The Real Impact of Improved Access to Finance: Evidence from Mexico

MIRIAM BRUHN and INESSA LOVE[*]

ABSTRACT

This paper provides new evidence on the impact of access to finance on poverty. It highlights an important channel through which access affects poverty—the labor market. The paper exploits the opening of Banco Azteca in Mexico, a unique "natural experiment" in which over 800 bank branches opened almost simultaneously in preexisting Elektra stores. Importantly, the bank has focused on previously underserved low-income clients. Our key finding is a sizeable effect of access to finance on labor market activity and income levels, especially among low-income individuals and those located in areas with lower preexisting bank penetration.

IT IS WELL RECOGNIZED that financial development is important for economic growth (Levine (2005)). Several recent papers also find a positive correlation between access to finance and poverty alleviation at the country level (Honohan (2004), Beck, Demirguc-Kunt, and Levine (2007), Demirguc-kunt, Beck, and Honohan (2008)). However, these papers tend to face identification issues, and thus they do not necessarily establish a causal relationship between access to finance and economic outcomes. Similarly, while the microfinance industry has grown exponentially in the past few decades and many researchers have written on the topic,[1] there is little systematic evidence on the casual impact of microfinance on economic activity (Karlan and Morduch (2009)).[2] This paper's first objective is to fill this gap by providing new evidence on the impact of access to finance on poverty. In particular, we provide evidence suggesting that improved access to finance for low-income individuals can play an important role in poverty alleviation.

Such evidence is important given that several recent randomized evaluations question the influential role previously attributed to microfinance in poverty

[1] See, for example, Pitt and Khandker (1998), Coleman (1999), Kaboski and Townsend (2005), McKernan (2002), and Pitt et al. (2003).

[2] See also Tim Harford, The battle for the soul of microfinance, *The Financial Times*, December 6, 2008.

alleviation.[3] These studies have intensified the debate on the role of finance in reducing poverty and have highlighted the importance of measuring plausible magnitudes of the effect.

In addition, there is little evidence on the channels through which finance may help to reduce poverty. This paper's second objective is to provide evidence on one such channel, namely, the labor market channel. The role of finance in the labor market has come into question after the recent financial crisis, which resulted in enormous job losses, particularly in countries with more developed financial sectors (Pagano and Pica (2012)). However, we find that there is a significant and positive impact of financial access on labor market outcomes. These results suggest that finance may alleviate poverty, at least in part, through its labor market effects.

Finally, this paper's third objective is to provide new insights that may influence the effectiveness of microfinance institutions (MFIs). We study the impact of a new bank for low-income individuals that has been able to leverage its relationship with a large retail chain to reduce transaction costs, acquire effective information, and enforce loan repayment. We discuss how these features can solve several problems that constrain standard MFIs, allowing them to play a larger role in poverty alleviation. The paper offers concrete suggestions on how policymakers can spur access to finance.

More specifically, we use a unique event—the opening of Banco Azteca in Mexico in October 2002—to evaluate the impact of increased access to financial services for low-income individuals on entrepreneurial activity, employment, and income. This event was unique in that Banco Azteca opened branches in all of the existing stores of its parent company—Grupo Elektra, a large retailer of consumer goods. Almost overnight, Banco Azteca established the second-largest network of branches in the country. This set a world record of a bank opening more than 800 branches at once.

An important feature of Banco Azteca was that from the start it catered to low- and middle-income groups that had been largely excluded from the commercial banking sector.[4] Capitalizing on Grupo Elektra's decades of experience in making small installment loans for its merchandize, rich data, and established information and collection technology, the bank was uniquely positioned to target this segment of the population, which it estimated to comprise over 70% of all households. Many of these households were part of the informal economy—operating small informal businesses that lacked the documentation necessary for obtaining bank loans. The nature of Azteca's operations, including low documentation requirements and motorcycle-riding loan officers that come to the borrower's house, as well as the size of the loans offered make it comparable to MFIs that operated in Mexico at the time of Azteca's opening. However, there are also important differences with MFIs that we discuss later.

We use the predetermined nature of the branch locations—which were opened in all stores of its parent company, Grupo Elektra—to identify the

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[3] See Banerjee et al. (2010) and Karlan and Zinman (2011).

[4] In fact, Banco Azteca's motto is "We changed banking, now it's your time to change" ("*Cambiamos la banca, cambia tú también*").

casual impact of Azteca's opening on economic activity through a difference-in-difference strategy. Specifically, we compare the changes in outcome variables before and after Azteca's opening across municipalities with preexisting Grupo Elektra stores and those without stores at the time of the bank opening. Our analysis controls for the possibility that time trends in outcome variables may be different between municipalities that had Grupo Elektra stores and those that did not. Using the Mexican National Employment Survey (ENE), we study the impact of this event on individuals' employment choices and income levels.

We have five main findings. First, the new bank opening led to a 7.6% increase in the proportion of informal businesses, but no change in formal businesses. This result is consistent with news reports suggesting that Azteca targeted lower-income individuals and also with Azteca's low documentation requirements. In contrast, formal business owners have easier access to commercial bank credit, and likely prefer it because of the higher interest rates charged by Azteca.[5]

Second, the new bank opening led to a 7% increase in income levels on average over two years. Similar to this result, Burgess and Pande (2005) find that the expansion of bank branches in rural India had a significant impact on alleviating poverty, although Kochar (2005) and Panagariya (2006) cast doubt on their findings.

While Burgess and Pande do not examine the channel through which increased bank presence alleviates poverty, we are able to investigate the effect of Banco Azteca's opening in more detail by considering how the impact varies with pre-event occupation. We find that the increased availability of financial services helped existing informal business owners continue their operations instead of closing their business and transitioning to being wage earners or not employed. This is consistent with evidence suggesting that microentrepreneurs have very high rates of return on capital, and hence would benefit from increased access to finance (see McKenzie and Woodruff (2008) and De Mel, McKenzie, and Woodruff (2008)).[6]

Third, Banco Azteca's opening led to a 1.4% reduction in the proportion of not employed individuals (i.e., individuals who are either unemployed or not in the labor force) and increased income for this segment of the population.[7] This is

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[5] When Azteca opened, it charged interest rates of about 40% per annum, while commercial banks charged rates of 20% to 40%. However, commercial banks rejected all but the most creditworthy customers (*The Dallas Morning News*, October 31, 2002). The inflation rate was comparatively low when Azteca opened, 3.6% in 2003 and 4.5% in 2004 (based on the consumer price index from the Mexican Statistical Institute, INEGI), implying that Azteca's real interest rates were about 35% per annum.

[6] Our findings are also consistent with Banerjee and Duflo (2012), who use an exogenous change in regulation that made credit more available to some firms to show that this increase in credit led to an increase in firms' sales and profits. The firms in their sample, however, are larger firms that receive credit from traditional banks.

[7] Our results on income are not as strong as our results on employment choices because of the nature of the data. The data set we use is designed to measure labor market participation rather than income or consumption. This implies that the quality of the labor market participation data is likely to be higher than the quality of income data available in the survey.

because some previously not employed individuals opened informal businesses and others were more likely to work as wage earners after Banco Azteca's opening. These results on employment and income mirror Karlan and Zinman's (2010) finding that increased availability of consumer credit has a range of positive outcomes on the household well-being, including an increased ability to retain employment and increased income. Karlan and Zinman's analysis includes only individuals that work as wage earners. Our study, however, shows that increased access to finance has positive effects on self-employment, as well as on wage work.

Fourth, we find that the impact was heterogeneous across different segments of the population by performing two sample splits. First, consistent with the fact that Azteca targeted the low- to middle-income population, we find that its impact was larger for individuals with below-median income levels. Second, we find that the impact was larger in municipalities that were relatively under-served by the formal banking sector before Azteca opened (measured by bank branch penetration). These results confirm that the channel through which Banco Azteca had an impact on real activity was through increased access to financial services.

Finally, we show that real GDP per capita growth rates have also increased following the introduction of Banco Azteca. These growth results further illustrate the positive effect that access to finance for low-income individuals has on economic activity and income.

Our paper is related to a literature on U.S. banking deregulation, which exploits the natural experiment of gradual relaxation of restrictions on statewide branching and on entrance by out-of-state banks. This relaxation of restrictions resulted in increased presence of banks in different states, which is somewhat akin to the entry of Banco Azteca. Some of the results of this literature parallel ours: Jayaratne and Strahan (1996) find a 0.5% to 1.19% increase in the economic growth rate. Black and Strahan (2002) find an increase in new firm incorporations of up to 8%.

Also closely related to our work, Beck, Levine, and Levkov (2010) find that banking deregulation resulted in a reduction in income inequality through the impact on labor market conditions. While we do not test for this directly in this paper, the entrance of Banzo Azteca has likely led to increased bank competition, similar to what Cetorelli and Strahan (2006) find in the United States: they argue that deregulation has led to increased competition and a larger presence of small firms. Despite some similarities with previous research, the unique feature of Banco Azteca—the targeting of low-income, previously un-banked individuals—makes it an important case for studying the real effects of bank expansion.

