

The Economic Impact of Banking the Unbanked

Evidence from Mexico

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Abstract

This paper examines the effects of providing financial services to low-income individuals on entrepreneurial activity, employment, and income. The analysis exploits cross-time and cross-municipality variation in the opening of Banco Azteca in Mexico to measure these effects with a difference-in-difference strategy. Banco

Azteca opened more than 800 branches simultaneously in 2002, focusing on low-income clients. The results show that the opening of Banco Azteca led to an increase in the number of informal business owners by 7.6 percent. Total employment also increased, by 1.4 percent, and average income went up by about 7 percent.

This paper—a product of the Finance and Private Sector Team, Development Research Group—is part of a larger effort in the department to understand the economic impact of expanding access to finance. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at mbruhn@worldbank.org or ilove@worldbank.org.

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The Economic Impact of Banking the Unbanked: Evidence from Mexico [#]

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Introduction

Several recent papers have found a positive correlation between access to finance and firm creation, economic growth, and poverty alleviation at the country level (World Bank, 2008, Honohan, 2004). However, these papers tend to face identification issues, implying that they do not necessarily establish a causal impact of increasing access to finance on economic outcomes. Similarly, while the microfinance industry has grown exponentially in the past few decades and a number of researchers have written on the topic,¹ there is still little systematic evidence on the casual impact of microfinance on economic activity (Harford, 2008, Karlan and Morduch, 2009). There is also little evidence on the channels through which finance may help to reduce poverty.

In this paper we use a unique event to evaluate the effect of increased access to financial services for low-income individuals on entrepreneurial activity, employment, and income. Specifically, we evaluate the effect of the opening of Banco Azteca in Mexico in October 2002. This event was unique in that Banco Azteca opened branches in all of the existing stores of its parent company – a large retailer of consumer goods, Grupo Elektra. 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 which had mostly been excluded from the commercial banking sector². Capitalizing on the 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 total 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 the motorcycle-riding loan officers that come to the borrower's house, as well as the size of the loans offered make it comparable to microfinance institutions that operated in Mexico at the time of Azteca opening.

¹ See for example Pitt and Khandker (1998), Coleman (1999), Kaboski and Townsend (2005), McKernan (2002), and Pitt, Khandker, Chowdury, and Millimet (2003b).

² In fact, Banco Azteca's motto is "We changed banking, now it's your time to change" ("*Cambiamos la banca, cambia tú también*").

We use the predetermined nature of the branch locations – which were opened in all stores of its parent company, Grupo Elektra - to identify the casual impact of Azteca opening on economic activity through a difference-in-difference strategy. Specifically, we compare the changes in outcome variables before and after Azteca opening across municipalities with pre-existing Grupo Elektra branches and those without branches at a time of the bank opening. Our analysis controls for the possibility that time trends in the outcome variables may be different in municipalities that had Grupo Elektra branches and from time trends in municipalities that did not have Grupo Elektra branches. Using the Mexican Labor Market Survey, ENE, we study the impact of this event on individuals' employment choices and income levels.

Our results show that the new bank opening led to an increase in the proportion of informal businesses by 7.6 percent, but to no change in formal businesses. This is consistent with anecdotal evidence 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 higher interest rates charged by Azteca³.

Second, the increase in informal businesses is only significant for men. However, we find a higher proportion of women working as wage-earners in municipalities with Azteca branches after its opening. This possibly signifies an expansion of labor market opportunities for women, from house makers to paid staff, perhaps in the informal businesses owned by their husbands or other male family members. Overall, total employment, including informal business owners and wage earners, rose by 1.4 percent for the complete sample.

Third, the new bank opening led to higher income levels for both men and women by about 7 percent. Similarly 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 opening in more detail, by considering how the impact varies with pre-event occupation. We find that

³ Azteca charged interest rates of about 50 percent per annum, while commercial banks at the time charged rates of 20 to 40 percent. However, commercial banks rejected all but the most creditworthy customers (The Dallas Morning News, 31 October 2002.)

the increased availability of financial services helped existing informal business owners to continue their operations instead of closing their business and transitioning to being the wage-earners or not employed. This is consistent with evidence suggesting that micro entrepreneurs 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)⁴.

Perhaps most importantly, Banco Azteca opening led to a reduction in the proportion of not employed individuals and increased income for this segment of the population.⁵ This is because some previously not employed individuals opened informal business and others were more likely to work as wage earners after Banco Azteca opening. These results on employment and income mirror Karlan and Zinman's (2007) 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. The Karlan and Zinman 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.

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 the operations, or an indirect one – i.e. via improvement in the competition in the local financial sector. Azteca was probably competing for clients with existing microfinance organizations 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 institutions⁶. Nevertheless, our evidence suggests that improving access to low income households has a significant impact on the labor market and income levels.

⁴ Our findings are also consistent with Banerjee and Duflo (2004) who use an exogenous change in regulation that made credit more available to some firms to show that this increase credit led to an increase in firms' sales and profits. The firms in their sample are, however, larger firms, receiving credit from traditional banks.

⁵ Our results on income are not as strong as our results on employment choices because of the nature of the data. The dataset we use is designed to measure labor market participation rather than household 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.

⁶ We have not been able to examine the market response to Azteca opening by microfinance institutions and credit unions since we do not have data on these institutions at the municipality level.

Our paper is related to a literature on US banking deregulation, which exploits the natural experiment of gradual relaxation of restrictions on state-wide 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: Jayarathne and Strahan (1996) find an increase in the economic growth rate by 0.51-1.19%, Black and Strahan (2002) find an increase in new firm incorporations by up to 8%.

