Remittances and Banking Services: Evidence from Mexico*

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Abstract

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JEL classification: F37, G21, 016
Keywords: remittances, financial development, banking sector depth and breadth

* The views expressed in this paper are those of the authors and do not represent the opinions of The World Bank Group, its Executive Directors or the countries they represent. We thank Soledad López and Florencia Moizeszowicz for excellent research assistance. Corresponding author: Maria Soledad Martinez Peria, Finance Research Group, World Bank, 1818 H St., N.W., MSN MC 3-300, Washington D.C. 20433. E-mail: mmartinezperia@worldbank.org

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Abstract

Despite the rising volume of remittances flowing to developing countries, their impact on the development of banking services in recipient countries has been largely unexplored. We examine this topic using county-level data for Mexico on the fraction of households that receive remittances and measures of both banking breadth (e.g., branches or accounts per capita) and depth (e.g., deposits or credit to GDP). We find that remittances are strongly associated with greater financial depth and breadth. The effects are significant both statistically and economically, even after conducting a number of robustness tests and addressing the potential endogeneity of remittances.

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Remittances and Banking Services: Evidence from Mexico

Migrants working outside their country of birth returned more than US$167 billion to family members in their countries of origin in 2005 (World Bank, 2006). Recent research suggests these remittances have important implications for the economies of remittance-recipient countries. Numerous studies analyze their impact on poverty, inequality, growth, education, infant mortality, and entrepreneurship.[1] However, surprisingly little attention has been paid to the question of whether remittances affect the financial sector in recipient countries. This issue is important because financial systems perform a number of key economic functions and their development has been shown to foster growth and reduce poverty (for example, see King and Levine, 1993; Beck, Levine and Loayza, 2000a,b; and Beck, Demirgüç-Kunt, and Levine, 2007). Burgess and Pande (2005) show that the expansion of banking services in particular can have a very large impact on poverty levels and growth. The link between remittances and banking services is important because some argue that intermediating remittances through the banking sector can multiply the developmental impact of remittance flows (Hinojosa-Ojeda, 2003; Terry and Wilson, 2005, and World Bank, 2006).

This paper analyzes the impact of remittances on the breadth and depth of the banking sector. There are several reasons to believe that remittances might lead to the opening of new commercial bank branches and to a greater use of financial services by its population. First, fixed costs to send remittances make the flows lumpy, providing households with excess cash for some period of time. Banks offer households a safe place to store this temporary excess cash. Second,

[1] For a review of the literature, see López Córdova and Olmedo, 2006. For the case of Mexico, Amuedo-Dorantes and Pozo (2005) consider the impact on healthcare expenditures; Esquivel and Huerta-Pineda (2005) look at the impact on poverty; Hanson (2007) looks at labor force participation; Hanson and Woodruff (2003) analyze the impact on schooling; Hildebrandt and McKenzie (2005) and Kanaiupuni and Donato (1999) consider infant mortality; López Córdova (2005) analyzes the impact of remittances on schooling, infant mortality and poverty; Woodruff and Zenteno (2006) and Woodruff (2007) look at entrepreneurship.

transactions fees for processing remittances can be an important source of income for commercial banks in remittance-receiving countries. The potential to collect such fees might induce banks to locate close to remittance recipients. Third, a substantial portion of remittances flows to households which are unbanked prior to sending migrants abroad—households in the middle and lower parts of the income distribution.[2] Banks acting as remittance payment agents fees associated with remittance transactions and, beyond that, are well positioned to offer other services to unbanked households receiving remittances. Finally, processing remittance flows provides banks with information on the income of recipient households. This information may make banks better able to extend loans to otherwise opaque borrowers.

Mexico makes an interesting case study because the country is among the top recipients of remittances worldwide, with more than $23 billion in flows in 2006. Remittances also flow disproportionately to rural and semi-urban areas in Mexico, which have been traditionally unbanked. Rural households are more than three times as likely to receive remittances: 12.3 percent versus 3.6 percent of households in larger communities. Furthermore, remittance flows are geographically concentrated within the Mexican territory. Of the 1.4 million Mexican households receiving remittances in 2004, almost half (680 thousand) are located in the Central Western states of Aguascalientes, Colima, Guanajuato, Jalisco, Michoacán, Nayarit, San Luis Potosí, and Zacatecas. In those states, 13% of all households received remittances, more than twice the national average.[3] The geographical concentration is important for identifying the impact of remittances on banking services. Also, while most remittances are channeled through

[2] Docquier and Marfouk (2005) provide detail on the educational attainment of migrants by country of origin and destination region. Worldwide, slightly more than a third of migrants counted by receiving country censuses in 2000 (36.4 percent) had 8 or fewer years of schooling, and 29 percent had 9 to 12 years of schooling. Comparable global data on the characteristics of recipient households is not available. In Mexico, however, data from the 2000 population census indicate that the average schooling of adults receiving remittances is 5.2 years, compared with 7.6 years among adults not receiving remittances.

[3] Calculations based on *Encuesta Nacional Ingreso-Gasto de los Hogares*, 2004. We are indebted to Pavel Luengas at the IADB for help in processing this information.

money transfer companies such as Western Union or Moneygram, Orozco (2004) reports that 55 percent of remittance collection points in Mexico are commercial bank branches.[4] This implies that banks are well-positioned to offer other financial services to individuals that visit banks to collect remittances. Finally, while remittance transaction costs have declined as the flow of remittances has increased, fees remain at least 3-5 percent of transfers (IMF, 2005)[5]. Even three percent of a $23 billion remittance flow implies potential earnings of $700 million per year for firms that participate in the remittance market. Thus, fees provide a substantial incentive to develop a financial services network which allows banks to capture a larger share of the market.

To study the impact of remittances on the breadth and depth of the banking sector, we use data on the location of every branch of a registered commercial bank in Mexico as of 2000, as well as data on the number of accounts, and the peso value of deposits and loans at each branch. We explore the connection between remittances and the number of branches and deposit accounts (both of which are measures of outreach or breadth) and the volume of deposits and credit to GDP (both traditional indicators of depth). If remittances lead to commercial bank entry, we expect this to show up most strongly in the number of branches and accounts and in the volume of deposits. However, the lumpy nature of remittance flows means that, properly intermediated, remittances provide a potential source of loanable funds even if they fund only current consumption by recipient households. We are therefore interested in knowing whether remittances are associated with increased lending by the banking system to households. Among households with migrants abroad, remittances might substitute for credit, decreasing demand for loans. Alternatively, remittances may increase the willingness of lenders to supply loans by

[4] Electronic transfers accounted for almost 93 percent of all remittance transactions in 2006, up from 51 percent in 1995.

