

**HOUSEHOLDS' SAVING BEHAVIOR, MACRO SHOCKS AND CREDIT CYCLES: An
Empirical Investigation using Mexican Households Surveys.**

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ABSTRACT

I use the framework of the life-cycle hypothesis to investigate households saving behavior in Mexico for 1984-2006. In this period, the Mexican economy went through important structural reforms, suffered recurrent economic crises and expansions, and experienced credit cycles. The examination of 10 households' surveys indicates that previous to 1998 the observed saving-age profiles have a U-shape; this would be an indication of the presence of liquidity constraints in young households and precautionary motives in old households. The pattern changes after 1998 where an inverted U-shape age profile is observed. There is some evidence indicating that more stable macroeconomic environment and a better functioning financial system may be partially playing a role for this change. In general, households with better access to financial resources save less than more liquidity constrained households. The synthetic panel's analysis complements the exercise and corroborates the cross sections' findings. In the final part of the paper, I examine the impact of macroeconomic fluctuations and credit cycles on households saving behavior. It is found that the effects of macro shocks and financial liberalization on households' saving decisions are stronger for households with better access to formal finance.

Keywords: Household saving, Mexico, precautionary saving, liquidity constraints, age and cohort profiles, synthetic panel.

JEL codes: D12, E21, O16

1. INTRODUCTION

In the neoclassical growth theory saving play an essential role in the aggregate functioning of an economy. High saving rates foster capital accumulation, feed higher levels of investment, and trigger a virtuous cycle of saving, investment and economic growth.¹

With capital mobility, developed countries may have an almost unlimited access to international financial markets.² In contrast, developing countries face considerably more obstacles for external financing with usually volatile foreign capital inflows that often generate balance of payment problems and economic crises.³ In this context, domestic saving may play a pivotal role for capital accumulation, investment, and growth in developing countries.⁴

In addition to serve as an engine for growth, domestic saving functions as a buffer stock during a crisis period and it adjusts to expectations about the future and to the current financial markets conditions.

National saving rates in developing countries differ a lot. For example, average domestic saving rates in countries of the East Asia region have been surpassing 30 percent of their GDP since 1980. In contrast, The Latin America region's saving rates revolve around 20 percent, with

¹ The relationship between saving and growth is crucial in the neoclassical growth models of Solow (1956), Koopmans (1965), and Ramsey (1928), and the AK models of Domar (1946), Frankel (1962) and Romer (1990).

² With the recent irruption of the current global financial crisis, credit markets are practically frozen worldwide.

³ The Mexican Peso crisis in the mid-90s, and the East Asia and Russian Crises of the late 1990's are the textbook examples.

⁴ Aghion et al (2006) argue that domestic saving affect growth in poor countries even with international capital mobility. In poor countries saving provide with collateral, which induces local entrepreneurs into effort needed to make foreign investment profitable. Their model shows how foreign direct investment is required to transfer frontier technological knowledge to local innovating sectors in these countries. The effect of saving on growth is reduced for rich countries because their small distance to technological frontier makes them less dependent on FDI to adopt new technologies.

24 percent as the highest figure before 1990. Figure 1 shows the staggering contrast between the high economic and saving growth rates in East Asia and the low rates in Latin America for most of the last three decades. This gap between the two regions could hardly be explained by differences in property rights protection, financial development or access to international financial markets. Some authors argue that East Asia benefited in the recent past from demographic shifts, in which the relative size of the age groups that produce and save the most has been increasing. Accordingly, this demographic change is one of the main reasons why East Asian countries' economic performance and their saving rates have been enhanced (Bloom and Williamson, 1999, Schultz, 2004).

For households in developing countries—where credit and insurance markets are underdeveloped or absent—saving is a crucial determinant of welfare. Facing income risks, the ability of liquidity-constrained households to smooth consumption is limited. In such conditions, households may decide to accumulate more assets or engage in precautionary saving in “good” times to shelter consumption in “bad” times. Therefore, saving is one of the only means to accumulate assets in the absence of efficient financial intermediation or insurance markets; moreover, the capacity to save becomes one of the best vehicles of social mobility and of enhancing future income possibilities.

