

Preliminary and Incomplete

Credit Expansion and Credit Contraction: their Effects on Households Savings Behavior in a Fragmented Economy

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Abstract

This paper deals with the households saving behavior after a financial reform and a financial crisis. These two events created a credit expansion and a credit contraction. This work considers explicitly the role of fragmented financial markets. Using Mexican National Surveys of Income and Expenditures, it is shown that households had different degrees of exposure to the financial market depending on their income level and location. Specifically, the paper analyzes the effects of the credit expansion of the early 1990's and the credit contraction after the financial crisis at the end of 1994 in Mexico, on the households' saving rate. In the financial reform case, results indicate that households with greater exposure to the financial system reduced their saving rate after the reform. The effect was stronger among younger households. In the case of the credit contraction, results show that households with higher access to the financial system increased their saving rate. In this case, the effect was stronger among older households. This indicates different motives for the saving rate changes in the two episodes.

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I. Introduction

Savings is a central element in the aggregate functioning of an economy. This variable is especially relevant in less developed countries where usually low national savings are considered an important cause of low investment and low economic growth. It is also important because savings function as a buffer stock during a crisis period. Savings also adjust to expectations about the future and to the current financial market conditions. Nevertheless, from the households' perspective, their capacity to adjust savings depends on their access to the financial system. Unfortunately, access to financial markets is not uniform in less developed countries.

In developing countries, access to financial intermediaries should be a positive function of the income level. Low-income individuals are constrained from financial services: usually borrowing is unavailable for them and savings accounts are not adequate given their income level. Other factor that limits access to financial intermediaries is the households' location. Financial units need a minimum market size to operate; therefore their presence would be limited in small communities. The effect is even stronger if the community is not only small but also relatively poor. In this sense, financial markets in developing countries are fragmented.

This paper analyzes the households savings behavior under different credit patterns in Mexico. Specifically, the article studies the effects on the households saving rates of the credit expansion in the 1989-1992 period and the subsequent credit contraction of the 1994-1996 period,. Furthermore, it explicitly recognizes the role of the financial market fragmentation. The article uses the 1989, 1992, 1994, and 1996 National Surveys of Households' Income and Expenditures.

The article presents evidence that indicate that households' access to the financial system is a function of their income level and of their location. The paper does a separate analysis for two periods: the 1989-1992 which includes the financial reform and the consequent credit

expansion; and the 1994-1996 period that comprehends the Mexican financial crisis and the important credit constraint.

For the 1989-1992 period, results indicate that households with higher exposure to the financial liberalization reduced their saving rate significantly after the reform. Also, results show that the change in saving rates is stronger among younger and richer households. This evidence is consistent with the hypothesis that the financial reform and subsequent credit expansion reduced the borrowing constraints of younger households.

Results for the 1994-1996 period indicate that households with greater exposure to the financial market increased significantly their saving rate after the crisis. Furthermore, results show that the older households rose their saving rate more than other younger age cohorts. This evidence is consistent with the hypothesis that the financial crisis made the outlook for retirement savings negative, therefore a rise in the current saving rate was necessary to compensate that effect.

The remainder of the paper is organized as follows. Section II presents an overview of relevant literature for the present analysis. Section III describes the two credit episodes and their causes. Section IV shows the data and includes an analysis of the fragmentation variables. Section V contains the empirical strategy and the main results of the paper. Finally, section VI concludes.

II. Literature Review¹

The financial liberalization literature gives important information about the effects of credit patterns on households savings behavior. The reason is that financial liberalization is usually followed by a significant credit expansion. Also, there is evidence that some of

¹ It has been difficult to find explicit evidence of the effects of credit contraction on savings. Most of the literature is related to the macroeconomic effects of the credit reduction, but not on the microeconomic effects. Nevertheless, forthcoming versions will include a more comprehensive literature review.

these expansion episodes ended as financial crisis (Díaz-Alejandro 1985, Schnedider and Tornell 2000).

There is an extensive descriptive literature about the experiences of developing countries with financial liberalization. A large proportion of it concentrates on the appropriate sequencing of financial reforms. Several authors (among them Galbis (1994), and Jbili, et. al. (1998)) have analyzed the tradeoffs between big-bang type and sequencing type liberalizations. Perhaps the most important result is that there is no single recipe for the way in which financial reforms should be implemented. It depends on initial conditions and specific countries characteristics.

One common effect of the financial liberalization is the increment in credit availability in the economy. Schmidt-Hebbel, et. al. (1996) mention that financial liberalization usually increases consumer lending and lessens borrowing constraints of consumers, both of which could decrease private saving.² The authors find a negative but insignificant impact of consumer credit on private savings in both industrial and developing countries.

Their results also show that the effects of financial liberalization on savings, using cross-country samples, are ambiguous. Determining the impact of financial deepening in savings, with a measure of broad money as an indicator of deepening, have lead to inconclusive results.

The effects of variables that reflect credit constraint have been easier to identify. Japelli and Pagano (1994) show that liquidity constraints on households could raise the saving rate. The authors perform cross-country regressions (including only OECD countries) of saving and growth rates on indicators of liquidity constraints on households. Their results suggest

² They also mention that liberalization could affect private saving through, at least, another three channels: first, capital market reforms may reverse capital flight, increasing domestic saving, but not necessarily private saving. Second, it may raise the efficiency of intermediation, increasing growth and hence private saving. Third, financial liberalization could increase the geographical density of financial institutions, the range of financial instruments, and the quality of financial regulation and supervision. This typically leads to financial deepening that should be reflected in a permanent increase in the stocks (and a temporary increase in the flows) of financial savings.

that the financial deregulations in the 1980's have contributed to the decline in national saving and growth rates in OECD countries.³

Few papers have dealt with the microeconomic impact of financial reforms and credit availability. One exception is the article by Attanasio and Weber (1994). The authors, using repeated cross-sections of UK household surveys, test alternative hypotheses for the consumption boom in the late 1980's.⁴ Using household level information allows them to test different hypotheses for different cohorts. According to their findings, younger cohorts increased consumption due to an upward revision in expected labor income; while older cohorts reacted after the liberalization of the housing markets that took place during the period.

The present paper contributes to the existing literature in the following way: the analysis recognizes that the microeconomic impact of the expansionary or contractionary credit patterns in a developing country depends on the degree of households' access to financial intermediaries. In general, income levels and households' location are correlated with the degree of exposure to financial intermediaries and, consequently, to financial developments. Therefore, for households with low exposure to the financial system, the effects of the credit patterns should be second order.

III. Credit Patterns in Mexico, 1989-1996

During the 1990's, Mexico experienced very different credit patterns. There were two clear episodes. The first one lasted from 1989 until 1994. This was a period of important financial reforms and substantial changes in economic expectations. The second episode began after the financial crisis at the end of 1994. The financial turmoil and the banking

³ Several authors have found that increasing the loan-to-asset-value ratios reduces net national saving in developing countries.

⁴ The consumption boom phenomenon during financial liberalizations is not an unique characteristic of England. The same phenomenon was observed during liberalization periods in Chile, Scandinavia, Israel and also Mexico (Dornbusch and Park (1995), Lennart and Bergström (1995)).

crisis provoked a sensible reduction in the credit granted by private banks. This section elaborates on those two episodes.

3.1 The Credit Expansion, 1989-1994

The Mexican financial reform of the late 1980's and early 1990's substantially changed the financial sector in the country.⁵ The government did a comprehensive reform with the following key aspects affecting households savings behavior: (1) monetary policy was carried on through open market operations and interest rates were allowed to respond rapidly to internal and external shocks; and (2) selective credit quotas and minimum reserve requirement for commercial banks were eliminated.⁶

The liberalization of passive interest rates was a progressive process. Since autumn 1988, the monetary authorities decided to let the markets set the level of interest rates. It is important to mention that, despite their liberalization, passive interest rates for 1 to 3 months fixed term deposits were negative in real terms in 1988, 1990, and 1991. Therefore, for most of 1989-1992 period, the return on savings that households were likely to obtain was not attractive.⁷

Banks' credit policy was substantially changed by the removal of selective credit quotas and by the elimination of minimum reserve requirements. By the end of 1988, the government decided that preferential credit should be given only through the development banks. In October 1988, credits' quota restrictions were eliminated on resources that banks obtained through certificates of deposit and promissory notes (commonly called nontraditional banking instruments). In April 1989, bank resources from traditional time deposits were also excluded from the selective credit quota requirements. In August of the

⁵ For a complete description of the Mexican financial reform see Ortiz (1994).

