

Foreign Entry and the Mexican Banking System, 1997-2007

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Abstract:

What is the impact of foreign bank entry on the pricing and availability of credit in developing economies? The Mexican banking system provides a quasi-experiment to address this question because in 1997 the Mexican government radically changed the laws governing the foreign ownership of banks: the foreign market share therefore increased five-fold between 1997 and 2007. We construct and analyze a panel of Mexican bank financial data covering this period and find no evidence that foreign entry increases the availability of credit. Our analysis also indicates that foreign banks screen borrowers more closely and charge higher lending rates. One of our most robust findings is that foreign ownership is associated with a decrease in housing lending. We suggest that this outcome may obtain because foreign owned banks may wish to avoid Mexico's difficult property rights environment.

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In recent years, governments around the world have been opening up their banking systems to foreign competition. Academics and policymakers have therefore been exploring the effects of foreign bank entry. Most studies conclude that foreign entry increases the contestability of markets, thereby reducing administrative costs, lowering net interest margins, and driving down bank rates of return.¹ Nevertheless, as Clarke, Cull, Martínez Peria, and Sánchez (2003) note, much of what we know comes from cross-country studies that are heavily weighted toward developed economies. This is particularly crucial because the impact of foreign entry may vary with the level of economic development (Lensink and Hermes 2004; Claessens, Demirgüç-Kunt, and Huizinga, 2001).

The literature to date on foreign bank entry in developing economies does not provide a consensus set of results about the effects of foreign entry. There is some evidence that foreign entry increases social welfare. Micco, Panizza, and Yañez (2006) find that foreign banks in developing countries tend to charge the same interest margins as domestic banks, but tend to have lower overhead costs and higher rates of return on capital. Clarke, Cull, and Martínez Peria (2006) find that enterprises in countries with high levels of foreign bank participation tend to rank interest rates and access to long term loans as lesser constraints on their operations and growth than do enterprises in countries with low levels of foreign bank participation. Martínez Peria and Mody (2004), analyzing a group of Latin American cases in a pooled time-series cross-sectional framework, find that foreign banks charge lower interest

¹ For representative works see: Berger and Humphrey 1997; Berger, Klapper, and Udell 2001; Demirgüç-Kunt and Huizinga 1998; Denizer 1999; Clarke, Cull, D'Amato, Molinari 1999; Barth, Caprio, and Levine 2000; Berger, DeYoung, Genay and Udell 2000; Barajas, Steiner and Salazar 2000; Claessens, Demirgüç-Kunt, and Huizinga, 2001; Levine, 2002; Mian 2003; Clarke, Cull, Martinez Peria, and Sánchez 2003, 2004; Demirgüç-Kunt, Laeven, and Levine 2004; Sturm and Williams, 2004.

rate spreads than domestically-owned banks. They also find that foreign bank entry is associated with an overall increase in administrative efficiency and a decrease in interest spreads, suggesting that foreign entry spurred competition. Denizler (1999), in a study of Turkey, obtains similar results: foreign entry reduced domestic bank overhead expenses as well as bank profitability. Unite and Sullivan (2003) find that foreign entry was associated with declines in interest rate spreads, overhead expenses, and profits in the Philippines, but that the effect was confined to domestic banks that had been tied to business groups. Studies of Uganda suggest that foreign banks have better internal control mechanisms than domestic banks in terms of judging the quality of borrowers, and thus achieve the same rate of return, but with lower risk (Kasekende and Sebudde 2002; Cull, Haber, and Imai 2007).

Not all the evidence points in the same direction, however. Havrylchuk (2006) finds that foreign banks in Poland are more efficient than domestic banks, but then shows that the efficiency gains are all located in “greenfield” banks: domestic banks that are acquired by foreign banks do not become more efficient. Cardim de Carvalho (2002) finds no differences between foreign and domestic banks in Brazil in terms of credit allocation or technical efficiency. Indeed, technical progress in online banking and automation in Brazil has been introduced more aggressively by domestically owned banks. Claessens, Demirgüç-Kunt and Huizinga (2001) find that foreign banks operating in developing economies have higher overhead expenses, charge higher interest margins, and earn higher rates of return than domestic banks. Research on Argentina and Pakistan indicates that foreign banks are less willing to extend credit on the basis of “soft knowledge” about firms. Foreign entry may therefore give larger firms even greater advantages by exacerbating problems of differential access to capital (Clarke, Cull, D’Amato, and Molinari, 2000; Berger, Klapper, and Udell

2001; Mian 2006). The finding that foreign banks eschew “soft knowledge” lending is supported by multi-country studies that use panel data techniques (Mian 2003). Indeed, in a study by Detragiache, Tressel, and Gupta (2006), foreign entry in a panel of poor economies was found to be associated with a net reduction in total lending to the private sector: foreign banks appear to have skimmed off the best credit risks, leaving domestic banks with a pool of weaker borrowers from which to select. This result is broadly consistent with work by Barajas, Steiner, and Salazar (2000) on Colombia. They find that the acquisition of domestic banks by foreign concerns produced a decline in non-performing loans and administrative costs, but that foreign entry also had a dark side: the increased competition created by foreign entry produced a deterioration in loan quality as high quality borrowers were skimmed off by foreign banks.

