having a US bank account, relationship to remittance recipient category, and years in US category) were collected at enrollment in the study and are available for the full sample.

We also attempted to administer a short (15-minute) follow-up via phone to all 1,400 migrants in the baseline sample. We successfully interviewed 59.5% of migrants. We refer to this 847-observation sample as the "follow-up survey sample". This sample is used for analysis of data that cannot be observed through the partner institution, most importantly remittances sent via other institutions, and savings.

Appendix Table 1 examines whether our randomized prices affected attrition from the follow-up survey sample, and finds no relationship between price and follow-up survey attrition for the most part. The only exception is being assigned the $4 price, which is associated with a roughly 9-percentage point lower probability of attrition (at the 5% significance level). We therefore will take inference about the impact of remittance price on outcomes in the follow-up sample as having internal validity, with the possible exception of inference regarding the lowest ($4) price point.

Appendix Table 2 presents means of the baseline stratification variables and baseline use of the partner institution for the follow-up sample and the other observations that are in the full sample but that were not successfully administered the follow-up. There are no dramatic differences across the two samples. The following differences between the two groups are statistically significantly different from zero: compared to attritting sample, the follow-up sample has a slightly higher percentage of recipients who are migrants' spouses (15% instead of 12%), lower percentage of spouses who have been in the US for 5 years or less (49% instead of 54%),

and a higher percentage of migrants who have been in the US for the longest years in US category, 11-15 years (15% instead of 12%).

Summary statistics are presented in Table 1. The main item we will point out is that post-treatment remittances sent per month are substantially lower in the follow-up survey than in the administrative data. Mean remittances per month recorded by the partner institution in the post-treatment period is $374.62, compared to just $105.58 in the follow-up survey. Mean total remittances per month reported in the follow-up survey (via the partner institution plus other channels) is $290.40.

Empirical Results

Balance of treatment groups along baseline characteristics

Table 2 presents formal regression evidence that the treatment groups in both the full and the follow-up samples are balanced along various baseline variables. Columns 1 through 7 present regression results for the full sample in regressions of price (variously specified) on several baseline variables. Column 1 presents coefficients on various baseline variables in a regression where the dependent variable is the randomly-assigned price. Columns 2-6 have the same right-hand-side variables as column 1, but the dependent variable is replaced with indicator variables that take the value of 1 if the randomized price equals $8, $7, $6, $5, or $4, respectively, and 0 otherwise. In column 7 the dependent variable is an indicator for price being less than or equal to $8. Columns 8 through 14 repeat the same regression specifications as in the previous columns, but this time for the smaller follow-up survey sample.

At the bottom of each column we present the p-value of the f-test that the right-hand-side variables in the regression are jointly statistically significantly different from zero. In not one

case does the f-test reject the null hypothesis that the right-hand-side variables are jointly not statistically significantly different from zero. In scattered cases individual regression coefficients are statistically significantly different from zero, but no more frequently than would be expected by chance.

Effect of randomized price on use of and prices actually paid at partner institution

Before presenting impacts of prices on remittances sent, it is important to first document how the randomized prices affected use of the partner money transmitter and on prices paid at that institution.

In columns 1 through 6 of Table 3, we present coefficients from regression of an indicator for use of the partner institution (1 if sent nonzero remittances during the period 3-11 months post-treatment, 0 otherwise) on various specifications of the randomized price. The mean of the dependent variable is 0.44. In columns 1 and 2 price is entered linearly, in columns 3 and 4 as separate indicators for each distinct price, and in columns 5 and 6 as an indicator for price being less than or equal to $8. Odd-numbered columns are specifications without controls, and even-numbered columns include the full set of control variables and fixed effects.

For the most part, it does not appear that the price affects migrants on the extensive margin of use of the partner money transmitter. The sole exception is that being assigned the lowest price of 4 makes the individual 6.3 percentage points more likely to use the partner institution at all, although this is only significant (at the 10% level) in the specification with control variables.

Columns 7-12 of the table are specifications identical to columns 1-6, but where the dependent variable is the mean fee paid per remittance transaction at the partner institution, and

where the sample is restricted to individuals who sent nonzero remittances via that institution (in other words, where the dependent variable in columns 1-6 equals 1). There is clearly a strong effect of randomized price on actual price paid. In all specifications in columns 7-12, each price variable, without exception, is highly statistically significantly different from zero (at levels far exceeding 1%).

The linear price specification (cols. 1-2) indicates that each $1 reduction in randomized price leads the mean fee paid when using the partner institution to decline by roughly $0.90. Coefficients in columns 9 and 10 indicate that the pattern of decline in mean fees paid is indeed monotonic in the size of the discount: roughly $0.75 lower when price is $8 (a $1 discount from the excluded $9 base category), progressing all the way to being roughly $4.60 lower when price is $4 (a $5 discount from the $9 base category).[9]

In sum, price did not affect whether or not the migrant used the partner institution at all (for the most part), but it did have a strong effect on prices paid conditional on sending at least one remittance via the partner institution.

Impact on remittances sent via the partner money transmission institution

We now turn to estimating the impact of randomized price on remittances sent via our partner institution. Regression results are in Table 4. In all columns of the table, the dependent variable is average remittances sent per month via the partner institution in US dollars, over the 9-month period from 3-11 months after treatment.

[9] Why might migrants apparently not be taking full advantage of the discount to which they were entitled? One possibility is that migrants may have in some cases failed to bring their VIP cards to the partner institution when making a transaction, or may have lost their VIP card. In addition, the VIP card did not entitle the customer to a discount if the remitted amount exceeded $1,500.

Column 1 of Table 4 presents evidence on the impact of price in the simplest possible specification: remittances regressed on the price (specified linearly), with no other control variables. The coefficient on remittances is negative and statistically significantly different from zero at the 5% level.

In column 2 of the table, the regression is modified to include the baseline stratification variables, measures of the extent to which the individual used the partner institution in the 12 months prior to treatment, and indicators of the cross-randomized savings treatment. In column 3, the regression additionally includes fixed effects for marketer, treatment month, and stratification cell (which fully absorb the effects of the separate stratification variables). Inclusion of the control variables and fixed effects in the regression absorbs a substantial amount of residual variation (R-squared rises from 0.004 in column 1 to 0.458 in column 2 and 0.484 in column 3), leading the coefficient on price to be estimated somewhat more precisely. The coefficient estimate does not change materially upon inclusion of the controls and fixed effects. The coefficient estimate in column 3 indicates that a $1 reduction in price leads to a $25.09 increase in average monthly remittances sent via the partner institution.

In columns 4 and 5, we show estimates of effects for the distinct prices randomized, by replacing the linear price variable with indicator variables for the separate prices $4, $5, $6, $7, and $8 (the excluded category is the $9 base category). The pattern of coefficients in not strictly monotonic (the impact of the $6 price is smaller than the impact of the $7 and $8 prices, for example), but it does show a general pattern of increasing positive impacts of remittances as the discount becomes larger. Effects of the $7, $5, and $4 prices are positive and statistically significantly different from zero with and without the inclusion of control variables.

Finally, Columns 6 and 7 present estimates of the impact of being offered *any* discount from the $9 base fee, by replacing the separate price indicators with a single indicator for price being less than or equal to $8. The estimate in column 7 (where all controls and fixed effects are included) indicates that migrants offered any discount at all send $80.76 more remittances per month on average via the partner institution. This effect is substantial, amounting to 24% of that variable's sample mean (which is $335.99).

Figures 1 and 2 provide a graphical view of the impact of the threshold effect of being assigned a price of $8 or below. In Figure 1, it is clear that mean remittances in the $9 group and the $8 and below group move in parallel from 12 months prior to treatment (month -12) until roughly 3 months after treatment (month 3). Thereafter, a gap opens up between the two data series, illustrating the increase in remittances sent for migrants assigned some discount on their remittance fee.