Also closely related to our work, Beck, Levine and Levkov (2007) find that banking deregulation resulted in a reduction in income inequality through the impact on labor market conditions. In particular, they find a reduction in the income gap between men and women, which parallels our results about increased employment opportunities for women. While we don't test for this directly in this paper, the entrance of Banco Azteca has likely led to increased bank competition, similar to what Cetorelli and Strahan (2006) find in the US: 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, namely the targeting of low income, previously unbanked individuals, make it an important case for studying the real effects of bank expansion.

The rest of the paper is organized as follows. Section 1 offers a brief background on Banco Azteca opening and its impact on the financial sector, while the Appendix contains a more detailed description of Banco Azteca's features. Section 2 lays out our empirical strategy. Section 3 describes the data. Section 4 presents our regression results, and Section 5 concludes.

I. Background on Banco Azteca

In March 2002, one of Mexico's largest retailers for electronics and household goods, Grupo Elektra, received a banking license. In October 2002, Grupo Elektra launched Banco Azteca, opening a total of 815 branches in all pre-existing Grupo Elektra stores.

From the outset, Banco Azteca targeted low and middle-income customers, historically underserved by the traditional banking industry. (See the Appendix for more details and quotes from Azteca founders and top management). With an extensive database of 4 million current and past Grupo Elektra customers, and a fleet of 3,000 motorcycle-riding

loan collection agents, Banco Azteca was able to extend credit to segments of the low-income population that were previously un-bankable. Azteca also requires less documentation than traditional commercial banks, often taking a co-signer instead of valid documents. Even today, many of its customers are informal business owners who do not have the proof of income required by other banks.

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 Grupo Elektra's retail stores. These loans had an average amount of \$250. Although these loans were tied to merchandise, they could be used for business purposes. For example, purchasing a new sewing machine or a fridge might allow a person to start or to sustain their micro business. In 2003, Azteca started offering \$500 consumer loans not tied to the merchandise. These amounts were comparable in size to loans offered by several microfinance organizations, which in 2002 amounted to about \$360.⁷ Towards the end of 2003, Azteca also 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 opening Banco Azteca 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 which cater to low-income households. The combined portfolio of the largest microfinance institutions 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.

⁷ Microfinance loan size is average for all microfinance institutions available on MIXmarket.org

Figure 2 shows the relative difference in the number of savings accounts in municipalities with Azteca, vs. municipalities without Azteca. Data on savings accounts comes from the Mexican bank supervisory body, the Comisión Nacional Bancaria y de Valores (CNBV). There is a clear rapid growth in savings accounts in municipalities with Azteca after December 2002⁸. These effects are also significant in a regression framework that controls for municipality-specific time trends⁹.

Thus, the opening of Banco Azteca had a non-trivial impact on availability of financial services in municipalities where the branches were present. More details on the bank opening are available in the Appendix.

II. Identification Strategy

In order to identify the effect of Banco Azteca opening on economic activity, we exploit the cross-municipality and cross-time variation in Azteca branches. As discussed above, Banco Azteca opened in October 2002, only in the municipalities that had pre-existing 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 opening:

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

where i denotes individuals, c denotes municipalities, and t denotes quarters. β is a set of municipality fixed effects, γ is a set of quarter fixed effects and Z is a matrix of individual control variables. Our main variable of interest is the *Azteca* dummy, which is the interaction between a post third quarter of 2002 dummy and a dummy that equals one for municipalities that had at least one Azteca branch in the fourth quarter of 2002 and that equals zero for all other municipalities in our sample. The coefficient δ is our estimate of the effect of Banco Azteca opening¹⁰. We cluster standard errors at the municipality level.

⁸ Unfortunately, we cannot perform the same regression analysis for loans since we do not have data on loans pre- and post-Azteca opening at the municipality level.

⁹ Available from the authors upon request.

¹⁰ An alternative strategy would be to interact the post-Azteca opening dummy with the number of Azteca branches (which is equivalent to Grupo Elektra stores) in each municipality in the fourth quarter of 2002. However, we do not have accurate data on the number of Azteca branches or Grupo Elektra stores for the fourth quarter of 2002.

The assumption needed to guarantee that this identification strategy is valid is that, in the absence of Banco Azteca 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 were on a steeper growth path in municipalities with Azteca than in municipalities without Azteca. If this were the case, we could detect a positive effect of Banco Azteca 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 different 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 pre-period, they are likely to have remained the same in the post-period in the absence of Azteca 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 two ways: First, we allow all municipalities with Azteca branch to have the same time trend, and all municipalities without 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).

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

III. Data

All of our main outcome variables come from the Mexican National Employment Survey (ENE). The ENE is the survey that the Mexican government relies on for calculating unemployment statistics and for measuring the size of the informal sector. It has been conducted quarterly since 2000-II and covers a random sample of approximately 150,000 households each quarter. Households remain in the survey for five consecutive quarters. We

use data for 2000-II to 2004-IV (19 quarters in total). After 2004-IV, the ENE was changed to a new survey¹¹.

We chose to use the ENE data in our analysis for the following reasons. First, it includes detailed questions about a person's economic activity (including self-employment), and it also reports a person's income from their main occupation. Second, it captures and distinguishes between formal and informal self-employment and firms, making it possible to investigate the effect of Banco Azteca on informal firms. This is important since anecdotal reports mentioned in the Appendix suggest that many Banco Azteca clients are informal business owners. Third, the 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 above¹². Forth, the panel structure of the ENE allows us to describe the effect of Banco Azteca more precisely by looking at the impact on different pre-reform occupation groups.