⁶ The substantial capitalization of the stock market and the pension reform could also have significant effects on households' savings decision. Nevertheless, only a small sector of the population participated in the stock market and the introduction of the pension reform was done almost at the end of the period of analysis.

⁷ The interest rate of comparable government bonds (in this case Cetes with 28 days maturity) has been greater than commercial banking deposit instruments. During the period of analysis, Cetes' interest rates were on average 20 percent higher than banking instruments. Nevertheless, it is unlikely that the median investor had direct access to the Cetes' return.

same year, this reform was extended to checking accounts. Despite the fact that the selective credit quota system was progressively eliminated from October 1988 to August 1989, the private banks' minimum reserve requirement was not removed completely until 1991.⁸

As a result of the reform, credit granted by the commercial banks increased from 182,561 millions of real pesos⁹ in 1989 to 351,306 millions of real pesos in 1992. This represents an increment of 92.43 percent in real terms during the same period (see table 1, and graphs 1 and 2). The average annual growth rate of total credit was 24.4 percent during the same period.

In the case of consumption credit, it increased 25,580 millions of real pesos during the 1989-1992 period, which represents an increment of 173 percent during the same time. This implies an annual average rate of growth during the period of almost 40 percent. As a proportion of total credit, consumption credit rose from 8 percent of total credit in 1989 to 11 percent in 1992.^{10 11} Mortgages increased 239.5 percent in real terms from 1989 to 1992. As a proportion of total credit, they rose from 8.3 percent in 1989 to 14.7 percent in 1992.

3.2 The Credit Contraction, 1994-1996

The 1994 Mexican crisis had a significant impact on the soundness of the financial system, especially on the banking system.¹² The devaluation and rise in interest rates had a double effect on the banks' balance sheets. First, on the assets side, the number of non-performing loans increased substantially. From December 1994 to December 1995 the proportion of non-performing loans to total loans increased from 13.7 percent to 19.7 percent. In May

⁸ Households' savings behavior could have also been affected by the reform of different non-banking institutions done in January 3rd, 1990. This reform influenced the operation of insurance and leasing companies, which should be related with the households' savings.

⁹ These are all real pesos with base = 1992.

¹⁰ Ortiz (1994) mentions that the increment in consumption credit allowed a substantial sector of the population to buy durables, mainly automobiles.

¹¹ It is important to mention that consumption credit stabilized from 1992 to 1994. The growth in consumption credit during those years was negligible. This implies that most of the effects of the credit expansion should have been felt by 1992.

1996 the problem was even worse, the proportion in that year was 25.8 percent. Second, on the passives side, private banks had a substantial proportion of their debt denominated in foreign currency.

As a result, banks curtailed their credit to the private sector. Total credit dropped 20.9 percent from 1994 to 1996. The negative trend continued; by 1998, the reduction in total banking credit was 30.5 percent. This decline was even steeper in the case of consumption credits. As can be seen from table 1, and graphs 1 and 2, the reduction in consumption credit was 64.3 percent from 1994 to 1996. This implies an average annual rate of growth of -40 percent during the same period. Consumption credit as a proportion of total credit changed from 7.14 percent in 1994 to 3.2 percent in 1996. In the case of mortgages, the decline was less pronounced, according to the data; by 1996, mortgages were still 9.4 percent higher than in 1994. Nevertheless, the impressive growth rate of this type of credit was substantially reduced after the financial crisis.

It is important to mention that banks did not resume lending when the economy started its recovery in 1996. During that year, the product grew 5.1 percent in real terms, while total bank credit fell approximately 14 percent from 1995 to 1996. There are two possible explanations: (1) a demand side one in which bank clients did not want credit; and (2) a supply side one in which banks did not grant credit for some reason.¹³ If this last one is true, then what Mexico has faced recently is a credit contraction.

¹² It is also true that the excess intermediation of the banking system, in terms of loans and over-indebtedness in dollars, was a factor that deteriorated even more the economic fragility of the country in 1994.

¹³ The inefficient legal framework has been a reason for not lending that banks have claimed.

IV. Data Description and Fragmented Financial Markets

This paper uses the 1989, 1992, 1994 and 1996 Mexican Households Surveys of Income and Expenditure (Encuesta Nacional Ingreso Gasto de los Hogares). The surveys are representative at the national level and comparable.¹⁴ Every survey has more than 10 thousand observations. They have detailed information on after tax income and its sources, types of expenditures, job and demographic characteristics and some financial transaction variables.

The key endogenous variable of the paper is the saving rate. The calculated saving rate is a flow measure of savings equal to household quarterly after tax income minus household quarterly consumption divided by household quarterly after tax income. Income is defined as the sum of wage income, business income, rent income, income from transfers and other income. Household consumption is the sum of expenditures in food, communications and transport, personal goods, health, educational, appliances, clothing, travel and leisure, housing, and other.¹⁵

One important implication of the credit expansion and contraction of the financial reform is the induced change in the consumption of durables. Therefore, an analysis of households' expenditures in different durable goods was done.¹⁶

For the 1989-1992 credit expansion, Tobit regressions of the expenditures in durables on a 1992 dummy variable were estimated. In the case of vehicles (cars, small trucks and motorcycles), the coefficient of the 1992 dummy was positive and significant.¹⁷ For TV's and videos the coefficient was negative but not significant. For audio equipment it was positive but not significant. For big appliances (like refrigerators and stoves) the coefficient

¹⁴ For a detailed description of the survey characteristics, see Inegi (1994).

¹⁵ An alternative definition of saving rate was calculated. In that definition, household's consumption does not include housing expenditures. The main results were not affected when using this alternative definition.

¹⁶ The durable goods analyzed were vehicles (cars, small trucks, and motorcycles), TV's and video, audio equipment, big appliances (among others refrigerators and stoves), other small appliances, and furniture. Regressions are not shown to save space. They included only the 1992 or 1996 dummy and a constant.

¹⁷ The proportion of households in the sample buying new vehicles increased from 1.4 percent in 1989 to 9.3 percent in 1992.

was positive and significant. Expenditures in other appliances increased significantly from 1989 to 1992. In the case of furniture the coefficient was negative but not significant.

For the 1994-1996 credit contraction, the same type of regressions as in the 1989-1992 case were estimated. In this case, the analysis for most durables indicates a significant reduction in the consumption of these goods. Only in the case of vehicles, the coefficient for the 1996 dummy was negative but not significant.

The empirical strategy of the paper is based on the fragmented financial markets of the Mexican economy.¹⁸ During the period of analysis, households had different exposure to financial services depending on two dimensions: their income and their location.

High-income households had greater access to financial services than low-income households did in the period of analysis. Using the same data set, Székely (1996) shows that there is a clear positive relation between the level of income and the percentage of households with credit cards and mortgages.

Tables 2 and 3 show probit regressions that explain the impact of different households' income per member levels in their probability of having a credit card.¹⁹ As can be seen, using the 1989-1992 sample, the discrete change in probability of having a credit card increases significantly with the households' income per member category. The coefficient increases from 0.12 for the 1 to 2 minimum wage category to 0.65 for the highest income per member level. Statistical tests reject the equality of the coefficients of the different income per member categories. When doing separate analyzes for 1989 and 1992, it is also true that the probability of a household having a credit card increases substantially and significantly with the households income.

As can be seen in table 3, using the 1994-1996 sample, the same type of behavior is found. The discrete change in the probability of having a credit card triples if the income per

¹⁸ McKinnon (1973) and Shaw (1973) were the first authors to introduce this concept. Fragmentation of the financial market implies that different households pay different prices for the same financial product.

¹⁹ Income per member of the household is measured in multiples of the 1992 Mexican minimum wage.

member of the household category changes from the 1 to 2 minimum wages bracket to the 2 to 5 minimum wages bracket. The coefficient changes from 0.10 to 0.32. Using only 1996 observations, the coefficient also triples between those categories, it increases from 0.10 to 0.38. In the case of 1994, the impact is similar but smaller in magnitude.

This is evidence that the exposure to the financial market depended substantially on the household income level. This type of fragmentation implies that the effects of the different credit patterns should be stronger among those with higher income.

Nevertheless, this type of analysis does not rule out differences in tastes for financial instruments. It is possible that low-income people do not use a credit card simply because their credit preferences are different from those of high-income individuals; also, it does not consider changes in tastes overtime. Under these conditions, probit's coefficients would be biased by unobservables. However, the experience of financial intermediaries for low-income people has shown that this sector of the population is constrained from financial services given the considerable importance of transaction costs of providing services to this fragment of the population.²⁰

The second type of fragmentation comes from the fact that availability of financial services is not universal in developing countries. Small towns usually offer limited or null financial services. This is especially important in developing countries given the significant differences between rural and urban areas. For the Mexican case, Mansell (1995) mentions that only in urban areas households had access to formal credit and formal savings instruments before 1994. She describes that access is even lower in rural-poor areas.²¹

Using data from the 1990 Mexican population census and from the 1989 economic census, and data from the 1995 Population Count and the 1998 economic census, it is possible to

²⁰ This is true in the case of small loans and small savings accounts. In the case of Mexico, Mansell (1995) documents that before 1994 the representative savings account in the country was too expensive for low-income people.