Figure 2 focuses on the difference in remittances for each month relative to treatment month between the $8 and below (discount) and $9 (no discount) groups, after controlling for baseline controls and fixed effects. The solid line is the difference in the two means, and the dotted line bounds the 90% confidence intervals.[10] The difference is small and not statistically different from zero until month 2, after which it becomes positive and the difference in particular months is statistically significantly different from zero at the 10% level in several instances.

Testing for shifting of remittances from other channels to the partner institution

In interpreting these results so far, a key question arises: when lower prices induce migrants to send more remittances via the partner institution, to what extent do those increases

[10] The data used to create the graph are the coefficient and confidence intervals for the indicator for "Price<=$8" obtained from 24 regressions analogous to those in column 7 of Table 4, but where in each separate regression the dependent variable is taken to be total remittances sent in various months before or after treatment.

simply represent shifting of remittances from *other* money transmitters? We would like to know whether our randomly-assigned prices induced migrants to send more remittances home *in total* (regardless of remittance channel), and so it is important to gauge the magnitude of such shifts from other remittance channels to the partner institution.

To assess the extent to which such shifting may have occurred, we focus on the sample of migrants who consented to being administered the follow-up survey in March through June 2009, and take advantage of questions on average remittances sent per month since the end of the treatment period, July 2008. The follow-up survey included questions about the share of remittances sent via our partner institution vs. other remittance channels.

Because we are now dealing with a smaller sample, we first confirm that the effect of price in this subsample generates similar results to previous tables. Regressions reported in Table 5 restrict the sample to migrants who are included in the follow-up survey sample. In column 1, the dependent variable is average monthly remittances sent from July 2008 through June 2009 (inclusive) via the partner institution, *as recorded in the partner institution's administrative data*.[11] Panel A displays the linear effect of price, Panel B the separate effects for each individual price level, and Panel C the effect of any discount (Price<=8). (Each panel involves running a separate regression where all controls and fixed effects are included.) Point estimates are quite similar to corresponding estimates in Table 4, as are statistical significance levels (although the smaller sample size does lead estimates to be slightly less precise).

In the remaining columns of the table, the dependent variables are all from the follow-up survey data. In column 2, the dependent variable is average monthly remittances sent since July

[11] Note that the dependent variable here differs slightly from the dependent variable in Table 4. In Table 4, the dependent variable was average monthly remittances sent via the partner institution over the 3-11 months post-treatment (whose calendar months differ across individuals). We chose to define the dependent variable in col. 1 of Table 5 differently so that it could be more readily compared with the remittance variables in the follow-up survey data.

2008 via the partner institution, but this time as self-reported by the migrant in the follow-up survey. Coefficients tend to have similar signs and significance levels as in column 1, but are all smaller in absolute value. For example, the coefficient on linear price in Panel A is -8.007 (significant at the 5% level) in column 2 but -23.646 (and significant at the 1% level) in column 1. This decline in the magnitude of coefficients in column 2 is consistent with general under-reporting of the remittance data in the follow-up survey, which we pointed out previously in discussion of the summary statistics (Table 1).

We investigate the impact of price on shifting of remittances away from other channels in column 3 of the table, where the dependent variable is self-reported average monthly remittances sent since July 2008 via money transmission channels *other than* the partner institution. Shifting away from other channels due to our randomly-allocated prices would show up as a positive coefficient on linear price (Panel A) and negative coefficients on the indicators for having received discounts (in Panels B and C).

The coefficient on linear price in Panel A is indeed positive, but it is about half the magnitude of the coefficient in column 2 and is not statistically significantly different from zero. Coefficients in Panel B are a mixture of positive and negative, and the one statistically significant coefficient (on the $8 price, at the 10% level) is actually positive. The coefficient on the indicator for Price<=$8 (Panel C) is also positive, but not statistically significantly different from zero. These results provide no evidence to suggest any shifting of remittances from other channels to the partner institution in response to lower prices.

To directly address the question of whether *total* remittances sent by migrants rose in response to lower prices, in the last column of the table the dependent variable is self-reported average monthly remittances sent since July 2008 via *all* money transmission channels. The

coefficient on linear price in Panel A is negative but not statistically significantly different from zero. In Panel B, 4 out of 5 coefficients are positive (two of which are statistically significant from zero at the 5% level), but there is no monotonic pattern: the largest coefficients (and also the only ones that are statistically significant) are those on the $8 and $6 prices.

The pattern of price coefficients in Panel B of column 4 suggests that a threshold effect at a price of $8 may be the more appropriate specification for the price effect in this subsample. Indeed, in Panel C, the coefficient on Price<=$8 is positive and significant at the 10% level: migrants in the follow-up survey subsample who are offered prices from $4 through $8 report sending $62.48 more in average monthly remittances (in total, across all channels) than migrants assigned to the $9 price. This is a substantial effect, amounting to 11.9% of the sample mean ($290.40).

Impact on frequency and dollars per transaction

In Table 6 we investigate whether the effects of price are due to frequency of transactions or amounts sent per transaction. For this analysis, we return to the full sample of all individuals administered the treatment, and all dependent variables refer to transactions with the partner institution. (The table is structured similarly to Table 5, with results from separate regressions for different price specifications in each column.)

In column 1, the dependent variable is the number of remittance transactions per month. The linear effect indicates that a $1 reduction in price leads to 0.11 additional transactions per month on average (and this effect is significant at the 1% level). Patterns of coefficients in Panel B are generally increasing (if not strictly monotonic), with effects of the $7, $5, and $4 prices

being significant at either the 5% or 1% levels. The threshold effect at $8 is positive and significant at the 1% level.

In column 2, the dependent variable is funds sent per remittance transaction (and is limited to observations that made at least one transaction). In this case, none of the coefficients in any specification are statistically significantly different from zero.

In sum, increases in remittances sent due to reductions in price appear to operate via increasing frequency of remittances rather than increases in amounts sent per transaction. It is sensible that the effect operates along this margin, since remittance fees and price discounts that we allocated are expressed on a per transaction basis.

Impact on fees

Of related interest is the question of whether the partner institution saw increased or decreased fee revenue as a result of the price reductions. We investigate this in column 3 of Table 6, where the dependent variable is average monthly fees paid to the partner institution. The results indicate that the price reductions led to lower fees paid; increases in transaction frequency (documented in column 1 of the table) were not enough to offset the lower fees per transaction. The estimate in Panel A indicates that for a typical customer, each $1 reduction in fees led the partner institution to lose $0.47 in remittance transaction fees per month.

Time-shifting of remittances?

The VIP card remittance prices we randomly assigned were valid until June 2009. For this reason, a reasonable question is whether migrants simply shifted remittances they would

have sent anyway (after June 2009) to an earlier month prior to the VIP card expiration to take advantage of the discount.

If migrants were in shifting future remittances to the present in order to take advantage of the discount before expiration, we should see an upward spike in remittances among migrants given the discount immediately prior to expiration. As it turns out, there is no such increase in June 2009. Figure 3 shows average remittances sent for each month before the project, during the treatment phase (Nov 2007 to July 2008, shaded yellow), and after treatment leading up to the June 2009. The months with the largest treatment effects are actually December 2008 and January 2009, around the time of Christmas when remittances usually spike. In sum, the time pattern of the price-induced increase in remittances is not consistent with intertemporal substitution of remittances to take advantage of the discount before expiration.[13]

Another way to get at this question of intertemporal substitution is to simply look at the impact of the randomized prices on migrants' savings. If migrants were shifting future remittances to an earlier month prior to expiration, we should see that lower remittance prices are associated with lower savings (a positive coefficient on the linear price variable and negative coefficients on the indicator variables for prices below $9).