The ENE covers a total of 1,222 municipalities, but we drop the ones that do not have any bank since we feel that they would be less comparable to the municipalities with Azteca. 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 the Mexican bank supervisory body, the Comisión Nacional Bancaria y de Valores (CNBV). Our final sample includes 576 municipalities, of which 249 had an Azteca branch in fourth quarter of 2002, and 327 did not have an Azteca branch, but had a branch of a different bank. Almost all the municipalities where Azteca opened also had a branch of a different bank. Only 6 out of the 249 Azteca municipalities in our data did not also have a different bank branch.¹³ Figure 3 shows a map

¹¹ There are two reasons why we do not use data from the new survey. 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 pre-existing Elektra store. This means that our identification strategy is less valid for later years.,

¹² 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. Then, households are chosen at random within the AGEB. This procedure implies that it could happen 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.

¹³ There are a total of 2,451 municipalities in Mexico, but the ENE does not cover all of them. The ENE is representative for cities, but only includes a random sample of rural municipalities. A total of 696 municipalities

of Mexico where municipalities that had an Azteca branch in the fourth quarter of 2002 are marked in dark blue, and municipalities that had a different bank branch, but no Azteca branch, are marked in light blue. 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 a) owns an informal business, b) owns a formal business, and c) is a wage earner¹⁴. These are the three possible occupations for somebody who is employed. People who do not fall into either 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 of the formal business owner dummy means that 8 percent of all people between the ages of 20 and 65 own a formal business.

Finally, we also 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 the ENE is probably not as reliable as the occupation data since it is not the focus of the survey. The survey only includes one question on income, asking for the earnings from the individual's main occupation. 4.2 percent of employed individuals do not answer this question. These individuals are then asked to report their income in terms of bins of the minimum wage. About 60 percent of the people who did not report their income in the first question report it in terms of the minimum wage (2.4 percent of the total sample). Taking these responses into account, we create a dummy variable indicating whether an individual earns above minimum wage¹⁵. We use this as an additional outcome variable.

had a bank branch in Mexico in the fourth quarter of 2002, 120 of which are not covered in our data. However, only 8 municipalities that had an Azteca branch are not in our data.

¹⁴ A detailed description of how these variables were constructed is available in Bruhn (2008).

¹⁵ We convert the incomes of the 95.8 percent individuals who reported them as amounts to multiples of the minimum wage using information on the minimum wage from the National Commission for Minimum Wages (Comision Nacional de Salarios Minimos, CONASAMI, <http://www.conasami.gob.mx>).

The upper panel of Table 1 includes summary statistics for the outcome variables split up by municipalities that had at least one Azteca branch in the fourth quarter of 2002 and by municipalities that didn't have any Azteca branch at that time, but that had at least one branch from a different bank. The data in Table 1 are for the pre-Banco Azteca period, including only observations between 2000-II and 2002-III. The averages in Columns 1 and 2 of Table 1 show that, in municipalities with Azteca, 8.2 percent of people in the sample owned an informal business in the pre-Azteca period. This number was higher for municipalities without Azteca, 13.8 percent. There is a somewhat smaller percentage of formal business owners, 7.9 in municipalities with Azteca and 6.6 in other municipalities. Another 50 (44) percent of our sample worked as wage earners in municipalities with (without) Azteca. The remaining 34 (36) percent of the sample were not employed.

The third column of Table 1 reports the differences in pre-reform 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 were different across our group of treatment and control municipalities does not invalidate the identification strategy. As discussed in Section II above, the identification strategy assumes that changes in outcome variables (not levels) are the same in municipalities with and without Azteca. The lower panel of Table 1 compares pre-period changes in outcome variables across Azteca and non-Azteca municipalities. There was 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 would 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 log 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.

We also use a number of individual background variables from the 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 pre-period changes are not included in the tables to save space, but they are available from the authors upon request.

IV. Results

IV. a. Business Owners

We first investigate the impact of Banco Azteca opening on entrepreneurial activity. Table 2 presents the results for the informal and formal business owner dummies as dependent variables. We find that the opening 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 group of Azteca and non-Azteca municipalities in the regressions (Column2). The coefficient is also similar when including 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 percent 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 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.

Figure 4 is a graphic illustration of the effect of Banco Azteca opening on the fraction of informal business owners. It displays the fraction of informal business owners in municipalities with and without an Azteca branch in 2002-IV over time. We observe a steep

increase in the fraction of informal business owners only in Azteca municipalities after Banco Azteca opened, while there were no differences in the two trends before Azteca opening.

Thus, our first set of results suggests that the opening of a new bank geared towards low income individuals has benefitted informal entrepreneurs. This is perhaps not surprising, as Banco Azteca targeted exactly this segment of the population (see Appendix).

When we split our sample by gender, we find that only men are more likely to work as informal business owners after Banco Azteca opened. The results for women are not statistically significant, while the results for men are strongly significant (Table 2 Panels B and C)¹⁶. Before Banco Azteca opened, 67.32 percent of informal business owners were men, and 12.63 percent of men owned an informal business. After Banco Azteca opened, the fraction of men owning an informal business increased by about 0.01, or 8 percent.

