

# Banking Correspondents and Financial Inclusion in Mexico

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## **Abstract**

*This paper assesses the impact of the banking correspondent model, a policy enacted to enable financial intermediaries to provide basic banking and payment services through third-party nonfinancial commercial establishments, on financial inclusion in Mexico. In particular, the study focuses on determining the effect of this policy on formal savings, measured as the number of active bank accounts and the total volume of bank deposits. To achieve this, we assemble a dataset that merges bank-correspondent level information with locational and operational data on banks in Mexico. We use this data with a difference in differences model using multiple time periods to determine whether the introduction of banking correspondents has boosted formal savings in Mexico by increasing the availability of financial services. Our results show a significant positive effect of the entrance of banking correspondents on both the volume of savings (in Mexican pesos) and the number of savings bank accounts. We do not find a differentiated effect for rural municipalities. We also find evidence of a spillover effect at a municipal level that suggested*

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*that banks' deposits would be reduced if a correspondence relation in which they are not involved begins.*

*Keywords: financial inclusion, branchless banking, banking correspondents, Mexico, savings.*

*JEL classification: G21, G28, O12.*

## 1. INTRODUCTION

There is an extensive literature that explores the impact of financial institutions on economic activity. Since Goldsmith's publication (1969) on the relation between financial structure and economic development, many studies have found that the development of markets that efficiently allocate financial resources within an economy has a positive causal effect on economic growth and other well-being indicators.<sup>1</sup> Consistent with these findings, financial inclusion has become a relevant topic over the last few years, since access to financial services has been found to increase economic growth. Recent evidence shows that countries with more deeply integrated financial systems experience accelerated economic growth and reduced income inequality and poverty rates (Beck et al., 2007). Also, there is evidence at the micro level that suggests that financial inclusion expands a household's ability to make different intertemporal choices and increases (reduces) its durable goods (temptation goods) expenditure (Banerjee et al., 2014). Furthermore, access to financial instruments has been seen to help alleviate unexpected situations such as disease and long periods of unemployment. Concurrently, access to credit may help the poor to obtain nonconventional outcomes of welfare measured by indicators related to the need for aid, lack of depression, trust, and female decision making (Angelucci et al., 2015).

However, market frictions often prevent access to financial services for households or firms that face higher transactional costs or are more informationally opaque. The most common examples of market frictions are lack of infrastructure, such as roads, bridges, or

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<sup>1</sup> Levine (2005) gives a thorough theoretical and empirical review on the link between finance and economic growth. Various empirical methods have been used to describe this question (for example, cross-country studies, panel, and time-series, among others), many of which are described in the aforementioned work.

electric power, and the disorganization of institutional frameworks. Such frictions often arise when economic downturns and financial crises cause a greater mistrust in the economy. These frictions are more prevalent in emerging economies with less developed financial markets and tend to limit disproportionately the access of small or young businesses and low-income households to these financial services. Since the supply of financial services is consequently inhibited from reaching its potential size, access to formal products is only available for a restricted segment of the population, namely the most developed economic areas. Excluded agents, in turn, tend to fulfill their need for financial services through informal mechanisms.

Despite recent improvements, Mexico still lags behind other similarly developed economies in most measures of financial development and inclusion, which makes addressing these problems a crucial task for boosting economic activity and reducing poverty. In particular, Mexico has low levels of financial inclusion compared to other developing economies. Demirgüç-Kunt et al. (2015) describe that only around 39% of the adult population in Mexico possess an account at a bank or other type of financial institution, which is still lower than the average of the Latin American and Caribbean region of approximately 51 percent.

According to the 2015 Mexican National Survey on Financial Inclusion (ENIF 2015), carried out in June 2015, 23.5% of all adults (between 18 and 70 years old) in Mexico do not have any savings, formal or informal. Approximately 15.1% of adults use only formal methods of savings; meanwhile, 32.5% only use informal methods. And, 28.9% of adults use both formal and informal instruments of savings. In addition, 56% of adults in Mexico do not have a bank account, of which only 14% are former users who have stopped using their accounts. That is, 42% of adults have never had a bank account. The same survey shows that 65% of the national adult population has saved cash in its home, and slightly more than 30% has saved money through a popular informal method called *tanda*.<sup>2</sup>

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<sup>2</sup> An informal savings club in which relatives, friends, and neighbors regularly contribute money to a pooled fund, and the member that receives the savings accumulated during the allotted time period is rotated or randomly determined. For example, the group may contribute to the

The absence or nonuse of formal saving methods is important since greater participation in these services closely correlates to a greater access to formal credit services. Consequently, all public policies that foster formal savings are of national interest because they encourage financial inclusion.

Unfortunately, in Mexico there is still a significant difference regarding wealth between urban and rural localities, which is reflected in access to formal savings. The Mexican case is characterized by its geographical disparities and insufficient economic opportunities in remote areas. On the one hand, banks face high fixed costs when opening new branch offices. This situation encourages banks to locate their branch offices close to urban areas to recover their investment quickly. On the other hand, geography dictates that people from remote areas have to travel long distances and pay high tariffs to obtain access to financial services. As we can imagine, this group of the population has to decide between paying for using formal financial services in addition to travel costs, or paying for using informal financial services. These circumstances bring higher incentives for using informal rather than formal services.

In order to facilitate access to basic financial services for households, Mexican legislation was changed to create a legal scheme that facilitates financial intermediaries in operating through banking correspondents—establishments such as retail or convenience stores, pharmacies, and supermarkets. Banking correspondents, an example of a broader term called *branchless banking*, is a business model in which the commercial establishment handles services itself, including cash withdrawals, deposit operations, loan and utility payments, and the payment of checks issued by the bank. The regulation was modified in December 2008<sup>3</sup> and operations began in November 2009. Since then, the number of banking correspondent units has surpassed the number of bank branches. Given their prevalence, it is likely that the banking correspondent model expanded access points to financial services for the Mexican population, thus increasing overall geographic coverage. This model could be a potential solution to the absence or disuse of financial services that are critical to expeditious economic growth and development. The presence of

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savings pool weekly, and give the accumulated savings to a random member of the group at the end of the week.

<sup>3</sup> Published in the *Diario Oficial de la Federación*, 12/04/2008.

banking correspondents could rapidly help formalize the demand for banking services, and thus help informal savers take their first step towards formal financial products.

In this paper, we aim to measure the impact of banking correspondents on savings, measured both as the number of active bank accounts and as the amount of total deposits in these accounts. The reasons for focusing on formal savings are the following: First, a formal savings account is normally a gateway to other types of formal financial products. As such, a formal savings account is a minimum requirement for financial inclusion. Second, saving is a fundamental tool for smoothing expenditure across time, and one that may bring large welfare benefits, particularly to low-income households (Mas and Siedek, 2008). Third, anyone can now easily open a savings account, as there are savings accounts that are not subject to any fee or minimal monthly balance. Finally, as we explained before, there is a distinct lack of financial inclusion in Mexico, and consequently evidence of a large latent demand for formal financial services.

Our empirical strategy relies on the fact that some of the retail stores used as banking correspondents have a large presence in Mexican territory. When banks sign a banking correspondent deal, banks register a discontinuous increase in their presence across different municipalities. The service becomes available immediately overnight, thus increasing the geographical coverage of formal financial services. For example, by July 2011, Oxxo (the largest retail stores chain in Mexico) signed its first correspondence deal with Santander, and the bank immediately obtained presence in 325 municipalities in a correspondence format. Moreover, the banks have different constraints in terms of capacity to sign deals and different preferences to sign them. This circumstance yields to heterogeneous effects of the correspondence service. In other words, the effect of signing a correspondence deal with the biggest correspondent is not the same as signing one with the smallest because of differences in the respective correspondent's geographical coverage level. In addition, the effect may vary depending on the characteristics of the location of the stores, namely if the establishment is located in a rural or urban area. In order to test whether this increase in access points has a significant effect on savings, we use a difference in differences model with multiple time periods to estimate the volume of savings and the number of active savings accounts in a given bank after it had contracted a new banking correspondent. To do this, we

construct a database with information on the dates of contracts for different banking correspondent deals and data on monthly savings on a bank-municipality level. Preliminary results showed a positive and significant effect of the entrance of banking correspondents on both the volume of savings and the number of savings accounts. Even though we account for the difference in characteristics of dissimilar municipalities, we do not find a differentiated effect for rural municipalities, where we would expect banking correspondents to have a larger impact. Finally, we find evidence of a possible spillover effect between banks. As a bank begins a new correspondence relation, the bank not only increases its savings but also reduces their competitors' volume of savings and bank accounts primarily due to a substitution effect among financial institutions. This spillover considerably reduces the initial calculated effect.