²¹ The author has also documented the significant costs that people have to incur when traveling from the rural communities or semi-urban communities to urban areas in order to go to the bank. This transaction cost is generally nontrivial.

construct correlation indexes of the proportion of population located in the rural areas of a state with the availability of financial access. Correlation indexes were also calculated between the proportion of rural communities and the availability of financial services in the states.

In this exercise, rural communities are defined as those with total population lower than 15,000 people.²² Table 4 exhibits the correlation indexes during most of the period of analysis. At the beginning of the 90's, the correlation between the number of financial units in a state and the proportion of rural population in the state was -0.58 ; while the correlation between the proportion of financial sector employees in a state and the proportion of rural population was -0.85 . These correlation indexes were significant at the 1 percent level.

Also for the 1989-1990 period, the correlation indexes between the proportion of rural communities in a state and the number of financial units in the state was -0.76 . The correlation between the percentage of rural communities and the proportion of financial employees in the state was -0.70 . Both correlation indexes were significant at the 1 percent level.

As table 4 shows, during the second half of the 1990's the conditions were similar. The correlation index between the proportion of rural population and the number of financial units was -0.47 . This index was significant at the 1 percent level. The correlation between the number of financial employees and the proportion of rural population in the Mexican states was -0.42 .²³ This coefficient was also significant.

In the case of the proportion of rural communities, during the second half of the 1990's, the correlation of this variable and the number of financial units in the states was -0.40 . This index was significant at the 5 percent level. On the other hand, the correlation between the

²² The exercises were also done considering rural communities as those with total population lower than 50,000 people. The correlation indexes were similar in magnitude and in degree of significance.

²³ Note that in this case the correlation is done with the number of financial employees in the states and not with the proportion as in the early nineties case. The reason was the lack of data.

proportion of rural communities and the number of financial employees in the states was – 0.05. This coefficient was not significant.

These statistics show that there is a lower concentration of financial services in states with higher proportion of rural communities. Smaller locations are less likely to have financial intermediaries. In those communities, the effects of the financial system should be second order effects, given their limited or null presence in rural areas. This is the second type of financial fragmentation that the paper explores and uses in the empirical strategy.

Given these two dimensions of fragmentation, the following variables were constructed: a dummy variable equal to one if the household have an income per member greater or equal than two minimum wages. Households in that income category should have access to financial services. Households with lower income per member should have limited access to financial services.

There is a reason to choose this specific level of income per member to determine the degree of exposure to the financial reform. It comes from the fact that the probability of households having a credit card increases substantially from the less than 2 minimum wages to the 2 to 5 minimum wages category (the change in the probability triples). Nevertheless, using an alternative definition for the income level does not change the results as long as the definition is not extreme. Consequently, it is possible to construct a group of high financial exposure versus a group of low financial exposure.

The fragmentation caused by the location of the household is captured by defining a threshold for rural (small) and for urban (big) towns in the sample. A community was identified as rural or small if it had less than 15,000 people. With this definition a dummy variable was created. The main estimates of the paper were also done using an alternative definition for rural communities. In that definition, a town was considered rural if its population was lower than 50,000 people; results did not change significantly.²⁴ With this fragmentation, it is possible to construct a group of households with high exposure to

financial services (those located in big towns) and a group of households with low exposure to financial services (those living in rural communities).

Table 5 shows the means of selected variables for the four waves of the survey. As can be seen, the average saving rate increased from 7.78 percent in 1989 to 9.59 percent in 1992, and it reduced to 8.03 percent in 1994. Nevertheless, there was a substantial fall in 1996. During that year, the average households' saving rate was only 1.20 percent. This should be a consequence of the magnitude of the income drop.²⁵ Average household income had its peak during 1992. From that year to 1996, income dropped more than 26 percent in real terms. Real average income was only 4,060 pesos during 1996.

Household size is stable through the four waves of data, the average number of household's members is close to 5 for all surveys. The education indicator is similar in the four years, the average is close to 2.5 (which implies that the household head had on average less than 6 years of education). The average number of income recipients is also similar in the four waves, its value is around 1.7. The stability is also true for the number of children in the households, around 1.6 kids per household.

A different look is obtained when the sample is divided using the fragmentation variables. Considering the fragmentation by income, the saving rate of the low-income households fluctuated around 5.70 percent to 6.66 percent from 1989 to 1994 (see table 6). Nevertheless, during 1996, their saving rate dropped to -1.17 percent. In the case of the high income group, their saving rate had its peak during 1992 when it was 26.89 percent. The saving rate fell to 21.17 percent in 1994 and to 20.30 percent in 1996.

Using the income fragmentation variable, in the case of mean household income, for constrained households, it fluctuated between 3,372 pesos and 3,560 pesos from 1989 to 1994. There was also a substantial drop during 1996, mean income fell to 2,839 for the low

²⁴ Only in the case of the triple interaction coefficients, for the 1989-1992 case, the degree of significance was smaller.

²⁵ Income fell 23 percent in real terms from 1994 to 1996, while consumption fell 19 percent during the same period.

income households. High income households followed a similar pattern of income behavior (of course with a much higher mean than the poorer households). They experienced an income drop from 1994 to 1996 of 14.5 percent, while it was 16 percent for the low income households.

Table 7 presents the saving rate and income means using the fragmentation by location variable. This exercise shows more variation in the saving rate than in the case of fragmentation by income. As can be seen, for smaller communities, the saving rate fluctuated from 5.70 percent to 14.16 percent in the 1989-1994 period. Since 1992, the saving rate of households located in bigger towns had been smaller than the one of households living in rural communities. The biggest difference was in 1992, when the households saving rate was on average 14.16 percent and 5.79 percent in small and big communities, respectively. During 1996, the saving rate of households was similar among the two types of towns, around 1.5 percentage points of income.

Finally, as shown in table 7, income has been consistently higher in bigger communities. During 1989, mean income of bigger communities was 36 percent higher than the one of smaller towns. This difference increased in the following survey waves: 97 percent in 1992, 62 percent in 1994, and 48 percent in 1996.²⁶

²⁶ It is relevant to mention that the relative number of households living in small towns versus those located in bigger cities looks different from 1989 to 1992. The 1989 survey has data for households located in 258 towns (considering big and small communities); the 1992 survey includes 363 towns. Nevertheless, exploring the composition of the surveys for those two years, it was found that the number of towns surveyed in both samples at the same time was only 130. This could, in fact, pose a problem for the present estimation. Results, using only the information of households located in towns that were surveyed in both years, were similar to those found when the complete sample was used. The different composition of the sample between the two survey years is not causing the results.

V. Empirical Strategy and Main Results

5.1. Empirical Strategy

As described in section III, the private credit and the financial sector behavior has been one of the most important economic phenomenon in Mexico during the 1990's. This phenomenon should have had a significant impact in the saving behavior of households in Mexico. However, not all of the Mexican households were affected in the same magnitude. Their direct exposure to the financial system and credit access depends substantially in their level of income and in their location.

A suitable way to analyze the effects in households' savings will be to follow the same household before and after the changes in credit patterns. The problem is that the available Mexican microeconomic data is not on the form of a panel. The household surveys of income and expenditures are repeated cross sections.

Nevertheless, the fragmented financial markets in the Mexican economy can be used to construct an empirical strategy for the estimation of the credit's impact. The first determinant of fragmentation is the income level of the households.

The effects of the credit patterns should be greater for the households with higher exposure. Therefore, the interaction coefficient of the high-income dummy and the 1992 dummy should give the savings behavior of households that were more exposed to the reform and the subsequent credit expansion; and the interaction coefficient of the high-income dummy and the 1996 dummy should represent the impact of the credit contraction on the households saving rate with higher exposure to the financial market.