Next, we exploit the panel structure of the ENE data to split up the impact of Banco Azteca opening by the four different possible pre-event occupations: informal business owner, formal business owner, wage-earner and not employed (which includes the unemployed and those out of labor force). In other words, we study how the transition between these 4 categories changed due to Banco Azteca opening. Column 1 of Table 3 reports our results for the informal business owner dummy as the outcome variable. To save space, only coefficients on the interaction term Azteca* Post Dec 2002 are reported, along with 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. Moreover, the other coefficients in Row 1 show that pre-event informal business 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 to continue their operations, rather than closing the business and transitioning into wage-earner or not employed status.

¹⁶ In our sample, 34% of all informal business owners are women, while 28% of all formal business owners are women.

IV. b. Wage Earners and Employment

In Table 4 we investigate the impact of Azteca opening on wage earners. We find that overall there is no statistically significant impact of the bank opening on the number of wage earners. However, when we estimate our model separately for men and women, we find that Banco Azteca opening led to an increase in the fraction of female wage-earners. The results for men are not statistically significant in our preferred specifications with time trends. It is plausible that increased availability of credit allowed men to start or expand their informal businesses, which then in turn employed women as wage-earners. In other words, an owner of an informal business may employ his wife and other female household members, who are then being recorded as wage-earners in our sample.

Note that overall, the opening of Banco Azteca increased employment both for men and women (Columns 5 and 6 of Table 4). Men were more likely to work as informal business owners, but not less likely to work as wage earners or registered business owners, implying an overall increase in employment. Women were more likely to work as wage earners, but not less likely to work as business owners, also implying an increase in employment. The effects in Columns 5 and 6 of Table 4 correspond to an increase in employment of about 1.4 percent over the pre-event level in the full sample.

When examining the effect of Banco Azteca opening on the fraction of wage earners and on employment by pre-event occupation, we find that the not employed are less likely to remain not employed after the event. Those previously not employed transitioned to working as 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).

IV. c. Income

Next, we investigate the impact of Banco Azteca opening on household income. Table 5 presents our results for two measures of income: the log of income +1 and the fourth root of income. We chose these two transformations of income as outcome variables since they allow us to include zero incomes. That is, they allow us to examine the impact of Banco Azteca on the income of the complete sample, including the not employed that have zero income. It is important to include the not employed in the income analysis since we find an increase in employment due to Banco Azteca opening.

The results in Column 1 of Table 5 are negative and not statistically significant. However, this is the specification without time trends and our analysis of pre-event changes in Section 4 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 both of our measures of income. The effects are similar for men and women (Panels B and C). If anything, the magnitude of the effect is larger for women – for example the coefficient on our variable of interest is 0.09 for women vs. 0.048 for men (Column 3).

We also examine the fraction of individuals earning above minimum wage as an outcome variable. This allows us to capture the 4.2 percent of employed individuals that do not report their income directly, but that report it in terms of bins relative to the minimum wage. However, we do not find any significant impact on the proportion of people receiving income above the minimum wage. It could be that the increase in income happened for low income individuals and that it 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 people improve their living standards, even if such an improvement is not enough to raise them completely out of poverty.

Finally, in Table 3 (Columns 5 and 6) 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 have a significant increase in income. This mirrors our finding that the previously not employed transition into being 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 percent. 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 on the survey.

V. Conclusion

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

Our results suggest that Banco Azteca helped informal business owners to keep their business running instead of transitioning into being wage earners or not employed. The fraction of informal business owners increased by 7.6 percent. This increase came exclusive from male owned businesses, not female owned businesses. Employment also increased by about 1.4 percent as a result of Azteca opening. Women were more likely to work as wage earners after Azteca opened and some previously not-employed individuals became informal business owners and wage earners. The rise in informal business and employment also led to an increase in income of about 7 percent on average.

Overall, these findings support the existing literature that has pointed towards a connection between access to finance and growth and poverty alleviation. They also shed new light on the channels through which access to finance for low-income individuals promotes economic development, namely by fostering the survival and creation of informal businesses.

Moreover, our results add to the evidence on the effects of microfinance since operationally Banco Azteca resembles a microfinance institution. It is sometimes argued that micro loans represent a transfer to the poor that is not put to a productive use. However, our results suggest that this not the case and that providing financial services to the poor can indeed generate additional economic activity.

Appendix.

Banco Azteca Serves Low-Income Customers

As of the opening date, “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.”¹⁷

Before Azteca, access to credit was largely unavailable to millions of informal businesses, such as taxi drivers, plumbers or street merchants. Banco Azteca officials claimed that credit will be more available to Mexico's large informal sector, the small businesses and self-employed who operate outside regulatory frameworks.¹⁸

“Banco Azteca SA, a new bank belonging to retail giant Grupo Elektra SA, wants to woo the millions of teachers, plumbers, cabbies and sidewalk vendors who traditional banks have long shunned.” “Mexican banks are focused on the sectors with the highest income,” said Carlos Septien, Banco Azteca's chief executive officer. “We're aiming for the C and D segments, which represent 70 percent of the population, or about 16 million families.”¹⁹

Commenting on the start-up of operations of the bank, Ricardo B. Salinas, Chairman of the Board of Grupo Elektra, stressed that: “Banco Azteca will improve access to goods and services for our people. A major impediment to the growth of the Mexican middle class has been the lack of access to credit, one of the main vehicles for personal financial improvement. Banco Azteca will demonstrate the importance of offering financial services to this under- served segment of the Mexican population.” (Reuters, 2002)

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 loaning to lower-income consumers, the Banco Azteca obtained information on about 4 million borrowers. Many of those customers 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.²⁰ “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 group has spent \$20 million a year over three years on information technology, including high-tech “fingerprint readers” that eliminate the need for customers to present IDs or passbooks. The bank also commands a 3,000-strong army of motorcycle-riding loan agents.