[5] http://www.imf.org/external/pubs/ft/fandd/2005/12/basics.htm. Beck, Demirguc-Kunt and Martinez Peria (2007) suggests these fees are much higher, with an average of 6%.

providing a stream of income from which loans can be repaid. Regardless, households in high-remittance communities who do not receive remittances themselves may have access to additional credit if the liquidity generated by the remittances is intermediated within the recipient communities.

Of course, while remittances may lead to an expansion of financial markets, the causation may also go in the opposite direction. Better access to financial institutions in Mexico may lower the cost of sending remittances, leading to larger and more frequent flows. Or, remittances and banking sector breadth and depth might both be driven by a third factor. We are interested in showing a causal link *from* remittances *to* financial development. We discuss the issue of endogeneity in Section 4, showing first that in the leanest regression specification, endogeneity exerts a downward bias. In a more expansive specification, we instrument for remittances using the placement of rail lines before the first wave of migration during the early 1900s, following López Córdova (2005) and Woodruff and Zenteno (2006).

We find that remittances have produced a broader and deeper banking sector in Mexico. Our most conservative estimate suggests that a one standard deviation change in the percentage of households receiving remittances is associated with one additional bank branch for each 100,000 people (against a mean of 1.79), an increase of 31 accounts per one thousand residents (against a mean of 42 accounts), and an increase of 3.4 percentage points in the deposit/GDP ratio (against a mean of 4.2). The results on credit granted by banks are less robust, though we find that credit is also positively associated with remittance flows in regressions which control for GDP per capita.

We are aware of only one existing study that investigates the causal relationship between remittances and financial development. Using aggregate cross-country data, Aggarwal,

Demirgüç-Kunt and Martinez Peria (2006) find evidence that remittances are associated with financial sector development across a broad set of countries. They use measures of financial development similar to those we use here, such as bank deposits and credit to GDP, and balance-of-payments based estimates of remittance flows. They address potential endogeneity by instrumenting for remittance flows using lagged values and economic conditions in the recipient countries.[6] However, several concerns stemming from the study's limitations bear mention. The study only captures remittances reported in the balance of payments statistics, which often neglect remittances received through means other than banks and are, therefore, measured with error. In addition, the study only examines the impact of remittances on banking depth, but ignores the implications for outreach. Finally, the cross-country framework employed cannot adequately deal with omitted variables, measurement errors and heterogeneity of effects across countries, as our data allow us to do.

The reminder of the paper is organized as follows. Section 2 motivates our empirical specifications with a discussion of the factors affecting the profitability of bank branches and the use of banking services. The data are described in Section 3, the result presented in Section 4, and concluding remarks offered in Section 5.

2. Factors affecting the location of bank branches and the use of banking services

In this section we sketch out a brief model of bank location and demand for financial services to analyze the role that remittances play in determining the location of bank branches

[6]Giuliano and Ruiz-Arranz (2006) also shows a positive correlation between the level of remittance flows and measures of bank deposits, but much weaker correlations between remittances flows and bank credit. Orozco and Fedewa (2005) show that households receiving remittances in five Latin American countries are more likely than non-recipient households to have bank accounts. The differences are large in Guatemala, El Salvador, Ecuador and Honduras, but much smaller in Mexico, where 19% of remittance-receiving households have accounts compared with 16% of non-recipient households. Neither study makes any claim about the causality of the associations they report.

and the use of banking services. We use the model only to fix ideas and motivate our empirical specifications using data for Mexico.

All of the branches in our data correspond to privately-owned banks. We therefore begin with the assumption that banks exhibit profit maximizing behavior, opening a branch in a given location only when the bank expects that branch to be profitable. Beginning from this supposition, we examine the factors which affect the demand for and use of financial services by households and household enterprises. We focus on households and small scale enterprises, rather than larger enterprises, because the latter conduct banking transactions in Mexico City and in a handful of other large cities. Households and small enterprises are likely to be the determining factor in the placement of branches in smaller counties.

The expected profitability of a given branch, and hence the decision to open it, depends on the expected costs of and revenues from operating the branch. Some of the bank's cost to open a branch will be one-time fixed costs. However, for notational simplicity, we express these costs as an annual carrying cost—that is, as an annual flow which would leave the bank equally well off. We denote the sum of the up front and annual fixed operating costs as C_B. Banks also pay a variable administrative cost per client, which we denote as c. Finally, banks pay interest on money deposited by account holders at a rate of r_d. Though theoretically r_d could depend on local conditions, in practice banks appear to pay the same interest rate at all branches. We therefore fix r_d at the national level.

The revenues of the branch come from investing the money deposited by clients and from fees charged for services. Banks can lend funds deposited in a branch to local clients, or transfer the funds to headquarters to be invested. The latter sets a floor on the returns from investing deposits. We assume the former is more profitable when the demand for credit is sufficient under

the terms required by the bank. Denoting the return on invested funds r_L and the share of deposits which are loaned out locally as L, we refer to the earnings rate on deposits as bank's average earnings on money deposited as $r_L(L)$, with $r_L'>0$. Note that some part of deposits is held as cash for transactions purposes, some part is loaned to clients of this or other branches, and some part is invested by headquarters in other assets. $r_L(L)$ represents a weighted average return on deposits used for all of these purposes.[7]

On deposits, net earnings depend on the interest rate spread—the difference between the rate earned on investments $r_L(L)$ and the rate paid on deposits r_d —and the total level of deposits. We denote total deposits as $N\overline{D_i}$ **,** where N represents the expected steady-state number of clients and $\overline{D_i}$ the expected steady-state average deposit per client. Banks also earn income from fees. We denote two types of fees—account fees f_a and transaction fees f_r. The account fees depend on the number of accounts opened and the transaction fees on the number of transactions, R. We assume that individuals can process remittances without opening an account, as in fact, many households in Mexico do.

Taking all of these elements together, the bank's expected profit from a prospective branch is then:

$$E(\pi) = \mathbf{[}(r_L(L) - r_d)\, N\overline{D_i} + f_a N + f_r R\mathbf{]} - \mathbf{[}C_b + cN\mathbf{]} \qquad (1)$$

The terms in the first set of brackets represent the bank's expected revenue. Those in the second set of brackets represent the expected cost of operating the branch. Revenues are increasing in the number of accounts, the average balance held in each account, the number of fee transactions, and the interest rate spread. The first three of these depend on factors which are

[7] We assume that the marginal branch is small relative to the total bank operation. That is, r_L is not affected by the decision to open the marginal branch.

specific to a given location. The spread has a floor level which is determined by national conditions, but local demand for credit may raise profitability at a given branch above this level. Costs depend on the fixed cost of operating in a given location.