As was explained in section IV, high-income households are defined as those with a total income per member greater than 2 minimum wages denominated in 1992 pesos. A different

definition for high versus low-income households does not change the results, as long as the new definition is not extreme.²⁷

For this type of determinant of financial fragmentation, the strategy was to run two separate equations for the credit expansion in the 1989-1992 period and for the credit contraction in the 1994-1996 period. The equation to estimate is the following:

$$S_i = d_0 Dummy199(2,6)_i \times HighIncomeDummy_i + d_1 Dummy199(2,6)_i + d_2 HighIncomeDummy_i + X_i b + e_i \quad (1)$$

The dependent variable S_i is the saving rate for household i . The coefficient of the first exogenous variable in equation (1) ($Dummy199(2,6)_i \times High Income Dummy_i$) represents the effect on the saving rates of households with higher access to financial intermediaries after the credit expansion in 1992 and the credit contraction in 1996.

Equation (1) also has a dummy for 1992 or 1996 (depending on the case) and a dummy equal to one if the household is high-income. The rest of the exogenous variables (represented by X_i) are household head gender, education variable indicator and its square, occupation of household head, a dummy for irregular reception of income,²⁸ a dummy for employment stability,²⁹ a dummy for access to medical services, the number of income recipients in the household, the percentage of children in the household, and state dummies.

As mentioned before, if saving preferences are different between high-income and low-income households, this could imply that even if low-income households had access to financial intermediaries their behavior could not have changed or changed after new credit patterns simply because they have different preference for savings and credit.

A different source of financial fragmentation is households' location. Households located in rural areas had less contact with financial intermediaries. Rural areas in Mexico and small

²⁷ This is true in the 1989-1992 exercise, it needs to be proven for the 1994-1996 period.

²⁸ Income reception is considered irregular if it is received in time spans greater than 3 months.

²⁹ Variable equals to one if the worker is in a union and has a formal job contract.

cities usually have limited or null formal financial services. In order to capture this source of financial fragmentation, a dummy variable of the size of cities was generated. The variable is equal to one if the population in the city is greater or equal than 15,000 people.³⁰

This type of fragmentation should be less problematic. The reason is that towns had households with all levels of income, despite their size. The difference relies on the fact that households in bigger cities are more exposed to the financial system than households in rural or smaller communities, despite their income level. In this sense, the effects of the credit expansion and credit contraction should be mostly second order.

Once again, the equation for this type of fragmentation is estimated for the 1989-1992 and for the 1994-1996 periods. The estimated regression is represented by equation (2).

$$S_i = \mathbf{a}_0 \mathit{Dummy199(2,6)}_i \times \mathit{BigTownDummy}_i + \mathbf{a}_1 \mathit{Dummy199(2,6)}_i + \mathbf{a}_2 \mathit{BigTownDummy}_i + X_i \mathbf{b} + \mathbf{e}_i \quad (2)$$

In this specification, S_i also represents the household's saving rate. The interaction of the 1992 or 1996 Dummy variable and the Big Town Dummy is the effect for households with higher exposure to credit patterns. The 1992 or 1996 Dummy and the Big Town Dummy were also included separately. The exogenous variables (represented by X_i) are the same as for the estimation in the income level fragmentation plus the level of income of the households.

A natural extension of the two exercises is to combine the two types of financial fragmentation into a single estimation. The degree of exposure to the financial reform increases with income and with the size of the town. So it is possible to take into account these two dimensions by a triple interaction coefficient. The triple interaction variable gives the effect of the financial reform and the subsequent financial crisis for the most exposed

³⁰ This was not the only benchmark used. An alternative definition, in which big cities were defined as those with population greater or equal than 50,000 people, was employed. The estimation results using this latest definition are not significantly different from those found with the 15,000 people benchmark.

households (high-income and living in a big city in 1992 or 1996). Equation (3) is the specification for the triple interaction estimator.

$$\begin{aligned}
S_i = & \mathbf{g}_0 \mathit{Dummy199(2,6)}_i \times \mathit{HighIncomeDummy}_i \times \mathit{BigTownDummy}_i \\
& + \mathbf{g}_1 \mathit{Dummy199(2,6)}_i \times \mathit{HighIncomeDummy}_i \\
& + \mathbf{g}_2 \mathit{Dummy199(2,6)}_i \times \mathit{BigTownDummy}_i \\
& + \mathbf{g}_3 \mathit{HighIncomeDummy}_i \times \mathit{BigTownDummy}_i \\
& + \mathbf{g}_4 \mathit{Dummy199(2,6)}_i + \mathbf{g}_5 \mathit{HighIncomeDummy}_i + \mathbf{g}_6 \mathit{BigTownDummy}_i \\
& + X_i \mathbf{b} + \mathbf{e}_i
\end{aligned} \tag{3}$$

In specification (3), S_i represents the saving rate of the household. The first exogenous variable is the interaction of a 1992 or 1996 Dummy, a High Income Dummy and a Big Town Dummy. High-income and big town dummies definitions are the same as before. The regression also includes second order interaction terms of the dummy variables and the dummy variables by themselves. The rest of the exogenous variables (represented by X_i) are the same as in specification (1).

5.2 Results³¹

For all the estimations, two different techniques were used. The first one was ordinary least squares with robust standard errors. Nevertheless, several statistical tests on the normality of the saving rates distribution were rejected. Consequently, a median regression estimation technique was used to avoid non-normality problems. This was calculated with bootstrapped standard errors with 100 iterations.

All calculations were done after cleaning the data for extreme values of the saving rate. The saving rate was constrained to be in the –100 percent to the 100 percent interval. Also,

³¹ The paper discusses only the values of the interaction coefficients. Nevertheless, when considered necessary, references to other variables' coefficients are done. Also, the tables presented at the end of the paper include all variables.

minimum values for income, and maximum and minimum values for household's head age were required.³²

Separate analysis for the two sources of fragmentation are estimated. Nevertheless, it is also important to combine the both sources of fragmentation. The reason is that, in order for the income fragmentation to be adequate, it should be assumed that low-income and high-income households have comparable preferences for savings. This will imply a similar behavioral response to the changes in the condition of the financial system if the exposure were the same for both groups.

It is true that bigger towns had financial services, but is also true that for low-income households access to financial instruments is not universal. Therefore, households' degree of exposure to the financial reform is a combination of their location and their income. The degree of exposure should be higher for high-income households in big cities. A way to combine the two sources of fragmentation is by doing a triple interaction estimation described in equation (3).

The estimation for the triple interaction specification is also realized splitting that coefficient by different age categories. Important behavioral responses to the different credit patterns could come from the age of the household. Households with different age structures could have different reasons to save. For example, younger households are more likely to face borrowing constraints. Using the age of the household head, five years age categories were constructed. In this procedure the triple interaction coefficient is interacted with the different age category dummies.

³² For the 1989-1992 period, the observations that do not satisfy those conditions are 3,480 (around 16 percent); in the 1994-1996 period the number of observations eliminated was 4,120 (close to 15 percent of the sample for that period).

5.2.1 The Credit Expansion: 1989-1992

A.1) Fragmentation by Income Level

Table 8 presents the results for this case. The first column contains the ordinary least squares estimates for the case without controls. As can be seen, the interaction coefficient between the 1992 dummy and the high-income dummy is 3.5 percentage points of income and is significant at the 5 percent level. In the case of the ordinary least squares regression with controls (second column of table 8) the interaction coefficient is approximately the same as in the non-control case, 3.9 percentage points of income, however its degree of significance increases.

In the case of the median regressions (third and fourth column of table 8), results are similar to those using ordinary least squares. It is relevant to mention that the interaction coefficients are bigger with this technique. For the specification without controls, the interaction coefficient of the 1992 dummy and the high-income dummy is 5.7 percentage points of income and is significant at the 1 percent level. For the specification with controls, the coefficient for the same variable is 5.5 percentage points of income.³³

B.1) Fragmentation by Location

The estimation results using the fragmentation by location in these years are shown in table 9. For the ordinary least squares estimates without controls (first column of the table), the interaction coefficient of the 1992 dummy and the big towns dummy is significant at the 1 percent level. It is -10.9 percentage points of income. The story is similar in the case of the ordinary least squares estimation with controls (second column table 9). The coefficient of the interaction of the two dummy variables is -8.3 percentage points of income and it is significant at the 1 percent level too. This indicates that households located in communities with financial services decreased their saving rate after the financial reform.

³³ Nevertheless, these results are not robust to the sample that is used. Specifically, if the sample is constrained to include only data obtained from towns that were surveyed in both the 1989 and 1992 waves, the results are no longer significant.

Using the median regression technique, the estimates without controls show a similar pattern to the one found in the ordinary least squares case. The 1992 dummy and the big town dummy interaction coefficient is -12.4 percentage points of income (actually stronger than the ordinary least squares case) and is significant at the 1 percent level. This indicates the same type of behavior, households living in bigger cities after the reform reduced their saving rates.