The rest of the paper is organized as follows. Section I offers detailed background on Banco Azteca's opening and its impact on the financial sector, as well as a comparison between Azteca and MFIs. Section II lays out our empirical strategy. Section III describes the data. Section IV presents our regression results, and Section V concludes.

I. Background on Banco Azteca

A. Characteristics of Banco Azteca

In March 2002, one of Mexico's largest retailers of electronics and household goods, Grupo Elektra, received a banking license. In October 2002, Grupo Elektra launched Banco Azteca, opening 815 branches in all preexisting Grupo Elektra stores. From the outset, Banco Azteca targeted low- and middle-income customers, historically underserved by the traditional banking industry. As the *New York Times* reports, "The bank was the first and only all-Mexican-owned franchise to be licensed by the Finance Ministry since 1994. It is also the first bank to aim at Mexico's middle and working classes: the 73 million people who live in households with combined family incomes of $250 to $4,000 a month, a mass market largely neglected by Mexico's banking system."[8]

Upon its launch, Banco Azteca benefited from synergies with their retail operations, which provided a rich source of data on their customers. With Elektra's 48 years of know-how in selling goods on installment to lower-income consumers, Banco Azteca had information on approximately 4 million borrowers. Many of these borrowers buy Elektra's products, develop film at its stores, or receive money transfers from the United States through Western Union. "We know this segment of Mexican society better than anyone else," says Banco Azteca President Carlos Septien.[9] "The sophisticated technology and collection systems already in place at Grupo Elektra will provide us with invaluable data about our customers' buying habits and financial needs, allowing us to succeed." The fact that Azteca branches are located in Elektra stores where clients make other purchases and transactions also has marketing benefits since it brings the bank closer to individuals who may otherwise be reluctant to approach a traditional commercial bank for a loan.

The bank also inherited a 3,000-strong army of motorcycle-riding loan agents. These agents carry handheld computers loaded with Elektra's rich database, which includes customers' credit histories and even names of neighbors who might help track down delinquent debtors.[10] "The difference between Elektra and more established banks is that Elektra has a much better collection system," said Joaquin Lopez-Doriga, an analyst with Deutsche-Ixe. "If you want to address the market that Elektra is addressing, you have to know it very well. That's very labor intensive."[11]

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[8] Lucy Conger, A bank for Mexico's working families, *The New York Times*, December 31, 2002.

[9] Geri Smith, Banco Azteca caters to the little guy—in appliance stores, *Business Week*, January 13, 2003.

[10] Geri Smith, Banco Azteca caters to the little guy—in appliance stores, *Business Week* 54, January 13, 2003.

[11] Lorraine Orlandi, Banco Azteca bikers reach out to Mexico's poor, *Reuters News*, September 21, 2003.

Banco Azteca requires less documentation than traditional commercial banks, often taking collateral and co-signers instead of valid documents. For example, *Business Week*[12] reported on an informal carpenter with no proof of income obtaining an Azteca loan using as collateral the items he bought on credit from Elektra stores in the past three years. Despite the high interest rate (48% per annum), the carpenter noted that "I don't really have any other options." Even today, many of Azteca's customers are informal business owners who do not have the proof of income required by other banks.

In summary, its unique information and collection technology and synergies with Elektra's retail operations have allowed Banco Azteca to extend credit to segments of the low-income population that were previously unbankable.

B. Increase in Financial Services Availability

Azteca began its operations by offering savings accounts targeted to low-income customers that could be opened with as little as $5. Within the first month, 157,000 accounts were opened, increasing to 250,000 accounts by the end of December 2002. At its opening in October 2002, Banco Azteca also took over the issuance of installment loans, which were previously issued by Elektrafin, the financing unit of Grupo Elektra's retail stores. These loans had an average amount of $250. Although these loans were tied to merchandize, they could be used for business purposes. For example, purchasing a new sewing machine or a refrigerator might allow a person to start or sustain a micro business. In 2003, Azteca started offering $500 consumer loans not tied to merchandize, with an average term of one year (Grupo Elektra's 2003 and 2004 Annual Reports). Toward the end of 2003, Azteca expanded into the mortgage and insurance business.

Although Grupo Elektra was disbursing installment loans before opening Banco Azteca, Banco Azteca's new savings accounts allowed its loan portfolio to expand significantly. Figure 1 plots Grupo Elektra's loan portfolio within Mexico over time, showing a steep increase from the fourth quarter of 2002 on. The loan portfolio increased from around 2 billion Mexican pesos at the time of the bank's opening to 10 billion Mexican pesos in the last quarter of 2004. Although this portfolio size is small compared to the total commercial bank credit to the private sector, which was about 550 billion Mexican pesos in the fourth quarter of 2002, it is large compared to the credit disbursed by smaller institutions that cater to low-income households. The combined portfolio of the largest MFIs in Mexico stood at only 0.5 billion Mexican pesos in the fourth quarter of 2004. In this same quarter, the total amount of outstanding loans from credit unions was 8.7 billion Mexican pesos.

Figure 2 shows the relative difference in the number of savings accounts in municipalities with Azteca versus those without Azteca. Data on savings accounts come from the Mexican bank supervisory body, Comisión

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[12] Geri Smith, Banco Azteca caters to the little guy—in appliance stores, *Business Week* 54, January 13, 2003.
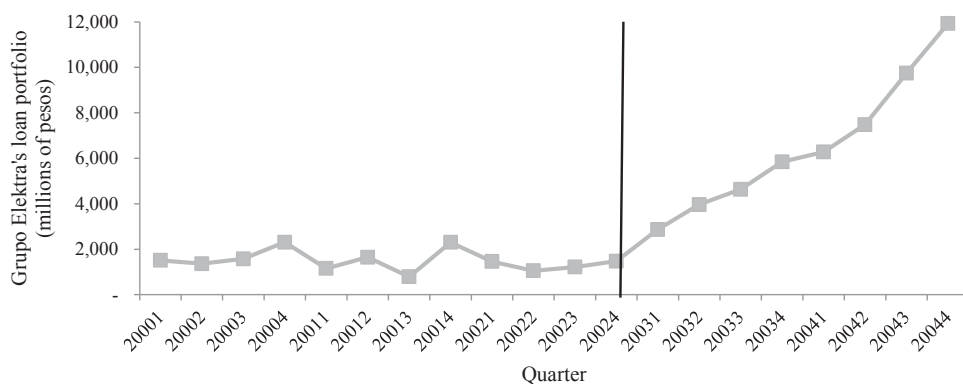
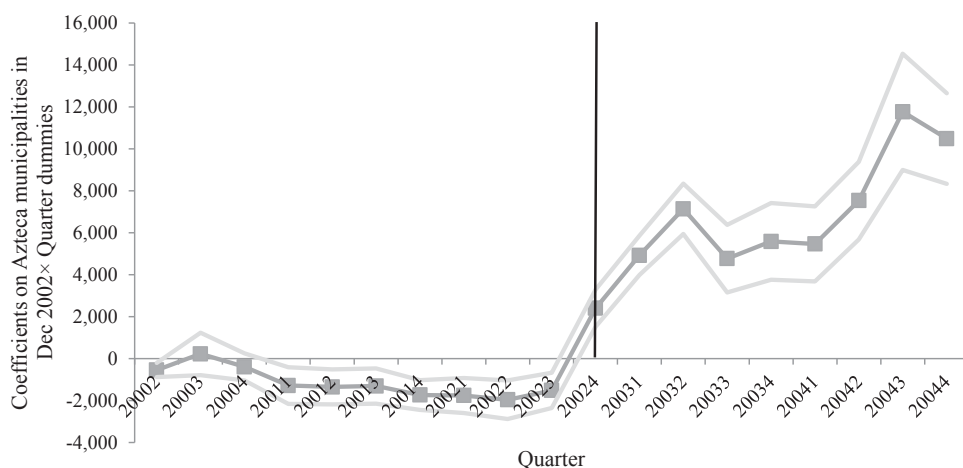**Figure 1.** Grupo Elektra's loan portfolio within Mexico over time.

Figure 2. Effect of Banco Azteca's opening on savings accounts over time.

Nacional Bancaria y de Valores (CNBV). As can be seen in the figure, there is clear rapid growth in savings accounts in municipalities with Azteca after December 2002.[13] These effects are also significant in a regression framework that controls for municipality-specific time trends.

In a related paper, Ruiz (2012) shows that individuals in municipalities where Banco Azteca opened were three times more likely to use bank credit and 46% less likely to obtain pawn shop credit. Thus, the opening of Banco Azteca had a nontrivial impact on the availability of financial services in municipalities where the branches were present.

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[13] Unfortunately, we cannot perform the same regression analysis for loans since we do not have data on loans pre- and post-Azteca's opening at the municipality level.