¹⁷ The New York Times, 31 December 2002.

¹⁸ The New York Times, 31 December 2002.

¹⁹ By Brendan M. Case, The Dallas Morning News, 31 October 2002.

²⁰ Business Week, 13 January 2003

They tote Compaq iPAQ 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.²¹

"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."²²

The bank began operations by offering savings accounts that could be opened with as little as \$5. In the first month, 157,000 accounts had been opened. By the end of December 2002, more than 250,000 accounts had been opened.

In December 2002, Banco Azteca received authorization to make loans, and has begun offering consumer financing identical to the installment plans of the Grupo Elektra retailers and has also begun offering \$500 personal loans not tied to appliance purchases. Elektra's old consumer financing operation closed down as its borrowers paid off their loans, which usually run for 53 weeks.

After less than a year of operations, Banco Azteca "has seen rapid success as it taps Mexico's vast informal economy, thanks to Elektra's long record of serving the working class."²³

Below are several anecdotal accounts from the press, on the typical customers of Banco Azteca.

Banco Azteca bikers reach out to Mexico's poor.

By Lorraine Orlandi, 21 September 2003, [Reuters News](#), (c) 2003 Reuters Limited

Loan officers make house calls to investigate potential customers and to ensure they make payments once a loan is approved. Sometimes they repossess items that are resold at Elektra's Bodega de Remates discount stores, typically at prices higher than the amount due on the loan.

On a recent afternoon Azteca loan officer Manuel Monroy hopped on a Honda 125 to visit Blanca Guevara at home in a working-class neighborhood of Mexico City. The 48-year-old widow had applied to buy a sewing machine for 2,174 pesos (about \$210) on credit at Elektra the day before.

Guevara said she could pay 41 pesos a week over 53 weeks, after a 141-peso down payment. But as an off-the-books house cleaner, she had no proof of income.

Once her mother-in-law, who owns their house, agreed to back the loan, Monroy looked over property and identification papers and recorded the information on a hand-held computer.

²¹ Business Week, 13 January 2003

²² Reuters News, 21 September 2003

²³ Reuters News, 21 September 2003

The software analyzed the information and within minutes a verdict flashed on the computer's tiny screen: "Approved." He pressed another button to produce a ticket from a printer on his belt for Guevara to present at the store.

BUY A TOASTER, OPEN A BANK ACCOUNT

Banco Azteca caters to the little guy--in appliance stores

By Geri Smith in Mexico City

13 January 2003 [BusinessWeek](#) 54, Number 3815

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Pedro Rubio was in a bind. The 56-year-old carpenter needed to come up with thousands of pesos in notary fees to get legal title to his modest cinderblock house. Otherwise, he feared that squatters would stake claim to it when he was away working at construction sites. But Rubio, who earns the equivalent of \$600 a month, had no proof of income and no bank account.

So on a recent morning, he walked through his gritty Mexico City neighborhood to an Elektra appliance store. At the back, behind an aisle of microwave ovens, he sat down with a loan officer from a new bank, Banco Azteca. Unfazed by Rubio's worn jeans and unshaven face, the officer drew up an inventory of his possessions: TV, refrigerator, washing machine--all bought on credit at Elektra in the past three years. Accepting these as collateral, the bank approved Rubio's application within 24 hours. The nine-month, \$200 loan carries a 48% annual interest rate, usurious by U.S. standards but not in Mexico, where the banking sector is still recovering from the effects of the 1994 peso crash. "It's a little expensive," says Rubio. Still, he says he can swing the weekly \$8 payments. In any event, he adds, "I don't really have any other option."

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Figure 1: Grupo Elektra's Loan Portfolio within Mexico over Time