A related body of research suggests that foreign banks represent a trade-off for a developing country. Galdino, Micco, and Powell (2004) develop a model and present evidence indicating that foreign banks may be less susceptible to funding shocks than domestic banks because they can tap capital from their home institutions, but at the same time foreign banks are more reactive to shocks that affect expected returns. That is, they may be more fickle than domestic lenders, leading to greater banking system instability.

We offer a contribution to the literature through a detailed study of the impact of foreign entry in Mexico. Focusing on a single country allows us to reduce the problems of identification and omitted variables that affect multi-country studies. Indeed, the Mexican case allows us to take a quasi-experimental approach. First, regulatory restrictions limited foreign bank entry before 1997, and then were dramatically liberalized, allowing foreign firms to purchase Mexico’s largest banks in a rapid manner. The foreign market share grew from

14 percent in September 1997, to 25 percent by December 2000, to 64 percent by December 2002, to 72 percent by December 2004, and to 76 percent by December 2007. Second, during the period under study, virtually all foreign entry in Mexico was through the acquisition of pre-existing, domestically-owned banks.² This reduces problems of omitted variable bias, because we are not forced to draw comparisons between newly arrived foreign retail banks without client lists, and long-standing domestically owned banks that have built up lending relationships over decades. Instead, we measure the impact of switching from domestic to foreign ownership. Third, the detailed nature of the data allows us to control for time-varying factors within banks over time, particularly the allocation of credit across different loan categories, thereby allowing us to reduce measurement error when we estimate regressions on the determinants of non-performing loans, net interest margins, loan interest rates, return on assets, return on equity, and administrative efficiency.

Our analysis indicates that switching from domestic to foreign ownership is associated with a sizable decline in the ratio of non-performing loans, which suggests that foreign owned banks are either less willing to make loans on the basis of “soft information” or have better technologies for screening borrowers. Their less risky loan portfolios are not, however, associated with lower interest rate spreads. The evidence suggests that the obverse is the case: the change from domestic to foreign ownership is associated with higher loan interest rates and thus higher net interest margins. We also find that the change from domestic to foreign ownership is not associated with an increase in administrative efficiency or profitability. This is a puzzling outcome: foreign banks earn more per unit of output (in this case credit), but those higher unit profit margins do not translate into higher rates of return on

² Walmart obtained permission to enter the retail banking market in Mexico at the end of 2006, but it only started operations in early 2008. Its operations are not yet covered in publicly available data sets.

capital. One obvious resolution of this puzzle is that switching from domestic to foreign ownership is associated with a decline in the volume of lending to firms and households. We find, in fact, that changes in ownership from domestic to foreign are associated with a decline in lending for housing. We suggest that this result may be associated with the assessment by foreign banks of Mexico's difficult property rights environment.

Data

We obtained, and put into machine-readable form, balance sheets, income statements, and loan portfolios on a quarterly basis for every retail bank in Mexico from September 1997 to December 2007.³ This data was gathered by Mexico's Comisión Nacional Bancaria y de Valores (CNBV) for the purpose of regulating the banks, and was then published in the CNBV's Boletín Estadístico de Banca Múltiple. The most recent quarters of data were available from the CNBV's website.⁴ For some reporting periods, some of the data was published by the CNBV in cumulative form (each quarter's data was the sum of that quarter's activity, plus the activity of the previous quarter). Undoing these cumulative totals was, after identifying the cases, a straightforward process. Some of the data for some reporting periods was also published by the CNBV in deflated form (where the data had been first run through a

³ We exclude representation offices or small subsidiary operations of foreign banks that are not engaged in retail banking. These boutique banks specialize in investment banking operations or serve as representation offices for their parent banks in making large loans to blue chip corporations. We note that they account for a trivial percentage of lending (in December 1997 they accounted for 1.7 percent of all lending—a proportion that did not increase appreciably over the next decade). Indeed, as their parent banks bought controlling interests in Mexican retail banks, their representation offices were merged with the retail bank and thus they ceased to exist as reporting units. Including them in our panel therefore decreases its balance. We note, however, that including them in the panel, and then controlling for their presence with a dummy variable, does not materially affect our results.

⁴ WWW.CNBV.gob.mx. Readers who may wish to replicate or extend our results should be cautioned not to rely on the website alone, because the CNBV deletes historical data for banks that later merged with other banks or otherwise exited the market. Simply downloading the data from the CNBV website will produce a truncated sample of surviving, merged banks.

price index). After identifying the cases, un-deflating the data was a straightforward process. We identified those banks that had been subject to mergers and acquisitions (both by other domestic banks and by foreign banks) from information compiled by Mexico's Comisión Nacional para la Protección y Defensa de los Usuarios de Servicios Financieros (CONDUSEF), and posted to their website. We are therefore able to create a unique dataset that allows us to follow banks in time, regardless of changes in name or ownership.⁵ We then code each bank-quarter as either domestic or a foreign merger and acquisition (hereafter, Foreign MA) with a dummy variable.⁶

In an ideal world, we would begin our analysis prior to the entry of any foreign mergers and acquisitions, which is to say in the early 1990s. Instead, we begin our analysis in September 1997. We do so because the macroeconomic instability of 1995-96 produced widespread debtor defaults, bank insolvencies, government interventions into the banks, and a bailout that ultimately cost Mexican taxpayers 15 percent of GDP (Haber 2005). There were two consequences of these interventions. The first was that in order to recapitalize the banks the government lifted the regulatory restrictions that had limited the ability of foreign banks to purchase Mexican retail banks. The second was that, in order to prevent a reoccurrence of the 1995-96 banking crisis, the government reformed bank accounting standards in 1997. This means that it is not possible to link data from before September 1997 with data from after September 1997 (Del Angel-Mobarak, Haber, and Musacchio 2004).