The structure of this document is the following: Section 2 contains a brief literature review of research relevant to this study. Section 3 describes the banking correspondent model and how this policy relates to branchless banking. Section 4 describes the evolution of banking correspondents in Mexico. Section 5 defines the econometric approach used in this study. Section 6 details the data collected for our model. Section 7 describes our preliminary results, and Section 8 contains the conclusion of the study.

## **2. LITERATURE REVIEW**

There is a large empirical literature that studies the effect of access to financial services on well-being indicators, with most of the research focusing on microfinance institutions and rural banks. For example, Burgess and Pande (2005) find that the expansion of banking services into rural areas significantly reduced poverty. For the Mexican case, both Bruhn and Love (2014) and Ruiz (2013) study the sudden expansion of Banco Azteca and its impact on different economic outcomes. Grupo Elektra—one of the largest retailers in Mexico—suddenly opened a Banco Azteca branch in every one of their stores. More than 800 bank branches simultaneously appeared over the country. Bruhn and Love identify a significant impact of the introduction of Banco Azteca on the number of informal business owners, overall employment, and average income in the treated municipalities. Similarly, when evaluating the impact of the same

event, Ruiz (2013) finds that households in municipalities in which Banco Azteca is present are more likely to borrow from banks and less likely to borrow from pawnshops due to the appearance of the financial service.

In addition, Aportela (1999) measures the impact of the expansion of the public institution Patronato del Ahorro Nacional (Pahnal)<sup>4</sup> on savings, using the Mexican Income and Expenditures National Survey (ENIGH). He identifies a positive effect, where the Pahnal expansion increased the savings rate by around 3%-5%. The effect is even more prominent for the poorest households.

However, a significant gap still seems to exist in the literature on the impact of banking correspondents in Mexico.<sup>5</sup> In Latin America, most of the empirical literature on banking correspondents focuses on Brazil. Assunção (2013) estimates the average entry threshold, that is, the minimum population needed to obtain at least one banking correspondent or one bank branch in Brazil. He finds that the entry threshold for banking correspondents is practically zero, observing a banking correspondent in almost every municipality, whereas bank branches have an entry threshold of 8,000-9,000 people. Rodrigues-Loureiro et al. (2016) find that there is a negative correlation between the existence of banking correspondents and bank branches, hinting that banking correspondents might be substituting some of the functions of bank branches. Nonetheless, banking correspondents attend to a different sector of the population than bank branches, as they are present in municipalities where the average income is considerably lower.

For the Mexican case, two works evaluate the impact of banking correspondents on different economic outcomes. Peña and Vázquez (2012) show that banking correspondents do not have a significant effect on chosen measures of financial inclusion. Their analysis focuses on both savings (measured by a number of accounts and number of debit cards) and credit (via a number of credit cards) as measures of financial inclusion. However, they only analyze the years 2010 and

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<sup>4</sup> Pahnal later came to be Banco de Ahorro Nacional y Servicios Financieros (Bansefi). Its main goal was to promote savings and financial inclusion on a national level, specifically in low-income households.

<sup>5</sup> The banking correspondent model is not extremely common in the world. A broader term called *branchless banking* (mentioned in the following section) has been studied in more detail. See, for example, Ivatury and Mas (2008).

2011, the initial stage of the banking correspondents boom. Using a larger time frame and a different identification strategy, we aim to reevaluate the impact of the banking correspondents model. In addition, we will focus solely on formal savings measures.

Eisele and Villarreal (2015) find that the introduction of banking correspondents in Mexico might have had a positive effect on household income. However, they argue that their results are inconclusive because their study does not account for the fact that many households that use banking correspondents previously had access to financial services.

There are also studies of the physical distance between borrowers and lending banks and its effect on credit conditions. For example, Degryse and Ongena (2005) find evidence of spatial price discrimination, which grows larger as the distance between the lending bank and other potential competitors increases. This point could be relevant in the case of banking correspondents. As banking correspondents appear in different municipalities, market power, and thereby credit conditions, might change. Although not in the scope of this paper, it is important to consider market power changes as another possible impact, for example in the form of spillover effects.

### 3. BANKING CORRESPONDENTS IN MEXICO

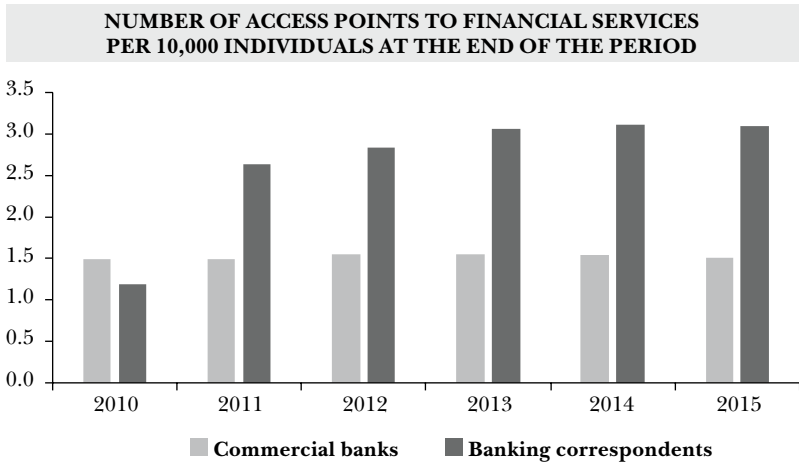
The legal construct of banking correspondents has existed in Mexico since the end of 2009. From 2010 to 2011, the number of banking correspondents per 10,000 individuals increased considerably (from 1.2 to more than 2.5), while the number of banking branches has stayed at almost at the same level throughout all periods (Figure 1).<sup>6</sup> Figure 1 also shows that banking correspondent units' growth rate was almost zero from 2012 to 2016. Nonetheless, as seen in Figure 2, the number of bank-correspondent deals has grown steadily during this period. We observe that smaller banks most commonly adopted the banking correspondent model at first, but the participation of larger banks in this practice sharply increased in 2011 and has steadily grown since then. This means that more banks are operating

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<sup>6</sup> Peña and Vazquez (2012) only observe the first two years of this figure.



Figure 1



Source: CNBV Financial Inclusion Data.

through third-party retail agents, even if the number of physical access points has not increased significantly since 2012.

According to Comisión Nacional Bancariay de Valores (National Banking and Securities Commission, CNBV) financial inclusion data for the first quarter of 2015, there were still 36.1% of municipalities (which only constitutes 4.3% of the total population) that did not have the presence of banking correspondents or bank branches. Conversely, the other 63.9% of municipalities (which constitutes 95.7% of the total population) have at least some means of access to financial services (banking correspondents or bank branches). It is important to note that 14% of all municipalities have banking correspondents as their sole access point, many of which are either rural or semi-rural.

From this perspective, it seems that banking correspondents have improved financial access to municipalities that bank branches alone would not have reached. In terms of usage, results from the ENIF show that banking correspondents usage increased considerably from 2012 to 2015 (Figure 3). The increase is even greater in rural areas, where more than 25% of the population reported that they had used a banking correspondent at least once in the last couple of months prior to the survey. Usage of ATMs also increased, though