The number of accounts is a function of the number of households near the prospective branch and the percentage of those households which choose to open an account. In the regressions discussed below, we control for the number of households near the branch by measuring the population density in the county. The percentage of households in a given county opening an account, and the average balance in the accounts is determined by households' demand for banking services. We focus on two sources of demand: transactions demand arising from timing mismatches between receipt of income and expenditures, and long term savings.

Timing mismatches depend on the lumpiness of income and the lumpiness of expenditures. Wage workers normally receive income weekly or bi-weekly in a relatively smooth manner. Agricultural households, on the other hand, receive income when crops are sold, a few times each year. The mismatch of income and expenditures increases demand for both savings and credit in agricultural areas. In our estimations, we control for agricultural income by looking at the share of the population employed in agriculture. We distinguish those that are wage earners from those that are self-employed, because the volatility of income is likely to be different for these two groups.

Timing mismatches result from an excess of income over expenditures over a short period of time. Long term savings result from the same excess of income over expenditures over a longer period of time. Long term savings may be motivated by life cycle savings, or by savings to purchase high cost goods—housing and durable goods, for example. In either case, we expect that long term savings are an increasing function of income levels. Wealthier households spend a

smaller portion of their income on goods purchased weekly (e.g., food) or monthly (e.g., electricity, telephone), and a higher portion of their income on good purchased less frequently (e.g. housing, automobiles). The demand for financial services is therefore increasing in income. Purchases of durable goods and housing may increase the household's demand for credit as well. In our estimations, we control for income by including per capita GDP at the county level.

Finally, in the context of rural and semi-urban Mexico, household demand for banking services may also depend on how well households understand the benefits of having an account. We conjecture that this depends on the education level of household heads and on Spanish language abilities, the latter because banks conduct most information campaigns in Spanish. In our estimations, we control for these factors by measuring schooling levels and the percentage of households in which the head speaks an indigenous language.

The cost of operating a branch may also vary across counties. Though we lack information on real estate prices and other factors affecting operating costs, we do know how far each county is from Mexico City, where the banks' headquarters are located. Distance from Mexico City might proxy for operating and monitoring costs. We expect these costs to affect the number of branches and credit but perhaps to be less important in terms of the number of deposit accounts and the volume of deposits conditional on there being at least one branch.

Remittances affect the use of banking services in at least three ways. First, the fixed costs of sending remittances imply that remittances are likely to arrive infrequently. As with other lumpy income flows, remittances thus generate a transactions demand for financial services. Banks also earn fees from processing remittances, and the fee income may be an important factor in the profitability of a branch. Finally, from the bank's perspective, remittances allow them to get to know and screen potential credit clients, reducing the risk in lending in the area. On the

other hand, by virtue of helping to relax financing constraints, remittances might have a negative impact on the demand for credit.

In sum, in addition to our primary variable of interest, remittances, we control in some regressions for population density, GDP per capita, the percentage of households involved in agricultural activities, average education levels, the percentage of households speaking an indigenous language, and the distance from Mexico City. Of course, several of these variables could reasonably be endogenous to financial development. We don't have enough instruments to address all of the endogeneity issues simultaneously. Instead, we focus on the potential endogeneity of the variable of interest, remittances, and show that the results with respect to remittances are robust to the inclusion or exclusion of the other variables which may affect the location of branches and the use of financial services.

Also note that (1) implies that in communities which are very small, bank branches may not be profitable even if there is a demand for accounts from households, because the profitability requires that enough households have accounts or use services to cover the fixed cost of opening the branch. Hence, higher levels of remittances in agricultural areas might not be associated with more bank branches in the very smallest communities. In our empirical estimations, we consider this possibility by excluding those counties where the share of rural population is 100 percent.

3. Data

We draw on data from various sources. Data on the number of branches, number of accounts, and volume of deposits and credit for each of Mexico's roughly 2,500 counties in the year 2000 come from the *Comisión Nacional Bancaria y de Valores* (CNBV), the banking

supervisory agency in Mexico. Summary statistics for these and other key variables are shown on Table 1. We eliminate Mexico City, since many large firms maintain centralized accounts there and the aggregate data are affected by this. Also, to minimize the influence of outliers we eliminate observations in the top 1 percent of the distribution for the number of branches, number of accounts, and volume of deposits and credit.

Only 26 percent of counties in Mexico have bank branches. The lack of bank branches is particularly notable in counties in which all of the population resides in rural communities. Only 0.99 percent of counties where 100 percent of the population resides in communities with less than 2,500 people have bank branches. There is an average of 1.79 bank branches per 100,000 and 42.1 accounts per thousand people across all of the counties in our sample**.** Also, across all counties, the deposit to GDP ratio is 4.24 % and the credit to GDP ratio is 0.65%.[8]

Data on GDP per capita in 1999/2000 come from the *Consejo Nacional de Población* (CONAPO), a Mexican government agency in charge of tracking population and other important statistics.[9] The average GDP per capita in our sample is US$ 3,388. Note that the GDP data include remittance receipts. For the country as a whole, remittances represented only about 2 percent of GDP in 2000. While the effect of remittances on income levels is clearly much higher in some counties, the 2000 data are the only GDP figures available to us. If part of the impact of remittances is operating through income, then controlling for GDP may bias downward slightly our estimate of the impact of remittances on financial development.

Our primary independent variable of interest is the percentage of households in each county who reported receiving remittances in the 2000 Population and Housing Census,

[8] Recall that the sample excludes Mexico City, which is the most banked city in the country, and includes counties with no banking activity. This explains why the ratios are much lower than those for the country as a whole.

[9] GDP in 1999 pesos is divided by population numbers from the 2000 census converted into U.S. dollars and adjusted for purchasing power differences between Mexico and the US. See explanation provided by CONAPO at http://www.conapo.gob.mx/00cifras/6c.htm.

implemented by the *Instituto Nacional de Estadística Geografía e Informática* (INEGI). We use data from a sub-sample of Mexican households that responded to an "extended questionnaire" (*cuestionario ampliado*), which, in addition to basic information on demographic and housing characteristics collected of all households, included questions on migration and non-wage sources of income, such as remittances, among other detailed questions. The sub-sample covered around 2.2 million households, or 10 percent of all households in the country, and was designed to be representative at the county level.[10] Not every household had an equal chance of being surveyed, but we use sample weights provided by the census to aggregate all information which is taken from the census to the county level, including the percentage of households receiving remittances. The data on Table 1 indicate that on average 6.54 percent of households in a county report receiving remittances.[11] The data show wide variance in remittance receipts among the counties. Almost 7 percent of counties have no households reporting they receive remittances, while in more than 25 percent of counties the share of households receiving remittances exceeds 10 percent.