⁵ The URL for this site has changed over time. Its current location is: <http://sipres.condusef.gob.mx/home/SQLsectoresSHCP.asp?ID=40> .

⁶ Foreign MA was coded as 1 if a foreign bank purchased a controlling interest in a domestic Mexican bank. This means that the Mexican bank continues to exist as a reporting unit, although its name is sometimes altered to reflect the change in ownership. For example, when the Banco de Bilbao y Vizcaya purchased a controlling interest in Bancomer, the merged bank was renamed BBV Bancomer.

Nevertheless, our data set captures the period in which the greatest changes in Mexican bank ownership occurred. At the beginning of the period under study (September 1997), only three of Mexico's 19 reporting banks, accounting for 14 percent of total bank credit, were Foreign MA (GE Capital Bank, Banco Bilbao Vizcaya, and Santander Mexicano). At the end of the period under study, seven of Mexico's 18 reporting banks, controlling 76 percent of total bank credit, were Foreign MA (Banamex, Santander Serfin, BBV Bancomer, GE Capital Bank, Bital, ScotiaBank Inverlat, and BBV Bancomer Servicios).

Methods

In order to explore the impact of foreign entry we build upon the methods employed by Martínez Peria and Mody (2004) to study interest rate spreads in foreign banks in Latin America. Their framework draws, in turn, on two bodies of literature: the dealership model of bank spreads developed by Ho and Saunders (1981), Allen (1988), and Angbazo (1997); and the firm-theoretic model of bank spreads developed by Zarruck (1989) and Wong (1997). We go beyond the Martínez Peria and Mody (2004) framework, however, in that we employ variants of their base regression on net interest margins to study a broad range of bank performance and bank strategy variables.

We also depart from Martínez Peria and Mody (2004) in that we employ a quasi-experimental estimation techniques in order to mitigate problems of identification and omitted variables. One problem that bedevils studies of the impact of foreign bank entry is that it is difficult to separate out the effects of foreign bank entry from effects that can be attributed to changes in other regulatory, legal, or macroeconomic factors (Barajas, Steiner, and Salazar 2000). Another problem that bedevils such studies is that the ownership status of banks is not

randomly assigned. If the characteristics that make certain banks attractive targets for foreign acquisition also make them more likely to display the outcomes of interest, there can be selection bias.

In order to mitigate these problems we take several steps. First, we control for all time-invariant factors that are specific to banks by including bank dummies in the regressions. Second, we include quarter dummies, in order to control for factors that affect all banks at any particular time, such as changes in the macro-economic or institutional environment. Third, we control for time-varying heterogeneity within banks by the addition of control variables that potentially determine which banks were selected for foreign acquisition and that also affect our outcomes of interest. The banks that were acquired by foreign banks tended to be large and tended to be distressed in the period before they were acquired. One might imagine that being large and being distressed might correlate with a number of bank performance outcomes. We therefore control for bank size by introducing a variable in all regressions for bank market shares, and control for bank distress by introducing a variable for the percentage of a bank's assets composed of bailout bonds issued by the government's deposit insurance agencies (Fobaproa and IPAB). Finally, in order to control for serial correlation in the data we cluster the (robust) standard errors by bank. Our Foreign MA dummy variable therefore picks up the effect of switching from domestic ownership to foreign ownership.

EMPIRICAL RESULTS:

Interest Spreads

We begin with the analysis of interest rate spreads—the difference between the implicit average interest charged on loans and the implicit average interest paid on deposits—in order to see whether switching from domestic to foreign ownership is associated with a

change in the price of credit. We control for a range of bank characteristics by estimating a regression with the following form:

$$\begin{aligned}
 \text{Spread}_{i,t} = & \alpha_0 + \alpha_1 \text{Foreign MA}_{i,t} + \alpha_2 \text{Fobaproa-IPAB}_{i,t} + \alpha_3 \text{Bank Market Share}_{i,t} + \\
 & \alpha_4 \text{Equity}_{i,t} + \alpha_5 \text{Housing Loans}_{i,t} + \alpha_6 \text{Commercial Loans}_{i,t} + \\
 & \alpha_7 \text{Consumer Loans}_{i,t} + \alpha_8 \text{Liquidity}_{i,t} + \alpha_9 \text{Bank}_i + \alpha_{10} \text{Quarter}_t, \\
 & + \alpha_{12} E_{i,t} \quad (1)
 \end{aligned}$$

where i is the bank id and t refers to the time period considered. In equation (1) the variable *Spread* is the net interest margin (the interest spread). *Foreign MA* is a dummy variable that takes a value of 1 at each point in time that a bank is owned by a foreign bank. *Fobaproa-IPAB* is the ratio of Fobaproa or IPAB bailout bonds to total assets in each bank. *Bank Market Share* is the proportion of each bank's loans to total system loans. *Equity* is the share of a bank's equity to its assets. In theory, higher equity ratios should discourage risky lending, because more stockholder wealth is at risk. *Housing Loans*, *Commercial Loans*, and *Consumer Loans* are the ratios of each of these loan categories to total bank assets. We include them because each of these loan types carries different interest rates, reflecting differences in the probability of repayment, collateralization, and term structure. *Liquidity* is the ratio of cash (including deposits in other banks or in the central bank) to assets. Higher liquidity ratios reflect a cost on banks, because they have to give up holding a higher yielding asset. Higher liquidity ratios should therefore be associated with larger *Spreads*. *Bank* is a bank-level fixed effect that controls for all time-invariant bank characteristics. *Quarter* is a dummy variable for each quarter. It allows us to control for changes in the macroeconomic or institutional environment that affects all banks. Descriptive statistics for each of these variables is found in Table 1.