An accurate characterization of household saving patterns in an economy is important not only for the central role of saving described above, but because different saving decisions imply different patterns of saving among individuals and in the aggregate economy. Different saving decisions also imply different responses of individual welfare and of aggregate saving to policies such as interest rates, and direct saving incentives such as tax deductions or the provision of social security.

In the saving and consumption literature, researchers face the dilemma of using aggregate data, and bear the problem of aggregation but gain high frequency information (weekly, monthly, quarterly, etc.). Alternatively, they can use microeconomic data, collected directly from the individuals who ultimately make the decisions on the relevant variables. Although this type of data is not affected by the aggregation problem, it constitutes low frequency data⁵.

In this paper, I take the microeconomic approach to study one component of private saving: households saving. I exploit the availability of a large number of household surveys from the Mexican Household Survey of Income and Expenditures (Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) to characterize the determinants of household saving decisions in Mexico for the period 1984-2006.⁶ Only a handful of previous works examined saving behavior at micro level in Mexico. But all of these studies were conducted for the late 1980s and early 1990s.⁷ With the additional surveys, the data cover a very long time period (twenty-two years), including three recessions (1986, 1994-95, and 2001), with the accompanying economic and financial crises, and three periods of recovering during the late 1980s-early 1990s, 1996-2000 and 2002-2006. The time's span is particularly relevant because it offers an opportunity to shed light on household saving patterns for a period when the country adopted important macroeconomic reforms and went through periods of economic distress. The

⁵ Usually the shortest time's span for households' surveys, for example, is one year.

⁶ There are eleven surveys that are comparable. From 1992 to 2004, the ENIGH surveys have been conducted biannually. The remaining surveys were conducted in 1984, 1989, and 2005. In this paper I use all but the 2005's survey. The reasons for including the 1984 and 1989 and not the 2005 surveys are to entirely cover the period 1984 -2006 while keeping a biannual spacing of the data for most of the studied period.

⁷ Papers on households saving using micro data mushroomed in the mid to late 90's, mostly for developed countries. There are fewer studies for Mexico, and they use at most five surveys in their analysis. The most recent survey used was the one from 1996. See for example Székely (1998), Calderon (1998), Villagomez and Zamudio (2000) Aportella (2001), Fuentes and Villagomez (2000) , and Attanasio and Székely (2000)

scarcity of studies analyzing the impact of these events on households saving at micro level is quite surprising. This paper attempts to fill the gap.

Additionally, Mexico's households' saving has dropped from 8.19 percent in 1989 to 4.6 percent in 2006 a drop of more than 43.3 percent (see table 2). Are changes in demographics and tastes the reasons for this drop? Are the financial liberalization and the incidence of credit cycles and economic crises playing any role in this phenomenon? These are other important questions addressed in this exercise.

Moreover, Mexico is an important emerging market economy that has adopted vigorous programs of stabilization and structural adjustments since the mid-1980s. In this regard Mexico becomes an interesting case study to gauge the effects of structural reforms on private saving in emerging markets.

In the macroeconomic sphere, the country made considerable progress with the elimination of the budget deficit, a sharp reduction of inflation, the liberalization of its trade regime—including the implementation of the North American Free Trade Agreement (NAFTA)—, the adoption of both current and capital-account convertibility in its international transactions, and the re-privatization of its banking sector. Furthermore, in the late 1990s Mexico adopted a second wave of structural reforms where the country sharply changed the legal and regulatory environment of the financial sector. These institutional changes included the opening of the banking sector to foreign ownership, the tightness of risk management practices and capitalization requirement, and the creation of a bureau of credit to have a better information system about borrowers.⁸

⁸ These reforms have been considered to play an important role for the current healthy state of the Mexican financial sector. For instance, in a recent article The Economist reported that

In this exercise, I conduct the empirical analysis within the framework of the Life-Cycle Hypothesis (LCH) of Modigliani and Brumberg (1954). The unifying framework of the LCH allows for a consistent description of the large amount of data included in the household surveys. The LCH in its simplest version implies that individuals' consumption and saving through their lives evolve according with their age. The analysis of the evolution of saving behavior by households that go through different stages of their life is useful to characterize the response of saving to different shocks.