Figure 2

EVOLUTION OF CORRESPONDENT-BANK RELATIONS

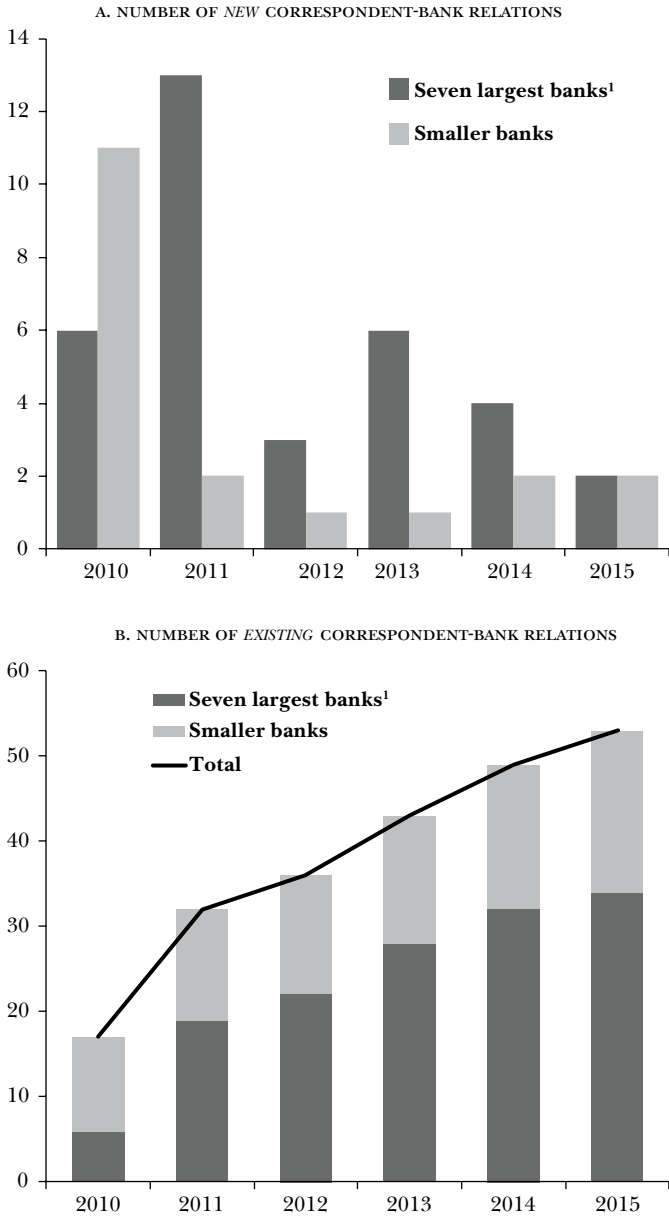
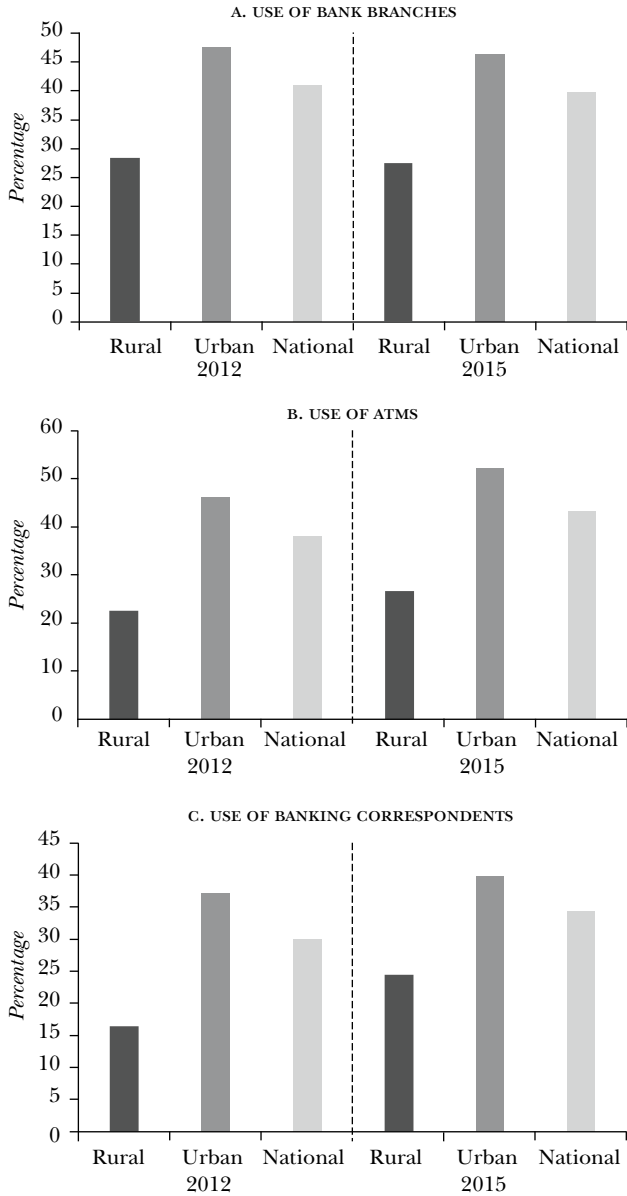


Figure 3

EVOLUTION OF CORRESPONDENT-BANK RELATIONS



Source: National Survey on Financial Inclusion 2012 and 2015.

the most notable rise occurred in urban areas. It should also be noted that the use of bank branches decreased for the same period. As Rodrigues-Loureiro et al. (2016) describe for the Brazilian case, banking correspondents and ATMs might be substituting some of the functions of bank branches in Mexico. This is not necessarily detrimental to financial inclusion, as we already saw that banking correspondents are reaching smaller communities. One possible reading is that banks have found a way to reduce costs and still reach out to new customers by implementing the new banking correspondent model. It is important to mention that we consider ATMs as bank branches because of the difficulty in differentiating between them across the database.

In Figure 4, we plot the average of the difference in formal savings (both number of accounts and volume of bank deposits) between municipalities with the presence of an active banking correspondent and municipalities without correspondents. Figure 4 illustrates a possible impact of banking correspondents on financial inclusion. After signing a new banking correspondent deal, savings (measured both as a number of accounts and total balance) increase.

We have seen the growth, both in presence and usage, of banking correspondents in Mexico, but there are various purposes for which people choose to utilize certain correspondents. Since a distinct variability exists in the agreements established between each bank and its correspondents, the services each bank-correspondent pair offers customers will consequently vary and can limit the overall services available to each customer. For example, while anyone can open a bank account in Oxxo with Banamex,<sup>7</sup> customers cannot open an account with Bancomer, even if Oxxo offers other financial services for Bancomer. Similarly, the agreement that Bancomer has with 7-Eleven (another retail stores chain) is not the same as its agreement with Oxxo.<sup>8</sup> The full range of services that a banking correspondent can offer is the following: making deposits to bank accounts, making loan and services payments, making a cash withdrawal, opening

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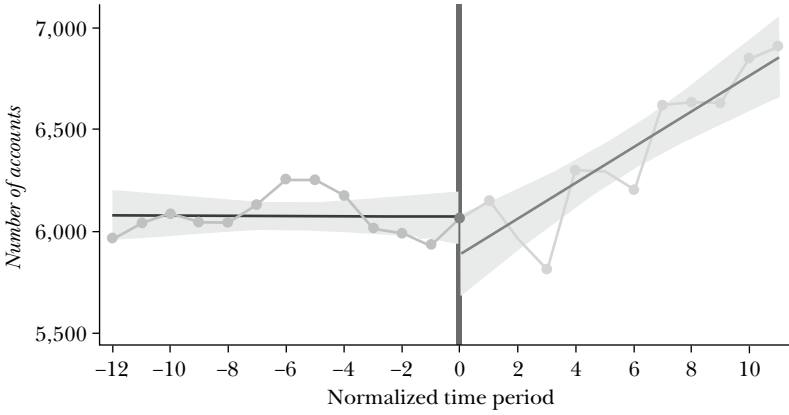
<sup>7</sup> Banamex is a subsidiary of Citibank. Only Banamex offers a certain type of low risk bank account that allows monthly deposits of no more than 800 USD, approximately.

<sup>8</sup> Bancomer only allows Oxxo to process deposits and loan payments. In addition to these services, Bancomer allows 7-Eleven to process service payments.

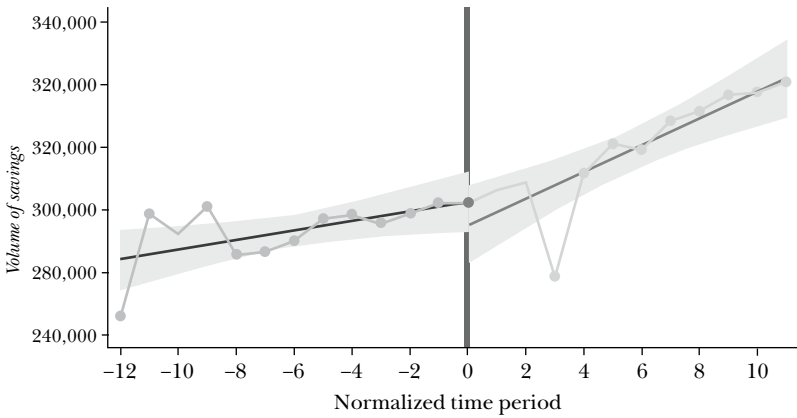
Figure 4

**DIFFERENCES BETWEEN TREATED AND NON-TREATED MUNICIPALITIES BEFORE AND AFTER SIGNING A NEW BANKING CORRESPONDENT DEAL**

AVERAGE DIFFERENCE OF NUMBER OF ACCOUNTS BETWEEN TREATED AND NON-TREATED MUNICIPALITIES ACROSS BANKS (ONE YEAR BEFORE AND ONE YEAR AFTER)



AVERAGE DIFFERENCE OF VOLUME OF SAVING BETWEEN TREATED AND NON-TREATED MUNICIPALITIES ACROSS BANKS (ONE YEAR BEFORE AND ONE YEAR AFTER)



- 95% CI
- Linear prediction of non-treated time period
- Linear prediction of treated time period
- Non-treated time period
- Treated time period

low-risk bank accounts, collecting checks, and checking balance information. However, despite the fact that customers can have access to a full array of financial services, there is a maximum transaction limit for both payments and deposits. As such, we would expect higher usage of banking correspondents among households and lower usage among business enterprises. The variation<sup>9</sup> in the combination of services offered by each correspondent-bank pair is significant because this heterogeneity presents an obstacle for identifying the impact of banking correspondents, as correspondent agreements are not comparable with each other. Nonetheless, we account for potential agency problems by capturing the bank's identity.