The variable of interest in this estimation is the *Foreign MA* dummy. It allows us to determine whether the switch from domestic to foreign ownership is associated with an increase in the interest rate spread—everything else held constant. As Column 1 of Table 2 indicates, the Foreign MA coefficient is both statistically and economically significant: Switching from domestic to foreign ownership is associated with a 1.3 percentage point increase in interest spreads. Given that the mean is 2.3 percent (see Table 1), the Foreign MA effect is very large. The other variables enter the regression with the expected signs. One variable, in particular, emerges as both statistically and economically significant: Housing Loans, which are strongly (and positively) correlated with interest spreads—a topic to which we shall later return.

One might be tempted to argue that Foreign MA banks charge higher net interest margins because they make loans that are more costly to administer. While this notion is counter-intuitive—because most studies find that foreign entry is associated with a lowering of administrative costs—it is worth testing. We therefore modify equation 1 by adding a variable for the ratio of administrative costs to assets, and present the results in Column 2 of Table 2. The coefficient for administrative costs enters the regression with the expected sign and significance, and it reduces the magnitude of the coefficient on the Foreign MA variable. Nevertheless, Foreign MA remains both statistically and economically significant: switching from domestic to foreign ownership is associated with 0.8 percentage point increase in interest spreads.

One might also be tempted to argue that the increase in interest rate spreads is a temporary phenomenon, associated with the initial period of foreign acquisition. We test this idea by adding dummy variables to the regression for the first year, and the first two years, of

foreign ownership. These had no material impact on the results, and so we do not reproduce them here.

Are higher interest rate spreads the product of lower interest rates offered to depositors by Foreign MA banks? In order to answer this question we modify equation 1 by substituting the implicit interest rate paid on deposits (Interest Paid as % of Deposits) for *Spread* as the dependent variable. We report the results in Column 3 of Table 2. The Foreign MA dummy in this regression is not statistically significant, which indicates that switching from domestic to foreign ownership is not associated with a rise (or fall) in deposit interest rates—all other things being equal. This regression does suggest, however, that there is a positive relationship between the degree to which a bank is invested in housing loans and the interest rates it offers depositors—a subject to which we shall return.

Perhaps, then, the larger interest spreads charged by Foreign MA banks are the product of charging more for loans? In Column 4 of Table 2 we modify equation 1 by substituting the implicit interest rate charged on loans for net interest margins. This regression does yield a coefficient on Foreign MA that is statistically and economically significant: switching from domestic to foreign ownership is associated with an increase of 1.5 percentage points in loan interest rates. Again, the degree to which a bank is invested in housing loans is strongly associated with the interest rates it charges. As we did with the regression on interest spreads, we attempt to reduce the statistical and economic significance of the Foreign MA dummy by adding a variable for the ratio of administrative costs to assets (see Column 5 of Table 2). The administrative cost variable enters the regression with the expected sign and significance, but the Foreign MA dummy remains statistically and

economically significant: switching from domestic to foreign ownership is associated with an increase of 0.9 percentage points in the implicit interest rate charged on loans.

Non-Performing Loans

One potential explanation of these results is that Foreign MA banks may be willing to accept higher levels of risk, or are less adept at screening borrowers, than domestically owned banks—and thus price credit accordingly. We therefore test the hypothesis that Foreign MA banks are either willing to accept higher levels of risk, or are less adept at screening for it, than domestic banks by estimating a regression with the following form:

$$\begin{aligned}
 NPL_{i,t} = & \alpha_0 + \alpha_1 \text{Foreign MA}_{i,t} + \alpha_2 \text{Fobaproa-IPAB}_{i,t} + \alpha_3 \text{Bank Market Share}_{i,t} + \\
 & \alpha_4 \text{Equity}_{i,t} + \alpha_5 \text{Housing Loans}_{i,t} + \alpha_6 \text{Commercial Loans}_{i,t} + \\
 & \alpha_7 \text{Consumer Loans}_{i,t} + \alpha_8 \text{Liquidity}_{i,t} + \alpha_9 \text{Bank}_i + \alpha_{10} \text{Quarter}_t + \alpha_{11} E_{i,t} \quad (2)
 \end{aligned}$$

where i is the bank id and t refers to the time period considered. In equation 2 the variable NPL is the ratio of non-performing to total loans, and all other variables are as described in equation 1.