The analysis is conducted in various steps. First, I inquire whether, in line with previous findings, saving behavior is sturdily influenced by demographic factors. To address this issue, I constructed cross-sectional age profiles as in Deaton (1992). Then, for each survey, I implemented cross sectional regressions of household saving on a group of theoretical determinants of saving.

Although cross-sectional analysis does not capture time and cohort effects, it may be still informative on the effects of these variables on saving for a specific point in time. The idea is, however, to extend the LCH framework to analyze the role of liquidity constraints and their linkages with the accessibility to financial resources on households saving.⁹

Second, given the impossibility of analyzing an intrinsic dynamic phenomenon, as saving, using cross-sectional analysis, a further step in this exercise is to include the dynamic aspects of

Banamex, the second largest bank in Mexico and a subsidiary of Citigroup, helped its “crisis stricken parent” with more than 40 percent of Citi net income originated from overseas operations between January and March of 2008, (“Mexico’s fast-growing banks appear unusually unaffected by the financial crisis north of the border”, *The Economist*, May 1st, 2008).

⁹ In this paper, liquidity constrained households have limited or null access to credit (formal and informal), have not access to financial instruments such as credit cards, receive not transfers in the form of remittances, government’s and/or relatives’ transfers, and have not real and financial wealth.

saving decisions. Since individual households are not followed across the ENIGH surveys, I cannot identify them in different surveys. To overcome these shortcomings, I make extensive use of the synthetic cohort techniques proposed by Browning, Deaton and Irish (1985) and widely used, since then, in a variety of situations. In principle, the method amounts to following the average behavior of groups whose membership is assumed to be fixed over time. This procedure allows me to study the dynamic behavior of the average of the variable of interest in different years. There are some caveats for using this technique. The most important ones are the endogeneity of family formation and dissolution, and the differential mortality and migration rates across socioeconomic groups.¹⁰ I address these issues by constraining the samples to households headed by individuals of ages between 25 and 64.

Third, following the characterization of household saving pattern, I investigate the impact of financial liberalization and aggregate shocks (the latter defined as pronounced economic downturns due to currency and/or financial crises) on households saving behavior. In particular, the question to investigate is to what extent households with access to financial resources modify their saving behavior when the economy experiences either credit expansions (a byproduct of financial liberalization and macroeconomic stability) or credit contractions (which resulted from financial and banking crises). I estimate a saving function¹¹ and employ a difference in difference (DD) technique to identify the effects of these two types of “macroeconomic shocks” on households saving behavior.

Conceivably, liquidity constrained households would incur in higher saving rates compared to households with better access to financial resources and transfers. If liquidity

¹⁰ See Behrman *et al.*, (1999) and Attanasio and Hoynes, (2000).

¹¹ It incorporates the life-cycle and liquidity constraints components considered in the previous parts.

constrains affect the ability of households to smooth consumption, then in response to income risk households may decide to accumulate more assets or engage in precautionary saving in ‘good’ times in order to shelter consumption in ‘bad’ times. This implies, on one hand, that the effect of a negative shock, say for example the economic crisis of the mid-1990s, would have a greater impact on saving rates of less liquidity constrained households. On the other hand, although the effects of financial liberalization on households’ saving are theoretically ambiguous, it is possible that in the short-run financial liberalization would loosen liquidity constraints by increasing the availability of credit and affecting the interest rates. If so, financial liberalization should be correlated with households’ access to financial services; for example by an increase of the availability of credit for consumption. Consequently, financial reforms should be negatively related with households saving. The negative impact of these reforms on saving rates should be greater for less liquidity constrained households.

In my analysis, I relate the economic peaks and troughs and financial liberalization processes with the credit cycles. Since the earliest comparable ENIGH survey started in 1984, I study the effects of the 1986’s economic crisis on households’ saving behavior using the 1984 and 1989 surveys. The remaining of the studied period is divided into two credit expansions and one credit contractions (see table 1): (i) the credit expansion of 1989-1994, produced by the late 80s and early 90s financial liberalization, (ii) the credit expansion after the financial reforms of the late 1990s and that it spanned from 2000 to 2006, and (iii) the credit contraction of 1994-2000, caused by the 1994-1995 financial crisis. In section 3, I present a detailed account of the financial reforms and crises, which provides *prima facie* evidence of their relationship with the credit cycles.