The median results with controls are shown in the fourth column of table 9. As can be seen, the estimated coefficients are similar to those found in former cases. Here the 1992 dummy and the big town dummy interaction coefficient is -10.7 percentage points of income and is significant at the 1 percent level too.

C.1) Results Combining both Sources of Fragmentation

The first column of table 10 shows these results for the ordinary least squares. The triple interaction coefficient, i.e. the interaction coefficient of the 1992 dummy, the high-income dummy and the big town dummy, is -11.2 percentage points of income and is significant at the 5 percent level. This implies that households most exposed to the financial reform reduced their saving rate by a significant amount. This coefficient is reduced to -8.8 percentage points when more variables are added to the ordinary least squares regression.³⁴

When using the median regression technique, the triple interaction coefficients are bigger and with a higher degree of significance. The triple interaction coefficient is -16.2 percentage points and is significant at the 1 percent level in the estimation without controls. For the estimation with controls, this estimate is around -13 percentage points of income and is significant at the 1 percent level. These results suggest that the households most exposed to the financial reform and subsequent credit expansion reduced significantly their saving rate after the reform took place.

³⁴ Using the alternative definition for big towns (those with population greater than 50,000 people) the triple interaction coefficients are also negative, but their degree of significance is reduced.

D.1) Triple Interaction Results by Age Categories³⁵

Results show that the impact of the financial reform was higher among younger households. For households in the 20 to 25 years age category, the triple interaction coefficient is –17 percentage points of income and is significant at the 1 percent level. The estimated coefficient is –12.8 percentage points for the 25 to 30 years age category, -14.7 percentage points for the 30 to 35 years age category, and -12.6 percentage points of income for the 35 to 40 years age category. All those estimated coefficients are highly significant. However, for households in older age categories, the coefficient estimates are smaller and generally non-significant. Graph 3 presents the estimated coefficients and bands with a 95 percent confidence interval.

High-income younger households are the ones that reacted significantly after the financial reform. Those are households that, despite their level of income, maybe did not have sufficient access to credit before the financial reform (a possible explanation for this could be that they did not have enough collateral to get a consumption credit). This result is consistent with the presence of more stringent borrowing constraints before the financial reform.

5.2.2 The Credit Contraction: 1994-1996

A.2) Fragmentation by Income Level

Table 11 shows the results using the income fragmentation variable after the financial crisis. As can be seen, in the case of ordinary least squares without controls, households with higher exposure to the financial system increased their saving rate in 6.01 percentage points of their income. This increment is significant at the 1 percent level. When adding controls to the OLS technique, the coefficient of the interaction of the 1996 dummy and the high income dummy is 4.65 percentage points of income and it is also significant at the 1 percent level.

³⁵ The estimation was done without controls and using ordinary least squares.

This behavior is sustained when using the median regression technique. In the case without controls, the interaction coefficient of the 1996 dummy and the high income dummy is significant and even higher than the ordinary least squares case; households with higher exposure to the financial system increased their saving rate in 7.65 percentage points of income after the credit contraction. The interaction coefficient of the estimation that includes controls is 5.14 percentage points of income and is also significant at the 1 percent level.

Therefore, using the fragmentation by income variable, the households that had more access to the financial markets increased their saving rate after the 1994 crisis. This represents evidence that those with higher income were able to absorb the shock and increase their saving rate. This should be certainly related to their access to the financial system.

B.2) Fragmentation by Location

Using ordinary least squares without controls, the interaction coefficient of the 1996 dummy and the big town dummy is 3.74 percentage points of income and it is significant at the 5 percent level. This indicates that households with higher access to the financial system were able to increase their saving rate after the financial turmoil. Nevertheless, when using the same estimation but including controls, the interaction coefficient is only 2.89 percentage points of income and is no longer significant.

Results using the median regression technique also show that households with higher access to the financial system increased their saving rate after the 1994 financial crash. In the case with no controls, the interaction coefficient is 3.26 percentage points of income; however, this coefficient is not significant. When controls are included to the estimation, the effect of better location access on the saving rates is an increase of 3.74 percentage points of income. This coefficient is significant at the 10 percent level.

All the interaction coefficients of the 1996 dummy and the big town dummy are positive in this exercise. Despite the fact that two of them were non significant, this behavior represents evidence that those with higher exposure to the financial system increased their saving rate after the financial crisis and the credit contraction. It is important to mention that the results are similar when a big town is defined as one that has a population greater than 50,000.

C.2) Results Combining both Sources of Fragmentation

In the case of the ordinary least squares technique without controls, the triple interaction variable coefficient is 0.05 percentage points of income (see table 13). Nevertheless, the effect is not significant. The same behavior is found when adding controls. In that exercise, the triple interaction coefficient is 0.12 but is also non-significant.

Similar patterns are found using the median regression technique. In this case, the triple interaction coefficient without controls is 3.57 percentage points of income. Nevertheless, it is not significant. In the median regression exercise that includes controls, the estimated coefficient is -2.57 percentage points but is also non significant.

Therefore, there is no evidence that the households with the highest level of exposure to the financial system (i.e. those with high income and located in communities with financial services) changed their saving rate. This contrasts with the triple difference evidence of the 1989-1992 period.

D.2) Triple Interaction Results by Age Categories³⁶

As can be seen in Graph 4, the triple interaction coefficients are negative until the household head age category of 35 to 40 years (excluding those households in the 25 to 30 years category) but not significant. For older groups, the coefficients are positive, although

³⁶ The estimation was done without controls and using ordinary least squares.

non-significant. This represents weak evidence that older households were the ones reacting to the financial crisis adjusting their saving rate.

It is relevant to mention that the same pattern was found when doing the analysis separating both sources of fragmentation and dividing the double interaction coefficients (i.e. the coefficient of the 1996 Dummy times each of the fragmentation variables) by age categories. In this case, older households increased their saving rate after the financial crisis. These results were significant and of important magnitude.

In the case of the income fragmentation, households with age of the head equal or greater than 45 years increased their saving rate between 5 and 12 percentage points of income (these coefficients are significant). Using the fragmentation by location, households with the head with age 45 years or older rose their saving rate between 5 and 10 percentage points of income; these coefficients are also significant.

A probable explanation of this is the effects of the financial turmoil in retirement savings (or any wealth that was hit after the crisis) and the worsening of macroeconomic expectations (specially in terms of inflation).

VI. Conclusions

This paper has shown that financial access is limited for a considerable fraction of Mexican households. In particular, the probability of having a credit card increases substantially with the household income level. It is also true that the presence of financial intermediaries is negatively correlated to the proportion of rural population and rural communities in the states.

The paper analyzes explicitly the effects on the households saving rates of two credit episodes. The first one comprehends from 1989 to 1992. This period was associated with a financial reform, elimination of the credit system quotas and minimum reserves requirements for the banks. As a consequence, total credit increased 92.4 percent from 1989

to 1992. A more important aspect was the expansion of consumption credit, it grew 174 percent in real terms during the same period.

The second period is from 1994 to 1996. The financial crisis at the end of 1994 drastically reduced the credit available for the society. Total credit fell 20.9 percent in real terms from 1994 to 1996, consumption credit dropped 64.3 percent during the same period. Up until today, credit has not recovered.

Results for the 1989-1992 period show that households with higher exposure to the Mexican financial liberalization reduced their saving rate. Results were robust to different estimation techniques and different benchmarks for the definition of high-income households and towns' size.

Also, the reduction on the saving rate was stronger among younger and richer households in urban areas. This finding is consistent with the hypothesis that the financial liberalization reduced the borrowing constraints for this sector of the population, which led them to a higher consumption.

For the credit contraction of the 1994-1996 period, results present evidence that households with higher income or located in bigger communities (i.e. households with greater financial access), increased their saving rate significantly after the financial crash. In the case of the income fragmentation variable, financially unconstrained households had a saving rate on average 4.65 to 7.65 percentage points of income higher than the one of constrained households. In the location fragmentation variable, unconstrained households had a saving rate 2.89 to 3.74 percentage points of income above the one of constrained households. The triple interaction exercise shows non-significant results.

Nevertheless, when doing the analysis by households age categories, it is found evidence that older households increased their saving rate after the financial crash (especially when doing a separate analysis for the two sources of fragmentation). This is consistent with the hypothesis that the financial crisis changed the expectations of these households about the

amount they required to save for retirement. In particular, older households were mostly under the a pay as you go pension system in which their benefits were affected by the financial turmoil and the inflation burst.

More work needs to be done, this paper does not answer all the questions on the effects of the credit patterns in the recent period and does not exploit other possible hypotheses for the households savings behavior changes. Also, the present analysis does not take the development of new financial instruments and that the number of financial branches in the cities is not static. Explicit consideration of these factors should be important.