As it turns out, there is no indication that such time-shifting of remittances is occurring, as the price has no effect on migrant reported savings. Table 7 presents coefficient estimates from separate regressions for different price specifications in each column, as in previous tables. Dependent variables are savings reported in the migrant follow-up survey in total (col. 1), in the U.S. (col. 2), in El Salvador (col. 3), and in cash (col. 4). With one exception, no coefficient in the table is large in magnitude or statistically significantly different from zero. The exception of

[13] Regression analyses, available from the authors on request, confirm that the effect of price is just as strong when examining price impacts on remittance flows in the July to December 2008 period, several months prior to expiration.

the coefficient on the Price=$8 indicator in Panel B of column 4, which may simply be due to sampling variation.

Sending remittances for others?

Another reasonable question is whether migrants may have responded to lower prices by sending additional remittances on behalf of other migrants who did not get similar discounts. If this was going on, the response to remittances that we estimate also would not represent the actual effect on remittances of the study participant. We examine this using a question in the follow-up survey (regressions not reported here but available from the authors on request). Sending remittances since July 2008 on behalf of someone else (which is reported by 9.0% of migrants in the survey) has no large or statistically significant relationship with price.

Other robustness checks

We have conducted a set of other auxiliary analyses to test the robustness of our results. Regression tables for all these results are available from the authors upon request.

First, we have tested whether results are driven by outliers in the remittance data. We find that results are similar when truncating the upper tail of the distribution of remittance dependent variables at the 95th percentile.

Second, we ask whether the positive effect of price reductions on remittances remains when restricting attention to more "normal" months (non-holiday months). We find that the price effect on remittances remains statistically significantly different from zero, and is about 2/3 the original magnitude, when we exclude the holiday months of December 2008 and January 2009 from the calculation of the remittance dependent variables.

Third, one might be concerned that results using the follow-up survey data may be subject to selection bias because assignment to the lowest price, $4, is statistically significantly associated with lower attrition from baseline to the follow-up survey. We find that results for dependent variables using the follow-up survey data are robust to exclusion of observations randomly assigned to the $4 price level.

Conclusion

We implemented a unique randomized field experiment testing the impact of reductions in remittance prices on the remittance decision-making of migrants from El Salvador in Washington, D.C. We find large positive effects of reductions in remittance transaction fees on remittances sent. The increases operate via increases in the frequency of transactions while remittances sent per transaction remain constant. It is likely that the price reductions led to increases in total remittances sent to El Salvador: we find no evidence that the price reductions simply led to shifting of remittances to our partner institution, to intertemporal shifting of remittances to take advantage of the discount, or to increases in remittances sent on behalf of others.

These results have important implications for both theory and policy. On the theoretical front, the results are difficult to reconcile with fully rational decision-making, since the increases in remittances are an order of magnitude larger than the fee savings enjoyed by migrants. These results are consistent with a behavioral model of procrastination along the lines of O'Donoghue and Rabin (1999, 2006) and Duflo, Kremer, and Robinson (forthcoming). In such a framework, migrants would be modeled as stochastically present-biased and partially naïve, underestimating their likelihood of being tempted to spend accumulated earnings prior to remitting. Migrants take

into account the remittance fee, and plan to send at certain frequency after accumulating certain amount. But migrants are overoptimistic about amounts they can accumulate prior to remitting: sometimes they cannot resist temptation to spend accumulated funds prior to sending them home. Therefore, their chosen frequency is less frequent than optimal (if migrants recognized true likelihood of being tempted). The result is that total amount remitted is lower than if frequency was higher. Our experiment lowered remittance fees for some migrants randomly, leading migrants to increase the frequency of remittances. Remitting with higher frequency reduced the loss of yet-to-be-remitted funds due to temptation spending, resulting in higher total remittances.

On the policy front, our results suggest that reforms that reduce migrant remittance fees can have larger impacts on remittance flows than a purely rational model might suggest. Such reforms include increases in competition in money transmission markets or improvements in information for migrants on the relative costs of different money transmission services. Our results indicate that the benefit-cost ratio of interventions that reduce remittance fees (including direct subsidization) is very attractive. The $25 in additional remittances induced by a $1 fee reduction implies a 25:1 benefit cost ratio of a policy that spent $1 to provide that reduction in fees.[14] If one considered a policy of reducing fees charged by money transmitters via direct subsidization of transactions, it should be possible to induce money transmitters to provide such a discount with less than a $1 subsidy per transaction, because (by our estimate) they only lose $0.47 per $1 discount provided. In this case the benefit-cost ratio would be even more attractive.

Appendix: Study Protocols

[14] This assumes zero social weight on the funds migrants spend in the US instead of remitting and a social benefit of remittances in the destination country equal to their dollar value.

The subjects of the field experiment are immigrants in the greater Washington D.C. area. To be eligible for inclusion in the sample, immigrants had to have met the following conditions: 1) they had to be from El Salvador, 2) their first entry into the U.S. had to have been within the last 15 years, and 3) they had to have sent a remittance to someone in El Salvador within the last 12 months. Individuals were intercepted in a public place by our study team members and asked if they were interested in enrolling in the study. Nearly all migrants in the study were enrolled at one of two consulates of the government of El Salvador (in Washington DC proper and in Woodbridge, VA)[15] or on the premises of a Banagricola branch in D.C., Maryland, and Virginia.

Study team members were individuals of Salvadoran origin, and mostly female. Members of the survey team approached individuals in waiting area of the consulate and invited them to participate in the study. Individuals who were enrolled into the study could designate a time and location when the initial marketing visit would be conducted. Individuals enrolled at a Banagricola branch location usually chose to do have their marketing visit then and there in the branch. Individuals who were enrolled at the Salvadoran consulates typically chose to have their visits at their home, workplace, a particular Banagricola branch, or some other public area (such as a restaurant).

The migrant sample should comprise a reasonable cross-section of Salvadoran migrants in the Washington, D.C. area, and is likely to include both documented and undocumented migrants (although we collected no information on migrants' legal status). The consulate of El Salvador serves Salvadorans regardless of their legal status. The main services sought by study participants at the consulate were passport renewals, civil registration (of births, deaths, and marriages), and assistance with processing of Temporary Protected Status (a special provision allowing temporary legal work for Salvadorans and other nationalities who entered the U.S. after natural disasters or civil strife in the home country).

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[15] The El Salvador consulate was aware of our study and agreed to cooperate. At regular intervals, a consular staffer would announce to individuals seated in the waiting area that our project staff were present and ask for their participation.