We also control for the density of population within the county. Some counties have much larger land areas than others. For a given population, having a larger land area (that is, having lower population density) is associated with longer distances to any point in the county. Longer distances imply longer travel times to and higher costs of using a bank branch. Hence, we expect that density should be positively associated with measures of bank branch development

[10] INEGI (2000) provides a detailed description of the sampling methodology used to implement the extended questionnaire.

[11] This is an unweighted mean of the municipio level data. The percentage of households reporting remittances in Mexico is less than 6.58% because those residing in smaller municipios are more likely to say they receive remittances.

and the use of banking services. Land area is taken from INEGI. The average population density for Mexican counties in our sample is 172 inhabitants per squared kilometer.[12]

We also use the population census to calculate the percentage of households involved in agricultural activities. We identify a household as agricultural if any member of the household is employed as a paid worker in agriculture. Because the income of self-employed agricultural workers is likely to have higher within-year variance than the income of wage workers in agriculture, we separate these two groups. Table 1 shows that an average of 12.8 percent of households in counties have an agricultural wage worker, and 19.7 percent have a self-employed worker in agriculture.[13]

Data on the percentage of household heads who speak an indigenous language and information on the average years of schooling of household heads also comes from the 2000 census. On average, 24.2 percent of household heads speak an indigenous language. The average years of schooling received by household heads is 4.46.

Finally, some of our estimations also control for the distance of each county to Mexico city where most bank headquarters are located. We calculated the distances from data on the geographical coordinates of each county used by López Córdova (2005), and originally obtained from INEGI.[14] The average distance is 463 kilometers.

4. Empirical Specifications and Results

Our baseline empirical specifications follow equation (2) below:

$$Banking\ Breadth_i \text{ (or } Depth_i) = \alpha_0 + \alpha_2\, Remittances_i + \alpha_2 GDP\ per\ capita_i + \alpha_3\, Density_i + \varepsilon_i \quad (2)$$

[12] Population density in 2000 for the country as a whole was 51 inhabitants per squared kilometer. The larger number we obtain reflects the fact that counties with smaller land area are more densely populated.
[13] Of course, a much smaller percentage of households in Mexico are involved in agriculture. The percentages are highest in the smallest counties. The percentages reported here weight all counties equally.
[14] We calculated distances in kilometers using Stata's *sphdist* command.

where *i* refers to the county identifier. *Banking Breadth* is measured by the ratio of branches and, separately, deposit accounts per capita. *Banking Depth* refers to the ratio of the volume of deposits and, separately, loans to GDP. *GDP per capita* is measured in thousands of dollars and *Density* refers to the ratio of population to area.

We first estimate equation (2) over the entire sample of counties outside of Mexico City. Because there is a mass of counties without bank branches, deposits, etc., we estimate (2) using a tobit specification. Given the fact that only a handful of the counties in which all of the population resides in rural communities have bank branches, we also estimate the regressions on the sample excluding these all-rural counties. We then check for robustness by including a number of additional controls in the regressions, such as the percentage of households with a wage earner in agriculture, the share of households with a member who is self-employed in agricultural activities, the percentage of household heads who speak an indigenous language, the average years of schooling obtained by household heads, and the distance between each county and Mexico City.

Table 2 columns (1) through (4) report results for each of the measures of financial depth and breadth when we include only the percentage of households receiving remittances as a regressor. The association between remittances and bank branches, accounts, and deposits is significant both statistically and economically. The coefficient on bank branches per capita is 0.16 in the first specification, indicating that a 1 point change in the percentage of households receiving remittances is associated with a 0.16 increase in the number of bank branches per 100,000 residents. A one standard deviation increase in the percentage of households receiving remittances (7.7 percentage points) is therefore associated with an additional bank branch per

100,000 residents in the county (against a mean of 1.79). Remittances have effects of similar magnitude on the number of accounts per 100 residents and the deposit/GDP ratio. A one standard deviation change in the percentage of households receiving remittances is associated with an increase of 31 accounts per one thousand residents (against a mean of 42 accounts), and an increase of 3.4 percentage points in the deposit/GDP ratio (against a mean of 4.2). Hence, for deposits, branches and accounts, we find the impact of remittances is large and highly significant. For credit, however, we find a much smaller and statistically insignificant effect.

As we noted above, remittances are more likely to flow to rural communities than to urban areas. They are also somewhat more likely to flow to lower income counties: there is a small negative correlation between income per capita and the percentage of households receiving remittances (-0.035). Higher income is likely to be highly correlated with the provision of banking services. Because the first results do not control for income or population density, they may understate the magnitude of the impacts of remittances on banking development. Admittedly, we face something of a dilemma here. On the one hand, higher income causes a higher demand for banking. On the other hand, there is an extensive literature showing the impact of financial services on income. Later in the paper, we will suggest instruments to address the potential endogeneity of remittance receipts. But we do not have additional instruments to address simultaneously the endogeneity of income.

With this caveat in mind, columns (5) through (8) of Table 2 show the results for regressions adding controls for GDP per capita and population density. For bank branches, accounts per capita, and the deposit-GDP ratio, the controls increase the magnitude of the effect of remittances by at least 50 percent. All of these effects remain significant. Per capita GDP and density both have the expected positive sign and are highly significant. Remittances now have a

significant effect on the credit to GDP ratio as well, with a measured effect more than three times larger than in the first regression. Relative to the mean credit/GDP ratio, the effect of remittances on credit is still much smaller than on the other dependent variables. A one standard deviation increase in the percentage of households receiving remittances is associated with 0.44 increase in the credit/GDP ratio, about two-thirds of the mean (0.65). A similar increase results in a change of almost twice that level in each of the other three dependent variables. While the results are clearly quite sensitive to controlling for GDP per capita, we find that a single dummy variable indicating that the county has per capita income above the 75th percentile produces nearly identical results. (See appendix Table A.1.) The presence of banks may alter the income levels in the county, but the presence of bank branches is unlikely to cause many counties to change classification from below the 75th percentile to above the 75th percentile. This simpler control is therefore arguably less subject to endogeneity concerns.