The remaining of the paper is organized as follows: in the next section, I discuss some hypotheses on saving motives highlighted in the literature, and some stylized facts on households' saving. In section three, I present a description of the macroeconomic environment for the period of study. My focus is on presenting a detailed account of the financial reforms. In section four I discuss the data and methods as well as the way I construct the variables and some descriptive statistics. In section five I present the cross-sectional analysis, and I apply the synthetic panel's methods to assess the dynamics of saving. Section six analyses the impact of macroeconomic shocks (caused by financial liberalization and crises) on households' saving. Finally the paper closes with some concluding remarks presented in section seven.

2. HOUSEHOLDS SAVING: HYPOTHESES AND STYLIZED FACTS

2.1 Incentives to Save

Individuals saving behavior vary over time and within individual's groups. In their excellent survey Browning and Luzardi (1996) enumerate a list of savings motives discussed by John Maynard Keynes in "*The general theory of employment, interest and money*" These include the intertemporal substitution motive, the life-cycle motive, the precautionary motive, and the bequest motive, among others.

For the last half-century, most theoretical advances on individuals' saving behavior have taken place within the boundaries of the intertemporal utility optimizing agent models. Within this framework a household chooses current consumption and saving, and an asset portfolio, to smooth utility over time. A horsepower in this class of models is the celebrated life-cycle/permanent income hypotheses pioneered by Franco Modigliani and Milton Friedman in the

1950s. King (1983) assesses that, “The contribution of Modigliani and Friedman was to translate the abstract notion of an optimal consumption profile into a model that could be estimated econometrically” (p. 5). The main implication of the life-cycle model is the separation of income and consumption profiles. By imposing or relaxing some restrictions to the intertemporal utility framework, it is possible to derive some important testable implications. For example, the conventional intertemporal consumption smoothing results can be obtained by assuming an additively separable utility function with a logarithmic functional form, interest rate equal to the intertemporal discount rate, and without uncertainty. In contrast, by relaxing one or more of these assumptions, it can be shown that consumption could increase or decrease throughout time, move together with income or react to income predictable changes, (Deaton, 1992).

2.2 Demographics and Saving

The life-cycle framework implies that individuals’ consumption and saving through their lives evolve according with their age. One of the most important results of the model is that lifetime saving has an inverted U shape because individuals save the most before retirement age.

One line of research considers the effect of demographic variables on saving behavior. If the intertemporal allocation of resources made by the representative agent is aimed to consumption smoothing, then household total consumption, and consequently saving, is correlated with the number of members in the household (Attanasio, 1999). If there is a correlation between income and the number of members in the household, then consumption would be not independent of disposable income. A similar result is obtained when the incorporation of household’s members to the labor force is endogenous and goods acquired in the marketplace can substitute goods produced domestically (Baxter and Jermann, 2000).

Furthermore, the intertemporal discount rate might depend on demographic factors and have an influence on consumption and saving decisions (See Attanasio, 1999). Empirically, some authors find that saving rates are higher in households without children, households with more than one earner, and in households where both partners work (See Bosworth et al., Browning and Luzardi, 1996, Coleman, 1998)

A different approach, deemed as an extension of the life-cycle hypothesis, refers to the study of savings and consumption on different life stages. In particular, the persistent positive saving rates of individuals at old age clearly contradict the life-cycle hypothesis' idea that individuals save when young and disave when old. A large proportion of elderly save out of their income or more specifically they continue to increase their non-annuity assets after retirement in many developed and developing countries¹². The most common explanations advanced for this phenomenon are the perceived higher risk of death, health issues, and the bequest motive (Coleman 1998, Browning and Luzardi 1996).

Some empirical studies analyze whether different generations have different propensity to save; the results are mixed. For example, Paxson (1996), Japelli and Modigliani (1998) and Attanasio and Szekely (2000) for United States, Italy, and developing countries respectively, find the "cohort effect" is significant. In contrast, the effect is non-existent according to the results reported by Attanasio (1998) for Great Britain and Paxson (1996) for Great Britain, Taiwan, and Thailand.