C. Comparison of Azteca and MFIs

Banco Azteca is similar to microfinance organizations (MFIs) in two respects. First, as noted above, Azteca offers loans of $250 to $500. This is comparable in size to loans offered by several microfinance organizations, which in 2002 amounted to about $360 on average.[14] Second, Azteca and MFIs serve similar types of clients. As discussed above, Azteca has low documentation requirements and hence is able to extend loans to informal businesses. Furthermore, it explicitly targets low-income segments of the population, similar to MFIs.

However, there are several important differences between Azteca and MFIs. First, Azteca is able to accept deposits, which reduces its cost of funds and enhances its growth opportunities, while MFIs are usually funded by donor funds or other capital. Second, Banco Azteca is regulated and supervised as any other commercial bank and hence it has to comply with CNBV reporting requirements and has participated in the deposit insurance program. In contrast, MFIs are not regulated as banks, they cannot take deposits, and they are not required to comply with reporting requirements. As a result, accounting information reported by MFIs is often deemed less reliable than that of regulated banks. In particular, MFIs usually underestimate nonperforming loans (NPLs) and are more lenient with restructuring loan terms. Third, Azteca is uniquely positioned to take advantage of economies of scale due to the synergies with its parent company, Grupo Elektra. As a result, it has a significant advantage in information technology and collection mechanisms. These differences have allowed Azteca to reduce operating costs despite the small loan size.

We present a comparison of Azteca and MFI operating costs, interest rates, and default rates in the Internet Appendix.[15] Data on Azteca come from CNBV and data on MFIs come from MIXmarket.org. Because Compartamos is unique among Mexican MFIs in many respects (such as going public with a controversial initial public offering in 2007, as discussed in Cull, Demirgüç-Kunt, and Morduch (2009)), we present data separately for Compartamos and the rest of the Mexican MFIs.[16] Operating costs are measured as noninterest expenses over assets, the interest rate is given by the ratio of interest income and fee income on loans to total loans, and the NPL is the ratio of problem loans to total loans, which is a commonly used measure of the default rate. The interest rate captures the average effective interest rate on loans.

The results reported in the Internet Appendix show that Azteca has lower operating costs than MFIs. Compartamos has lower operating costs than the average MFI, but higher costs than Azteca. With respect to interest rates, Azteca charges lower rates than MFIs. On average, the rates are about 40% for Azteca, in the 70% to 90% range for Compartamos, which is well known for its high interest rates, and about 60% to 70% for other MFIs. Again, Azteca's

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[14] Microfinance loan size is the average for all MFIs available on MIXmarket.org.

[15] The Internet Appendix may be found in the online version of this article.

[16] Data for MFIs are not available before 2004. For this reason, we start the comparison in 2004.

lower operating costs are likely a factor that allows it to charge lower interest rates than MFIs. Finally, in terms of default rates, Azteca has lower default rates than reported by most MFIs, but higher default rates than those of Compartamos.[17]

To summarize, these comparisons confirm the assertions above that Azteca's information and collection technology and synergies with Elektra's retail business have indeed contributed to its lower operating costs, which have allowed it to charge lower interest rates. The Azteca model may offer several solutions to the drawbacks of standard MFIs, specifically, the methods to reduce operating costs. In the conclusion (Section V), we discuss policy implications derived from Banco Azteca's features and experience, and we suggest specific measures that can spur access to finance for low-income individuals.

II. Identification Strategy

To identify the effect of Banco Azteca's opening on economic activity, we exploit cross-municipality and cross-time variation in Azteca branches. As discussed above, Banco Azteca opened in October 2002 in the municipalities that had preexisting Grupo Elektra stores. This allows us to estimate the following difference-in-difference regression, which compares municipalities with and without Banco Azteca before and after Azteca's opening:

$$y_{ict} = \alpha + \beta_c + \gamma_t + \delta^* Azteca_{ct} + \pi^* Z_{ict} + \varepsilon_{ict},$$

where i denotes individuals, c denotes municipalities, t denotes quarters, β is a set of municipality fixed effects, γ is a set of quarter fixed effects, Z is a matrix of individual control variables, and y is one of our outcome variables, such as an indicator for employment status (formal or informal business owner, wage earner, or not employed) or income level (described in more detail in the next section). Our main variable of interest is the dummy *Azteca*, which is the interaction between a post–third quarter 2002 dummy and a dummy that equals one for municipalities that had at least one Azteca branch in the fourth quarter of 2002 and zero for all other municipalities in our sample. The coefficient δ is our estimate of the effect of Banco Azteca's opening. We cluster standard errors at the municipality level.[18]

The assumption needed to guarantee that this identification strategy is valid is that, in the absence of Banco Azteca's opening, the average difference between outcome variables across municipalities with and without Azteca would have been the same post-October 2002 as pre-October 2002. That is, outcome variables can differ in levels across municipalities with and without Azteca, but they cannot differ in changes. This assumption would be violated if, for example, the number of informal businesses was on a steeper growth path in

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[17] The caveat noted above about reporting requirements implies that NPLs reported by MFIs may underestimate true problem loans, suggesting that the differences in NPLs are even larger than they appear in the Internet Appendix.

[18] Without clustering, our results are statistically significant at the 0.001% level.

municipalities with Azteca than in municipalities without Azteca. If this were the case, we could detect a positive effect of Banco Azteca's opening on the number of informal businesses when there was actually no effect.

While the identification assumption is fundamentally untestable since we do not observe the counterfactual of Banco Azteca not having opened, we verify whether the assumption is likely to hold in three ways. First, as is common in the literature, we test for parallel pre-event trends in outcome variables across municipalities with and without Azteca. If the changes were the same in the preperiod, they are likely to have remained the same in the postperiod in the absence of Azteca's opening.

Second, we run regressions that control for the possibility of municipalities with and without Azteca having different linear time trends. If our estimated effects are driven entirely by differences in trends, then these effects should disappear once we control for time trends in the regressions. We do this in three ways. First, we allow all municipalities with an Azteca branch to have the same time trend, and all municipalities without an Azteca branch to have a different time trend. Second, we allow each municipality to have its own time trend (i.e., municipality-specific time trends). Third, we investigate the selection process for Elektra and include additional municipality characteristics interacted with time trends to account for the possibility that such characteristics might be driving our results.

Finally, we examine graphically whether the estimated change in outcome variables in municipalities with a Banco Azteca branch coincides with the time of Banco Azteca's opening.

III. Data

All of our main outcome variables come from ENE, the survey that the Mexican government relies on to calculate unemployment statistics and measure the size of the informal sector. This survey has been conducted quarterly since the second quarter of 2000 and covers a random sample of approximately 150,000 households each quarter. Households remain in the survey for five consecutive quarters. We use data from the second quarter of 2000 to fourth quarter of 2004 (19 quarters in total). After the fourth quarter of 2004, ENE was changed to a new survey.[19]

We choose to use ENE data in our analysis for several reasons. First, this survey includes detailed questions about a person's economic activity (including self-employment), and reports a person's income from her main occupation. Second, it captures and distinguishes between formal and informal self-employment and firms, making it possible to investigate the effect of Banco

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[19] We do not use data from the new survey for two reasons. First, the question that distinguishes informal from formal business owners is different in the new survey, implying that one of our main outcome variables is not consistent across the two surveys. Second, Banco Azteca started opening new branches after initially establishing branches in all preexisting Elektra stores. This means that our identification strategy is less valid for later years.

Azteca on informal firms. This feature is important since many of Banco Azteca's clients are likely to be informal business owners, as discussed above. Third, ENE covers a wide range of municipalities for 10 quarters before Banco Azteca opened and 9 quarters after, allowing us to implement the identification strategy described above.[20] Fourth, the panel structure of ENE allows us to describe the effect of Banco Azteca more precisely by looking at the impact on different prereform occupation groups.

ENE covers a total of 1,222 municipalities, but we drop those that do not have any bank (i.e., neither an Azteca branch nor any other bank branch) since Azteca opened almost exclusively in municipalities that already had a branch of a different bank.[21] We determine which municipalities had a bank branch in the fourth quarter of 2002 and which had an Azteca branch by referring to data from CNBV. Our final sample includes 576 municipalities, of which 249 had an Azteca branch in the fourth quarter of 2002, and 327 did not have an Azteca branch but had a branch of a different bank. Figure 3 provides a map of Mexico where municipalities that had an Azteca branch in the fourth quarter of 2002 are marked in dark gray, and municipalities that had a different bank branch but no Azteca branch are marked in light gray. Both types of municipalities are distributed throughout Mexico.