In close to 40 percent of Mexico's counties, the share of the population residing in communities with fewer than 2,500 residents is 100 percent. As we noted above, bank branches are very rare in these all-rural counties. Though remittances tend to flow disproportionately to rural communities, the small population density in these counties may result in banks not being able to cover the fixed costs of operating a branch in these areas. For the remaining regressions, we drop the 909 counties which have entirely rural populations from the sample. Table 3 shows the effect of doing so using the same specifications we reported in Table 2. We see that the coefficients are roughly 30 to 40 percent larger than those on Table 2. We note that the means of the dependent variables are also about 50 percent larger when we exclude the all-rural counties. Thus, while remittances have a larger absolute impact on the level of banking services in the

sample excluding all-rural counties, the relative impact is very similar to that which we found in the full sample.[15]

The discussion in section 3 of the factors affecting the location of bank branches and the use of financial services suggests that other variables aside from GDP per capita and population density might influence our banking sector indicators. Table 4 presents tobit specifications including these additional controls. In particular, we control for a potential source of lumpiness in household income by measuring the share of the county population employed in agriculture. We distinguish between wage earners and self-employed among agricultural workers. We also control for the average years of schooling among residents in each county and for the share of the population that speaks an indigenous language since these variables might affect the ability of households to understand the benefits of banking services. Finally, we include the distance between each county and Mexico City as an additional control. Given that most banks' headquarters are located in Mexico City, this variable may proxy for the cost to the bank of monitoring bank operations outside of the capital. Alternatively, distance to Mexico City might serve as a proxy for the input costs of bank operations.

We find that agricultural self-employment and years of schooling are both highly significant. Schooling has the expected sign—counties in which household heads have an additional year of schooling have higher measures of banking depth and breadth. Agricultural employment does not have the expected sign if we focus on a demand side interpretation.[16] Counties in which a larger percentage of the households are self-employed in agriculture are less likely to have banking services, suggesting that commercial banks do not serve this sector. As we

[15] For the remainder of the paper, we report results are based on the sample excluding all-rural counties. The findings do not change in any significant way if we include these counties.

[16] As discussed in Section 2, the lumpiness of farming income may increase the demand for banking services by agricultural households.

expected, distance to Mexico City influences the number of branches and the volume of credit but not deposits. However, the sign on this variable is the opposite of what we would have expected if we interpret this variable as a proxy for monitoring costs. This may suggest that a more appropriate interpretation for this variable is as a proxy for operating costs since these are lower in areas more distant from Mexico City, as rents and wages may also be lower.

Most importantly for our purposes, including these additional controls does not change the results on remittances. We continue to find that remittances have a positive impact on the number of bank branches and the use of deposit and credit services. Moreover, the magnitude of the effect is almost identical to what we found when we controlled only for GDP per capita and population density (compare to Table 3 columns 5 through 8).

Potential endogeneity of remittances

The results reported on tables 2-4 ignore the potential endogeneity of remittances. There are numerous sources of endogeneity, with suggested biases running in either direction. First, the presence of financial institutions may cause higher remittance flows, either because financial development allows people to finance migration, and hence increases migration flows and remittances, or because the presence of financial institutions is associated with lower costs of sending remittances, and hence a greater propensity to do so. Neither of these seems to be a first order concern. Commercial banks in Mexico are an unlikely source of credit to finance migration. While better access to financial networks might facilitate receipt of remittances, the primary channel appears to be from migration flows to banking development. When we use county level data on migration rates rather than remittance rates, we find results similar to those reported so far. The 2000 population census asks whether any member of the household has

migrated outside of Mexico in the past five years, and if so, to which country. We calculate the percentage of households with at least one emigrant to the United States. Appendix table A.2 shows that we obtain nearly identical results when we use this variable in place of remittance flows. Thus, the effect appears to be driven by migration flows, which cause remittance flows.

Our findings are likewise unaffected by reverse causation arising from the fact that we measure bank branches and remittances at the same point in time. Data on banking breadth and depth are available from the Banco de Mexico for the 2001-2005 period, though for a smaller sample of counties.[17] However, the excluded counties account for less than 3 percent of the Mexican population. When we regress the mean of branches and deposits per capita as well as deposits and credit to GDP over the period 2001-2005 against our measure of remittances for 2000, we obtain results very similar to those reported in Table 3.

A second source of endogeneity is that some portion of the migrants out of Mexico returns after a period abroad. These return migrants may bring back knowledge of US financial markets, and hence have higher demand for financial services. We view this as primarily affecting the interpretation of the results. If knowledge of financial markets acquired abroad is an important factor in increasing demand for financial services in Mexico, then the coefficient on remittances should be interpreted as reflecting the broader impact of migration on financial development and outreach.

A final source of endogeneity appears to be more serious. The lack of financial services may cause a lack of economic development, or both may be related to some omitted third factor. The lack of development, in turn, might lead to out migration and, subsequently, higher remittance flows. That is, our regression may be mis-specified because we lack a control for

[17] There are more than 2,400 counties in Mexico. However, the data provided by the Banco de México aggregate the branches, deposits and loans for some of the smaller counties into a broader category labeled "others". There are 29 states which report this "other" category.

counties with "bleak futures." In that case, we can definitively sign the direction of the bias only for the set of regressions on columns (1) through (4) of tables 2 and 3. These regressions include only remittances on the right hand side. Since the omitted variable is negatively correlated with banking development and positively correlated with migration and remittances, the tobit coefficients for this specification will be biased downward.

We believe the unmeasured characteristics of the counties are the main source of endogeneity and the tobit results for the specification including only remittances should be interpreted as representing a lower bound of the impact of remittances on financial market development. These results show that remittances are positively associated with the opening of bank branches, and the number of accounts and level of deposits. The effect of remittances on credit remains somewhat ambiguous, however, because the remittances variable is significant in the credit regression only after we control for GDP per capita as well.[18] In general, the direction of bias can be determined in the presence of other independent variables only when those variables are orthogonal to the variable of interest. Because the correlation between remittances and GDP per capita is low (-0.035 in the full sample), it is unlikely that its inclusion in the regression will switch the direction of bias on the remittances coefficient. But since the two variables are correlated to some degree, we cannot prove conclusively that the bias from the excluded variable remains negative.