The variable of interest in this estimation is the *Foreign MA* dummy. It allows us to determine whether the switch from domestic to foreign ownership is associated with an increase in the ratio of non-performing loans—everything else held constant. Column 1 of Table 3 indicates that Foreign MA enters the regression with a negative sign, and is both statistically and economically significant. Switching from domestic to foreign ownership implies a 6.8 percentage point *decrease* in the rate of non-performance. This implies that Foreign MA banks are either willing to accept lower levels of risk than domestically owned banks, or that Foreign MA banks have better screening technologies to detect risky borrowers.

We note that this result is consistent with the results from Kasekende and Sebudde (2002) and Cull, Haber, and Imai (2007), which indicate that foreign banks tend to have better screening technologies than domestically owned banks. Our results are also consistent with our interviews with Mexican bankers and entrepreneurs, who indicate that local loan committees tend to be willing to grant business loans on the basis of soft information, but that the central offices of Foreign MA banks tend to reject this soft-information and prefer standardized credit scoring criteria. In short, one would be hard pressed to argue that the higher interest rates charged by Foreign MA banks are compensation for accepting greater levels of risk.

Rates of Return

If the switch from domestic to foreign ownership is associated with an increase in net interest margins, then one would expect that the switch from domestic to foreign ownership would be associated with an increase in bank rates of return. We therefore test this hypothesis in Table 4, where we estimate a series of regressions on the rate of return on equity.

We control for a range of bank characteristics by estimating a regression with the following form:

$$ROE_{i,t} = \alpha_0 + \alpha_1 Foreign\ MA_{it} + \alpha_2 Fobaproa-IPAB_{it} + \alpha_3 Bank\ Market\ Share_{it} + \alpha_4 Housing\ Loans_{it} + \alpha_5 Commercial\ Loans_{it} + \alpha_6 Consumer\ Loans_{it} + \alpha_7 Bank_i + \alpha_8 Quarter_t + \alpha_9 E_{it} \quad (3)$$

where i is the bank id and t refers to the time period considered. In equation (3) the variable ROE is the rate of return on equity, and all other variables are as described in equation 1.

The variable of interest in this estimation is the *Foreign MA* dummy. It allows us to determine whether the switch from domestic to foreign ownership is associated with an increase in the rate of return on equity—everything else held constant. As Column 1 of

Table 4 indicates, the Foreign MA coefficient is positive, but is not statistically significant. One might think that the inclusion of variables that control for the allocation of assets across different loan classes might perhaps be soaking up the difference between foreign and domestic banks: when a bank is purchased by foreign owners, it is possible that there is a reallocation of capital. We therefore modify equation 3 in Column 2 of Table 4 by dropping the loan category variables. This has no effect on the *Foreign MA* coefficient.

Perhaps measurement error in *ROE* is driving the lack of results on foreign MA. We therefore substitute return on assets (*ROA*) for return on equity in equation 3, and present the results in Table 5. *ROA* enters the regression with a negative sign, but it is far from statistical significance. As we did in Table 4, we drop the conditioning variables for loan categories in order to see if we can increase the statistical significance of the *ROA* variable. This modification, reported in Column 2 of Table 5, has no material impact on the regression results.

Administrative Efficiency

One of the implications of the *ROE* and *ROA* regressions is that the switch from domestic to foreign ownership is not associated with an increase in administrative efficiency. Our regressions on interest rate spreads and on loan interest rates have a similar implication: controlling for administrative costs *reduced* the magnitude of the Foreign MA coefficients in these regressions (see Columns 2 and 5 of Table 2). We therefore test the hypothesis that the switch from domestic to foreign ownership is associated with an increase in administrative efficiency in Table 6. We control for a range of bank characteristics by estimating a regression with the following form:

$$\begin{aligned}
AdminCost_{i,t} = & \alpha_0 + \alpha_1 Foreign\ MA_{i,t} + \alpha_2 Fobaproa-IPAB_{i,t} + \alpha_3 Bank\ Market\ Share_{i,t} + \\
& \alpha_4 Housing\ Loans_{i,t} + \alpha_5 Commercial\ Loans_{i,t} + \alpha_6 Consumer\ Loans_{i,t} + \\
& \alpha_7 Liquidity_{i,t} + \alpha_8 Bank_{i,t} + \alpha_9 Quarter_{i,t} + \alpha_{10} E_{i,t} \quad (4)
\end{aligned}$$

where i is the bank id and t refers to the time period considered. In equation 4 the variable *AdminCost* is the ratio of administrative costs to assets, and all other variables are as described in equation 1.

The variable of interest in this estimation is the *Foreign MA* dummy. It allows us to determine whether the switch from domestic to foreign ownership is associated with an increase in administrative costs—everything else held constant. As Column 1 of Table 6 indicates, the Foreign MA coefficient enters the regression with the wrong sign (it is positive), but is not statistically significant. Modifications of equation 5, in which we dropped conditioning variables in various combinations had no material effect on these results. We therefore do not reproduce them here.

Lending Strategies

Our regression results present something of a puzzle: the switch from domestic to foreign ownership is associated with an increase in interest rate spreads, but bigger spreads do not translate into higher rates of return on capital. Neither a willingness to bear greater levels of risk nor higher administrative costs explain this outcome. One possible explanation is that the switch from domestic to foreign ownership is associated with lower volumes of credit.