Since our analysis applies to potential Banco Azteca clients who could be economically active, we keep only individuals of working age (between the ages of 20 and 65) in our sample. We then construct three of our main outcome variables by creating dummy variables for each person in the sample, indicating whether the person (i) owns an informal business, (ii) owns a formal business, or (iii) is a wage earner.[22] These are the three possible occupations for somebody

[20] It is important to point out that the way the ENE sample is constructed implies that a municipality-year average is not necessarily representative of the municipality in that year. The sample selection procedure randomly selects households at a small geographic unit, the AGEB (Basic Geo-Statistical Area). All AGEBs within a state are first stratified by socioeconomic characteristics. Within each stratum, a certain number of AGEBs is chosen at random. Households are then chosen at random within the AGEB. This procedure implies that it could be the case that only some socioeconomic groups get selected in a given municipality in a given year. However, since the strata are randomly chosen, this remains in expectation a random sample of the households in a municipality, so that the estimate should remain unbiased.

[21] Only 6 out of the 249 Azteca municipalities in ENE did not have a bank branch before Azteca opened, while slightly more than half of all ENE municipalities did not have a bank branch. For the whole of Mexico, only 28% of all 2,451 municipalities had a bank branch at that time. ENE is representative for cities, but only includes a random sample of rural municipalities. Out of all 696 municipalities with a bank branch in Mexico, 120 are not in ENE, while only 8 municipalities with Azteca are not covered by ENE. The municipalities without a bank branch in ENE tend to be rural with few inhabitants, and, while comprising a little over half of the municipalities, they only contain 12% of individuals in ENE. Dropping these municipalities reduces our sample size by 12%. At the same time, reducing the number of municipalities from over 1,200 to close to 600 has computational advantages as it allows us to control for municipality-specific time trends. To assess whether dropping municipalities without banks influences our results, we ran our main regressions with Azteca group time trends in the full sample of municipalities. The results are similar to those reported in the paper and are presented in the Internet Appendix.

[22] A detailed description of how these variables were constructed is available in Bruhn (2008).
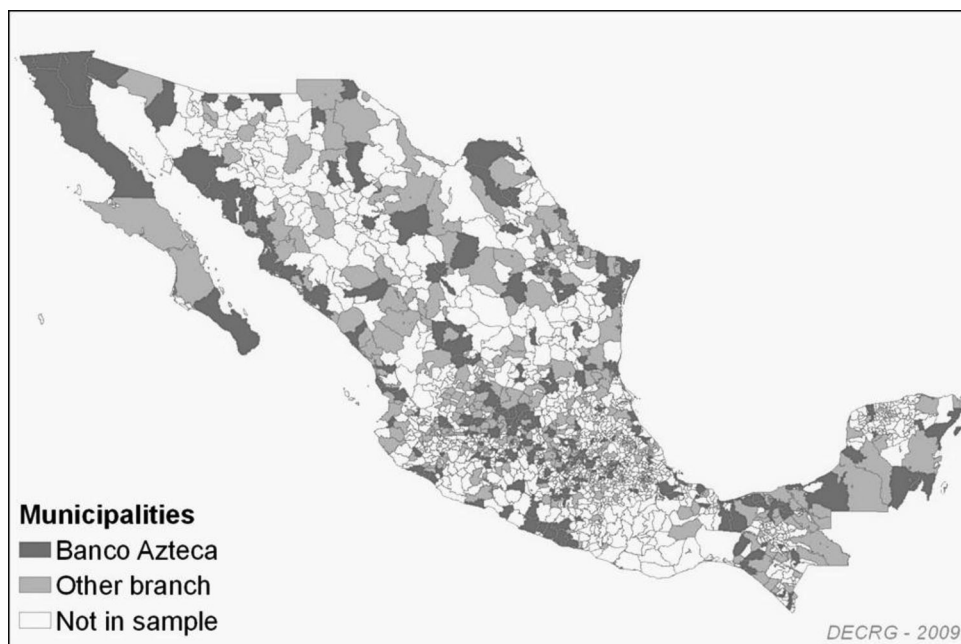
Figure 3. Map of municipalities with Banco Azteca branches and other bank branches.

who is employed. People who do not fall into any of these categories are not employed (they are either unemployed or not in the labor force).

All dummies are defined for the whole sample, meaning that they denote the percentage of all individuals in the sample who fall into each category. For example, a value of 0.08 for the formal business owner dummy means that 8% of all people between the ages of 20 and 65 own a formal business.

Finally, we use monthly income as an outcome variable. While the dummy variables are defined for everybody in our sample, income is available only for the gainfully employed and is missing for the unemployed, for individuals who are out of the labor force, and for unpaid workers. Unfortunately, the income data from ENE are probably not as reliable as the occupation data since income is not the focus of the survey. Indeed, the survey only includes one question on income, asking for earnings from the individual's main occupation. Of the employed individuals, 4.2% do not answer this question. These individuals are then asked to report their income in terms of bins of the minimum wage. About 60% of those who do not report their income in the first question report it in terms of the minimum wage (2.4% of the total sample). Taking these responses into account, we create a dummy variable indicating whether an individual earns above minimum wage.[23] We use this measure as an additional outcome variable.

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[23] For the 95.8% of individuals who reported income as amounts, we convert these figures as amounts to multiples of the minimum wage using information on the minimum wage from the

The upper panel of Table I, Panel A, includes summary statistics for the outcome variables split into municipalities that had at least one Azteca branch in the fourth quarter of 2002 and municipalities that did not have an Azteca branch at that time but had at least one branch from a different bank. The data in Table I are for the pre–Banco Azteca period, including only observations between the second quarter of 2000 and the third quarter of 2002. The averages in columns 1 and 2 of Table I show that, in municipalities with an Azteca branch, 8.2% of individuals in the sample owned an informal business in the pre-Azteca period. This number is higher for municipalities without an Azteca branch, at 13.8%. The percentage of formal business owners is somewhat smaller, at 7.9% in municipalities with a Banco Azteca and 6.6% in other municipalities. Another 50% (44%) of our sample worked as wage earners in municipalities with (without) Azteca. The remaining 34% (36%) of the sample were not employed.

The third column of Table I, Panel A, reports differences in prereform averages for municipalities with and without Azteca and their statistical significance. Individuals who live in municipalities with Azteca are more likely to be employed, more likely to work as wage earners, and more likely to own a registered business. However, they are less likely to own an informal business. Moreover, individuals in municipalities with Azteca have a higher average monthly income than individuals in municipalities without Azteca.

The fact that pre-Azteca outcomes are different across our treatment and control municipalities does not necessarily invalidate the identification strategy, but differences in levels may be correlated with differences in changes. As discussed in Section II, the identification strategy assumes that changes in outcome variables (not levels) are the same in municipalities with and without Azteca. The lower part of Table I, Panel A, compares preperiod changes in outcome variables across Azteca and non-Azteca municipalities. There is no statistically significant difference in average changes across these municipalities for the informal and formal business owner dummies. The fraction of wage earners, however, decreased in Azteca municipalities in the pre-Azteca period, while it increased in non-Azteca municipalities. This is also reflected in the fact that the fraction of people who are not employed increased in Azteca municipalities while it decreased in non-Azteca municipalities. These differences in changes are statistically significant and could bias our results against finding a positive effect on the fraction of wage earners. Similarly, the fraction of people who earn above minimum wage and also income increased more in non-Azteca municipalities than in Azteca municipalities, which could also bias our results against finding a positive effect on these income variables. In our regressions, we control for different linear time trends in Azteca and non-Azteca municipalities to correct for these biases. Overall, there is no indication that differences in trends across municipalities could lead us to find a positive effect that is not actually there, implying that our estimates are on the conservative side.

National Commission for Minimum Wages (Comision Nacional de Salarios Minimos, CONASAMI, http://www.conasami.gob.mx).

<div align="center">

Table I

Pre-Azteca Comparison of Municipality Characteristics

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In Panel A, columns 1 and 2 report group means for each variable with standard errors in parentheses, and column 3 reports the *t*-test for differences in the means with standard errors clustered at the municipality level. Employed individuals include wage earners and self-employed/business owners. Changes are changes in ENE municipality averages from one quarter to the same quarter of the next year, using data from the second quarter of 2000 to the third quarter of 2002. In Panel B, columns 1 and 2 report group means for each variable with standard errors in parentheses, and column 3 reports the *t*-test for differences in the means. All values are real (converted to 2011 pesos using the GDP deflator from the World Development Indicators database). 1993 (1998) GDP per capita is calculated as a municipality's 1993 (1998) value added, divided by its 1995 (2000) population. To reduce noise in the data, we dropped top and bottom 1% outliers. Significance levels: * 10%, ** 5%, and *** 1%.