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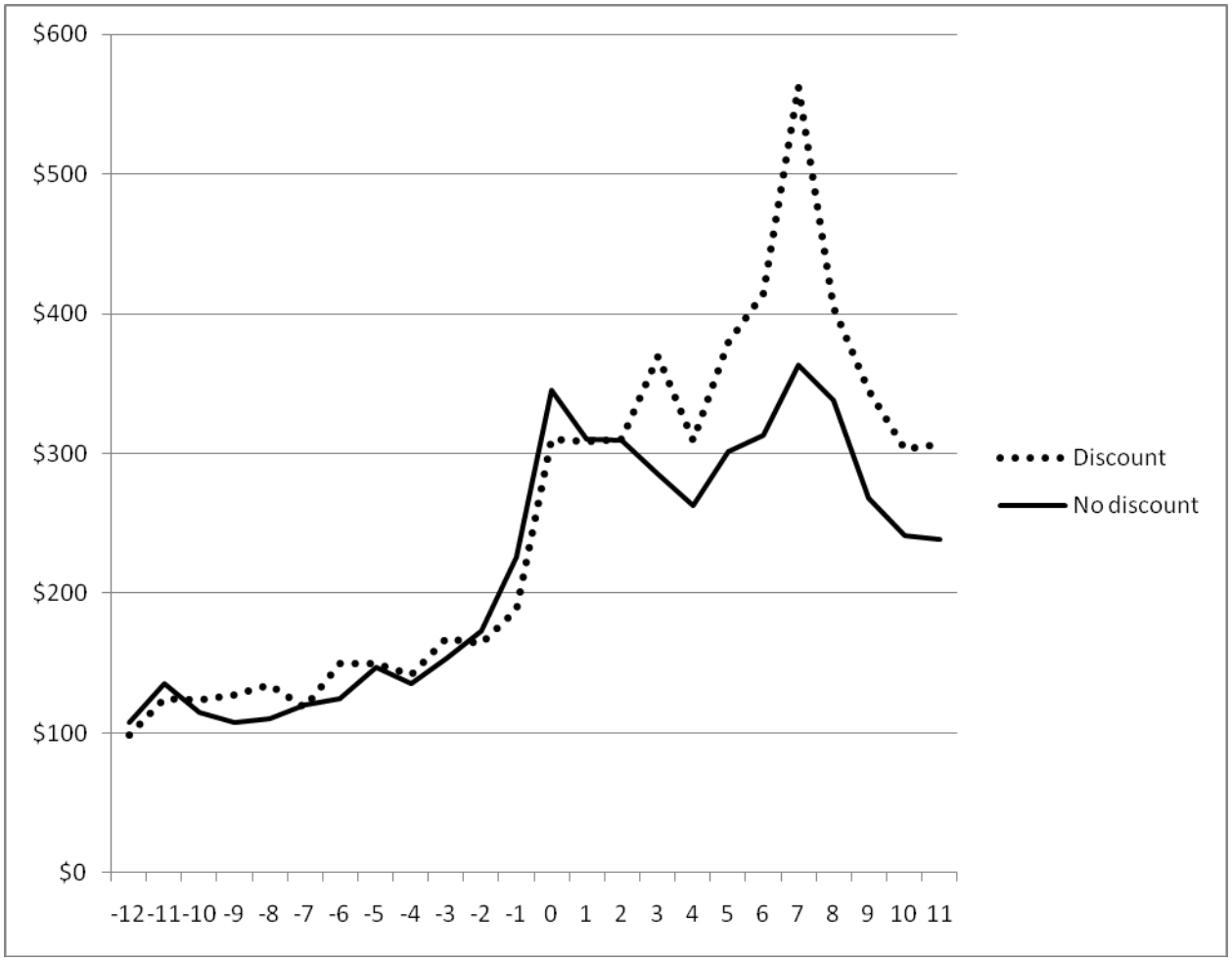
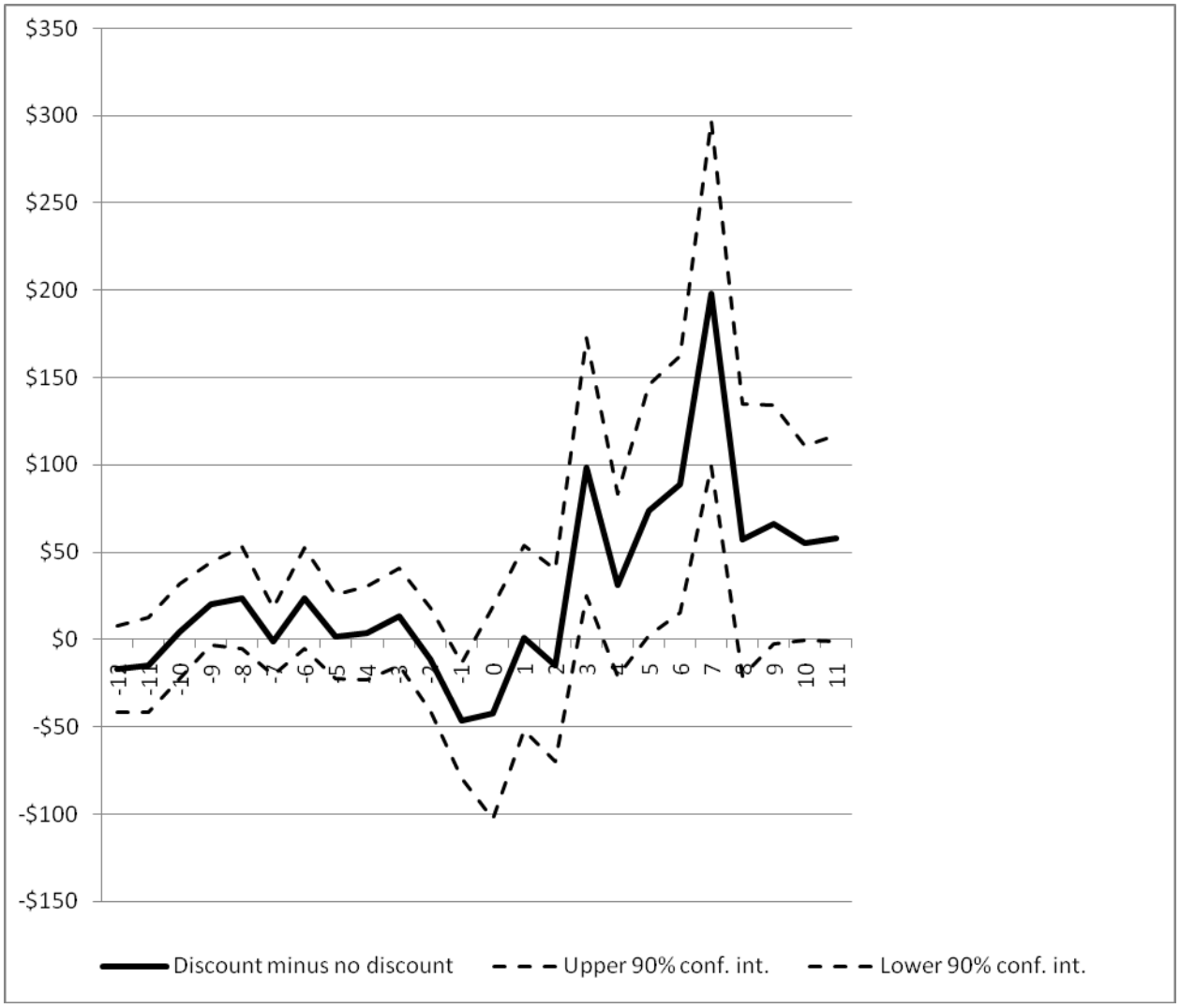
Figure 1: Remittances sent via partner money transmission institution, in months relative to treatment month