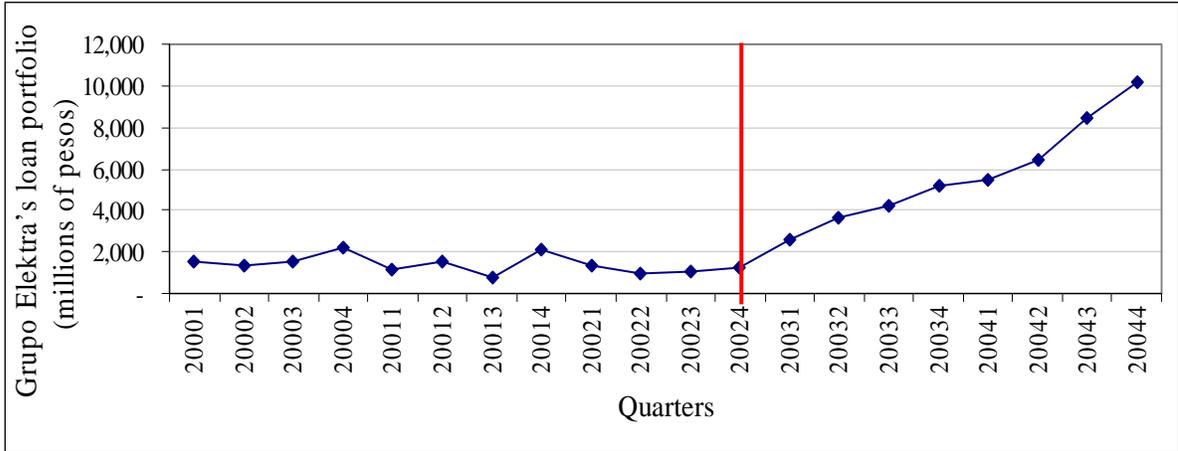


Figure 2: Effect of Banco Azteca Opening on Savings Accounts over Time

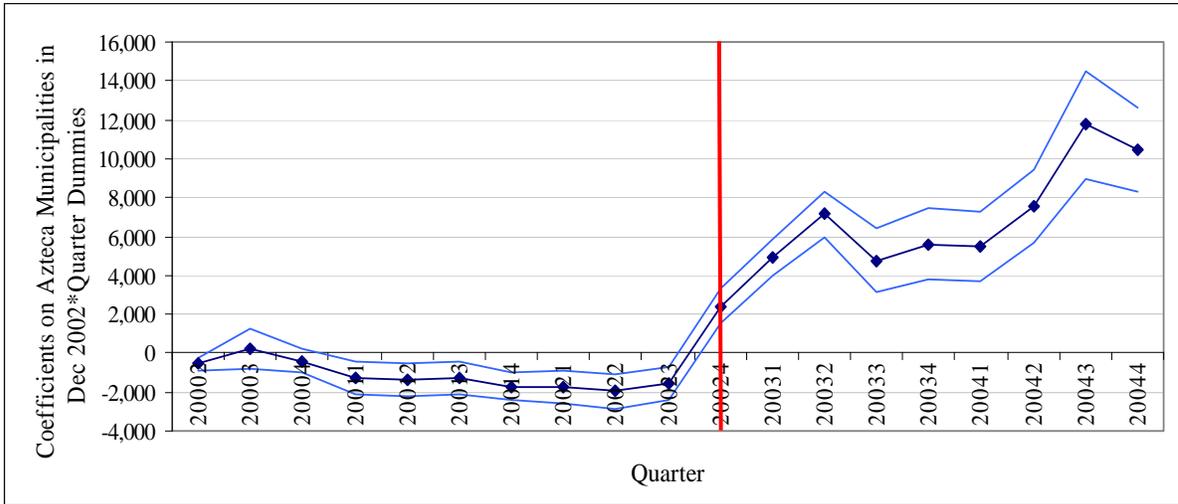


Figure 3: Map of Municipalities with Banco Azteca Branches and Other Bank Branches

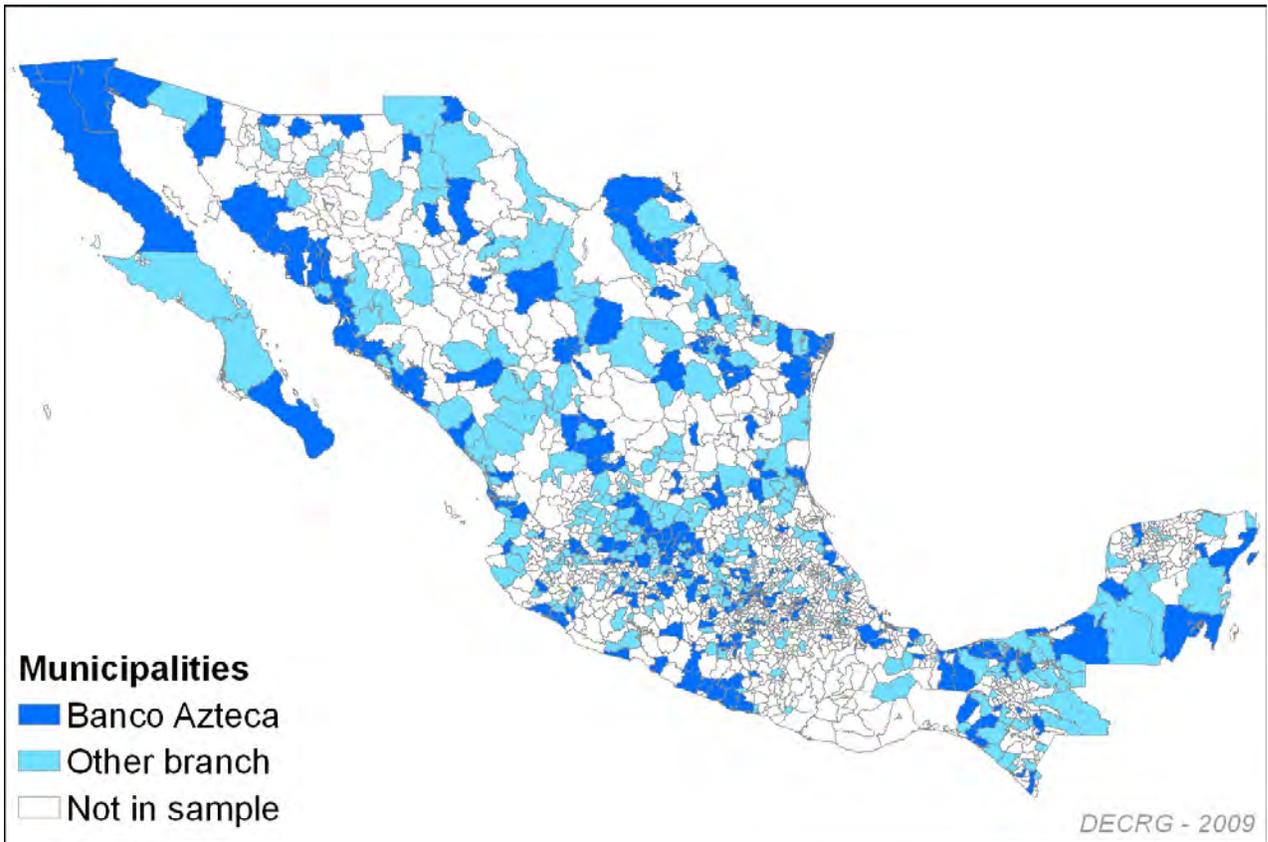


Figure 4: Average of Informal Businesses Owner Dummy for Municipalities with and without Banco Azteca over Time