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Table 1
Accumulated Real Credit Growth During Selected Periods

	Total Loans	Housing Loans	Consumption Loans
Initial Year: 1989			
1989-1990	27.0	15.4	74.7
1989-1991	55.4	16.5	176.3
1989-1992	92.4	239.5	174.0
1989-1993	118.3	358.6	154.7
1989-1994	188.1	478.9	155.4
Initial Year: 1994			
1994-1995	-6.3	17.2	-38.3
1994-1996	-20.9	9.4	-64.3
1994-1997	-29.4	-1.0	-69.3
1994-1998	-30.5	-3.0	-72.7

Source: Banco de México

Table 2
1989-1992: Probit Analysis of Credit Access Indicators
Dependent Variable Equals to 1 if the Household had a Credit Card^{1/2/}
(Standard Errors in Parenthesis)

	1989-1992 Sample	1989 Sample	1992 Sample
INCOME PER MEMBER DUMMY:			
1 to 2 Minimum Wages	0.116 (0.007)	0.113 (0.009)	0.119 (0.010)
2 to 5 Minimum Wages	0.317 (0.012)	0.288 (0.017)	0.347 (0.018)
5 to 10 Minimum Wages	0.549 (0.027)	0.479 (0.041)	0.606 (0.035)
More than 10 Minimum Wages	0.654 (0.037)	0.598 (0.074)	0.681 (0.043)
N	18,133	9,549	8,584
Chi-Square	2,156.1	909.2	1,246.3

^{1/} Coefficients report the discrete change in the probability of having a credit card if the household is in the specified income per member category. Regressions include a constant and the income per member level dummies, but no other covariates.

^{2/} Estimates were done after cleaning the data for extreme values in the saving rates. Specifically, the saving rates were constrained to be in the -100 percent to 100 percent interval. It also imposes minimum values for income and minimum and maximum age levels.

Table 3
1994-1996: Probit Analysis of Credit Access Indicators
Dependent Variable Equals to 1 if the Household had a Credit Card^{1/2/}
(Standard Errors in Parenthesis)

	1994-1996 Sample	1994 Sample	1996 Sample
INCOME PER MEMBER DUMMY:			
1 to 2 Minimum Wages	0.103 (0.006)	0.107 (0.009)	0.102 (0.008)
2 to 5 Minimum Wages	0.315 (0.011)	0.376 (0.015)	0.253 (0.015)
5 to 10 Minimum Wages	0.558 (0.022)	0.644 (0.028)	0.455 (0.035)
More than 10 Minimum Wages	0.695 (0.030)	0.780 (0.030)	0.519 (0.063)
N	22,722	10,869	11,853
Chi-Square	2,451.4	1,459.0	919.9

^{1/} Coefficients report the discrete change in the probability of having a credit card if the household is in the specified income per member category. Regressions include a constant and the income per member level dummies, but no other covariates.

^{2/} Estimates were done after cleaning the data for extreme values in the saving rates. Specifically, the saving rates were constrained to be in the -100 percent to 100 percent interval. It also imposes minimum values for income and minimum and maximum age levels.

Table 4
State Level Correlation Indexes of the Proportion of Rural Population and
the Proportion of Rural Communities with Financial Indicators
(1989-1990 and 1995-1998 periods)^{1/2/}

	Proportion of Population Located in Rural Communities in the State		Proportion of Rural Communities in the State	
	1989-1990	1995-1998	1989-1990	1995-1998
Number of Financial Units in the State	-0.588	-0.396	-0.762	-0.471
Employees in the Financial Sector ^{3/}	-0.850	-0.049	-0.704	-0.422

^{1/} Calculations are done using the 1990 Mexican Census, the 1989 and 1998 Economic Census, and the 1995 Population Count. Rural communities are defined as those with total population lower than 15,000 people.

^{2/} Most correlation indexes are significant at the 1 percent level.

^{3/} For the 1989-1990 period the variable is a proportion of total employment in the state.

Table 5
Table of Means of Selected Variables, 1989-1996

	1989	1992	1994	1996
Saving Rates (percentage points of income)	7.78 (0.38)	9.59 (0.39)	8.03 (0.33)	1.20 (0.31)
Income (1992 pesos)	4,981 (120.92)	5,523 (128.59)	5,308 (84.18)	4,060 (89.30)
Household Size	5.11 (0.02)	4.94 (0.02)	4.85 (0.02)	4.71 (0.02)
Age of Head	41.56 (0.12)	40.55 (0.12)	41.61 (0.11)	41.21 (0.10)
Education Indicator	2.54 (0.02)	2.44 (0.02)	2.47 (0.02)	2.69 (0.02)
# of Income Recipients	1.71 (0.01)	1.65 (0.01)	1.76 (0.00)	1.78 (0.00)
# of Kids	1.56 (0.01)	1.59 (0.01)	1.65 (0.01)	1.58 (0.01)
N	9,549	8,584	10,869	11,853

^{1/} Standard errors in parenthesis. Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

Source: own calculations using the 1989, 1992, 1994 and the 1996 surveys of Income and Expenditures in Mexico.

Table 6
Table of Means Presented by Income Per Member Level^{1/2/}

	Saving Rates (percentage points of income)		Income (1992 pesos)	
	Low-Income	High-Income	Low-Income	High-Income
1989	5.77 (0.41)	22.50 (1.04)	3,560 (27.73)	15,353 (927.29)
N	8,398	1,151	8,398	1,151
1992	6.66 (0.42)	26.89 (1.00)	3,433 (29.14)	17,845 (783.83)
N	7,339	1,245	7,339	1,245
1994	5.70 (0.35)	21.17 (0.80)	3,372 (25.17)	16,225 (454.60)
N	9,232	1,637	9,232	1,637
1996	-1.17 (0.32)	20.30 (0.92)	2,839 (20.54)	13,868 (735.38)
N	10,540	1,313	10,540	1,313

^{1/} Standard errors in parenthesis. Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Low-income households are defined as households with income per member lower than 2 minimum wages. High-income households are those with income per member equal or higher than 2 minimum wages. Source: own calculations using the 1989, 1992, 1994 and the 1996 surveys of Income and Expenditures in Mexico.

Table 7
Table of Means Presented by Towns' Size
(Small Towns are Those with Population \leq 15,000) ^{1/}

	Saving Rates (percentage points of income)		Income (1992 pesos)	
	Small Towns: Population \leq 15,000	Big Towns: Population > 15,000	Small Towns: Population \leq 15,000	Big Towns: Population > 15,000
1989	5.70 (0.96)	8.21 (0.42)	3,829 (106.97)	5,219 (143.97)
N	1,628	7,921	1,628	7,921
1992	14.16 (0.63)	5.79 (0.50)	3,609 (110.53)	7,119 (214.27)
N	3,902	4,682	3,902	4,682
1994	11.83 (1.21)	7.66 (0.34)	3,388 (141.70)	5,499 (91.24)
N	982	9,887	982	9,887
1996	1.59 (1.23)	1.16 (0.31)	2,823 (116.11)	4,190 (97.79)
N	1,120	10,733	1,120	10,733

^{1/} Standard errors in parenthesis. Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

Source: own calculations using the 1989, 1992, 1994 and the 1996 surveys of Income and Expenditures in Mexico.

Table 8
1989-1992: Effects of Financial Reform on the Saving Rate
Analysis of High-Income Households versus Low-Income Households
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1992 Dummy	0.90 (0.59)	0.91 (0.64)	-0.74 (0.68)	0.25 (0.76)
High Income Dummy	16.73 (1.12)	19.07 (1.17)	15.56 (1.17)	18.05 (1.04)
1992 Dummy × High Income Dummy	3.49 (1.56)	3.92 (1.51)	5.65 (1.71)	5.52 (1.67)
Dummy of Gender of Household Head (male=1)		0.28 (0.83)		1.13 (0.81)
Age of Household head		0.01 (0.03)		-0.02 (0.04)
Education Indicator Level (Head)		-1.56 (0.44)		-1.30 (0.52)
Square of Education Indicator		0.08 (0.05)		0.06 (0.06)
Household Head Blue Collar		0.73 (1.00)		0.73 (1.03)
Household Head Peasant		1.42 (1.29)		1.03 (1.41)
Household Head Employer		9.59 (1.51)		10.91 (1.80)
Household Head Self- employed		3.98 (1.08)		4.07 (1.43)
Irregular Reception of Income		4.35 (1.00)		5.86 (1.16)
Employment Stability		-0.01 (0.48)		-0.38 (0.50)
Medical Service		-1.07 (0.67)		-0.81 (0.76)
Number of Income Recipients in Household		4.33 (0.28)		4.66 (0.28)
% of Children in the Household		-0.84 (1.39)		-2.90 (1.77)
Constant	5.77 (0.41)	-3.33 (3.17)	9.65 (0.54)	-0.95 (3.40)
N	18,133	18,133	18,133	18,133