On aggregate, almost all banking correspondents accept loan payments and deposits to bank accounts (personal or third party). These two are the most common types of transactions carried out by the banking correspondents (Figure 5). Interestingly, cash withdrawal is a service allowed only to very few banking correspondents, the main agent of which is Telecomm (the Mexican state-owned telegraph company<sup>10</sup>). Nonetheless, it is the third most popular service used in banking correspondents.

To observe the participation of each banking correspondent in the market, we see that Oxxo represents 60% of the total bank-correspondent branches (Figure 6). By bank-correspondent branches, we mean that we are counting a retail agent twice or more if it has double or multiple correspondence relations. Commercial establishments do not necessarily have an exclusive correspondent relation with just one bank. In the former example, Oxxo-Bancomer and Oxxo-Banamex are counted as two different bank-correspondent units, even if the business unit is the same.

In Mexico, Oxxo demonstrates the greatest participation in correspondent banking because they have the largest retail network and have multiple correspondent relations.<sup>11</sup> The next most prominent

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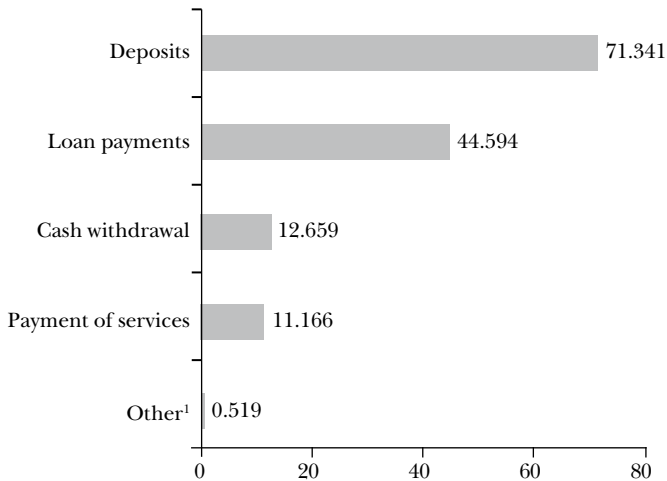
<sup>9</sup> For a full description of services allowed by each bank to their correspondents, see Table 2.18 of the National Report on Financial Inclusion 7 (Consejo Nacional de Inclusión Financiera, 2016)

<sup>10</sup> Telecomm not only provides telegraph services. Its infrastructure now also delivers the federal conditional cash transfer programs and other telecommunication services.

<sup>11</sup> According to Consejo Nacional de Inclusión Financiera (2016), Oxxo provides banking correspondence services to Banamex, BBVA Bancomer, Compartamos, Inbursa, Santander and Scotiabank.

Figure 5

**USE OF SERVICES PROVIDED BY BANKING CORRESPONDENTS,  
TO NOVEMBER 2015**  
Number of transactions



<sup>1</sup> Other services include opening savings accounts, check collection and balance information.

Source: CNBV.

participant is Telecomm, which has a similarly large retail network, presence in rural areas, and offers the cash withdrawal service.<sup>12</sup> Walmart, Soriana, Chedraui, and Coppel are supermarkets or retail stores, normally located in urban or metropolitan areas.<sup>13</sup>

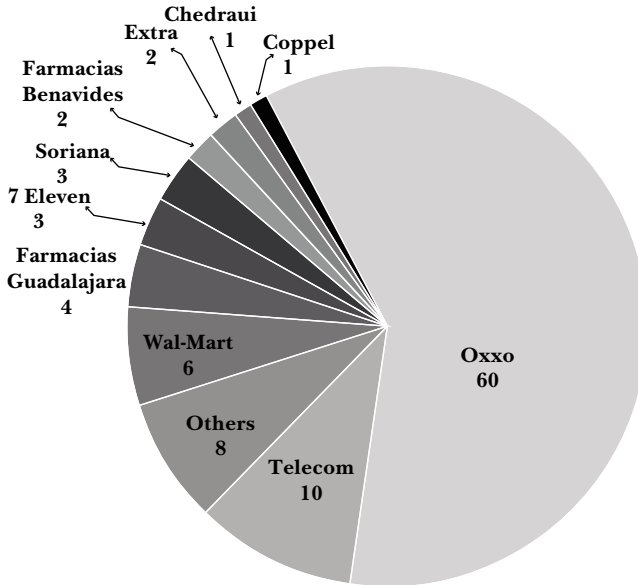
As we can see, there exists an enormous heterogeneity across banking correspondents' agreements, which creates difficulties in addressing their impact on banking savings. The first dimension of heterogeneity is the spectrum of the establishments with which banks

<sup>12</sup> According to Consejo Nacional de Inclusión Financiera (2016), Telecomm has a correspondent agreement with Afirme, Banamex, BBVA Bancomer, Banorte, HSBC, Inbursa, Santander and Scotiabank.

<sup>13</sup> According to Consejo Nacional de Inclusión Financiera (2016), Walmart provides banking correspondence services to American Express, Invex and Walmart Bank; Soriana to American Express, BBVA Bancomer, Banorte, HSBC, Invex, and Scotiabank; and Chedraui to American Express, Banamex, BBVA Bancomer, Banorte, HSBC, Invex, Scotiabank. Coppel only gives services to Bancoppel.

Figure 6

USE OF SERVICES PROVIDED BY BANKING CORRESPONDENTS,  
TO NOVEMBER 2015  
Percentages



Source: CNBV Report on Banking Correspondents.

make banking correspondent deals. Some establishments prefer to place themselves in urban areas (as 7-Eleven and Chedraui) while others prefer rural areas (for example, Telecom). Furthermore, there are banking correspondents like Walmart, which have even larger fixed costs than those of bank branches. Given the presence of bank's plans for expansion, each bank chooses whom to hire as a banking correspondent. After banks choose with whom to work, they then face a second decision: "What services should be included in the correspondence agreement?" This brings a second dimension of heterogeneity to bank-correspondent deals.



## 4. THEORETICAL CONSIDERATIONS ON BANKING CORRESPONDENTS

As described in Mas (2009), the banking correspondent model is only one particular example of branchless banking, where banking transactions are taken out from banking branches and put into non-banking retail agents. Other types of branchless banking are payment cards or mobile phone transactions. The fundamental aim of branchless banking is to lower transaction costs for both the provider and the potential user.

Building bank branches carry an inherently large fixed cost. Thus, bank branches are located in communities where a dense population guarantees a sufficiently large amount of daily transactions. As such, for communities where these criteria are not met (that is, poor and rural communities), the cost is transferred to the population, via traveling and queuing.

By using banking correspondents, banks use existing retail stores as their point of transaction origin, considerably lowering fixed costs to offer banking services. On the other side, customers' transaction costs are also lowered, as they do not have to travel or wait as long to use financial services. In addition, although we would expect banking correspondents to have a more prominent effect on rural areas, they can also have a positive impact on urban areas. Even where bank branches are easily accessible, the presence of banking correspondents can incentivize customers to shift lower-value transactions outside bank branches.

A new banking correspondent deal can be a win-win situation for the three parties involved. Customers have easy access to some financial services, banks attract new customers without incurring in large costs, and banking correspondents win directly through commissions per transaction and indirectly through higher customer traffic. However, Mas (2009) mentions two possible obstacles to banking correspondents achieving success. First, as the potential market per banking correspondent unit is relatively smaller, it is important to cater to as many customers as possible. This is a difficult endeavor for banking correspondents, as they need to attract new customers to a third-party financial institution. The correspondent scheme has to make banking correspondents attractive and profitable for offering these financial services. The second obstacle is that, as the number of customers served by banking correspondents is lower than that of

banking branches, the number of transactions per customer should be as high as possible to generate sufficient business for agents. As such, banking correspondents should offer a wide array of services: savings, credit disbursements and repayments, bill payment, collecting salaries and welfare payments, and remittances, among others. This, as we described in the previous section, has proven difficult in the Mexican case. Not all of the banking correspondents are able to supply the full range of financial services. Only recently were banking correspondents able to open bank accounts, a service still not standard for all correspondents.