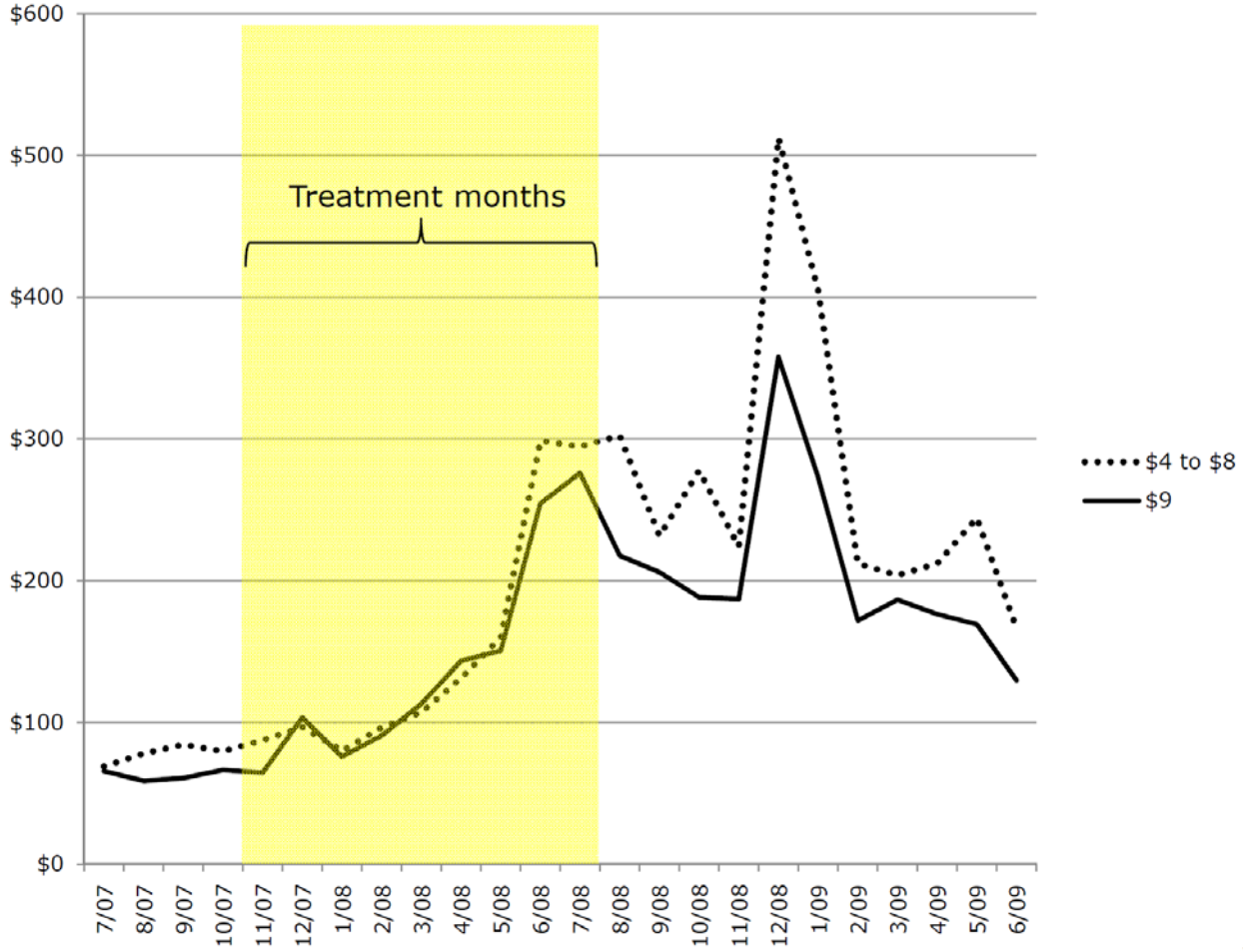
Notes: Treatment month is month 0, one month after treatment is month 1, one month before treatment is month -1, etc. Treatment months range from Nov 2007 to Jul 2008. Migrants in "No discount" group assigned remittance transaction fee of $9. Migrants in "Discount" group assigned remittance transaction fees ranging from $4 to $8, in dollar increments.

Figure 2: Difference in remittances sent via partner money transmission institution between "Discount" and "No discount" groups, in months relative to treatment month



Notes: Solid line is mean remittances in "Discount" group minus mean remittances in "No discount" group. Dashed lines are upper and lower bounds of 90% confidence interval. The data used to create the graph are the coefficient estimates and confidence intervals for the indicator for "Price<=$8" obtained from 24 regressions analogous to those in column 7 of Table 4 (including baseline controls and fixed effects), but where in each separate regression the dependent variable is taken to be total remittances sent in various months before or after treatment. See previous figure for other notes.

Figure 3: Remittances sent via partner money transmission institution, calendar months



Notes: Treatment months range from Nov 2007 to Jul 2008. 50% of Migrants in study have 50% probability of being assigned remittance transaction fee of $9, and 10% probability of being assigned to one of the lower price points, $4, $5, $6, $7, or $8.

Table 1: Summary statistics

	Mean	Std. Dev.	10th pct.	Median	90th pct.	Num. Obs.
Treatment and stratification variables						
Price	7.40	1.83	4	8	9	1,400
Price = 8 (indic.)	0.10	0.30				1,400
Price = 7 (indic.)	0.11	0.31				1,400
Price = 6 (indic.)	0.11	0.31				1,400
Price = 5 (indic.)	0.10	0.30				1,400
Price = 4 (indic.)	0.11	0.32				1,400
Price <= 8 (indic.)	0.53	0.50				1,400
Recipient is migrant's parent (indic.)	0.49	0.50				1,400
Recipient is migrant's child (indic.)	0.05	0.22				1,400
Recipient is migrant's spouse (indic.)	0.14	0.35				1,400
Recipient is migrant's other relative (indic.)	0.32	0.46				1,400
Migrant is female (indic.)	0.29	0.45				1,400
Migrant has US bank account (indic.)	0.66	0.47				1,400
Migrant has been in US 0-5 years (indic.)	0.51	0.50				1,400
Migrant has been in US 6-10 years (indic.)	0.35	0.48				1,400
Migrant has been in US 11-15 years (indic.)	0.14	0.35				1,400
Savings treatment 3 (indic.)	0.25	0.43				1,400
Savings treatment 2 (indic.)	0.26	0.44				1,400
Savings treatment 1 (indic.)	0.24	0.43				1,400
Savings treatment 0 (indic.)	0.25	0.44				1,400
Baseline use of partner institution						
Baseline customer (indic.)	0.37	0.48				1,400
Remittances / month (US$)	139.37	285.59	0.00	0.00	527.08	1,400
# remittance transactions / month	0.45	0.95	0.00	0.00	1.63	1,400
Funds sent per remittance transaction (US$)	392.28	380.25	123.72	282.31	785.71	521
Remittance fees paid per month (US$)	4.16	8.72	0.00	0.00	15.00	1,400
Post-treatment use of partner institution						
Post-treatment customer (indic.)	0.43	0.50				1,400
Remittances / month (US$)	335.99	639.82	0.00	0.00	1,176.67	1,400
# remittance transactions / month	1.20	2.30	0.00	0.00	4.11	1,400
Funds sent per remittance transaction (US$)	361.59	483.27	112.73	238.45	675.36	604
Remittance fees paid per month (US$)	8.42	16.73	0.00	0.00	28.33	1,400
Post-treatment use of partner institution (follow-up survey sample)						
Post-treatment customer (indic.)	0.44	0.50				847
Remittances / month (US$)	374.62	684.46	0.00	0.00	1,340.33	847
# remittance transactions / month	1.30	2.30	0.00	0.00	4.33	847
Funds sent per remittance transaction (US$)	368.25	511.83	114.24	245.11	675.36	376
Remittance fees paid per month (US$)	9.07	16.07	0.00	0.00	30.00	847
Post-treatment variables, reported in follow-up survey						
Remittances / month, partner institution (US$)	106.58	223.57	0.00	0.00	325.00	847
Remittances / month, other channels (US$)	183.82	515.75	0.00	75.00	433.33	847
Remittances / month, all channels (US$)	290.40	532.38	0.00	180.00	616.67	847
Savings, total (US$)	1,059.66	2,961.47	0.00	0.00	3,000.00	833
Savings in US (US$)	587.16	2,003.83	0.00	0.00	1,500.00	830
Savings in El Salvador (US$)	366.90	2,066.02	0.00	0.00	60.00	825
Savings in cash (US$)	111.64	663.49	0.00	0.00	0.00	830

Notes -- Baseline use of partner institution variables are over 12 months prior to treatment month. Post-treatment use of partner institution variables are over 3-11 months after treatment. Sample for funds sent per remittance transaction is conditioned on sending at least one remittance in reference period via the partner institution. Migrant follow-up survey administered in Mar - Jun 2009. "Baseline customer" and "post-treatment customer" are indicators for sending nonzero remittances via partner institution during respective reference period.