^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

Table 9
1989-1992: Effects of Financial Reform on the Saving Rate
Analysis of Big Towns versus Small Towns (Big Towns are those with Population > 15,000)
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1992 Dummy	8.47 (1.15)	6.82 (1.18)	8.42 (1.13)	7.70 (1.29)
Town Dummy (Equal to 1 if Population > 15,000)	2.52 (1.05)	1.39 (1.10)	3.17 (1.05)	2.90 (1.30)
1992 Dummy × Town Dummy	-10.89 (1.32)	-8.29 (1.36)	-12.42 (1.36)	-10.74 (1.59)
Income Per Member		0.00 (0.00)		0.00 (0.00)
Dummy of Gender of Household Head (male=1)		-0.38 (0.84)		-0.29 (1.02)
Age of Household head		0.00 (0.03)		-0.04 (0.04)
Education Indicator Level (Head)		-1.23 (0.45)		-0.91 (0.60)
Square of Education Indicator		0.16 (0.06)		0.04 (0.08)
Household Head Blue Collar		0.47 (1.00)		0.29 (1.21)
Household Head Peasant		-0.21 (1.30)		-0.56 (1.43)
Household Head Employer		11.01 (1.76)		9.48 (1.74)
Household Head Self- employed		4.04 (1.09)		3.62 (1.34)
Irregular Reception of Income		2.93 (1.02)		4.81 (1.30)
Employment Stability		0.00 (0.48)		-0.32 (0.49)
Medical Service		-0.49 (0.68)		-0.40 (0.79)
Number of Income Recipients in Household		4.37 (0.28)		4.58 (0.35)
% of Children in the Household		-5.08 (1.47)		-4.21 (1.79)
Constant	5.70 (0.96)	-2.60 (3.34)	8.92 (0.93)	-0.85 (4.23)
N	18,133	18,133	18,133	18,133

^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

Table 10
1989-1992: Effects of Financial Reform on Households' Saving Rate
Triple Interaction Analysis (Big Towns are those with Population > 15,000)
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1992 Dummy	7.92 (1.18)	6.00 (1.21)	7.73 (1.50)	6.15 (1.62)
High Income Dummy	20.38 (3.49)	21.44 (3.50)	19.06 (4.67)	19.05 (3.68)
Town Dummy (Equal to 1 if Population > 15,000)	2.01 (1.09)	1.73 (1.14)	2.30 (1.26)	2.59 (1.32)
1992 Dummy × High Income Dummy	15.90 (4.27)	12.93 (4.19)	23.37 (5.48)	18.98 (3.97)
1992 Dummy × Town Dummy	-12.78 (1.37)	-8.86 (1.40)	-13.45 (1.69)	-9.95 (1.89)
High Income Dummy × Town Dummy	-4.25 (3.68)	-3.65 (3.66)	-4.46 (4.79)	-2.15 (3.82)
1992 Dummy × Town Dummy × High Income Dummy	-11.22 (4.59)	-8.78 (4.50)	-16.19 (5.89)	-12.74 (4.03)
Dummy of Gender of Household Head (male=1)		-0.40 (0.83)		0.40 (1.01)
Age of Household head		0.01 (0.03)		-0.02 (0.03)
Education Indicator Level (Head)		-1.28 (0.44)		-0.81 (0.48)
Square of Education Indicator		0.07 (0.05)		0.02 (0.06)
Household Head Blue Collar		0.84 (1.00)		1.03 (1.13)
Household Head Peasant		0.06 (1.30)		-0.09 (1.42)
Household Head Employer		9.02 (1.51)		10.09 (1.89)
Household Head Self-employed		3.88 (1.08)		3.92 (1.24)
Irregular Reception of Income		2.99 (1.00)		4.34 (1.22)
Employment Stability		-0.08 (0.48)		-0.48 (0.53)
Medical Service		-0.65 (0.67)		-0.66 (0.79)
Number of Income Recipients in Household		4.44 (0.28)		4.64 (0.33)
% of Children in the Household		-1.26 (1.38)		-3.68 (1.68)

Table 10 (continued)

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
Constant	4.12 (0.99)	-4.11 (3.30)	7.88 (1.21)	-2.23 (3.08)
N	18,133	18,133	18,133	18,133

^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

Table 11
1994-1996: Effects of Financial Reform on the Saving Rate
Analysis of High-Income Households versus Low-Income Households
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1996 Dummy	-6.88 (0.48)	-6.21 (0.62)	-8.06 (5.75)	-6.97 (0.63)
High Income Dummy	15.47 (0.87)	15.39 (0.93)	13.46 (0.92)	14.32 (1.01)
1996 Dummy × High Income Dummy	6.01 (1.31)	4.65 (1.38)	7.65 (1.55)	5.14 (1.78)
Dummy of Gender of Household Head (male=1)		-4.73 (0.69)		-4.42 (0.77)
Age of Household head		0.01 (0.02)		0.03 (0.02)
Education Indicator Level (Head)		-0.85 (0.20)		-0.74 (0.23)
Square of Education Indicator		0.05 (0.01)		0.05 (0.01)
Household Head Blue Collar		-4.07 (0.86)		-4.09 (0.92)
Household Head Peasant		-3.48 (1.04)		-2.56 (1.09)
Household Head Employer		5.03 (1.22)		5.31 (1.61)
Household Head Self- employed		-0.91 (0.89)		-0.59 (0.95)
Irregular Reception of Income		1.74 (0.82)		1.29 (1.05)
Employment Stability		0.77 (0.48)		0.92 (0.65)
Medical Service		2.34 (0.71)		2.15 (0.87)
Number of Income Recipients in Household		3.76 (0.22)		4.12 (0.22)
% of Children in the Household		-4.65 (1.12)		-3.84 (1.18)
Constant	5.70 (0.35)	9.96 (2.10)	9.11 (0.41)	12.00 (2.08)
N	22,722	22,722	22,722	22,722

^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

Table 12
1994-1996: Effects of Financial Reform on the Saving Rate
Analysis of Big Towns versus Small Towns (Big Towns are those with Population > 15,000)
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1996 Dummy	-10.23 (1.72)	-9.42 (1.75)	-10.75 (2.30)	-9.53 (2.07)
Town Dummy (Equal to 1 if Population > 15,000)	-4.17 (1.25)	-6.94 (1.26)	-3.76 (1.44)	-7.22 (1.39)
1996 Dummy × Town Dummy	3.74 (1.79)	2.89 (1.77)	3.26 (2.36)	3.74 (2.15)
Income Per Member		0.00 (0.00)		0.00 (0.00)
Dummy of Gender of Household Head (male=1)		-4.26 (0.69)		-3.99 (0.82)
Age of Household head		0.02 (0.02)		0.04 (0.02)
Education Indicator Level (Head)		-0.94 (0.19)		-1.02 (0.21)
Square of Education Indicator		0.08 (0.01)		0.07 (0.01)
Household Head Blue Collar		-4.35 (0.87)		-4.06 (0.78)
Household Head Peasant		-3.77 (1.04)		-2.54 (0.97)
Household Head Employer		5.21 (1.25)		4.65 (1.35)
Household Head Self- employed		-1.20 (0.89)		-0.86 (0.89)
Irregular Reception of Income		1.65 (0.82)		1.62 (1.06)
Employment Stability		1.31 (0.48)		1.49 (0.57)
Medical Service		2.41 (0.72)		1.40 (0.92)
Number of Income Recipients in Household		3.84 (0.22)		4.10 (0.27)
% of Children in the Household		-5.92 (1.26)		-3.11 (1.21)
Constant	11.83 (1.21)	15.91 (2.45)	8.92 (0.93)	16.74 (2.64)
N	22,722	22,722	22,722	22,722

^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

Table 13
1992-1996: Effects of Financial Reform on Households' Saving Rate
Triple Interaction Analysis (Big Towns are those with Population > 15,000)
(Percentage Points of Income, Standard Errors in Parenthesis)^{1/}