## 5. DATA DESCRIPTION

### 5.1 Savings

The savings data we use in this paper comes from the CNBV Regulatory Reports. This report gives detailed information about the number and balance of all types of deposit accounts offered to the public. We use available data from April 2011 to February 2016. This report is particularly useful for our analysis, as it disaggregates the information on a bank-municipality level. For every type of product, we know how many accounts bank  $b$  has in a given municipality  $m$  at time  $t$ .

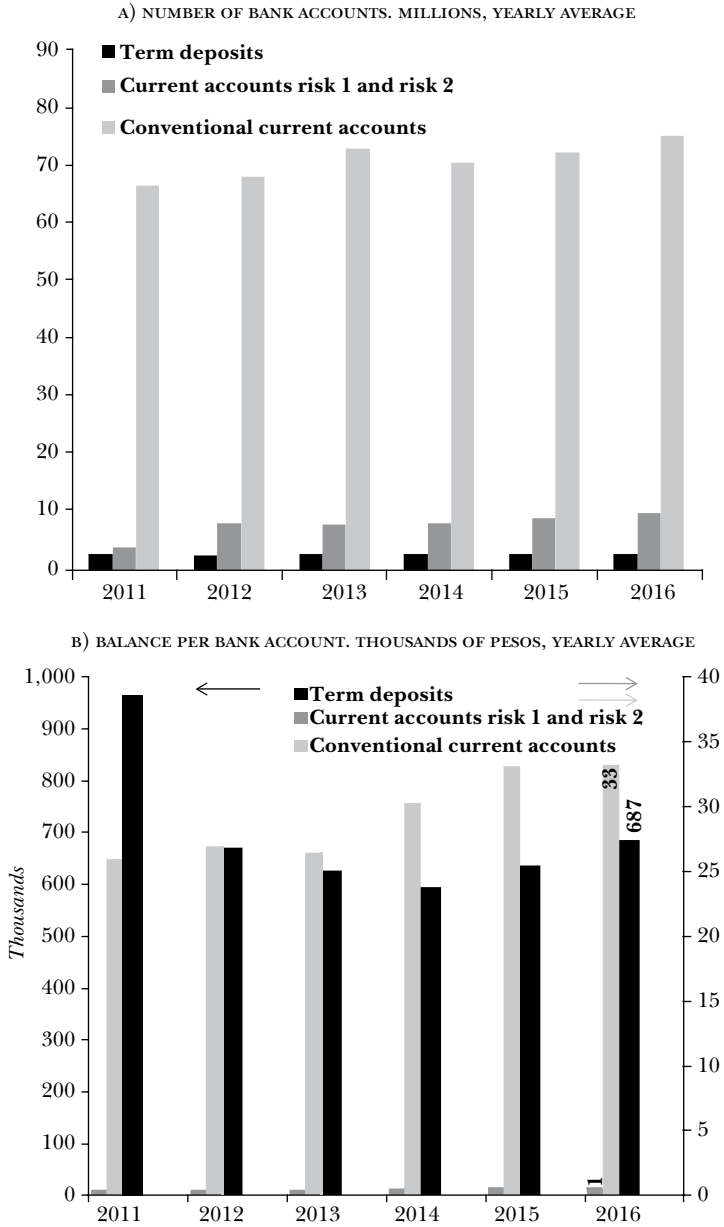
Essentially the banks offer three broad types of deposit accounts:

- 1) Low-risk current accounts. These can only be opened by natural persons and have a maximum monthly balance limit. Some of these accounts can now be opened with banking correspondents.
- 2) Conventional current accounts. These can be opened by natural or juridical persons. These types of accounts have a higher maximum limit or do not have one at all.
- 3) Term deposit accounts. These accounts are subject to a given term in the bank and to interest payments previously agreed.

The great majority of bank accounts is concentrated in conventional current accounts, both in number and average balance terms (Figure 7). In Table 1, we briefly describe savings in volume (or balance) and the number of accounts.

Figure 7

TYPES OF SAVINGS ACCOUNT IN MEXICO



Source: R24 B-2421 Report.

**Table 1**

<i>All banks</i>	<i>Full sample</i>	
	<i>Mean</i>	<i>Standard deviation</i>
<i>Total</i>		
Savings balance by municipality	236,642	1,733,585
Number of accounts by municipality	10,687	66,716
<i>Top seven banks</i>		
Savings balance by municipality	315,477	2,096,402
Number of accounts by municipality	12,147	51,718
<i>Rest of banks</i>		
Savings balance by municipality	83,292	516,423
Number of accounts by municipality	7,847	88,848

As we explained before, we will study changes in the volume of savings and number of accounts. Our savings measure is the sum of all types of accounts, as all of them are saving instruments.

## 5.2 Business Location Information

An important aspect of our empirical strategy is the correct identification of municipalities with and without the presence of retail agents before they become banking correspondents. To do so, we use information from the National Statistics Directory of Economic Units (DENUE) published by the National Institute of Statistics and Geography (INEGI). This directory has location information on all the active commercial establishments in the Mexican territory.

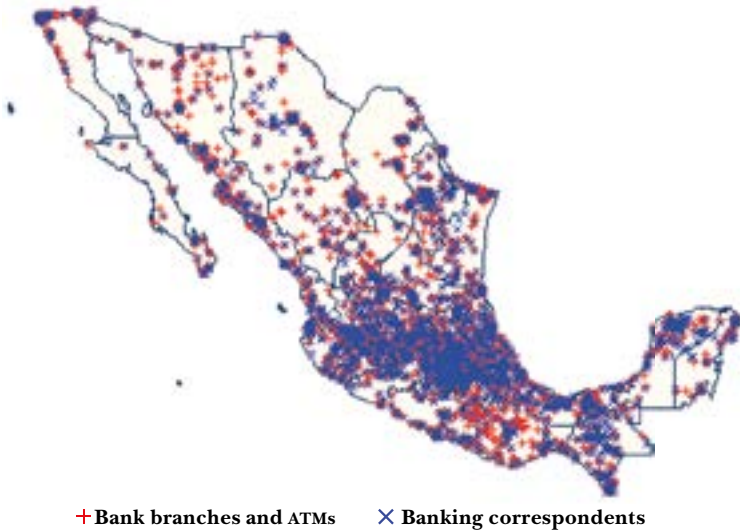
Using the commercial or legal name of the establishments, we identify the biggest banking correspondent chains in Mexico: Oxxo, Wal-Mart, 7-Eleven, Telecomm, Farmacias Guadalajara, Farmacias Benavides, Coppel, Extra, Soriana, Radioshack, Chedraui, Diconsa supermarkets,<sup>14</sup> Comercial Mexicana, Sanborns, FarmaciasABC, and Suburbia. The aforementioned retailers cover more than 95% of the

<sup>14</sup> We used a slightly different strategy to identify Diconsa supermarkets. We identified all the establishments that had the word *Diconsa* on their commercial or legal name. We then filtered them by type of commercial

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Figure 8

**LOCATION OF BANK BRANCHES,  
ATMS AND BANKING CORRESPONDENTS**  
Banking correspondents and bank branches plus ATMs  
February, 2016



Source: DENU.

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banking correspondent units in Mexico. Using the same method, we also identify bank branches and ATMs for each bank. Although the DENU only gives information on active establishments, they give a yearly date of incorporation starting from 2010. This coincides perfectly with the timing of the introduction of banking correspondents. Figure 8 shows how both branch offices (including ATMs) and banking correspondents are distributed all around the Mexican territory. The geographical distribution of banking correspondents seems to overlap that of bank branches and ATMs. By estimating the geodetic distance between a banking correspondent and the closest branch office (or ATM), we find that the average is less than one kilometer

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establishment and only kept those that fell into the supermarkets category.

(approximately 825 meters), and the distance for the 50th percentile is around 300 meters.

By using information from CNBV, we can retrieve the date of the contract between a bank and a correspondent. As such, we can identify which of the aforementioned establishments start giving banking correspondent services for a specific bank on a specific date. In Table 2, we see the maximum number of banking correspondent deals by the institution (bank and retail chain). We see that the biggest banks and retail stores have the highest number of deals.