Table 2: Testing balance of baseline characteristics with respect to price
(Ordinary least-squares estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Sample:	Full							Migrants surveyed at follow-up (Mar - Jun 2009)						
Dependent variable:	Price	Price = 4 (indic.)	Price = 5 (indic.)	Price = 6 (indic.)	Price = 7 (indic.)	Price = 8 (indic.)	Price <= 8 (indic.)	Price	Price = 4 (indic.)	Price = 5 (indic.)	Price = 6 (indic.)	Price = 7 (indic.)	Price = 8 (indic.)	Price <= 8 (indic.)
Recipient is migrant's child	0.119	0.010	-0.036	-0.036	0.042	-0.003	-0.022	0.044	0.034	-0.001	-0.077	0.014	-0.011	-0.040
	(0.232)	(0.040)	(0.038)	(0.039)	(0.040)	(0.038)	(0.063)	(0.310)	(0.055)	(0.049)	(0.051)	(0.053)	(0.050)	(0.083)
Recipient is migrant's spouse	-0.222	0.018	0.011	0.014	0.010	0.025	0.078*	-0.036	-0.001	-0.015	0.032	-0.013	0.030	0.033
	(0.157)	(0.027)	(0.026)	(0.026)	(0.027)	(0.026)	(0.043)	(0.200)	(0.036)	(0.032)	(0.033)	(0.034)	(0.032)	(0.054)
Recipient is migrant's other relative	-0.123	0.005	0.019	0.015	-0.005	-0.014	0.020	-0.180	0.025	0.025	-0.015	0.007	-0.012	0.029
	(0.112)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.031)	(0.148)	(0.026)	(0.023)	(0.024)	(0.025)	(0.024)	(0.040)
Migrant is female	-0.177	0.007	0.023	0.016	-0.001	0.003	0.048	-0.087	-0.023	0.012	0.054**	-0.014	0.018	0.047
	(0.111)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.030)	(0.146)	(0.026)	(0.023)	(0.024)	(0.025)	(0.023)	(0.039)
Migrant has US bank account	0.104	-0.009	0.014	-0.037**	-0.012	0.023	-0.022	0.101	-0.014	0.004	-0.018	-0.011	0.028	-0.011
	(0.111)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.030)	(0.146)	(0.026)	(0.023)	(0.024)	(0.025)	(0.024)	(0.039)
Migrant has been in US 6-10 years	-0.189*	0.007	0.015	0.022	0.020	-0.011	0.052*	-0.102	0.017	-0.014	0.020	0.005	0.006	0.033
	(0.112)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.031)	(0.148)	(0.026)	(0.023)	(0.024)	(0.025)	(0.024)	(0.040)
Migrant has been in US 11-15 years	0.014	-0.016	-0.012	0.047*	-0.003	-0.022	-0.006	0.024	-0.004	-0.023	0.041	0.001	-0.036	-0.021
	(0.154)	(0.027)	(0.025)	(0.026)	(0.027)	(0.025)	(0.042)	(0.196)	(0.035)	(0.031)	(0.032)	(0.033)	(0.031)	(0.053)
Indicator: migrant sent remittances over 12 months pre-treatment	0.205	-0.010	-0.025	-0.037	0.028	0.000	-0.044	0.150	0.019	-0.038	-0.049	0.033	-0.015	-0.049
	(0.136)	(0.024)	(0.022)	(0.023)	(0.023)	(0.022)	(0.037)	(0.186)	(0.033)	(0.029)	(0.031)	(0.032)	(0.030)	(0.050)
Remittances sent / month ($) over 12 months pre-treatment	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
# remittance transactions / month over 12 months pre-treatment	-0.128	0.003	0.034**	0.010	-0.030*	0.009	0.025	-0.135	0.003	0.034*	0.016	-0.045**	0.029	0.036
	(0.093)	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)	(0.025)	(0.127)	(0.023)	(0.020)	(0.021)	(0.022)	(0.020)	(0.034)
Constant	7.465***	0.118***	0.076***	0.114***	0.101***	0.093***	0.503***	7.382***	0.127***	0.093***	0.101***	0.115***	0.078***	0.514***
	(0.110)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)	(0.030)	(0.149)	(0.027)	(0.024)	(0.024)	(0.025)	(0.024)	(0.040)
Observations	1400	1400	1400	1400	1400	1400	1400	847	847	847	847	847	847	847
R-squared	0.009	0.002	0.007	0.008	0.006	0.003	0.008	0.005	0.005	0.008	0.015	0.007	0.009	0.006
P-val. of F-test: joint signif. of RHS vars.	0.273	0.970	0.417	0.344	0.537	0.919	0.368	0.935	0.944	0.778	0.263	0.833	0.673	0.875

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes -- Dependent variable in cols. 1 and 8 is linear price. Dependent variables are indicators in all other columns. Price was assigned randomly in dollar increments between $4 and $9 inclusive after stratification into cells for unique combinations of the following variables: gender (male/female), having a US bank account (yes/no), relationship to remittance recipient (parent/child/spouse/other), and years in US category (0-5 years/6-10 years/11-15 years). Pre-treatment remittances are as recorded by partner institution 12 months prior to treatment. Treatment months are Nov 2007 through Jul 2008 inclusive. Omitted recipient relationship category is "parent". Omitted years in US category is "0-5 years".

Table 3: Impact of randomized price on use of partner institution and on mean price paid at partner institution
(Ordinary least-squares estimates)

Dependent variable:	Post-treatment customer (indicator for sending non-zero remittances)						Mean price paid per remittance transaction at partner institution					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Price	0.002	-0.005					0.907***	0.897***				
	(0.007)	(0.005)					(0.035)	(0.037)				
Price = 8 (indicator)			0.042	0.044					-0.776***	-0.756***		
			(0.046)	(0.034)					(0.218)	(0.223)		
Price = 7 (indicator)			0.045	0.024					-1.556***	-1.488***		
			(0.044)	(0.032)					(0.208)	(0.213)		
Price = 6 (indicator)			-0.021	0.016					-2.547***	-2.522***		
			(0.045)	(0.033)					(0.225)	(0.238)		
Price = 5 (indicator)			-0.030	-0.034					-3.569***	-3.464***		
			(0.046)	(0.034)					(0.233)	(0.243)		
Price = 4 (indicator)			0.014	0.063*					-4.642***	-4.622***		
			(0.044)	(0.032)					(0.213)	(0.217)		
Price <= 8 (indicator)					0.010	0.024					-2.588***	-2.533***
					(0.027)	(0.019)					(0.154)	(0.161)
Savings treatment 3		0.018		0.016		0.017		-0.188		-0.172		-0.243
		(0.028)		(0.028)		(0.028)		(0.184)		(0.184)		(0.221)
Savings treatment 2		-0.018		-0.019		-0.018		-0.208		-0.181		-0.258
		(0.027)		(0.027)		(0.027)		(0.186)		(0.187)		(0.224)
Savings treatment 1		-0.011		-0.011		-0.011		-0.156		-0.150		-0.240
		(0.028)		(0.028)		(0.028)		(0.187)		(0.188)		(0.225)
Baseline customer of partner institution		0.581***		0.579***		0.581***		0.211		0.219		0.274
		(0.028)		(0.028)		(0.028)		(0.188)		(0.188)		(0.226)
Remittances sent / month ($) over 12 months pre-treatment		0.000		0.000		0.000		0.001**		0.001*		0.001**
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
# remittance transactions / month over 12 months pre-treatment		0.044**		0.046**		0.044**		-0.113		-0.114		-0.152
		(0.019)		(0.019)		(0.019)		(0.088)		(0.088)		(0.106)
Constant	0.419***	-0.018	0.426***	-0.078	0.426***	-0.066	0.610**	-0.393	8.715***	7.500***	8.715***	8.012***
	(0.055)	(0.154)	(0.019)	(0.149)	(0.019)	(0.149)	(0.271)	(1.260)	(0.094)	(1.239)	(0.112)	(1.485)
Marketer fixed effects		Y		Y		Y		Y		Y		Y
Treatment month fixed effects		Y		Y		Y		Y		Y		Y
Stratification cell fixed effects		Y		Y		Y		Y		Y		Y
Observations	1,400	1,400	1,400	1,400	1,400	1,400	604	604	604	604	604	604
R-squared	0.000	0.507	0.002	0.509	0.000	0.507	0.521	0.579	0.523	0.582	0.321	0.393