¹² For developing countries see Paxson (1996) , Denizer and Wolf (1998), Attanasio and Szekely (1998) , among others.

2.3 Precautionary saving

Another departure from the life-cycle hypothesis is originated from thinking about uncertainty. This variable has a negative effect on consumption but a positive effect on saving, so that it would generate a demand for precautionary saving. Browning and Lusardi (1996) point out as two of the most important features of precautionary saving its dependency on the uncertainty of future exogenous variables —agents facing higher variance in their future income or higher uncertainty on their future demographics would change their saving behavior—, and its dependency on current assets and current earnings.

Carroll (1997) proposes a model predicting that prudent agents facing uncertain earnings will never borrow, if there is the slightest possibility of not earning enough to repay their debts. Hence, people's consumption would be effectively constrained by their current income.

Another stream of literature combines precautionary saving and impatient agents when they are young, and it postulates that agents generate a “buffer stock” for consumption smoothing when they expect future adverse shocks. Once relatively impatient agents reach a certain level of resources, they spent their total income; as a consequence, consumption moves parallel with income which clearly is a departure of the life-cycle hypothesis, (Carroll, 1992).

2.4 Liquidity constraints

The assumption of the presence of perfect capital markets implies that agents could transfer resources throughout different periods in life with not transaction costs and a constant interest rate, so individuals can borrow or lend by how much as they wish. This assumption has been largely questioned. In practice, individuals often face limited access to borrowing; they face liquidity constraints. Browning and Lusardi (1996), argue that the behavior of agents facing

liquidity constraints could be similar to that observed on individuals with precautionary saving motive, but it is hard to disentangle both motives empirically. Deaton (1990) shows how the presence of liquidity constraints reinforces the precautionary motive.

The financial liberalization literature provides extensive information about the effects of credit patterns on household savings behavior.

One common effect of financial reform in the form of financial liberalization is the increment in credit availability in the economy. According with Schmidt-Hebbel, et al. (1996), and financial liberalization usually increases consumer lending and relax borrowing constraints of consumers, both of which could decrease private saving. These authors 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. 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.

Japelli and Pagano (1994) estimate regressions of saving rates on growth using cross sectional data for OECD countries, and they show that households facing liquidity constraints

generally increase their saving rates. These authors argue that financial liberalization in the 1980s contributed to the reduction of aggregate saving in these economies.

There are few studies analyzing empirically the microeconomic effects of financial reforms on household saving behavior. For example, Attanassio and Weber (1994) tested different hypotheses on the consumption boom experienced in Great Britain at the end of the 1980s. These authors find that young generation increased their consumption due to their expectations of improving their labor income; meanwhile older generations modified their behavior as a consequence of the liberalization of the real state market. For both cases, financial liberalization relaxed household liquidity constraints and decreased household saving.

3. MEXICO'S FINANCIAL SYSTEM REFORMS

In this section, I describe the most important financial reforms of the last two decades on the Mexican financial sector¹³.

3.1. Antecedents

In 1982, the Mexican government nationalized the banking system in response to an economic crisis. It reduced the number of banks and obliged them to lend a significant portion of their reserves to the public sector. Given the lack of competitive pressures, the banks failed to develop credit skills and processes.

¹³ See Ortiz (1994) for a more extended description of the Mexican financial reform in the late 1980's and early 1990's. For a complete account of financial reforms adopted for the rest of the 1990s, see Gonzalez-Anaya and Marrufo (2001)

In early 1984 there was a moderate economic recovery that continued until mid-1985, when Mexico faced another balance-of-payments crisis. The government responded with a step-wise devaluation of the peso and the announcement of cuts in the fiscal deficit and domestic credit. Growth slowed and inflation accelerated.

By the late 1980's and early 1990's, the government adopted an important financial reform that, once again, substantially changed the financial sector in the country. Two key aspects were contained in this comprehensive reform. First, monetary policy was carried on through open market operations and interest rates were allowed to respond rapidly to internal and external shocks; and second, selective credit quotas and minimum reserve requirement for commercial banks were eliminated.

The liberalization of passive interest rates was a progressive process. By the end of 1988, the monetary authorities decided to let the markets set the level of interest rates. 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 1989 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 (Ortiz, 1994).