	Municipalities with an Azteca branch in Dec 2002 (1)	Municipalities without Azteca, but with other branch in Dec 2002 (2)	Difference (Azteca non-Azteca) (3)
Panel A. Pre-Azteca Averages of Individual-Level Variables (ENE Data)			
Outcome Variables: Levels			
Informal business owner dummy	0.0821	0.1380	−0.0560***
	(0.2745)	(0.3449)	(0.0087)
Formal business owner dummy	0.0790	0.0656	0.0134***
	(0.2697)	(0.2475)	(0.0033)
Wage earner dummy	0.4969	0.4403	0.0566***
	(0.5000)	(0.4964)	(0.0111)
Not employed dummy	0.3417	0.3560	−0.0143**
	(0.4743)	(0.4788)	(0.0067)
Above minimum wage dummy	0.5827	0.4763	0.1064***
	(0.4931)	(0.4994)	(0.0161)
Log(1 + monthly income)	4.9999	4.4705	0.5294***
	(3.9346)	(3.8103)	(0.0918)
Outcome Variables: Changes			
Informal business owner change	−0.0023	−0.0010	−0.0013
	(0.0388)	(0.0551)	(0.0021)
Formal business owner change	0.0049	0.0055	−0.0005
	(0.0264)	(0.0360)	(0.0014)
Wage earner change	−0.0038	0.0031	−0.0068***
	(0.0486)	(0.0690)	(0.0026)
Not employed change	0.0012	−0.0075	0.0087***
	(0.0467)	(0.0649)	(0.0025)
Above minimum wage change	0.0001	0.0059	−0.0059**
	(0.0516)	(0.0650)	(0.0026)
Log monthly income change	0.0311	0.0982	−0.0671***
	(0.3612)	(0.4593)	(0.0182)
Panel B. Pre-Azteca GDP per Capita Level and Growth (Census Data)			
Average 1993 GDP per capita (pesos)	26,359	12,354	14,005***
	(26,163)	(20,777)	(2,037)
Average 1998 GDP per capita (pesos)	30,450	15,910	14,539***
	(28,134)	(27,353)	(2,360)
Average 1993 to 1998 GDP per capita growth rate (%)	24	44	−20***
	(45)	(67)	(5)

Table II
Impact on Entrepreneurial Activity

Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at municipality level). Regressions include quarter and municipality fixed effects, as well as individual-level control variables. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

	Dependent Variable					
	Informal business owner dummy			Formal business owner dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Azteca*Post-Sep 2002	0.0062**	0.0057**	0.0067**	−0.0039*	−0.0014	−0.0003
	(0.0027)	(0.0027)	(0.0027)	(0.0022)	(0.0021)	(0.0021)
R^2	0.069	0.069	0.069	0.051	0.051	0.052
No. of obs.	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268
Group time trend	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes

To further investigate pre-Azteca differences across municipalities, in Table I, Panel B, we report GDP per capita levels and growth rates for Azteca and non-Azteca municipalities. These data come from the 1994 and 1999 Economic Census, as well as the 1995 and 2000 Population Censuses (municipal-level GDP is only available every five years). The table shows that Azteca municipalities had higher average GDP per capita than non-Azteca municipalities in 1993 and 1998. However, non-Azteca municipalities had a higher average GDP per capita growth rate from 1993 to 1998. This pattern suggests that income was converging across Azteca and non-Azteca municipalities in the pre-Azteca period[24] and is consistent with what we reported in Panel A using labor market survey (ENE) data. The lower growth rates in Azteca municipalities prior to Azteca's opening may bias our analysis against finding a positive impact of Azteca's opening. Thus, it is important to control for preexisting trends in our regressions, which is our preferred specification.

We also use a number of individual background variables from ENE as control variables in the regressions. These variables include age, gender, marital status, and education dummies. Summary statistics for these background variables and their preperiod changes are in the Internet Appendix.

IV. Results

A. Business Owners

We first investigate the impact of Banco Azteca's opening on entrepreneurial activity. Table II presents the results for the informal and formal business owner dummies as dependent variables. We find that the opening

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[24] We also ran a regression of GDP per capita growth rates on base year GDP per capita and find that municipalities that had higher GDP per capita in 1993 had a statistically significantly lower growth rate from 1993 to 1998 (significant at the 2.1% level).

of Banco Azteca had a positive and statistically significant impact on the fraction of informal business owners. The coefficient on our variable of interest remains statistically significant and similar in size when we include a separate time trend for the Azteca and non-Azteca municipalities in the regressions (column 2). The coefficient is also similar when we include municipality-specific time trends (column 3). Overall, the results suggest that the opening of Banco Azteca increased the fraction of informal business owners by 0.0062, which corresponds to 7.6% of the pre-Azteca fraction of 0.082.

The effect on registered business owners is negative in the specification without time trends, but this effect is not robust to including time trends in the regression. It is perhaps not surprising that the fraction of formal business owners did not increase due to Banco Azteca's opening. In contrast to informal business owners, formal business owners typically have access to commercial banks, since they have the necessary documentation, and commercial banks tend to offer lower interest rates. While not statistically significant in our preferred specifications, the negative result for formal business owners could be due to increased competition from informal businesses. It is also plausible that increased access to finance for informal businesses may reduce incentives for business formalization, particularly since gaining access to finance is one of the reasons businesses become formal. This may not be socially desirable because of a reduction in the tax base and lowered opportunities for business growth and expansion. Policymakers may reduce any potentially negative impact on formal firms by making it easier and less expensive to register formal businesses (see Bruhn (2008, 2013), Klapper and Love (2010)) and by reducing the tax burden on formal businesses (see Fajnzylber, Maloney, and Montes-Rojas (2011)).

Figure 4 graphically illustrates the effect of Banco Azteca's opening on informal business owners. The figure displays the fraction of informal business owners in municipalities with and without an Azteca branch in the fourth quarter of 2002 over time. We observe a steep increase in the fraction of informal business owners only in Azteca municipalities after Banco Azteca opened, while the fraction of informal business owners followed a parallel trend across Azteca and non-Azteca municipalities before Azteca opening.

Our first set of results therefore suggests that the opening of a new bank geared toward low-income individuals has benefited informal entrepreneurs. This is perhaps not surprising, as Banco Azteca targeted exactly this segment of the population.

Next, we exploit the panel structure of the ENE data to examine the impact of Banco Azteca's opening on the four pre-event occupation groups: informal business owner, formal business owner, wage earner, and not employed (which includes the unemployed and those out of the labor force). In particular, we study how transitions between these four categories changed due to Banco Azteca's opening. Column 1 of Table III reports our results for the informal business owner dummy as the outcome variable. To save space, only coefficients on the interaction term *Azteca*Post Sep 2002* are reported, along with
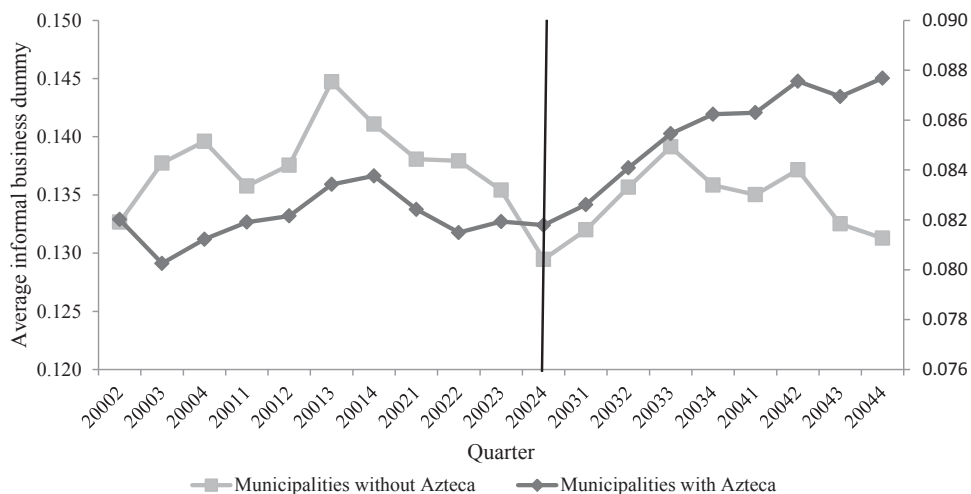
Figure 4. Average of informal business owner dummy for municipalities with and without Banco Azteca over time.

Table III
Impact on Dependent Variable by Pre-Event Occupation

Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at municipality level). Regressions include quarter and municipality fixed effects, municipality-specific time trends, as well as individual-level control variables. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

	Dependent Variable				
Pre-Event Occupation	Informal (1)	Formal (2)	Wage-earners (3)	Not employed (4)	Log (1+ income) (5)
Informal	0.0394***	0.0016	−0.0280**	−0.0130*	0.0721
	(0.0148)	(0.0084)	(0.0116)	(0.0078)	(0.0648)
Formal	−0.0017	−0.0204	0.0117	0.0103	−0.0116
	(0.0107)	(0.0195)	(0.0130)	(0.0104)	(0.1143)
Wage earners	0.0019	0.0015	−0.0019	−0.0015	−0.0028
	(0.0034)	(0.0020)	(0.0054)	(0.0043)	(0.0451)
Not employed	0.0053	0.0023	0.0088	−0.0165**	0.0868*
	(0.0033)	(0.0019)	(0.0059)	(0.0069)	(0.0492)

their standard errors. The regressions include individual control variables and municipality-specific time trends.