**Table 2**

**MAXIMUM NUMBER OF DEALS BY INSTITUTION**

<i>Bank</i>	<i>Maximum number of deals with correspondents in the pPeriod</i>	<i>Correspondent</i>	<i>Maximum number of deals with banks in the period</i>
BBVA Bancomer	11	Chedraui	8
Banamex	7	Oxxo	7
American Express	6	Soriana	7
HSBC	5	Walmart	5
Invex	5	Suburbia	5
Banorte	4	Seven Eleven	4
Inbursa	3	Farmacias Guadalajara	3
Santander	2	Extra	3
Scotiabank	2	Comercial Mexicana	3
Compartamos	2	Farmacias Benavides	2
Banco del Bajío	1	Farmacias ABC	2
Afirme	1	Telecomm	1
Monex	1	Coppel	1
BanCoppel	1	Radioshack	1
Consubanco	1	Dicons	0
		Sanborns	0

## 6. EMPIRICAL METHODOLOGY

### 6.1 Basic Model

Our study aimed to quantify the effect of the implementation of the banking correspondent model on households in Mexico, primarily on their formal savings. We define formal savings as savings deposited in bank accounts, both in number and volume in Mexican pesos. The first step in our identification strategy relies on studying the effect that contracting a new banking correspondent relation has on savings for a given bank. As discussed above, we exploit the cross-municipality variation in banking correspondent units. Depending on the date of the agreement, establishments that, for example, were only convenience stores a few days before are now able to provide some basic financial services. Figure 4 illustrates the dynamics of savings, measured by both the number of accounts and the volume of savings, before and after signing a new banking correspondent deal. We identify the date of activation and assume that all the establishments become active banking correspondents after that date. Note that the difference between bank-municipalities pairs that were treated (i.e., a banking correspondent was activated) and those that were not increases after the date of treatment.

This variation allows us to use a difference in difference model with multiple time periods in the following form:

$$\ln(s_{b,m,t} + 1) = \gamma_b + \theta_m + \tau_t + \delta(\text{Num Corresp}_{b,m,t}) + \beta_1(\text{Bank Br}_{b,m,t}) + \beta_2(\text{Num Corresp}_{b,m,t} * \text{Bank Br}_{b,m,t}) + \beta_3 X_{m,t} + \varepsilon_{b,m,t},$$

where  $s_{b,m,t}$  is a measure of savings (number of accounts or balance volume in Mexican pesos) in municipality  $m$  taken by bank  $b$ . On all of our estimations, we use two measures of savings: a log of the number of accounts plus 1 and a log of savings volume plus 1. These transformations allow us to include those bank-municipalities for which savings were zero at some point in time. In this specification, the variable of interest is the number of *active* correspondence relations that bank  $b$  has at time  $t$  in municipality  $m$ ,  $\text{Num Corresp}_{b,m,t}$ . We identify only the number of commercial chains, not establishments, working as banking correspondents in that municipality  $m$  and for bank  $b$ . As bank  $b$  signs more banking correspondence deals, this

variable will have a heterogeneous effect on different municipalities depending on the presence of the banking correspondents and the presence of other deals. *Bank*  $Br_{b,m,t}$  is a dummy variable indicating if there are bank branches of bank  $b$  in municipality  $m$  at time  $t$ . Finally, we include an interaction indicating the effect of the presence of different banking correspondence relations with the presence of at least one bank branch of bank  $b$  in municipality  $m$  at time  $t$ . This last interaction would indicate if the presence of bank branches boosts or dampens the presence of banking correspondents. As such, we do not expect a specific sign on  $\beta_2$ .  $X_{m,t}$  is a vector of control variables that can help account for possible time-varying non-observed characteristics between municipalities. In this vector, we include the number of retail store chains in municipality  $m$  at time  $t$ , whether they have a banking correspondent deal with bank  $b$  or not. This variable will help control for nonobserved infrastructure in the municipality, given by the presence of different convenience stores, supermarkets or pharmacies. We also include an interaction of the previous variable with the presence of bank branches at municipality  $m$  at time  $t$ . The interaction seeks to account for different effects of the number of chains over savings between municipalities with and without bank branches.  $\gamma_b, \theta_m$  and  $\tau_t$  are bank, municipality, and time fixed effects, respectively.

For our identification strategy to be valid, we need to assume that average differences in savings between the two groups of focus, bank-municipality pairs—with and without a banking correspondent—would have been the same before and after signing the banking correspondent deal. Trends should not be different for each of these groups. If the savings growth rate were to be greater for bank-municipality pairs with a soon to be banking correspondent *before* signing the banking correspondent deal, then we would be detecting a spurious positive effect. Additionally, to control for possible differences in bank growth rates we include a bank-specific time trend in our specification. Finally, we account for possible differences in bank- and time-fixed effects between those bank-municipality pairs with and without branch offices.



## 7. RESULTS

In the following subsections, we present our results on an aggregate level, discuss a potential spillover effect, and finally present the results disaggregated by the type of municipality (rural or urban).

### 7.1 Basic Model

First, we investigate the impact of the *number* of active banking correspondent *chains* with our entire sample. Table 3 shows results for the number of accounts and volume of savings, respectively. Column 1 shows only a basic estimation, without any of the aforementioned fixed effects. We see that for both the volume of savings and the number of savings accounts, there is a positive relation between banking correspondents and savings. As we would expect, the presence of bank branches is also positively correlated with savings. In column 2, we add the previously mentioned control variables for infrastructure. As expected, we observe higher savings in municipalities with a larger presence of potential banking correspondents (convenience stores, supermarkets, and pharmacies, among others). Note that the coefficient of interest is significantly lower when including these controls. As we now distinguish between the activation of banking correspondents and the presence of the commercial establishment, the effect is not overestimated, correcting for a possible omitted variable bias.

As we add the fixed effects, we see that the estimated impact of banking correspondents diminishes. Still, columns 3 and 4 indicate that the introduction of banking correspondents increases savings significantly in both the volume of savings and the number of savings accounts (around 30%).

Column 4 of Table 3, in terms of the number of accounts, indicates that the introduction of banking correspondents increases the number of savings accounts significantly in both municipalities with and without bank branches (10.1% and 33.3% respectively, as read in the marginal effects box). As we expected, the effect seems to be larger for those municipalities without bank branches, while both marginal effects remain positive. Likewise, in terms of the volume of bank deposits, column 4 of Table 3 shows that the introduction of banking correspondents increases the volume of savings significantly

Table 3

## BASIC MODEL, BANK-MUNICIPALITY LEVEL RESULT

	Coefficient (standard error)							
	$\ln(\text{Number of accounts}+1)$	$\ln(\text{Balances}+1)$						
	(1)	(2)	(3)	(4)				
<i>A. Characteristics of the municipality in the last period</i>								
Number of active correspondent chains at the municipality	3.171 <sup>a</sup> (0.101)	1.650 <sup>a</sup> (0.103)	0.319 <sup>a</sup> (0.0712)	0.333 <sup>a</sup> (0.0728)	4.179 <sup>a</sup> (0.130)	2.021 <sup>a</sup> (0.135)	0.292 <sup>a</sup> (0.0956)	0.306 <sup>a</sup> (0.0973)
Branch offices by bank	7.637 <sup>a</sup> (0.0551)	6.737 <sup>a</sup> (0.0822)	5.685 <sup>a</sup> (0.155)	5.833 <sup>a</sup> (0.158)	10.60 <sup>a</sup> (0.0762)	9.330 <sup>a</sup> (0.115)	7.884 <sup>a</sup> (0.207)	7.942 <sup>a</sup> (0.210)
Number of active correspondent chains at the municipality*branch offices by bank	-2.598 <sup>a</sup> (0.102)	-1.270 <sup>a</sup> (0.103)	-0.267 <sup>a</sup> (0.0728)	-0.232 <sup>a</sup> (0.0738)	-3.526 <sup>a</sup> (0.131)	-1.640 <sup>a</sup> (0.136)	-0.248 <sup>b</sup> (0.0992)	-0.226 <sup>b</sup> (0.1000)
<i>B. Additional controls related to infrastructure</i>								
Number of commercial chains at the municipality	0.685 <sup>a</sup> (0.0269)	0.421 <sup>a</sup> (0.0404)	0.376 <sup>a</sup> (0.0429)	0.972 <sup>a</sup> (0.0354)	0.536 <sup>a</sup> (0.0551)	0.501 <sup>a</sup> (0.0573)		
Number of commercial chains at the municipality*branch offices by bank	-0.486 <sup>a</sup> (0.0282)	-0.139 <sup>a</sup> (0.0329)	-0.144 <sup>a</sup> (0.0328)	-0.691 <sup>a</sup> (0.0375)	-0.237 <sup>a</sup> (0.0489)	-0.236 <sup>a</sup> (0.0488)		

*C. Fixed effects controls*

Time-fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Municipality-fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Bank-fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Bank-time trend-fixed effects	No	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes
Branch offices*time-fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Branch offices*bank-fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R <sup>2</sup>	0.722	0.752	0.940	0.947	0.702	0.734	0.946	0.951				

Number of observations 416,068

Note: the coefficients of time-, bank-, municipality- and bank-time trend-fixed effects are not shown in this table. <sup>a, b, c</sup> indicate statistical significance at 1%, 5%, 10%. The model does not have a constant.