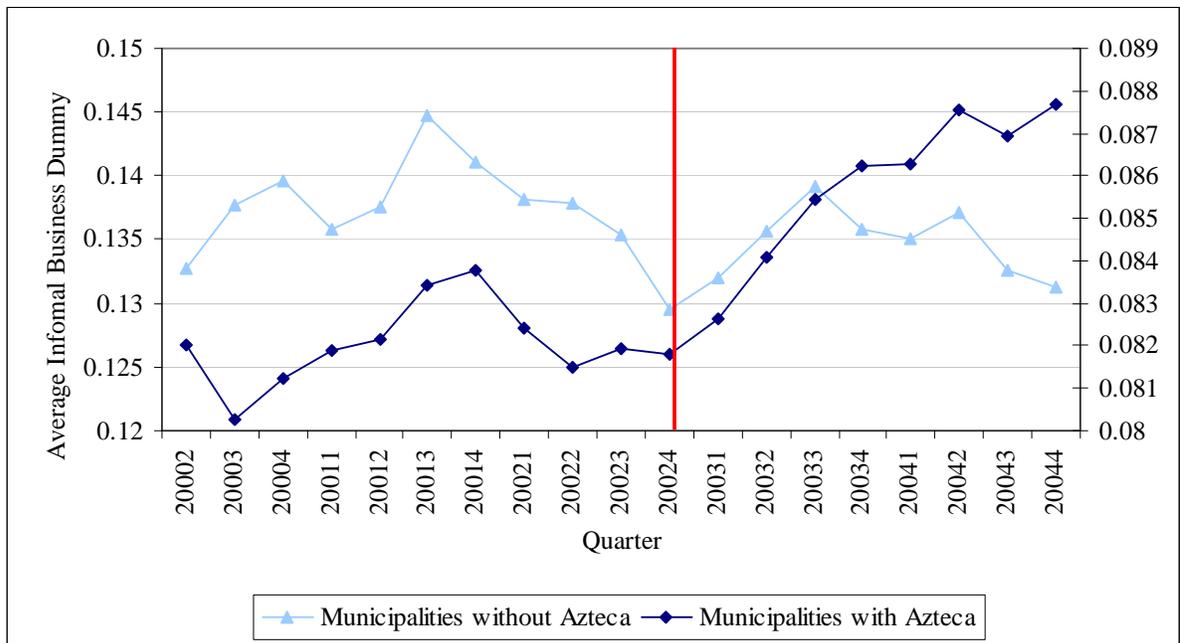


Table 1: Pre-Azteca Averages of Individual Level Variables

	Municipalities with any Azteca branch in Dec 2002	Municipalities without Azteca, but with other branch in Dec 2002	Coefficient of Azteca dummy
	(1)	(2)	(3)
Outcome Variables Levels			
Informal business owner dummy	0.0821 (0.2745)	0.1380 (0.3449)	-0.0560*** (0.0087)
Formal business owner dummy	0.0790 (0.2697)	0.0656 (0.2475)	0.0134*** (0.0033)
Wage earner dummy	0.4969 (0.5000)	0.4403 (0.4964)	0.0566*** (0.0111)
Not Employed dummy	0.3417 (0.4743)	0.3560 (0.4788)	-0.0143** (0.0067)
Above minimum wage dummy	0.5827 (0.4931)	0.4763 (0.4994)	0.1064*** (0.0161)
Log monthly income +1	4.9999 (3.9346)	4.4705 (3.8103)	0.5294*** 0.0918
Outcome Variables Changes			
Informal business owner change	-0.0023 (0.0388)	-0.0010 (0.0551)	-0.0013 0.0021
Formal business owner change	0.0049 (0.0264)	0.0055 (0.0360)	-0.0005 (0.0014)
Wage earner change	-0.0038 (0.0486)	0.0031 (0.0690)	-0.0068*** (0.0026)
Not Employed change	0.0012 (0.0467)	-0.0075 (0.0649)	0.0087*** (0.0025)
Above minimum wage change	0.0001 (0.0516)	0.0059 (0.0650)	-0.0059** (0.0026)
Log monthly income change	0.0311 (0.3612)	0.0982 (0.4593)	-0.0671*** (0.0182)

Note: Standard errors in parentheses (clustered at municipality level). The employed 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 2000-II to 2002-III
Significance levels: * 10%, ** 5%, *** 1%