Column 1 shows that the increase in informal business is due to the fact that those that had an informal business before Azteca opened are more likely to continue operating an informal business after Azteca opened. More-over, the other coefficients in row 1 show that pre-event informal business

Impact on Wage Earners and Employment

Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at municipality level). Regressions include quarter and municipality fixed effects, as well as individual-level control variables. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: * 10%, ** 5%, and *** 1%.

	Dependent Variable					
	Wage earner dummy			Not employed dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Azteca*Post-Sep 2002	−0.0042	0.0046	0.0034	0.0019	−0.0089***	−0.0098***
	(0.0035)	(0.0038)	(0.0038)	(0.0032)	(0.0034)	(0.0034)
R^2	0.140	0.140	0.141	0.230	0.230	0.230
No. of obs.	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268
Group time trend	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes

owners were less likely to be not employed or wage earners after Banco Azteca opened. This suggests that the increased availability of financial services helped existing informal business continue their operations, rather than close the business and transition into wage earner or not employed status.

B. Wage Earners and Employment

In Table IV, we investigate the impact of Azteca's opening on wage earners. We find that, while the coefficients in our preferred specifications (with group time trends or municipality-specific time trends) are positive, they are not statistically significant at conventional levels. Thus, we do not observe any impact of the bank's opening on the number of wage earners.

However, we observe a reduction in the percentage of the not employed population, which includes the unemployed and those out of the labor force. The effects in columns 5 and 6 correspond to an increase in employment of about 1.4% over the pre-event level.

When examining the effect of Banco Azteca's opening on the fraction of wage earners and on employment by pre-event occupation (Table III), we find that the not employed are less likely to remain not employed after Azteca's opening. Those previously not employed transitioned to informal business owners or wage earners. However, these effects are only marginally statistically significant (*p*-value of 0.11 for the informal business owner dummy and of 0.14 for the wage earner dummy).

Table V
Impact on Income

Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at the municipality level). Regressions include quarter and municipality fixed effects, as well as individual-level control variables. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

	Dependent Variable					
	Log (1+ income)			Above minimum wage dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Azteca*Post-Sep 2002	−0.0283	0.0739**	0.0762***	−0.0077*	0.0042	0.0033
	(0.0240)	(0.0274)	(0.0275)	(0.0042)	(0.0032)	(0.0032)
R^2	0.279	0.280	0.280	0.270	0.270	0.271
No. of obs.	4,533,848	4,533,848	4,533,848	4,644,097	4,644,097	4,644,097
Group time trend	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes

C. Income

Next, we investigate the impact of Banco Azteca's opening on income.[25] Table V presents our results using log of income +1 as the outcome variable. We employ this transformation of income because it allows us to include zero incomes. That is, it allows us to examine the impact of Banco Azteca on the income of the complete sample, including the not employed individuals who have zero income. It is important to include not employed persons in the income analysis since we find an increase in employment due to Banco Azteca's opening.[26]

The results in column 1 of Table V are negative and not statistically significant. However, this is the specification without time trends. Our analysis of pre-event changes in Section IV suggests that we may underestimate the effect of Banco Azteca on income if we do not control for different time trends across municipalities. The specifications with time trends in columns 2 and 3 show a statistically significant increase in income of about 7%.

We also examine the fraction of individuals earning above minimum wage as an outcome variable. This allows us to capture the employed individuals that

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[25] The income data are in nominal terms. Our regressions control for overall inflation by including quarter fixed effects. The impact estimate for nominal income will thus be the same as that for real income, unless inflation varied across Azteca and non-Azteca municipalities. To assess whether this was the case, we would need price indices at the municipality level, which are unfortunately not available.

[26] We also ran the analysis using the fourth root of income as an alternative outcome variable. The fourth root of income mimics the logarithmic function well for positive numbers (see Thomas et al. (2003), who choose the fourth root of income instead of the log to include zero and negative yields). When using the fourth root of income, the results are similar to those obtained with the log of income + 1.

do not report their income directly, but report it in terms of bins relative to the minimum wage. However, we do not find any statistically significant impact on the proportion of people receiving income above the minimum wage (although the coefficients have the right sign—that is, positive). It could be the case that the increase in income happened for low-income individuals (which we confirm in the next section) but that this increase was insufficient to raise them above the minimum wage level. Nevertheless, we observe an overall positive increase in income, which suggests that an increase in the availability of financial services for low-income individuals can help some individuals improve their living standards, even if such improvement is not enough to raise them completely out of poverty.

Finally, in Table III (column 5) we explore the impact on income levels for the four pre-event occupation groups. We find that only those in the previously not employed category experienced a significant increase in income. This mirrors our finding that the previously not employed become either informal business owners or wage earners. The impact on income for previous informal business owners is also positive, amounting to an increase of about 7%. However, this effect is not statistically significant since the standard error is quite big. It is possible that there is a lot of noise in this estimate since informal business owners may be reluctant to report their true income.

D. Sample Splits

We now explore whether the opening of Banco Azteca had heterogeneous effects on different segments of the population. We consider two sample splits. First, as discussed above, Banco Azteca targeted low- to middle-income individuals. In addition, low documentation requirements made Azteca an attractive source of credit for informal businesses and people who would otherwise be excluded from the formal banking sector (such as low- and middle-income individuals). Therefore, the impact of Banco Azteca's opening should be more pronounced for this segment of the population. To test this conjecture, we split the sample based on individual income levels.[27]

Results of the income splits are given in Table VI. We find no significant results for the sample with above-median income levels (although the impact on informal business owners is positive with a *t*-statistic of 1.3). Thus, all prior results are coming from the sample of individuals with below-median income: we observe a statistically significant increase in informal businesses and wage earners (which is significant for this subsample, while not significant for the overall sample), an increase in employment, and an increase in income. These results support our hypothesis that opening a bank that aims to serve the low- and middle-income segment of the population would have an impact on exactly this segment of the population.

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[27] In a related paper, Bruhn and Love (2011) investigate gender differences in increased availability of financial services and find that men are more likely to become informal business owners, while women are more likely to become wage earners.

Table VI
Sample Split by Median Income Level

Median income is 1,720 pesos. Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at the municipality level). Regressions include quarter and municipality fixed effects, municipality-specific time trends, as well as individual-level control variables. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

(i) Everybody is employed.

	Dependent Variable				
Income	Informal business owner dummy (1)	Formal business owner dummy (2)	Wage earner dummy (3)	Not employed dummy (4)	Log (1+ income) (5)
Above median	0.0050	0.0011	−0.0060	(i)	0.0029
(No. of obs. 2,302,575)	(0.0039)	(0.0036)	(0.0044)		(0.0056)
Below median	0.0107***	−0.0029	0.0111**	−0.0188***	0.1333***
(No. of obs. 2,231,273)	(0.0034)	(0.018)	(0.0050)	(0.0058)	(0.0337)

Second, the opening of Banco Azteca should have a larger impact in areas that were relatively more underserved by the existing banking sector. To test this hypothesis, we split the sample based on municipalities' level of bank penetration, measured by the number of branches per population in the quarter before Azteca's opening. In particular, we split the sample into individuals living in municipalities with above and below the 75th percentile of bank branches per 100,000 people in the third quarter of 2002 (the quarter before Azteca opened). We choose the 75th percentile since most municipalities in our sample have a relatively low ratio of bank branches per 100,000 people.[28] Moreover, this sample split gives similar sample sizes in both groups since the municipalities with above 75th percentile bank branches per 100,000 people are also the most populated ones.

Table VII shows that our main results are driven by municipalities that had a low number of bank branches per 100,000 people before Azteca opened. The estimated effects of Azteca opening on the fraction of informal business owners, the fraction of not employed individuals, and income are of slightly larger magnitude than for the full sample and are highly statistically significant. The corresponding coefficients for the sample of municipalities with a high number of bank branches per 100,000 people, on the other hand, are smaller in size and are not statistically significant. These results offer additional evidence that the impact of Banco Azteca's opening was due to the increase in financial services it provided to underserved populations.

[28] In the municipalities in our sample, the 75th percentile of branches per 100,000 individuals is 9.38, whereas high-income countries have a median of 30 branches per 100,000 individuals (World Bank (2008)).