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes -- Dependent variable is recorded during 9-month period 3-11 months after treatment. Marketer fixed effects are for the specific individual (out of 9) who conducted the marketing visit. Fixed effects for stratification cell are for each of 48 unique combinations of stratification variables: gender (male/female), having a US bank account (yes/no), relationship to remittance recipient (parent/child/spouse/other), and years in US category (0-5 years/6-10 years/11-15 years). Treatment months are Nov 2007 through Jul 2008 inclusive.

Table 4: Impact of price on remittances sent to El Salvador via partner institution
(Ordinary least-squares estimates)

Dependent variable: Remittance funds sent per month via partner institution (US$)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Price	-21.943**	-24.669***	-25.092***				
	(9.342)	(6.965)	(7.036)				
Price = 8 (indicator)				75.482	51.038		
				(59.601)	(44.664)		
Price = 7 (indicator)				119.486**	82.131*		
				(57.002)	(42.643)		
Price = 6 (indicator)				13.551	22.964		
				(58.084)	(44.039)		
Price = 5 (indicator)				108.029*	86.278*		
				(59.601)	(44.832)		
Price = 4 (indicator)				116.812**	153.435***		
				(56.707)	(42.512)		
Price <= 8 (indicator)						87.227**	80.762***
						(34.183)	(25.772)
Recipient is migrant's child		138.445**					
		(60.322)					
Recipient is migrant's spouse		190.322***					
		(40.839)					
Recipient is migrant's other relative		6.525					
		(29.159)					
Migrant is female		43.976					
		(28.801)					
Migrant has US bank account		26.463					
		(28.722)					
Migrant has been in US 6-10 years		-47.870					
		(29.176)					
Migrant has been in US 11-15 years		-41.382					
		(40.039)					
Savings treatment 3		52.127	79.729**		80.016**		79.909**
		(35.815)	(36.372)		(36.442)		(36.416)
Savings treatment 2		66.961*	88.848**		86.159**		88.858**
		(35.500)	(36.076)		(36.140)		(36.116)
Savings treatment 1		37.095	50.879		52.645		50.496
		(36.093)	(36.504)		(36.565)		(36.552)
Baseline customer		236.189***	220.003***		216.768***		218.262***
of partner institution		(35.288)	(37.277)		(37.343)		(37.303)
Remittances sent / month ($)		0.724***	0.757***		0.757***		0.755***
over 1-12 months pre-treatment		(0.082)	(0.083)		(0.083)		(0.083)
# remittance transactions / month		134.925***	120.835***		122.799***		121.927***
over 1-12 months pre-treatment		(24.184)	(24.748)		(24.811)		(24.767)
Constant	498.470***	186.472***	-29.280	290.014***	-270.498	290.014***	-249.063
	(71.249)	(63.554)	(202.858)	(24.828)	(196.804)	(24.818)	(196.731)
Marketer fixed effects			Y		Y		Y
Treatment month fixed effects			Y		Y		Y
Stratification cell fixed effects			Y		Y		Y
Observations	1,400	1,400	1,400	1,400	1,400	1,400	1,400
R-squared	0.004	0.458	0.484	0.007	0.486	0.005	0.483

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes -- Dependent variable is average remittances sent per month through partner bank during 9-month period 3-11 months after treatment. Marketer fixed effects are for the specific individual (out of 9) who conducted the marketing visit. Omitted recipient relationship category is "parent". Omitted years in US category is "0-5 years". Fixed effects for stratification cell are for each of 48 unique combinations of stratification variables: gender (male/female), having a US bank account (yes/no), relationship to remittance recipient (parent/child/spouse/other), and years in US category (0-5 years/6-10 years/11-15 years). Treatment months are Nov 2007 through Jul 2008 inclusive.

Table 5: Impact of price on remittances sent to El Salvador (migrant follow-up survey sample)
(Ordinary least-squares estimates, including full set of controls and fixed effects)

	(1)	(2)	(3)	(4)
Dependent variable: Average monthly remittances sent since July 2008 (US$)…				
	… via partner institution (administrative data)	… via partner institution (as reported by migrant in follow up survey)	… via other channels (as reported by migrant in follow up survey)	… via all channels (as reported by migrant in follow up survey)
Panel A: Linear effect of price				
Price	-23.646***	-8.007**	3.939	-4.068
	(8.650)	(3.683)	(9.854)	(10.215)
R-squared	0.539	0.322	0.087	0.079
Panel B: Indicators for each price point				
Price = 8 (indicator)	63.499	39.404*	106.071*	145.475**
	(55.976)	(23.783)	(63.732)	(65.916)
Price = 7 (indicator)	147.896***	30.217	13.767	43.983
	(52.960)	(22.502)	(60.298)	(62.365)
Price = 6 (indicator)	59.088	52.063**	85.808	137.871**
	(55.033)	(23.382)	(62.658)	(64.805)
Price = 5 (indicator)	70.620	-7.900	-18.783	-26.683
	(56.701)	(24.091)	(64.557)	(66.770)
Price = 4 (indicator)	128.385**	55.219**	-35.259	19.960
	(50.891)	(21.623)	(57.943)	(59.928)
R-squared	0.542	0.328	0.094	0.090
Panel C: Threshold effect at $8				
Price <= 8 (indicator)	97.801***	35.306***	27.174	62.480*
	(31.969)	(13.609)	(36.451)	(37.736)
R-squared	0.540	0.323	0.088	0.082
Observations (same for all panels)	847	847	847	847

* significant at 10%; ** significant at 5%; *** significant at 1%
Notes -- Sample in all regressions restricted to migrants included in follow-up survey. Reference periods for dependent variables are as follows: Jul 2008 - Jun 2009 for administrative data on remittances sent via partner institution (col. 1); from Jul 2008 to month of survey for remittances reported by migrant in follow-up survey (cols. 2-4). Follow-up survey administered between Mar and Jun 2009. For each dependent variable, coefficients from 3 separate regressions are reported (in Panels A, B, and C). All regressions include marketer fixed effects, treatment month fixed effects, stratification cell fixed effects, indicator variables for savings treatments 1, 2, and 3, and the following controls for remittances sent via partner institution in 1-12 months prior to treatment: 1) indicator for being a customer at baseline (sending any remittances); 2) average amount sent per month; and 3) average number of transactions per month. See previous tables for other notes.