To attempt to obtain a cleaner estimate on the impact of remittances on banking development, we address endogeneity with instrumental variables. Following several others (see, for example, Hildebrandt and McKenzie 2005, López Córdova 2005, and Woodruff and Zenteno 2006), we exploit the fact that migration has deep historical roots in Mexico. Early migration

[18] The specification on tables 2 and 3 includes both GDP per capita and density, but the magnitude of the coefficient on remittances is similar in all four regressions when the density variable is dropped.

was centered in central-western Mexico, around the city of Guadalajara. As described in Woodruff and Zenteno (2006), this early migration was related to the placement of rail lines. Our instrument is derived from this relationship. We use the distance of each county from the rail network as it existed in 1900 and then the distance from that point on the rail network to the U.S. border. Coatsworth (1972) estimates that rail travel cost one-third to one-sixth as much as other land transportation options during this period. We therefore multiply the distance from the county to the rail by five and add it to the distance traveled along the rail network to the border. We use as an instrument the minimum between this sum and five times the direct distance to the U.S. border. In counties near the U.S. border but far from the rail network, migrants would have traveled over land rather than by rail. The resulting variable, which we label *minimum distance*, measures the cost of migrating in the early 1900s, when the migration networks were established.[19]

Using the historical migration network as an instrument identifies the exogenous component of remittances which comes from the historical migration patterns. We interpret results from this IV as identifying the long-term impact of remittances on commercial bank development. Table 5A shows the results from the first-stage of the IV estimations. We report results from two specifications. The first controls only for GDP per capita and population density. The second includes the full set of controls. We find as expected that our instrument, *minimum distance*, has a negative impact on remittances. In other words, in counties that are further away from the rail and the U.S. border, a smaller share of households receives remittances. The effect of distance on remittances is significant in either specification, though the effect is stronger in the first specification. The F-statistics for the instrument are around 96 in

[19] The results are not qualitatively different if we simply add the distance to the rail line and the distance traveled along the rail line.

each of the four regressions controlling only for GDP per capita and density, and around 19 in the regressions with the broader set of controls. While much lower in the second set of regressions, the F-statistic does not suggest that the instrument is weak.

The more parsimonious specification is preferable because of concerns with endogeneity of some of the additional regressors included in the second specification. However, the distance measure is significant as a regressor in the second stage in this specification, in violation of the exclusion restriction. The instrument is not significant in the second stage once we control for agricultural employment and indigenous language. Thus, while the instrument weakens as a regressor in the first stage, it passes the exclusion restriction in the more extensive specification.

Second stage IV results are shown in Table 5B. Consistent with a negative bias in the tobit results, we find larger impacts of remittances on banking development when we instrument for remittances. Indeed, the IV results suggest impacts which are approximately three times larger than the tobits (and close to six for the credit to GDP ratio) when we control only for GDP per capita and population density. The IV results are one and one-half to three times as large when we include the additional controls. The standard errors are much larger as well. When we use the full set of regressors, the IV result for credit to GDP is not statistically significant and the result for deposits to GDP is significant only at the .10 level. In general, though, we continue to find that remittances have a positive impact on the number of bank branches and the use of banking services when we instrument for remittances using the minimum distance along the rail and by land to the US border.

5. Concluding remarks

Remittance flows are rising worldwide and are an increasingly important source of income for households in lower income countries. Economists are just beginning to understand how remittances affect local economic outcomes in the recipient countries. Using county-level data for Mexico, this paper contributes to the literature by focusing on a question that has been largely ignored: how remittances affect banking sector breadth and depth. Mexico makes for an excellent case study because remittance flows are large and geographically concentrated. Also, in Mexico banks play an important role in the payment of remittances so the potential to earn fees from these services and to cross-sell other banking products is large.

We find that remittances are strongly associated with the depth and breadth of banking services in Mexico. The effects are significant both statistically and economically. The most robust impacts relate to the placement of bank branches, the number of accounts and the deposit to GDP ratio. We find a positive impact on credit as well, though here the results are less robust. Credit is significant only when we control for GDP per capita, though a dummy variable separating the upper quartile from the lower three quartiles is a sufficient control.[20]

Will the expansion of banking services caused by remittances result in additional development in the remittance recipient communities? This is a critical question, and an area for future research. The work of Burgess and Pande (2005) suggests that we should expect to find important effects on poverty and growth. The fact that we find some evidence of an association between remittances and credit suggests that banks may allow households to leverage remittance incomes for the purchase of durable goods or for investment in enterprises. But a more complete answer to the question will require more detailed data on the use of banking services in communities receiving remittances.

[20] Woodruff (2006) also finds a positive association between receipt of remittances and the likelihood of having a loan using household data from a sample of households which have accounts in non-bank financial institutions in Mexico.

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Table 1: Variable Definitions and Descriptive Statistics

Variable	Description	Observations	Mean	Median	Standard deviation	Minimum	Maximum
Deposits to GDP (%)	Deposit volume year 2000 to 1999 GDP in current pesos	2392	4.241	0	9.391	0	54.861
Credit to GDP (%)	Credit volume year 2000 to 1999 GDP in current pesos	2392	0.652	0	2.003	0	15.836
Branches per capita	Branches per 100,000 inhabitants	2392	1.789	0	3.837	0	22.001
Accounts per capita	Accounts per 1000 inhabitants	2380	42.126	0	95.694	0	610.394
Households receiving remittances (%)	Percentage of households receiving remittances from overseas	2392	6.542	3.449	7.711	0	53.714
GDP per capita	GDP per capita (dollars)	2391	3,388	2,776	2,535	149	27,695
Density	Population per square kilometer	2392	172.287	46.186	757.884	0.217	19773.74
Agricultural wage employment (%)	Percentage of households employed in agriculture as wage workers	2392	12.81	9.33	11.675	0	69.557
Agricultural self employment (%)	Percentage of households self-employed in agriculture	2392	19.684	14.079	17.369	0	88.351
Indigenous language (%)	Percentage of household heads who speak an indigenous language	2392	24.206	2.413	35.54	0	100
Schooling	Average years of schooling completed by household heads	2392	4.46	4.233	1.617	0	13.574
Distance to Mexico	Distance between each county and Mexico City	2392	462.802	357.332	370.307	7.622	2270.397

Table 2: Basic County-Level Tobit Estimations Including All Counties Other Than Mexico City