Table VII
Sample Split by Pre-Event Bank Branches

The 75th percentile of bank branches per 100,000 individuals across municipalities in our sample in 2002-III is 9.38. Reported are coefficients on the interaction term between the Azteca dummy and a post-September 2002 dummy. Standard errors are in parentheses (clustered at the municipality level). Regressions include quarter and municipality fixed effects, municipality-specific time trends, as well as individual-level control variables. Individual-level control variables are age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

Pre-Azteca branches per 100,000 people (2002-III)	Dependent Variable				
	Informal business owner dummy (1)	Formal business owner dummy (2)	Wage earner dummy (3)	Not employed dummy (4)	Log (1+ income) (5)
Above 75th percentile	−0.0025	−0.0016	0.0013	0.0030	0.0237
(No. of obs. 2,644,793)	(0.0058)	(0.0040)	(0.0102)	(0.0095)	(0.0833)
Below 75th percentile	0.0086***	0.0001	0.0031	−0.0117***	0.0892***
(No. of obs. 2,083,475)	(0.0030)	(0.0024)	(0.0044)	(0.0041)	(0.0317)

E. Elektra Location and Growth Rates

One potential concern with our results is that the location of Elektra stores is nonrandom and that fundamental differences between Elektra and non-Elektra locations may drive our results. To better understand the selection process for Elektra, we look at Elektra's annual reports (2001 and 2002), which include a section describing Elektra's strategy for choosing locations. The reports state that Elektra stores have traditionally been located in areas where the middle class lives. In addition, the area needs to have a minimum amount of foot traffic (200 people per hour during main shopping hours). The report further states that, historically, most Elektra stores have been opened in metropolitan areas. Based on this information, we collect data on the size of the population, the share of the middle class in each municipality, and the share of the population living in urban areas from the Mexican Statistical Institute's (INEGI) 2000 Population Census. Next, we examine empirically how these three variables predict whether a municipality has an Elektra store (i.e., Azteca branch) in December 2002. In addition, we examine the extent to which log GDP and GDP per capita growth rates predict Azteca locations, as there is a difference in these variables in Azteca versus non-Azteca municipalities, as presented in Table I, Panel B.

Table VIII displays marginal effects from Probit regressions of the Azteca dummy on several explanatory variables. The results in column 1 indicate that population size and the middle class share are indeed strong predictors of Elektra stores' location (both variables are statistically significant at the 0.001% level). Together, these two variables explain 45.9% of the variation in Elektra locations. In column 2, we add the share of the population living in urban areas to proxy for the metropolitan focus of Elektra's strategy. However, this variable is not statistically significant when the other two variables are included in the regression. Column 3 shows that log GDP does not significantly predict where Elektra locates, conditional on population size and middle class share. However, municipalities with a lower GDP per capita growth rate are

Table VIII
Predicting Azteca Locations

Reported are marginal effects from Probit regressions. Population, middle class share, and urban areas data are from the 1995 and 2000 Population Censuses. Middle class share is the fraction of the population whose income lies between 3 and 10 multiples of the minimum salary. GDP data are from the 1994 and 1999 Economic Censuses. GDP and growth variables exclude the top and bottom 1% outliers, which is why the sample size drops in columns 3, 4, and 5. Significance levels: *10%, **5%, and ***1%.

	Dependent Variable				
	Dummy = 1 if municipality had an Azteca branch in Dec 2002				
	(1)	(2)	(3)	(4)	(5)
Log(population in 2000)	0.5053***	0.4958***	0.5095***	0.5115***	0.3707***
	(0.0642)	(0.0648)	(0.7722)	(0.0658)	(0.0652)
Log(middle class share in 2000)	0.4391***	0.3378***	0.4404***	0.4260***	0.2984***
	(0.0764)	(0.1213)	(0.0975)	(0.0774)	(0.0838)
Log(1+ share of population living in urban areas in 2000)		0.4436			
		(0.3527)			
Log GDP in 1998			0.0116		0.0144
			(0.0330)		(0.0339)
GDP per capita growth 1993–1998				−0.0013***	−0.0013***
				(0.0005)	(0.0005)
R^2	0.459	0.463	0.468	0.468	0.469
No. of obs.	576	576	564	562	562

more likely to have an Elektra store (columns 4 and 5). This last finding is in line with the differences reported in Table I, Panel B, which indicate that the pre-Azteca GDP per capita growth rate is lower in Azteca municipalities.

To examine whether the selection process for Elektra identified in Table VIII can account for our results, we add log of population, log of middle class share, and GDP per capita growth rate, each interacted with a time trend, to our main regressions. Note that the level of these variables is already controlled for by municipality-specific fixed effects.[29] Table IX shows that our results are robust to the addition of these interactions. Thus, even if the areas where Azteca is more likely to locate (i.e., areas with a large population, a high middle class share, and lower growth rate) experience different time trends, this does not drive our results. The coefficients on the trend interactions indicate that areas with a higher middle class share in 2000 display flatter time trends in wage employment and income. In addition, areas with higher GDP per capita growth experienced a lower informal business formation rate and a lower level of income growth. This is in line with the convergence hypothesis discussed above, which posits that areas with lower income are catching up to areas with higher income.

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[29] The variables that are not statistically significant in predicting Elektra locations—share of urban population and GDP per capita—are not included in these regressions.

Robustness Checks: Controlling for Elektra's Selection Process

Reported are coefficients on the interaction terms. Standard errors are in parentheses (clustered at the municipality level). Population and middle class share data are from the 2000 Population Census. Middle class share is the fraction of the population whose income lies between 3 and 10 multiples of the minimum salary. GDP data are from the 1994 and 1999 Economic Censuses. GDP per capita growth excludes the top and bottom 1% outliers. Regressions include quarter and municipality fixed effects, as well as individual-level control variables and the Azteca dummy interacted with a time trend. Individual-level control variables are gender, age, marital status, and education dummies. Significance levels: *10%, **5%, and ***1%.

	Dependent Variable				
	Informal business owner dummy (1)	Formal business owner dummy (2)	Wage earner dummy (3)	Not employed dummy (4)	Log (1+ income) (5)
Azteca*Post-Sep 2002	0.0061**	−0.0015	0.0039	−0.0084**	0.0712***
	(0.0027)	(0.0021)	(0.0038)	(0.0034)	(0.0277)
Log(population)*trend	0.0001	−0.0001	−0.0001	0.0001	−0.0002
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0018)
Log(middle class share) *trend	0.0004	0.0001	−0.0011**	0.0006	−0.0098***
	(0.0003)	(0.0002)	(0.0005)	(0.0005)	(0.0036)
GDP per capita growth 1993–1998*trend	−0.0005***	0.0001	−0.0005	0.0006	−0.0045
	(0.0002)	(0.0001)	(0.0003)	(0.0004)	(0.0029)
R^2	0.069	0.051	0.140	0.229	0.279
No. of obs.	4,718,314	4,718,314	4,718,314	4,718,314	4,524,172

To further investigate the relationship between Azteca locations and growth rates, we collect additional data on GDP per capita growth for the periods 1993 to 1998, 1998 to 2003, and 2003 to 2008. Unfortunately, municipality-level GDP and population data are available only every five years (from INEGI's Economic and Population Censuses). Figure 5 presents average growth
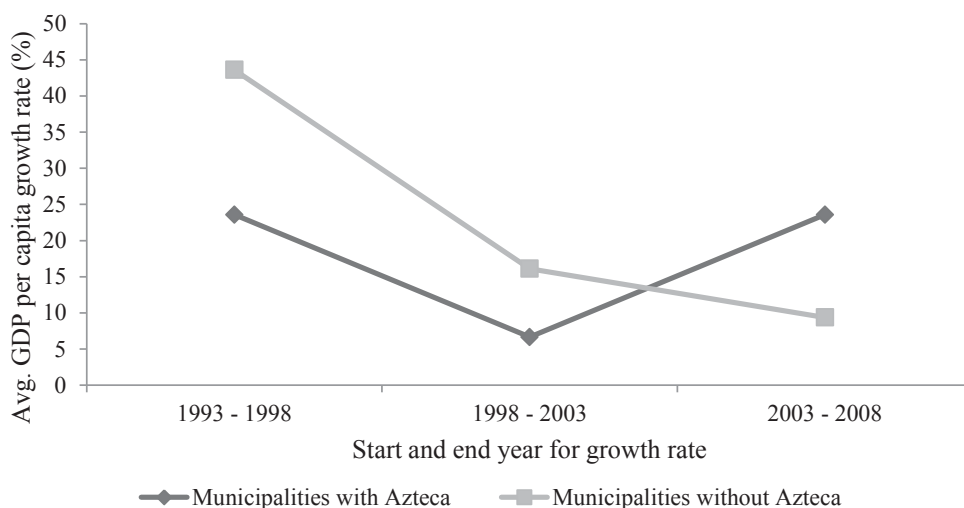

Figure 5. Real GDP per capita growth rates.

Table X
GDP per Capita Growth Rates

The dependent variable is real GDP per capita growth rate measured at five-year intervals: 1993–1998, 1998–2003, and 2003–2008. Columns 1 to 4 are estimated on the sample of ENE municipalities with a bank branch, while columns 5 and 6 are estimated on the full sample of ENE municipalities. Columns 1, 3, and 5 assume that the 1998 to 2003 data point falls in the post-Azteca period, while columns 2, 4, and 6 assume it falls in the pre-Azteca period. Standard errors are in parentheses (clustered at the municipality level). Significance levels: *10%, **5%, and ***1%.