MARGINAL EFFECT OF THE PRESENCE OF AN ACTIVE CORRESPONDENT RELATION

*Municipalities with correspondent chains*

	<i>Number of accounts</i>	<i>Volume of savings</i>
With branch offices	0.101	0.08
Without branch offices	0.333	0.306

in both municipalities with and without bank branches, by 8% and 30.6% respectively.

These preliminary results suggest that the appearance of banking correspondents does have a positive and significant effect on savings. Nonetheless, in this specification, we are not considering two very important dimensions. First, the introduction of banking correspondents might have different impacts depending on the type of municipality. Second, banking correspondents might be experiencing a spillover effect between banks. That is, as new banking correspondents appear, customers might be changing from one bank to another. In the following subsections, we try to study these dimensions.

## **7.2 Rural vs. Urban**

If we expect banking correspondents to have a positive impact on savings, there would be a greater effect on the communities in which access to financial services is more limited. According to INEGI, there are six types of municipalities depending on the population size: rural, in transition, semi-urban, urban, semi-metropolis, and metropolis. Based on these categories, we use a broader classification. We define rural as both rural and in transition municipalities. Urban aggregates all other classifications: urban, semi-urban, metropolis and semi-metropolis. Our database has information on 1,054 urban municipalities and 1,401 rural municipalities that account for 2,455 Mexican municipalities.

Table 4 shows the results of estimating the basic model in Section 6.1, while interacting the independent variables with a rural dummy variable. Contrary to what we might expect, we do not find a significantly greater effect of banking correspondents on rural municipalities than on urban municipalities. That is, although there is a significant effect on both rural and urban, there is no evidence of a heterogeneous effect between these different types of municipalities. Column 3 of Table 4 suggests that the introduction of banking correspondents increases the number of savings accounts in municipalities without bank branches for both rural and urban areas by 20.6%. This positive effect is also homogeneous between rural and urban municipalities (17.9%) in terms of the volume of savings (column 6 of Table 4 and the bottom box of marginal effects).

For urban municipalities with branch offices, the effect on the number of savings accounts is 3.5%, and 17.9% on volume of savings

(second column of the bottom box). However, in the case of rural municipalities with a presence of bank branches, we find that the marginal effect of banking correspondents is negative (shadowed). Since there is only a small number of rural municipalities with branch offices and correspondent chains, further analysis is necessary to assess that there was not, in fact, a negative impact on the presence of correspondent relations in these municipalities.

### 7.3 Spillover Effects

Finally, since our observation units are bank-municipality pairs, there may be other banks in the same municipality with new active correspondents. As a consequence, the bank's competition may be triggering a spillover effect on savings records. This effect is important in terms of financial inclusion. Banking correspondents might affect a bank level but not the aggregate level, as customers (already financially included) are simply changing their savings from one institution to another.

In this exercise, the explanatory variable varies slightly. We build a new variable, defined as the total number of active correspondent chains in municipality  $m$ , minus the number of correspondent chains working for bank  $b$ . If the number is too large, then there are many banking correspondents *not* working for bank  $b$ , and as such, we would expect its coefficient to be negative. We then proceed to estimate the model described in Section 6.1.

We report our findings in Table 5. In terms of the number of savings accounts, the activation of a new correspondent for another bank reduces the number of accounts by 10.8% if the municipality has bank branches, and by 26.8% if the municipality does not have branch offices. For the case of the volume of savings, the activation of a new correspondent for another bank reduces the volume of savings by 8.5% if the municipality has bank branches, and by 24% if the municipality does not have branch offices.

These results suggest that even though the positive effect of the activation of a correspondent is very strong, the negative effect of the activation of a competitor correspondent at the same municipality may considerably decrease this effect.

Table 4

## RESULTS BY TYPE OF MUNICIPALITY

	Coefficient (standard error)		
	$\ln(\text{Number of accounts}+1)$	$\ln(\text{Balances}+1)$	
	(1)	(2)	(3)
<i>A. Characteristics of the municipality in the last period</i>			
Number of active correspondent chains	0.521 <sup>a</sup> (0.0797)	0.170 <sup>b</sup> (0.0798)	0.206 <sup>b</sup> (0.0821)
Branch offices by bank	8.442 <sup>a</sup> (0.160)	5.845 <sup>a</sup> (0.176)	7.832 <sup>a</sup> (0.178)
Number of active correspondent chains*branch offices by bank	-0.173 (0.0816)	-0.499 <sup>a</sup> (0.0808)	-0.171 <sup>b</sup> (0.0821)
Rural*number of active correspondent chains*branch offices by bank	-0.0235 (0.144)	-0.165 (0.128)	-0.0235 (0.128)
Rural*branch offices by bank	-0.354 (0.248)	-0.647 <sup>c</sup> (0.226)	-0.358 (0.226)
Rural*number of active correspondent chains*branch offices by bank	-1.403 <sup>a</sup> (0.416)	-0.755 (0.337)	-1.448 <sup>a</sup> (0.339)
<i>B. Additional controls related to infrastructure</i>			
Number of commercial chains in the municipality	0.561 <sup>a</sup> (0.0323)	0.619 <sup>a</sup> (0.0411)	0.561 <sup>a</sup> (0.0432)
Number of commercial chains in the municipality*branch offices by bank	-0.238 <sup>a</sup> (0.0335)	-0.241 <sup>a</sup> (0.0331)	-0.241 <sup>a</sup> (0.0330)
Rural*number of commercial chains in the municipality	0.195 <sup>b</sup> (0.0789)	0.197 <sup>b</sup> (0.0589)	0.163 <sup>a</sup> (0.0591)

Rural*number of commercial chains in the municipality*branch offices by bank	0.242 (0.180)	0.424 <sup>b</sup> (0.166)	0.390 <sup>b</sup> (0.166)	0.355 (0.235)	0.611 <sup>a</sup> (0.231)	0.569 <sup>b</sup> (0.227)
<i>C. Fixed effects controls</i>						
Time-fixed effects	No	Yes	Yes	No	Yes	Yes
Municipality-fixed effects	No	Yes	Yes	No	Yes	Yes
Bank-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank-time trend fixed effects	No	No	Yes	No	No	Yes
Rural*time-fixed effects	No	Yes	Yes	No	Yes	Yes
Rural*municipality-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Rural*bank-fixed effects	No	Yes	Yes	No	Yes	Yes
Rural*bank-time trend fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.915	0.874	0.917	0.923	0.947	0.952
Number of observations	416,068					

Note: the coefficients of time-, bank-, municipality- and bank-time trend-fixed effects are not shown in this table.

<sup>a</sup>, <sup>b</sup>, <sup>c</sup> indicate statistical significance at 1%, 5%, 10%. The model does not have a constant.

	Number of accounts		Volume of savings	
	Rural	Urban	Rural	Urban
With branch offices	-1.053	0.035	-1.224	0.179
Without branch offices	0.206	0.206	0.179	0.179

Table 5

		SPILLOVER EFFECTS				
		Coefficient (standard error)				
		$\ln(\text{Number of accounts}+1)$				
		(1)	(2)	(3)		
		$\ln(\text{Balances}+1)$				
		(1)	(2)	(3)		
<i>A. Characteristics of the municipality in the last period</i>						
Total active correspondent chains -active correspondent chains for bank <i>b</i>	-1.648 <sup>a</sup> (0.0831)	-0.142 <sup>b</sup> (0.0590)	-0.268 <sup>a</sup> (0.0649)	-2.231 <sup>a</sup> (0.113)	-0.133 <sup>c</sup> (0.0797)	-0.240 <sup>a</sup> (0.0868)
Branch offices for bank <i>b</i>	6.740 <sup>a</sup> (0.0820)	5.602 <sup>a</sup> (0.156)	5.781 <sup>a</sup> (0.161)	9.342 <sup>a</sup> (0.114)	7.816 <sup>a</sup> (0.207)	7.915 <sup>a</sup> (0.213)
(Total active correspondent chains-active correspondent chains for bank <i>b</i> ) *branch offices for bank <i>b</i>	1.276 <sup>a</sup> (0.0839)	0.112 <sup>c</sup> (0.0619)	0.160 <sup>b</sup> (0.0650)	1.877 <sup>a</sup> (0.114)	0.109 (0.0847)	0.155 <sup>c</sup> (0.0881)
<i>B. Additional controls related to infrastructure</i>						
Number of correspondent chains in the municipality	1.699 <sup>a</sup> (0.0470)	0.547 <sup>a</sup> (0.0428)	0.555 <sup>a</sup> (0.0460)	2.312 <sup>a</sup> (0.0628)	0.652 <sup>a</sup> (0.0570)	0.663 <sup>a</sup> (0.0598)
Number of correspondent chains in the municipality*branch offices for bank <i>b</i>	-1.262 <sup>a</sup> (0.0481)	-0.232 <sup>a</sup> (0.0402)	-0.256 <sup>a</sup> (0.0413)	-1.802 <sup>a</sup> (0.0645)	-0.325 <sup>a</sup> (0.0552)	-0.345 <sup>a</sup> (0.0560)