In order to test this hypothesis we estimate a series of regressions on the volume of lending, as measured by the ratio of various loan classes to assets. We begin by looking at the total of all lending to private firms and households by estimating a regression with the following form:

$$Private\ Loans_{i,t} = \alpha_0 + \alpha_1 Foreign\ MA_{i,t} + \alpha_2 Fobaproa-IPAB_{i,t} + \alpha_3 Bank\ Market\ Share_{i,t} + \alpha_4 Equity_{i,t} + \alpha_5 Bank_i + \alpha_6 Quarter_t + \alpha_7 E_{i,t} \quad (5)$$

where i is the bank id and t refers to the time period considered. In equation 5 the variable *Private Loans* is sum of all credit allocated to firms and households divided by assets, and all other variables are as described in equation 1.

The variable of interest in this estimation is the *Foreign MA* dummy. It allows us to determine whether the switch from domestic to foreign ownership is associated with an increase (or decrease) in lending for private purposes—everything else held constant. The Foreign MA coefficient enters the regression with a negative sign, but it is not statistically significant (see Column 1 of Table 6). At the very least, we can say that the switch from domestic to foreign ownership is not associated with an increase in credit availability.

One possibility is that lumping all loans to firms and households together into a single variable might be too blunt a measure to capture the effect of switching from domestic to foreign ownership on the availability of credit. We therefore modify equation 5 in Columns 2, 3, 4, and 5 of Table 6 by substituting subcategories of private lending for the *Private Loans* variable, where each variable is the share of that loan type as a percent of assets. We obtain one striking result: the coefficient on Housing Loans (Column 5) enters the regression with a negative sign, is of large magnitude, and is significant at the 99 percent confidence level. It implies that switching from domestic to foreign ownership is associated with a five percentage point decrease in the share of assets allocated to housing credit. Given the fact that the sample mean is 4.8 percent (and it 7.7 percent for Foreign MA banks only), the implication is that switching from domestic to foreign ownership had an economically significant impact.

The results from our other regressions shed some light on why foreign owned banks may be disinclined to allocate credit in the housing market. Our regressions on interest spreads indicate, for example, that there is a positive correlation between the spread that banks seek and the percentage of their assets allocated to housing credit (Table 2, Column 1). The statistical significance of the coefficient on housing loans is dramatically reduced, however, when we add a control for administrative costs (Table 2, Column 2). We obtain a similar result in the regressions on the implicit interest rates charged on loans: a strongly positive association between housing lending and the interest rate charged; and a reduction in significance of the housing variable when we control for administrative costs (Table 2, Columns 4 and 5). Not surprisingly, housing loans enter the administrative cost regressions (Table 6) as positive and significant. The implication from all three sets of regressions is clear: housing loans are more costly to administer than other types of loans. One possible reason for higher costs of administration is that housing loans are more likely to fail than other types of loans. Sure enough, Table 3 indicates that there is a strong positive association between housing loans and non-performing loans.

These regression results square with qualitative evidence about difficulties that creditors have in making sure that a mortgage applicant really has clear title to a parcel. Mexican property registers are notoriously inaccurate. Public records often show multiple owners for the same parcel, liens are not recorded, property sales often go unrecorded, parcel boundaries may not be clearly specified, and files can be tampered with. In short, it is not always clear that a mortgage holder is the legal owner of a parcel. (Joint Center 2004).

A second difficulty that lenders confront is the difficulty in enforcing a mortgage contract. Until 2001, Mexico's bankruptcy procedures were cumbersome in the extreme,

which allowed debtors to delay foreclosures for years on end (Mackey 1999: 101). In 2001, the government pushed through a bankruptcy reform that permitted mortgage contracts to be recast so as to place collateralized assets outside of an individual's or a firm's bankruptcy estate. In the case of home mortgages, liens on property were replaced with bilateral trusts, in which the bank is both the trustee and beneficiary of the trust. If the borrower fails to make agreed payments, the bank can evict the debtor and sell the house at auction. Debtors can legally contest the repossession but they are unable to remain in the house during the process (Caloca González, n.d.). These reforms, while an improvement over the previous system, were not a panacea. A mortgage borrower can, for example, use a number of legal and extralegal tactics that raise the costs of repossession relative to the value of her or his house, thereby making it difficult to enforce the terms of a bilateral housing trust. For instance, a borrower can "lease" her house to a family member. If a bank then moves to repossess the house, the bank must do so with the "renter" still living there, because, under Mexico's favorable renters' laws, that person cannot be easily evicted. If the bank then decides to sell the house at auction (as the law requires it to do), the price it receives reflects the stream of rent available from the rental contract. Yet the net present value of the stream of rent is likely be far less than the market value of the house if were it unencumbered by a rental agreement (which may in any event be fictitious if the mortgage holder actually occupies the house). Once the bank has taken possession of the house, moreover, the borrower/renter has few incentives to preserve the structure's physical condition or its market value. For reasons such as these, non-bank housing lenders (SOFOLÉS—which predominantly fund their loan books by borrowing from a government-backed development bank that also guarantees the

mortgage) generally pay debtors who are in default to vacate the house: this option is less costly than going through the required legal steps.

CONCLUSIONS AND *IMPLICATIONS*:

Taken together, our results suggest that the welfare gains that Mexico has obtained from foreign bank entry have been modest. The sale of Mexico's largest banks to foreign concerns allowed the country to recapitalize its banking system following a financial crisis. Foreign ownership has not, however, been associated with greater efficiency in bank operations, increased lending to firms and households, or a fall in the price of credit. Indeed, the data analyzed here suggests that foreign banks have been somewhat hesitant to service certain parts of the Mexican market. The data also suggest that foreign ownership has been associated with higher priced credit, all other things held constant.