	Dependent Variable					
	5-year real GDP per capita growth rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Azteca*Post-Sep 2002	22.400***	29.035***	21.124***	30.289***	28.504***	27.755***
	(6.107)	(7.650)	(7.510)	(9.403)	(8.901)	(10.342)
Post-Sep 2012 dummy	−30.900***	−20.523***				
	(4.557)	(5.143)				
Azteca dummy	−20.049***	−14.819***				
	(4.719)	(3.193)				
R^2	0.031	0.015	0.313	0.319	0.289	0.289
No. of obs.	1,690	1,690	1,690	1,690	3,538	3,538
Year fixed effects	No	No	Yes	Yes	Yes	Yes
Municipality fixed effects	No	No	Yes	Yes	Yes	Yes
Postdummy = 1 for years	2003, 2008	2008	2003, 2008	2008	2003, 2008	2008

rates for Azteca and non-Azteca municipalities for these three time periods (we remove the 1% outliers in the top and bottom of the growth rate distribution). To facilitate comparison, we use the same municipalities as in the previous analysis, that is, ENE municipalities with at least one Azteca or non-Azteca bank branch. The first period in Figure 5 contains the same data points as Table I, Panel B, and shows that the average growth rate is lower for Azteca municipalities than for non-Azteca municipalities in the pre-Azteca period. The average growth rate in the 1998 to 2003 period is again lower for Azteca municipalities than for non-Azteca municipalities, but the difference is now smaller since this period already includes one year after Azteca's opening. Most importantly, in the post-Azteca period, the average growth rate for Azteca municipalities is higher than for non-Azteca municipalities, thus reversing the differences of the prior periods.

We test this finding more formally using difference-in-difference regressions with the real GDP per capita growth rate as the dependent variable (see Table X). As in previous regressions, the effect of Banco Azteca's opening is given by the coefficient on the interaction of the Azteca dummy with a post-Azteca dummy. Table X first shows the regressions for the sample of ENE municipalities with an Azteca or non-Azteca bank branch (columns 1 through 4). The results indicate that Azteca's opening had a positive impact on growth

rates, significant at the 1% level. This effect is robust to controlling for municipality fixed effects and time dummies (columns 3 and 4). In columns 5 and 6, we reproduce the same regressions for the full sample of ENE municipalities, including municipalities that did not have a bank branch in the fourth quarter of 2002. The results are even stronger when we use the full sample. Since the growth rate for the 1998 to 2003 period is a "mixed" period, that is, it contains one year after Azteca's opening (2003), in columns 2, 4 and 6 we classify this period as pre-Azteca (since this stacks the cards against finding an effect) while in columns 1, 3, and 5, we classify it as post-Azteca. We find a positive and significant effect of Azteca's opening on growth rates in all specifications. Thus, our results imply that Azteca's opening has reversed, or at least mitigated the negative trajectory (i.e., slower growth) that Azteca municipalities faced pre-Azteca.

While the novelty and main contribution of our paper lies in the micro-level results presented earlier, the growth regressions here provide further support for our conclusions on the positive impact of Azteca's opening and thus strengthen our case. Furthermore, the growth results are in line with the vast literature that finds a positive impact of increased access to finance on growth.

F. Additional Robustness Checks

In this section, we address several additional questions and present further robustness checks. We first discuss whether the opening of Azteca had a gradually increasing impact on economic activity. For example, the impact may be stronger in later years as Azteca increased its menu of financial services offered and as its competitors have had time to respond to the new entrant. Unfortunately, our data only include two years of post-Azteca data (i.e., 2003 and 2004). It is, therefore, difficult to properly measure a gradual effect in our data.

Nevertheless, we run a test using our preferred specification by adding an interaction term with a year 2004 dummy to the regression (the results are available in the Internet Appendix). For most of our measures, there is some indication that the effect is stronger in 2004 than in 2003, but the difference is not statistically significant. However, for the not employed dummy the regression shows a significant difference and the effect in the later years is stronger (i.e., we observe a larger reduction in nonemployment due to Azteca in 2004 than in 2003). Furthermore, as we have shown above, the growth rates in the 2003 to 2008 period clearly show a positive impact of Azteca, which suggests that the positive impact has continued (and possibly intensified) after our sample period.

A related concern is that Azteca later opened branches in municipalities that did not have Elektra stores in the fourth quarter of 2002. In this case, our results would understate the true effect of Azteca's opening since some municipalities in our "control group" also receive an Azteca branch. On the other hand, if Azteca later opened more branches in municipalities that had an Elektra store in the fourth quarter of 2002, this would already be reflected in our estimates because we estimate the average impact of having any Azteca branch.

We do not use later branch openings in our estimation because their opening is not exogenous, as it is in the case of the initial roll-out when branches were opened in all Elektra stores existing at that time. In addition, differences in the size of Azteca branches across municipalities could be endogenous, that is, Azteca may open larger branches in municipalities where the effect is expected to be larger. Again, we are unable to estimate such differences because we lack a proper instrument for branch size.

Finally, we perform several "falsification" tests to check whether the results we attribute to the opening of Banco Azteca are due to preexisting differences across Azteca and non-Azteca municipalities. We use only pre-Azteca data (from the second quarter of 2000 to the third quarter of 2002) and run our preferred specification (controlling for differential time trends) with several alternative Azteca opening dates in the middle of this period (i.e., in second, third, and fourth quarters of 2001). Since Azteca had not actually opened yet in these quarters, we should find no effect of being an Azteca municipality in these regressions. The results of these tests are available in the Internet Appendix. Most of the coefficients are not statistically significant. The only exception is that the coefficient on the not employed dummy shows a positive impact of being an Azteca municipality in one of the tests and a negative impact in another, significant at the 10% level. Since these tests involve 18 regressions in total (three different opening dates for six different outcome variables), it is not surprising that two of them are statistically significant at the 10% level.

V. Conclusion

This paper shows that expanding access to finance to low-income individuals can have a sizeable positive effect on economic activity. We examine the case of Banco Azteca in Mexico, which opened over 800 branches almost overnight in 2002, targeting their savings accounts and loan services mainly to low-income individuals and informal business owners.

Our results suggest that Banco Azteca helped informal business owners keep their business running instead of becoming wage earners or not employed. The fraction of informal business owners increased by 7.6%, and overall employment increased by about 1.4% as a result of Azteca's opening. These increases in informal business ownership and employment led in turn to an increase in income of about 7% on average.

In addition, we find that the impact was more pronounced for individuals with below-median income levels, which was the population targeted by Banco Azteca, and in municipalities that were underserved by the formal banking sector prior to Azteca's opening. This finding suggests that the impact on real activity was due to increased access to financial services. Finally, we show that real GDP per capita growth rates have also increased following the opening of Banco Azteca, which further strengthens the case for the positive impact of access to financial services on economic activity.

It is important to point out that our paper does not establish whether the new bank opening had a direct impact, which it might have had given its large scale of operations, or an indirect impact via increased competition in the local

financial sector. Azteca was probably competing for clients with existing MFIs and credit unions. Thus, the impact on the economic outcomes we observe could have stemmed from the access to credit and savings provided by Azteca, or by a number of other financial institutions.[30] Nevertheless, our evidence suggests that improving access to low-income households has a significant impact on both the labor market and income levels.

Overall, these findings indicate that access to finance can contribute significantly to poverty alleviation. They also shed new light on the channels through which increased access to finance for low-income individuals promotes economic development, namely, by fostering the survival and creation of informal businesses and by increasing employment.

Our results also add to the evidence on the effects of microfinance since Banco Azteca's target population and loan sizes resemble those of MFIs. Despite these similarities, Azteca's model is unique due to the synergies with its parent company, Grupo Elektra. Nevertheless, Azteca's experience provides policy insights on how to address some of the challenges often faced by standard MFIs, namely, high operating costs resulting from costly enforcement and lack of information. First, Azteca has benefited from a proprietary information system developed by Elektra over the years. Policymakers can support availability of credit information by establishing public credit registries or supporting private bureaus that collect detailed information on loan performance (i.e., positive and negative information). Policies can also encourage retailers and service providers such as utility companies to participate in credit registries and bureaus. Second, Azteca has benefited from lower enforcement costs resulting from in-house enforcement mechanisms. Policymakers should focus on reducing the fixed costs of enforcement through more efficient legal systems. Third, Azteca has demonstrated that flexible lending practices, such as alternative documentation and collateral requirements, are important in expanding access to low-income individuals. Policymakers can encourage undocumented businesses to formalize by reducing the regulatory burden and costs of business registration, and can further support access to finance by improving collateral laws and establishing collateral registries. Finally, Azteca's experience demonstrates that a good case could be made for allowing or even encouraging large retailers to obtain banking licenses, as this can create significant synergies and economics of scale.

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[30] We are not able to examine the market response to Azteca's opening by MFIs and credit unions since we do not have data on these institutions at the municipality level.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Appendix S1: Internet Appendix.