	Coefficient (standard error)					
	ln(Number of accounts+1)			ln(Balances+1)		
	(1)	(2)	(3)	(1)	(2)	(3)
<i>C. Fixed effects controls</i>						
Time-fixed effects	No	Yes	Yes	No	Yes	Yes
Municipality-fixed effects	No	Yes	Yes	No	Yes	Yes
Bank fixed effects	No	Yes	Yes	No	Yes	Yes
Bank-time trend-fixed effects	No	No	Yes	No	No	Yes
Branch offices*time-fixed effects	No	Yes	Yes	No	Yes	Yes
Branch offices*bank-fixed effects	No	Yes	Yes	No	Yes	Yes
R <sup>2</sup>	0.755	0.940	0.947	0.738	0.946	0.951
Number of observations	416,068					

Note: the coefficients of time-, bank-, municipality- and bank-time trend-fixed effects are not shown in this table. <sup>a, b, c</sup> indicate statistical significance at 1%, 5%, 10%. The model does not have a constant.

MARGINAL EFFECT OF ACTIVATION OF THE CORRESPONDENT RELATION (calculated with results in the last column)		
	Number of accounts	Volume of savings
With branch offices	-0.108	-0.085
Without branch offices	-0.268	-0.240

## 7.4 Municipal-level Estimations

In our final exercise, we also considered an analysis at municipal level to observe the aggregate effects of the activation of the correspondent service. By using information on a municipal level, instead of bank-municipality, we can capture the spillover effect and determine if there is still a final increase in formal savings. To do so, we considered the following model:

$$\ln(\bar{s}_{m,t} + 1) = \theta_m + \tau_t + \delta(\text{NumCorresp}_{m,t}) + \beta_1(\text{PresBank } Br_{m,t}) + \beta_2(\text{NumCorresp}_{m,t} * \text{PresBank } Br_{m,t}) + \beta_3 X_{m,t} + \beta_4 Z_{m,t} + \varepsilon_{m,t},$$

where  $\bar{s}_{m,t}$  is also a measure of average savings of banks at the municipality  $m$  at time  $t$ . We use average savings by municipality because we want to study the effect on the average bank.  $\text{NumCorresp}_{m,t}$  refers to the total number of banking correspondent *relations* at municipality  $m$  at time  $t$ , and  $\text{PresBank } Br_{m,t}$  is a dummy variable that has a value of 1 if the municipality has the presence of at least one branch office of any bank and 0 otherwise.  $X_{m,t}$  is the usual vector of control variables that includes the number of retail store chains at municipality  $m$  at time  $t$ . Additionally, we include a set of dummy variables indicating which banks report nonzero savings for municipality  $m$ .  $Z_{m,t}$  is a vector of control variables related to the proportion of banks reporting either zero number of accounts or zero volume of savings, depending on each case. That is,  $Z_{m,t}$ , includes a variable that ranges from 0 to 1 and measures the proportion of nonreporting banks as well as the interactions with all the control variables considered for this specification. All other variables, namely the fixed effects, have the same definition of the basic model. Errors are clustered at a municipal level.

The results in Table 6 show that, on aggregate, banking correspondents do have a positive effect on the number of savings accounts. We estimate a 20% impact for municipalities *without* branch offices but only a 1% increase in municipalities *with* branch offices. In terms of the volume of savings, we do not see a statistically significant effect.

## 8. CONCLUSIONS

In this paper, we estimate the effect on the volume of savings and the number of active accounts for a given bank-municipality after it contracts a new banking correspondent relation through a difference in differences model with multiple time periods. We provide evidence that banking correspondents have had a positive effect on formal savings in Mexico, measured both by the number of accounts and volume of savings. This impact seems to be homogenous for both rural and urban areas, as we do not find a differentiated effect for rural municipalities. It is important to highlight that we cannot distinguish if this increase in formal savings is due to an increase in overall savings or just a shift from informal to formal services.

We also find that the impact of banking correspondents at a bank-municipality level is largely due to a spillover effect. Our results show that the activation of banking correspondent deals inside the municipality can have a negative impact on rival banks. Customers might be changing from one institution to another, depending on the activation of banking correspondents for other competing banks. This spillover is prominent, but there still seems to be a positive effect at the aggregate level. Finally, these findings contrast with those of Peña and Vázquez (2012), who do not find banking correspondents to have any effect on financial inclusion.

Table 6

<b>MUNICIPAL-LEVEL RESULTS</b>		<i>Coefficient (standard error)</i>				
	<i>ln[(Number of accounts / number of banks at the municipality)+1]</i>	<i>ln[(Savings / number of banks at the municipality)+1]</i>				
	(1)	(2)	(3)	(1) (2) (3)		
<i>A. Characteristics of the municipality in the last period</i>						
Number of active correspondent chains at the municipality	-1.159 <sup>a</sup> (0.314)	0.195 <sup>c</sup> (0.115)	0.206 <sup>c</sup> (0.109)	-1.951 <sup>a</sup> (0.441)	0.148 (0.136)	0.170 (0.126)
Existence of branch offices	8.164 <sup>a</sup> (0.0380)	2.166 <sup>a</sup> (0.0639)	2.233 <sup>a</sup> (0.0639)	11.50 <sup>a</sup> (0.0527)	2.414 <sup>a</sup> (0.0839)	2.532 <sup>a</sup> (0.0836)
Number of active correspondent chains at the municipality*existence of branch offices	1.164 <sup>a</sup> (0.314)	-0.285 <sup>b</sup> (0.115)	-0.193 <sup>c</sup> (0.110)	1.979 <sup>a</sup> (0.441)	-0.306 <sup>b</sup> (0.136)	-0.136 (0.127)
<i>B. Additional controls related to infrastructure</i>						
Number of commercial chains at the municipality	4.984 <sup>a</sup> (0.141)	0.749 <sup>a</sup> (0.0755)	0.738 <sup>a</sup> (0.0753)	7.416 <sup>a</sup> (0.205)	0.931 <sup>a</sup> (0.0946)	0.906 <sup>a</sup> (0.0940)
Number of commercial chains at the municipality*existence of branch offices	-4.798 <sup>a</sup> (0.141)	-0.507 <sup>a</sup> (0.0767)	-0.633 <sup>a</sup> (0.0773)	-7.280 <sup>a</sup> (0.205)	-0.635 <sup>a</sup> (0.0964)	-0.856 <sup>a</sup> (0.0966)

*C. Fixed effects controls*

Time-fixed effects	No	Yes	Yes	No	Yes	Yes
Bank-fixed effects	No	Yes	Yes	No	Yes	Yes
State-fixed effects	No	Yes	Yes	No	Yes	Yes
Bank-time trend-fixed effects	No	No	Yes	No	No	Yes
<i>D. Extra controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.703	0.956	0.958	0.666	0.958	0.961
Number of observations	209,792					

Note: the coefficients of time-, bank-, municipality- and bank-time trend-fixed effects are not shown in this table. <sup>a</sup>, <sup>b</sup>, <sup>c</sup> indicate statistical significance at 1%, 5%, 10%. The model does not have a constant. Extra controls are integrated by a dummy of the proportion of banks reporting zero accounts from the total of banks reporting a number of accounts at the municipality *m* and its respective interactions with all the characteristics of the municipality at that period.

MARGINAL EFFECT OF ACTIVATION OF THE CORRESPONDENT RELATION  
AT MUNICIPALITIES WITH CORRESPONDENT CHAINS

	<i>Effect on number of accounts</i>	<i>Effect on volume of savings</i>
With branch offices	0.013	0
Without branch offices	0.206	-0

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