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables). Robust z statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)
	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households Receiving Remittances	0.1564	3.9704	0.4437	0.0151	0.2375	6.1426	0.662	0.0564
	[4.09]***	[4.20]***	[4.59]***	[0.89]	[6.65]***	[6.85]***	[6.84]***	[3.54]***
GDP per capita					2.1059	51.4631	4.3635	1.0399
					[16.80]***	[16.25]***	[12.14]***	[12.87]***
Density					0.0007	0.0243	0.0025	0.0006
					[3.31]***	[3.59]***	[3.93]***	[3.22]***
Constant	-8.6058	-221.3261	-21.3552	-4.4699	-15.77	-402.1896	-38.8721	-8.141
	[16.03]***	[16.26]***	[16.22]***	[15.40]***	[21.31]***	[20.76]***	[18.92]***	[17.71]***
Observations	2392	2380	2392	2392	2391	2379	2391	2391
Log Likelihood	-3020.72	-4784.71	-3522.3	-2450.55	-2736.05	-4512.17	-3320.96	-2184.21

Table 3: Basic County-Level Tobit Estimations Excluding Mexico City and All Rural Counties

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables). Robust z statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)	(3.7)	(3.8)
	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households Receiving Remittances	0.2139	5.3976	0.6296	0.0184	0.307	7.89	0.8444	0.0717
	[5.14]***	[5.23]***	[5.89]***	[0.98]	[7.84]***	[8.01]***	[7.87]***	[4.05]***
GDP per capita					1.683	40.8493	2.9729	0.8759
					[13.71]***	[13.49]***	[9.54]***	[10.47]***
Density					0.0003	0.0149	0.0016	0.0004
					[2.15]**	[3.08]***	[3.34]***	[2.79]***
Constant	-3.6425	-99.0378	-9.6372	-2.1537	-11.0329	-283.6331	-24.4406	-6.1407
	[8.05]***	[8.80]***	[8.97]***	[9.29]***	[15.45]***	[15.60]***	[12.77]***	[13.59]***
Observations	1483	1470	1483	1480	1482	1469	1482	1479
Log Likelihood	-2644.19	-4391.19	-3138.59	-2136.85	-2464.38	-4220.75	-3039.52	-1972.95

Table 4: Tobit Estimations with Additional Controls Excluding Mexico City and All Rural Counties
Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).
Robust z statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	(4.1)	(4.2)	(4.3)	(4.4)
	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households Receiving Remittances	0.2939	7.6178	0.8182	0.0793
	[6.96]***	[7.19]***	[7.16]***	[4.10]***
GDP per capita	0.7339	16.3509	0.5555	0.2716
	[6.07]***	[5.95]***	[2.31]**	[4.06]***
Density	-0.0002	-0.0005	-0.0001	0.0001
	[1.57]	[0.16]	[0.34]	[1.05]
Agricultural Employment (wage)	-0.0345	-1.3169	-0.1162	-0.0116
	[1.35]	[2.04]**	[1.72]*	[0.89]
Agricultural Employment (self)	-0.1476	-3.5575	-0.4198	-0.0773
	[4.32]***	[4.15]***	[4.67]***	[4.13]***
Indigenous Language	-0.0321	-0.7694	-0.055	-0.0103
	[2.42]**	[2.26]**	[1.54]	[1.48]
Schooling	1.3165	36.5185	3.7589	1.0105
	[4.64]***	[5.14]***	[5.24]***	[6.02]***
Distance to Mexico	0.0016	0.024	0.001	0.0012
	[2.81]***	[1.60]	[0.67]	[3.20]***
Constant	-11.4699	-297.7812	-25.3827	-7.9097
	[6.25]***	[6.40]***	[5.27]***	[7.36]***
Observations	1482	1469	1482	1479
Log Likelihood	-2394.05	-4148.14	-2964.36	-1889.55

Table 5A: First Stage Tobit Instrumental Variables Estimations Excluding Mexico City and All Rural Counties

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).

Robust z-statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)	(5.7)	(5.8)
	Dependent variable: Households Receiving Remittances (%)							
	Branches per capita equation	Accounts per capita equation	Deposits to GDP equation	Credits to GDP equation	Branches per capita equation	Accounts per capita equation	Deposits to GDP equation	Credits to GDP equation
GDP per capita	-0.341	-0.3487	-0.3248	-0.3443	-0.0898	-0.0967	-0.0627	-0.1071
	[-6.00]***	[-6.08]***	[-6.13]***	[-5.97]***	[-1.23]	[-1.32]	[-0.89]	[-1.45]
Density	-0.0008	-0.0008	-0.0008	-0.0009	-0.0005	-0.0005	-0.0004	-0.0005
	[-3.95]***	[-3.96]***	[-4.17]***	[-3.91]***	[-3.73]***	[-3.76]***	[-3.87]***	[-3.67]***
Agricultural Employment (wage)					-0.1461	-0.1515	-0.1436	-0.1487
					[-9.78]***	[-10.1]***	[-9.64]***	[-9.89]***
Agricultural Employment (self)					-0.0896	-0.0902	-0.0851	-0.0906
					[-6.17]***	[-6.19]***	[-5.91]***	[-6.21]***
Indigenous Language					-0.0866	-0.0859	-0.0852	-0.0875
					[-12.8]***	[-12.6]***	[-12.7]***	[-12.9]***
Schooling					-2.1625	-2.1573	-2.1210	-2.1762
					[-12.4]***	[-12.3]***	[-12.2]***	[-12.3]***
Distance to Mexico					0.0002	0.0002	0.0002	0.0003
					[0.65]	[0.54]	[0.53]	[0.87]
IV: Min distance border by train	-0.0019	-0.0020	-0.0019	-0.0020	-0.0010	-0.0010	-0.0010	-0.0010
	[-14.4]***	[-14.2]***	[-14.2]***	[-14.5]***	[-6.44]***	[-6.36]***	[-6.40]***	[-6.49]***
Constant	10.6708	10.7177	10.4568	10.8131	23.6059	23.6946	23.0998	23.8428
	[22.9]***	[22.7]***	[23.1]***	[22.9]***	[19.6]***	[19.6]***	[19.3]***	[19.6]***
Observations	1482	1469	1482	1479	1482	1469	1482	1479
Cragg Donald F-statistic	99.65	98.70	96.25	101.8	20.71	20.58	19.98	21.23
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 5B: Second Stage Tobit Instrumental Variables Estimations Excluding Mexico City and All Rural Counties
Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).
Robust z-statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)	(5.7)	(5.8)
	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households Receiving Remittances	1.0379	27.9439	2.6834	0.4142	0.7743	21.2124	1.4265	0.2389
	[6.79]***	[7.26]***	[6.89]***	[4.38]***	[2.50]**	[2.70]***	[1.82]*	[1.22]
GDP per capita	1.8561	45.6566	3.3843	0.9584	0.7778	17.6875	0.5920	0.2886
	[13.7]***	[13.5]***	[9.73]***	[10.7]***	[5.89]***	[5.68]***	[2.26]**	[4.08]***
Density	0.0009	0.0304	0.0029	0.0007	0.0000	0.0059	0.0001	0.0002
	[3.24]***	[3.50]***	[3.77]***	[3.15]***	[0.11]	[1.13]	[0.30]	[1.25]
Agricultural Employment (wage)					0.0327	0.6713	-0.0329	0.0111
					[0.67]	[0.53]	[-0.26]	[0.38]
Agricultural Employment (self)					-0.0963	-2.0903	-0.3583	-0.0600
					[-2.04]**	[-1.77]*	[-3.03]***	[-2.17]**
Indigenous Language					0.0172	0.6127	0.0058	0.0063
					[0.48]	[0.67]	[0.064]	[0.28]
Schooling					2.3433	65.5514	5.0362	1.3543
					[3.40]***	[3.76]***	[2.91]***	[3.10]***
Distance to Mexico					0.0016	0.0239	0.0010	0.0012
					[2.71]***	[1.53]	[0.69]	[3.15]***
Constant	-16.6337	-437.4999	-38.2834	-8.7961	-22.3445	-606.8741	-38.8620	-11.5590
	[-12.1]***	[-12.6]***	[-10.9]***	[-10.2]***	[-3.15]***	[-3.37]***	[-2.20]**	[-2.59]***
Observations	1482	1469	1482	1479	1482	1469	1482	1479
Log Likelihood	-7392	-9107	-7958	-6909	-7187	-8900	-7750	-6687