Table 6: Impact of price on frequency, dollars per transaction, and fees for remittances sent via partner institution
(Ordinary least-squares estimates, including full set of controls and fixed effects)

	(1)	(2)	(3)
Dependent variable:	Number of remittance transactions per month	Funds sent per remittance transaction (US$)	Fees paid to partner institution per month (US$)
Panel A: Linear effect of price			
Price	-0.110***	3.995	0.474***
	(0.022)	(11.156)	(0.164)
R-squared	0.605	0.132	0.589
Panel B: Indicators for each price point			
Price = 8 (indicator)	0.171	44.850	0.625
	(0.141)	(67.678)	(1.043)
Price = 7 (indicator)	0.266**	78.450	0.018
	(0.134)	(64.722)	(0.996)
Price = 6 (indicator)	0.085	68.029	-2.163**
	(0.139)	(72.466)	(1.028)
Price = 5 (indicator)	0.291**	-15.205	-2.718***
	(0.141)	(73.762)	(1.047)
Price = 4 (indicator)	0.734***	-50.579	-1.541
	(0.134)	(65.988)	(0.992)
R-squared	0.607	0.138	0.590
Panel C: Threshold effect at $8			
Price <= 8 (indicator)	0.318***	26.102	-1.132*
	(0.081)	(40.696)	(0.602)
R-squared	0.602	0.132	0.587
Observations (same for all panels)	1400	604	1400

* significant at 10%; ** significant at 5%; *** significant at 1%
Notes -- Reference period for dependent variables is 3-11 months post-treatment. All dependent variables calculated from administrative data of partner instititution. Regression for dollars sent per remittance transaction (col. 2) only includes observations with at least one transaction at partner institution. For each dependent variable, coefficients from 3 separate regressions are reported (in Panels A, B, and C). All regressions include marketer fixed effects, treatment month fixed effects, stratification cell fixed effects, indicator variables for savings treatments 1, 2, and 3, and the following controls for remittances sent via partner institution in 1-12 months prior to treatment: 1) indicator for being a customer at baseline (sending any remittances); 2) average amount sent per month; and 3) average number of transactions per month. See previous tables for other notes.

Table 7: Impact of price on migrant savings (migrant follow-up survey sample)
(Ordinary least-squares estimates, including full set of controls and fixed effects)

	(1)	(2)	(3)	(4)
Dependent variable: Savings reported in follow-up survey (US$)…	… in total	… in U.S.	… in El Salvador	… in cash
Panel A: Linear effect of price				
Price	-36.946	0.121	-55.213	16.240
	(57.381)	(38.741)	(40.599)	(12.963)
R-squared	0.079	0.086	0.061	0.067
Panel B: Indicators for each price point				
Price = 8 (indicator)	462.375	206.729	37.359	215.022**
	(372.690)	(251.137)	(263.462)	(83.810)
Price = 7 (indicator)	119.476	-130.589	214.368	48.898
	(350.322)	(236.009)	(248.782)	(78.761)
Price = 6 (indicator)	-131.558	-64.518	40.873	-76.310
	(364.510)	(247.158)	(260.458)	(82.482)
Price = 5 (indicator)	-199.307	-361.705	150.151	6.471
	(378.246)	(255.927)	(268.472)	(85.408)
Price = 4 (indicator)	498.768	250.482	336.495	-85.145
	(336.983)	(227.077)	(238.966)	(75.781)
R-squared	0.084	0.093	0.062	0.078
Panel C: Threshold effect at $8				
Price <= 8 (indicator)	171.306	-4.129	167.555	17.252
	(212.398)	(143.412)	(150.309)	(48.034)
R-squared	0.080	0.086	0.061	0.065
Observations (same for all panels)	833	830	825	830

* significant at 10%; ** significant at 5%; *** significant at 1%
Notes -- Follow-up survey administered between Mar and Jun 2009. For each dependent variable, coefficients from 3 separate regressions are reported (in Panels A, B, and C). All regressions include marketer fixed effects, treatment month fixed effects, stratification cell fixed effects, indicator variables for savings treatments 1, 2, and 3, and the following controls for remittances sent via partner institution in 1-12 months prior to treatment: 1) indicator for being a customer at baseline (sending any remittances); 2) average amount sent per month; and 3) average number of transactions per month. See previous tables for other notes.

Appendix Table 1: Impact of price on attrition from follow-up survey
(Ordinary least-squares estimates)

Dependent variable: Indicator for attrition from follow-up survey sample

	(1)	(2)	(3)	(4)	(5)	(6)
Price	0.009	0.010				
	(0.007)	(0.007)				
Price = 8 (indicator)			-0.012	-0.017		
			(0.046)	(0.046)		
Price = 7 (indicator)			-0.021	-0.023		
			(0.044)	(0.044)		
Price = 6 (indicator)			-0.009	-0.019		
			(0.044)	(0.045)		
Price = 5 (indicator)			0.009	0.009		
			(0.046)	(0.046)		
Price = 4 (indicator)			-0.083*	-0.088**		
			(0.043)	(0.044)		
Price <= 8 (indicator)					-0.024	-0.029
					(0.026)	(0.027)
Savings treatment 3		-0.027		-0.027		-0.027
		(0.037)		(0.038)		(0.038)
Savings treatment 2		-0.080**		-0.079**		-0.080**
		(0.037)		(0.037)		(0.037)
Savings treatment 1		-0.016		-0.017		-0.016
		(0.038)		(0.038)		(0.038)
Baseline customer		0.038		0.040		0.039
of partner institution		(0.038)		(0.039)		(0.038)
Remittances sent / month ($)		-0.000**		-0.000*		-0.000*
over 12 months pre-treatment		(0.000)		(0.000)		(0.000)
# remittance transactions / month		0.029		0.027		0.028
over 12 months pre-treatment		(0.026)		(0.026)		(0.026)
Constant	0.326***	0.560***	0.408***	0.664***	0.408***	0.648***
	(0.055)	(0.209)	(0.019)	(0.203)	(0.019)	(0.203)
Marketer fixed effects		Y		Y		Y
Treatment month fixed effects		Y		Y		Y
Stratification cell fixed effects		Y		Y		Y
Observations	1,400	1,400	1,400	1,400	1,400	1,400
R-squared	0.001	0.062	0.003	0.063	0.001	0.061

* significant at 10%; ** significant at 5%; *** significant at 1%
Notes -- Mean of dependent variable is 0.395 (553 out of 1,400 migrants did not participate in follow-up survey.) Follow-up survey administered from Mar - Jun 2009. Marketer fixed effects are for the specific individual (out of 9) who conducted the marketing visit. Fixed effects for stratification cell are for each of 48 unique combinations of stratification variables: gender (male/female), having a US bank account (yes/no), relationship to remittance recipient (parent/child/spouse/other), and years in US category (0-5 years/6-10 years/11-15 years). Treatment months are Nov 2007 through Jul 2008 inclusive. See previous tables for other notes.

Appendix Table 2: Means of treatment and baseline variables by subsample

	Subsample		
	Migrants completing follow-up survey	All other observations	P-value: test of equality of means
Stratification variables			
Recipient is migrant's parent (indic.)	0.48	0.52	0.154
Recipient is migrant's child (indic.)	0.05	0.05	0.700
Recipient is migrant's spouse (indic.)	0.15	0.12	0.040
Recipient is migrant's other relative (indic.)	0.32	0.31	0.852
Migrant is female (indic.)	0.29	0.29	0.752
Migrant has US bank account (indic.)	0.68	0.64	0.084
Migrant has been in US 0-5 years (indic.)	0.49	0.54	0.070
Migrant has been in US 6-10 years (indic.)	0.36	0.35	0.669
Migrant has been in US 11-15 years (indic.)	0.15	0.12	0.050
Baseline use of partner institution			
Baseline customer (indic.)	0.36	0.39	0.298
Remittances sent / month (US$)	144.91	130.90	0.370
# remittance transactions / month	0.45	0.45	0.917
Funds sent per remittance transaction (US$)	406.08	372.64	0.324
Remittance fees paid per month (US$)	4.16	4.17	0.972

Notes -- Table presents means of key variables for each subsample prior to treatment. Follow-up survey fielded in Mar - Jun 2009. P-value is for F-test of equality of means across treatment groups. See Table 1 for other notes. Follow-up sample N=847, and all other observations sample N=553.