Table 2: Impact on Entrepreneurial Activity

	Dependent variable:					
	Informal business owner dummy			Formal business owner dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Complete Sample						
Azteca*Post Dec 2002	0.0062** (0.0027)	0.0062** (0.0028)	0.0067** (0.0027)	-0.0039* (0.0022)	-0.0011 (0.0021)	-0.0003 (0.0021)
R-squared	0.069	0.057	0.069	0.051	0.047	0.052
No. of observations	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268
Panel B: Women						
Azteca*Post Dec 2002	-0.0016 (0.0020)	0.0033 (0.0026)	0.0042 (0.0027)	-0.0013 (0.0015)	0.0010 (0.0017)	0.0009 (0.0018)
R-squared	0.031	0.019	0.032	0.013	0.009	0.014
No. of observations	2,515,225	2,515,225	2,515,225	2,515,225	2,515,225	2,515,225
Panel C: Men						
Azteca*Post Dec 2002	0.0158*** (0.0053)	0.0091* (0.0051)	0.0101** (0.0047)	-0.0065* (0.0039)	-0.0037 (0.0037)	-0.0018 (0.0035)
R-squared	0.099	0.077	0.102	0.053	0.046	0.054
No. of observations	2,213,043	2,213,043	2,213,043	2,213,043	2,213,043	2,213,043
Group time trend	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes

Note: Standard errors 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%, *** 1%

Table 3: Impact on Dependent Variable by Pre-Event Occupation

	Dependent variable:					
	Informal	Formal	Wage-earners	Not employed	Log (1+ income)	Fourth root of income
Pre-Event Occupation						
Informal	0.0394*** (0.0148)	0.0016 (0.0084)	-0.0280** (0.0116)	-0.0130* (0.0078)	0.0721 (0.0648)	0.0639 (0.0638)
Formal	-0.0017 (0.0107)	-0.0204 (0.0195)	0.0117 (0.0130)	0.0103 (0.0104)	-0.0116 (0.1143)	0.0681 (0.1255)
Wage Earners	0.0019 (0.0034)	0.0015 (0.0020)	-0.0019 (0.0054)	-0.0015 (0.0043)	-0.0028 (0.0451)	-0.0092 (0.0431)
Not Employed	0.0053 (0.0033)	0.0023 (0.0019)	0.0088 (0.0059)	-0.0165** (0.0069)	0.0868* (0.0492)	0.0751* (0.0444)

Note: Reported are coefficients on interaction term of Azteca* Post Dec 2002 estimated with municipality time trends. Standard errors 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%, *** 1%

Table 4: Impact on Wage Earners and Employment

	Dependent variable:					
	Wage earner dummy			Not Employed dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Complete Sample						
Azteca*Post Dec 2002	-0.0042 (0.0035)	0.0039 (0.0040)	0.0034 (0.0038)	0.0019 (0.0032)	-0.0089*** (0.0034)	-0.0098*** (0.0034)
R-squared	0.140	0.136	0.141	0.230	0.226	0.230
No. of observations	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268	4,728,268
Panel B: Women						
Azteca*Post Dec 2002	0.0033 (0.0043)	0.0095** (0.0044)	0.0108** (0.0045)	-0.0004 (0.0052)	-0.0138** (0.0054)	-0.0159*** (0.0054)
R-squared	0.139	0.133	0.140		0.109	0.119
No. of observations	2,515,225	2,515,225	2,515,225	2,515,225	2,515,225	2,515,225
Panel C: Men						
Azteca*Post Dec 2002	-0.0135*** (0.0048)	-0.0030 (0.0057)	-0.0055 (0.0054)	0.0041 (0.0026)	-0.0024 (0.0032)	-0.0027 (0.0031)
R-squared	0.075	0.065	0.076	0.089	0.083	0.0893
No. of observations	2,213,043	2,213,043	2,213,043	2,213,043	2,213,043	2,213,043
Group time trend	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes

Note: Standard errors 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%, *** 1%

Table 5: Impact on Income

	Dependent variable:								
	Log (1+ income)			Fourth root income			Above minimum wage dummy		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. Complete Sample									
Azteca*Post Dec 2002	-0.0283 (0.0240)	0.0691** (0.0286)	0.0762*** (0.0275)	-0.0155 (0.0242)	0.0577** (0.0269)	0.0660*** (0.0255)	-0.0077* (0.0042)	0.0030 (0.0036)	0.0033 (0.0032)
R-squared	0.279	0.274	0.280	0.311	0.302	0.311	0.270	0.259	0.271
No. of observations	4,533,848	4,533,848	4,533,848	4,533,848	4,533,848	4,533,848	4,644,097	4,644,097	4,644,097
Panel B: Women									
Azteca*Post Dec 2002	-0.0063 (0.0327)	0.0712* (0.0389)	0.0907** (0.0388)	0.0093 (0.0295)	0.0550 (0.0351)	0.0727** (0.0350)	-0.0031 (0.0041)	0.0041 (0.0041)	0.0058 (0.0040)
R-squared	0.149	0.141	0.150	0.171	0.163	0.172	0.160	0.151	0.161
No. of observations	2,452,291	2,452,291	2,452,291	2,452,291	2,452,291	2,452,291	2,488,115	2,488,115	2,488,115
Table C: Men									
Azteca*Post Dec 2002	-0.0538** (0.0269)	0.0541* (0.0308)	0.0483* (0.0290)	-0.0451 (0.0295)	0.0500 (0.0307)	0.0479* (0.0280)	-0.0134** (0.0058)	0.0003 (0.0050)	-0.0015 (0.0045)
R-squared	0.139	0.125	0.140	0.185	0.159	0.186	0.134	0.101	0.137
No. of observations	2,081,557	2,081,557	2,081,557	2,081,557	2,081,557	2,081,557	2,155,982	2,155,982	2,155,982
Group time trend	No	Yes	No	No	Yes	No	No	Yes	No
Municipality time trend	No	No	Yes	No	No	Yes	No	No	Yes

Note: Standard errors 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%, *** 1%