3.2 Re-privatization of the banks and the peso crisis

Between 1991 and 1992, the government returned the commercial banks to private ownership. The new bank owners were mostly brokerage houses or industrialists with little banking experience. At the same time, expectations of economic growth fueled a sharp increase in bank lending. This aggressive lending combined with a lack of credit skills led to an increase of bad debt in the banking system.

As a result of the credit boom, credit granted by the commercial banks increased 92.43 percent in real terms during the period 1989-1992. The average annual growth rate of total credit was 24.4 percent during the same period. In the case of consumption credit, it experienced an increment of 173 percent during the same period with the highest increase experienced by mortgages (Aportela, 2001).

The devaluation of the Peso in December of 1994 triggered a severe economic and financial crisis, which caused a rapid build up of non-performing loans and a sharp decline in bank lending. 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 1996 the problem was even worse; the proportion in that year was 25.8 percent. Between 1994 and 2006, commercial banking assets declined at an average annual rate of 1.4 percent in real terms from 51 percent of GDP in 1994 to 33 percent of GDP in 2006 (see figure 2).

Second, on the liabilities 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. From 1994 to 2006 domestic banking credit fell at an average annual rate of 3.0 percent from 36

percent of GDP in 1994 to 15 percent of GDP in 2006 (see figure 2). This decline was even steeper in the case of consumption credits before 1998. As it can be seen from figure 3, the reduction in consumption credit was 54.5 percent from 1994 to 1996. Consumption credit as a proportion of total credit changed from 7.14 percent in 1994 to 3.2 percent in 1996. Mortgages were still 5 percent higher than in 1994 in 1997 but they suffered a sharp decline afterwards. While total bank and mortgage lending declined steadily in real terms well beyond 2002, consumer-lending expansion started around 2000 at impressive rates. The remarkable take-off of consumer credit has been fueled primarily by a large increase in credit card lending (see figure 3). An idea that is relevant in this paper is that the credit for consumption's boom could be a byproduct of the structural changes in the financial system. This in turn might have an impact on household saving behavior.

3.3 The 1990s post crises reforms and the internationalization of the banks

In the aftermath of the peso crisis and worried that the banking system would collapse under a rising level of bad debt, the Mexican government implemented a series of capitalization and restructuring programs and intervened in the operations of several failing banks. While government intervention was successful in stabilizing the banking sector, the scope of the rescue effort was not sufficient to address the sector's capitalization needs. The high fiscal cost of the banking rescue made further support politically difficult and the government turned to foreign investors to improve the capitalization and overall competitiveness of Mexican banks.

Starting in the mid-1990s, the Mexican government gradually removed restrictions on the operation of foreign banks. The North American Free Trade Agreement (NAFTA), which was launched on January 1, 1994, opened the Mexican banking sector to foreign banks by permitting

entry through the establishment of chartered subsidiaries. In March of 1995, the Mexican Congress passed legislation allowing foreign financial institutions to acquire majority stakes in Mexican banks.

Foreign interest in the three largest banks, however, was limited to 30 percent. In December of 1998, the government removed all remaining limitations on foreign ownership of Mexican banks. The liberalization of the investment regime triggered a wave of FDI in the Mexican banking sector. Foreign banks were attracted by the size and growth potential of the Mexican market and the sector's low asset valuations. Between 1994 and 2004, foreign banks invested more than U.S. \$30 billion in Mexican financial services. Following regulatory changes in 1995, BBV (Spain), BSCH (Spain), and Bank of Nova Scotia (Canada) acquired minority stakes in smaller banks, which they gradually increased to take full control. Between 2000 and 2002, Citigroup (U.S.A.), HSBC (U.K.), and the two Spanish banks (BBV and BSCH) took over the industry leaders and merged them with their local operations. Banking FDI reached a peak in 2001 with Citigroup's U.S.\$12.5 billion takeover of Banamex, the largest foreign acquisition in Mexico and the largest financial sector deal ever in Latin America.