Appendix

Table A1: Basic Tobit Estimations Replacing GDP per Capita with a Dummy for GDP > than 75 Percentile

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).
Robust z-statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households Receiving Remittances	0.2425	6.2940	0.6754	0.0603
	[6.51]***	[6.82]***	[6.84]***	[3.64]***
Dummy GDP p75	11.6144	286.8822	26.0744	5.8151
	[21.76]***	[20.52]***	[19.79]***	[15.56]***
Density	0.0006	0.0228	0.0023	0.0005
	[2.55]**	[2.77]***	[3.13]***	[2.65]***
Constant	-11.7566	-301.4885	-30.4166	-6.1000
	[19.69]***	[19.78]***	[20.19]***	[17.33]***
Observations	2392	2380	2392	2392
Log Likelihood	-2789.55	-4554.82	-3335.49	-2220.47

Table A2: Basic Tobit Estimations Replacing Remittances for the Percentage of Households with a Migrant Sample Excluding Mexico City and All Rural Counties

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).
Robust z-statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP	Branches per capita	Accounts per capita	Deposits to GDP	Credits to GDP
Households with at least one migrant overseas	0.1198	3.2139	0.4342	-0.0191	0.2482	6.5689	0.7037	0.0508
	[3.11]***	[3.36]***	[4.43]***	[1.00]	[6.89]***	[7.29]***	[7.13]***	[2.89]***
GDP per capita					1.7148	41.7447	3.0583	0.8763
					[13.50]***	[13.32]***	[9.41]***	[10.41]***
Density					0.0002	0.0134	0.0014	0.0004
					[1.73]*	[2.91]***	[3.14]***	[2.73]***
Constant	-3.1921	-89.0302	-8.9262	-1.8805	-11.0525	-285.8036	-24.6354	-6.0363
	[6.83]***	[7.69]***	[8.10]***	[8.02]***	[14.65]***	[14.95]***	[12.16]***	[13.09]***
Observations	1483	1470	1483	1480	1482	1469	1482	1479
Log Likelihood	-2653.96	-4400.35	-3149.12	-2136.8	-2476.91	-4231.7	-3050.25	-1976.1

Table A3: Basic Tobit Estimations Where Measures of Depth and Breadth are Averaged over 2001-2005
Sample Excluding Mexico City and All Rural Counties

Regressions exclude outliers (observations in the top 1 percent of the distribution for the dependent variables).
Robust z-statistics are in brackets. The symbols *,**, and *** denote significance at 10, 5 and 1 percent levels, respectively.

Variables	Branches per capita Average 201-2005	Accounts per capita Average 2001-2005	Deposits to GDP Average 2001-2005	Credit to GDP Average 2001-2005	Branches per capita Average 201-2005	Accounts per capita Average 2001-2005	Deposits to GDP Average 2001-2005	Credit to GDP Average 2001-2005
Households Receiving Remittances	0.1383	3.5939	0.8169	0.0107	0.1733	5.5479	0.9738	0.0273
	[4.28]***	[3.52]***	[6.32]***	[0.79]	[5.21]***	[5.34]***	[7.11]***	[1.92]*
GDP per capita	1.1119	38.308	1.5281	0.3767	0.384	13.3587	-0.5566	0.072
	[12.00]***	[11.78]***	[6.33]***	[7.31]***	[3.90]***	[4.13]***	[2.06]**	[1.65]*
Density	0.0001	0.0145	0.0012	0.0004	-0.0004	-0.0076	-0.0007	0.0001
	[0.57]	[2.17]**	[1.99]**	[2.32]**	[2.74]***	[1.66]*	[1.55]	[0.66]
Agricultural Employment (wage)					-0.0638	-2.34	-0.1474	-0.0175
					[2.66]***	[3.10]***	[1.66]*	[1.67]*
Agricultural Employment (self)					-0.0563	-1.1309	-0.1818	-0.0164
					[2.35]**	[1.41]	[1.99]**	[1.40]
Indigenous Language					-0.0104	0.2806	0.0207	-0.005
					[1.01]	[0.70]	[0.53]	[0.98]
Schooling					1.4631	64.1366	5.4058	0.7956
					[6.78]***	[8.39]***	[6.83]***	[6.70]***
Distance to Mexico					0.0015	-0.0054	-0.0009	-0.0003
					[3.09]***	[0.34]	[0.57]	[1.23]
Constant	-2.1912	-85.5148	-1.3966	-1.2167	-5.8995	-275.3927	-16.8685	-3.4751
	[4.04]***	[4.58]***	[0.80]	[4.43]***	[4.22]***	[5.69]***	[3.12]***	[4.84]***
Observations	1003	1004	1003	1003	1003	1004	1003	1003
Log Likelihood	-2548.67	-5021.59	-3463.48	-2014.39	-2486.96	-4948.92	-3417.76	-1963.16