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
1996 Dummy	-10.11 (1.76)	-9.19 (1.80)	-10.99 (1.88)	-9.96 (1.87)
High Income Dummy	31.58 (4.07)	28.54 (4.07)	31.01 (5.20)	25.55 (6.21)
Town Dummy (Equal to 1 if Population > 15,000)	-4.19 (1.29)	-5.71 (1.31)	-3.88 (1.20)	-5.35 (1.45)
1996 Dummy × High Income Dummy	5.66 (5.62)	4.33 (5.62)	3.66 (8.00)	7.45 (8.94)
1996 Dummy × Town Dummy	3.58 (1.83)	3.01 (1.83)	3.28 (1.90)	2.85 (2.15)
High Income Dummy × Town Dummy	-16.63 (4.17)	-13.88 (4.16)	-17.76 (5.43)	-11.97 (6.35)
1992 Dummy × Town Dummy × High Income Dummy	0.05 (5.78)	0.12 (5.77)	3.57 (8.26)	-2.57 (9.12)
Dummy of Gender of Household Head (male=1)		-4.64 (0.69)		-4.47 (0.70)
Age of Household head		0.01 (0.02)		0.03 (0.02)
Education Indicator Level (Head)		-0.76 (0.20)		-0.67 (0.22)
Square of Education Indicator		0.05 (0.01)		0.04 (0.01)
Household Head Blue Collar		-4.11 (0.86)		-4.23 (0.77)
Household Head Peasant		-3.75 (1.04)		-2.71 (0.98)
Household Head Employer		4.93 (1.22)		5.19 (1.37)
Household Head Self-employed		-1.15 (0.89)		-0.78 (0.95)
Irregular Reception of Income		1.53 (0.81)		1.32 (0.99)
Employment Stability		0.78 (0.48)		0.86 (0.61)
Medical Service		2.39 (0.71)		2.25 (0.82)
Number of Income Recipients in Household		3.82 (0.22)		4.15 (0.25)
% of Children in the Household		-4.79 (1.26)		-3.86 (1.34)

Table 13 (continued)

	Ordinary Least Squares ^{2/}		Median Regressions ^{3/}	
	Without Controls	With Controls ^{4/}	Without Controls	With Controls ^{4/}
Constant	9.48 (1.23)	15.32 (2.44)	12.58 (1.29)	17.00 (2.50)
N	22,722	22,722	22,722	22,722

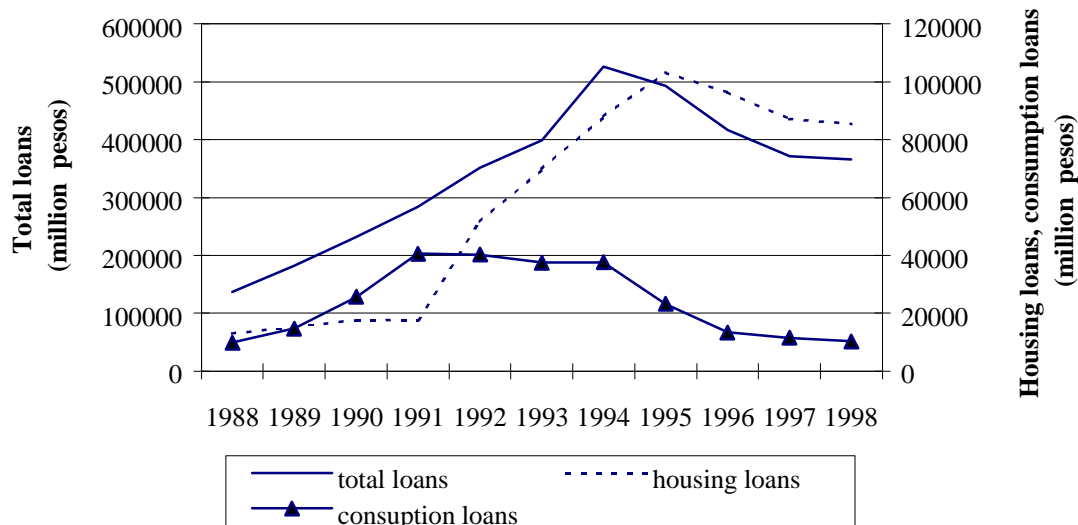
^{1/} Saving rates were calculated as the difference of quarterly income minus quarterly consumption divided by quarterly income. Calculations were done after cleaning the data for extreme values in the saving rates and low incomes. Specifically, the saving rates were constrained to between -100 percent and 100 percent.

^{2/} Robust standard errors in parenthesis

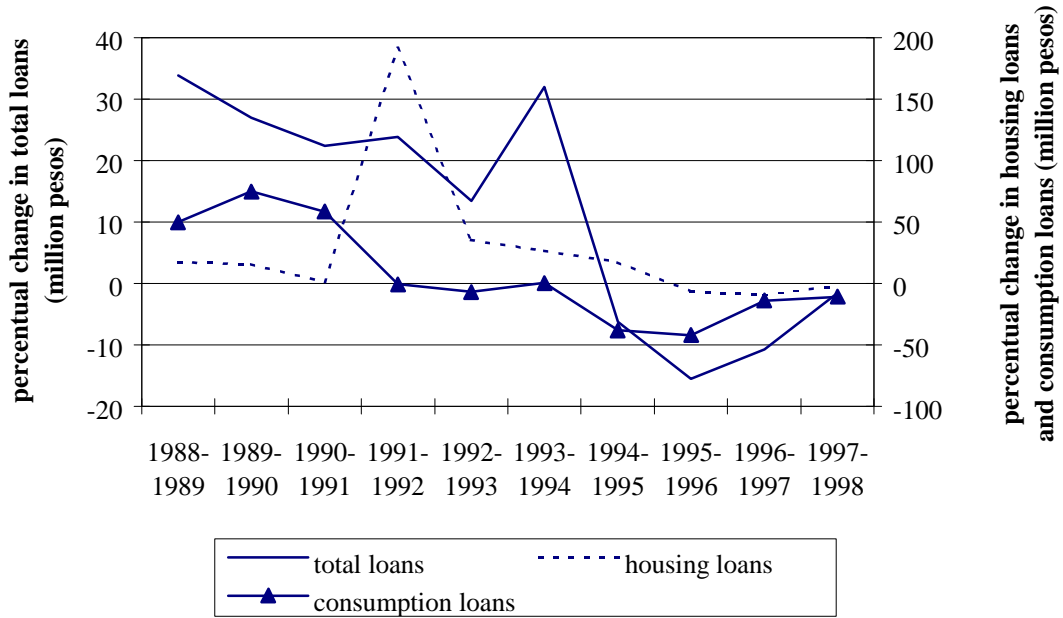
^{3/} Bootstrapped standard errors with 100 iterations

^{4/} State dummies are included in these regressions but are not presented.

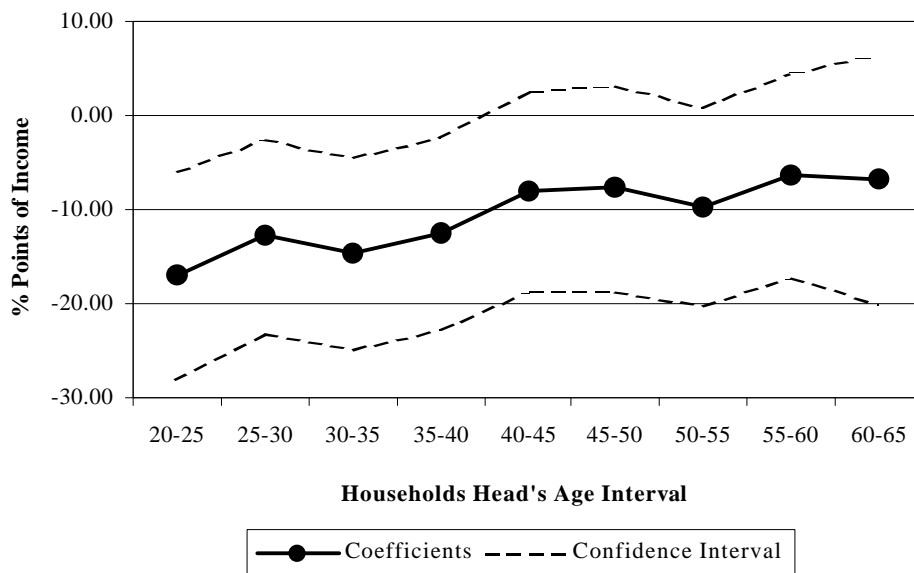
Graph 1
Total, Consumption, and Housing Credit, 1988-1998
 (Real Million Pesos, Base = 1992)



Graph 2
Total, Consumption, and Housing Credit, 1988-1998
(Real Percentage Change)



Graph 3
1989-1992: Triple Interaction Coefficients by
Household Head's Age Categories
(Estimation Method: OLS without Controls)



Graph 4
1994-1996: Triple Interaction Coefficients by
Household Head's Age Categories
(Estimation Method: OLS without Controls)