Our results are consistent with some of the findings of the extant literature. For example, our results on the association between foreign ownership and lower levels of non-performing loans mirror the results that researchers have obtained in studies of Ugandan banks. (Kasekende and Sebudde 2002; Cull, Haber, and Imai 2007). Our results are also consistent with the finding in the extant literature that foreign banks may opt out of certain segments of credit markets (Clarke, Cull, D'Amato, Molinari, 2000; Mian, 2003, 2006). Our results on the effects of foreign entry on administrative costs, mirror those obtained in studies of Brazilian and Polish banks (Cardim de Carvahlo 2002; Havrylchy 2006). Finally, our results on interest spreads are consistent with the findings of Claessens, Demirguç-Kunt and Huizinga (2001). Unlike these authors, however, our results do not indicate that foreign banks also earn higher rates of return. This may be because foreign banks in Mexico are somewhat reluctant to enter certain segments of the loan market—most particularly lending

for housing. Whether this is a general characteristic of foreign banks, or is peculiar to Mexico, can only be known through detailed studies of foreign bank entry in other developing economies.

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Table 1
Summary Statistics

Variable	All Banks					Foreign MA Banks			Domestic Banks		
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Spread (net interest margin)	757	0.023	0.042	-0.11	0.559	208	0.024	0.027	549	0.023	0.046
Market Share Loans	808	0.051	0.074	0	0.298	238	0.093	0.086	570	0.034	0.061
Non-Performing Loan Ratio	804	0.04	0.057	0	0.489	238	0.031	0.029	566	0.044	0.065
Equity Ratio	804	0.164	0.161	0.03	0.971	238	0.172	0.209	566	0.161	0.135
Return on Equity	803	0.023	0.083	-1.56	0.254	237	0.029	0.079	566	0.020	0.085
Private Lending as % Assets	793	0.482	0.226	0	0.992	231	0.396	0.236	562	0.518	0.212
Commercial Lending as % Assets	793	0.346	0.23	0	0.881	231	0.225	0.189	562	0.395	0.227
Consumer Lending as % Assets	793	0.049	0.105	0	0.808	231	0.079	0.128	562	0.037	0.091
Housing Lending as % Assets	793	0.048	0.078	0	0.828	231	0.077	0.111	562	0.037	0.056
Fobaproa-IPAB as % Assets	793	0.091	0.172	0	0.909	231	0.126	0.147	562	0.077	0.179
Loans to SOFOLES as % Assets	793	0.039	0.072	0	0.535	231	0.014	0.028	562	0.049	0.082
Liquidity Ratio	804	0.149	0.08	0	0.527	238	0.152	0.060	566	0.148	0.087
Interest Income on Loans	781	0.047	0.05	0	0.829	232	0.041	0.035	549	0.050	0.055
Interest Paid on Deposits	757	0.025	0.02	0	0.341	208	0.019	0.014	549	0.027	0.021
Administrative Costs as % Assets	803	0.017	0.017	0	0.196	237	0.019	0.020	566	0.016	0.016

Table 2
Interest Rate Regressions

	(1)	(2)	(3)	(4)	(5)
	Spread (Net Interest Margin)	Spread (Net Interest Margin)	Interest Paid on Deposits	Interest Earned on Loans	Interest Earned on Loans
Foreign MA	0.0130** (0.00500)	0.00828*** (0.00239)	0.00202 (0.00273)	0.0150** -0.00588	0.00930*** -0.00321
Fobaproa-IPAB as % Assets	-0.0223** (0.00827)	-0.0430*** (0.0149)	-0.0208 (0.0138)	-0.0409*** -0.0138	-0.0610*** -0.0198
Market Share Loans	-0.0717 (0.0470)	0.0174 (0.0377)	0.0528** (0.0245)	-0.0255 -0.0621	0.0689 -0.0442
Equity Ratio	-0.0213 (0.0176)	-0.0437* (0.0217)	-0.0270** (0.0120)	-0.0426** -0.0153	-0.0612*** -0.0159
Housing Loans as % Assets	0.163*** (0.0539)	-0.0265 (0.0398)	0.0409*** (0.0138)	0.208*** -0.0566	-0.00903 -0.0352
Commercial Loans as % Assets	-0.0186 (0.0167)	0.0103 (0.0138)	-0.00921 (0.00815)	-0.0277 -0.0166	0.00374 -0.0136
Consumer Loans as % Assets	0.00812 (0.0433)	-0.0367 (0.0426)	0.0134* (0.00760)	0.0217 -0.0452	-0.0297 -0.0392
Liquidity Ratio	0.0227 (0.0346)	0.0333 (0.0302)	0.0147 (0.0208)	0.0346 -0.0437	0.0433 -0.0386
Ratio of Administrative Costs to Assets		1.879*** (0.598)			2.141*** (0.574)
Bank Dummies	Yes	Yes	Yes	Yes	Yes
Quarter Dummies	Yes	Yes	Yes	Yes	Yes
Constant	0.0160 (0.0164)	-0.0100 (0.0145)	0.0241*** (0.00700)	0.0394* -0.0203	0.0108 -0.016
Observations	749	749	749	773	773
R-squared	0.651	0.743	0.644	0.592	0.673

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dummies for first year of foreign ownership and first two years of foreign ownership do not have a material impact on the results.

Dropping control variables, in various combinations, does not have a material impact on the results.

Table 3
Regressions on Non-Performing Loans

	Non-Performing Loans as Percent Total Loans
Foreign MA	-0.0676*** (0.0226)
Fobaproa-IPAB as % Assets	-0.154 (0.143)
Market Share Loans	-0.259 (0.304)
Equity Ratio	-0.0287 (0.0605)
Housing Loans as % Assets	0.162*** (0.0543)
Commercial Loans as % Assets	-0.0387 (0.0398)
Consumer Loans as % Assets	0.0140 (0.0847)
Liquidity Ratio	-0.0181 (0.0689)
Bank Dummies	Yes
Quarter Dummies	Yes
Constant	0.174** (0.0836)
Observations	793
R-squared	0.624

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The addition of dummies for the first year, or the first two years, of foreign ownership do not have a material impact on these results.

Dropping control variables, in various combinations, does not have a material impact on the results.

Table 4
Return on Equity Regressions

	Rate of Return on Equity	Rate of Return on Equity
Foreign MA	0.0357 (0.0356)	0.0392 (0.0341)
Fobaproa-IPAB as % Assets	-0.0583 (0.0663)	-0.0637 (0.0687)
Market Share Loans	-0.426 (0.422)	-0.430 (0.386)
Housing Loans as % Assets	-0.0911 (0.0899)	
Commercial Loans as % Assets	0.0237 (0.0287)	
Consumer Loans as % Assets	0.0144 (0.0389)	
Bank Dummies	Yes	Yes
Quarter Dummies	Yes	Yes
Constant	0.115 (0.0752)	0.111 (0.0725)
Observations	792	792
R-squared	0.232	0.226

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dummies for first year of foreign ownership and first two years of foreign ownership do not have a material impact on the results.

Dropping control variables, in various combinations, does not have a material impact on the results.

Table 5
Return on Assets Regressions

	Rate of Return on Assets	Rate of Return on Assets
Foreign MA	-0.00457 (0.00484)	-0.00306 (0.00419)
Fobaproa-IPAB as % Assets	-0.0356*** (0.00644)	-0.0347*** (0.00491)
Market Share Loans	-0.115* (0.0621)	-0.126 (0.0787)
Housing Loans as % Assets	-0.0300 (0.0200)	
Commercial Loans as % Assets	-0.00680 (0.0152)	
Consumer Loans as % Assets	-0.00279 (0.0147)	
Bank Dummies	Yes	Yes
Quarter Dummies	Yes	Yes
Constant	0.0368* (0.0187)	0.0368* (0.0187)
Observations	792	792
R-squared	0.543	0.543

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dummies for first year of foreign ownership and first two years of foreign ownership do not have a material impact on the results.

Dropping control variables, in various combinations, does not have a material impact on the results.

Table 6
Administrative Cost Regressions

	Administrative Costs as Percent of Assets
Foreign MA	0.00196 (0.00196)
Fobaproa-IPAB as % Assets	0.00404 (0.00302)
Market Share Loans	-0.0579** (0.0223)
Housing Loans as % Assets	0.0966*** (0.00704)
Commercial Loans as % Assets	-0.0161 (0.0108)
Consumer Loans as % Assets	0.0206* (0.0101)
Liquidity	-0.00548 (0.00818)
Bank Dummies	Yes
Quarter Dummies	Yes
Constant	0.0193*** (0.00523)
Observations	792
R-squared	0.841

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dummies for first year of foreign ownership and first two years of foreign ownership do not have a material impact on the results.

Dropping control variables, in various combinations, does not have a material impact on the results.

Table 7
Private Lending Regressions

	Private Loans as Percent of Assets	Commercial Loans as Percent of Assets	Consumer Loans as Percent of Assets	Loans to SOFOLES as Percent of Assets	Housing Loans as Percent of Assets
Foreign MA	-0.0627 (0.0421)	-0.0328 (0.0306)	-0.00623 (0.0216)	0.0262 (0.0205)	-0.0499*** (0.0154)
Fobaproa-IPAB as % Assets	-0.448*** (0.1000)	-0.252*** (0.0847)	-0.105** (0.0382)	-0.0430 (0.0572)	-0.0484 (0.0335)
Market Share Loans	0.586 (0.803)	0.476 (0.787)	-0.175 (0.230)	0.212 (0.153)	0.0724 (0.182)
Equity Ratio	-0.369** (0.163)	-0.116 (0.111)	-0.178 (0.106)	0.0272 (0.0203)	-0.103** (0.0386)
Bank Dummies	Yes	Yes	Yes	Yes	Yes
Quarter Dummies	Yes	Yes	Yes	Yes	Yes
Constant	0.413** (0.187)	0.180 (0.184)	0.128* (0.0707)	-0.0372 (0.0401)	0.142*** (0.0394)
Observations	793	793	793	793	793
R-squared	0.786	0.843	0.470	0.452	0.462

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dummies for first year of foreign ownership and first two years of foreign ownership do not have a material impact on the results.

Dropping control variables, in various combinations, does not have a material impact on the results.