By 2006, foreign financial institutions controlled more than 80 percent of Mexican banking assets, up from 16 percent in 1997. Since 2004, four of the five largest banks were under foreign control; in 1997 only one of the top five banks was foreign-owned. In 2006, three foreign-owned banks: Bancomer (BBVA), Banamex (Citigroup), and Santander dominate the Mexican banking sector, accounting for 60.1 percent of commercial assets. In January of 2003, Serfin (BSCH) and Santander-Mexicano (BSCH) merged their operations under the Santander-Serfin brand to form a potential challenger to the leaders. Other key players include Banorte, the only major bank still controlled by local investors, and HSBC (see figures 4a and 4b).

4. DATA AND DEFINITIONS

4.1 Data

The ENIGH surveys were conducted during the third quarter of each surveyed year using stratified sampling. The surveys are comparable and representative at the national level, and for the rural and urban populations; they contain extremely detailed information about the expenditure (by type) of each household together with information on income by source (after taxes and social security contributions), and socio-economic and demographic variables. Information is also available on non-monetary expenditure, such as auto-consumption. There are eleven surveys available, covering a time span of twenty-two years; with the exception of the 1984, 1989 and 2005, the rest of the surveys were conducted biannually beginning at 1992¹⁴. The size of the surveys varied from year to year with 4,735 households surveyed in 1984, 11,535 in 1989, 10,530 in 1992, 12,815 in 1994, 14,042 in 1996, 10,952 in 1998, 11,657 in 2000, 19,856 in 2002, 25,115 in 2004, 25,443 in 2005, and 20,875 in 2006. A detailed description of the data is presented in appendix A1.

4.2 Definitions of Households saving and construction of variables

Households' saving can be distinguished between *discretionary* and *mandatory* saving. *Discretionary saving* is determined by the household intertemporal utility maximization problem where it chooses saving absolute value and portfolio composition, given their budget constraints and applicable incentives such as tax relief and mandatory contributions to funded and unfunded

¹⁴ As I mentioned above, in this study I exclude the 2005's survey.

pension schemes. *Mandatory savings* is beyond the household control, for example mandatory contributions to funded pension plans¹⁵.

In this exercise, I construct the variable saving (S) based on households' discretionary saving. In particular, S is defined as the flow of household income net of taxes and retirement contributions (disposable income) minus the flow of consumption's expenditures. This broad saving definition captures overall saving responses and neutralizes the effects of the shifting of the composition of household portfolios (Börsch-Supan, 2003). Disposable income is obtained by adding all income from all sources across all members of the household and it includes wage income, business income, rent income, income from transfers and other income. Household total consumption is the sum of expenditures in food, communications and transport, personal goods, health, educational, appliances, clothing, travel and leisure, housing, and other.

A common problem for constructing saving rates from survey data is that both consumption and income are likely to be underreported. Since saving is just the residual of income minus consumption, the underreporting of these two variables magnifies the measurement error of saving. The degree of underreporting is probably greater from high-income households; these households tend to have high saving propensities. Figure 5 plots saving rates by income deciles, and it shows that saving rates are higher for the top deciles of the household income distribution. Hence, an underreporting of income by richer household would generate a downward bias in saving rates.

In addition to using the ratio of saving to income as the measure of saving rates, I also use the ratio of saving to consumption. This measure of saving rates can be interpreted as a

¹⁵ For an excellent discussion on saving's definitions see Poterba (1994) and Börsch-Supan (2003)

simple common proxy for lifetime resources, and it is a monotonic transformation of the ratio of saving over income (Attanassio, 1998).

4.3 Summary statistics of relevant variables

Table 2 presents summary statistics on selected variables. As it can be seen, saving rate SR1, defined as the ratio of saving over income, increased from 6.92 percent in 1984 to 8.19 percent in 1989, and it started to decrease steadily until 1996, where it was at its all-times lowest rate of -0.22 percent. The drastic fall in saving rates recorded for 1996 may be reflecting the magnitude of the income drop caused by the financial crisis of 1994-95. Household saving rates started to recuperate gradually, reaching a peak of 6.37 percent in 2002—a saving rate lower, however, than those of the 1980s. The second measure of saving rates SR2, defined as the ratio of saving over consumption has a similar pattern. And the median values for both measures of saving rates are also consistent.

Average households' income was very similar in real terms from 1989 to 1994. From 1994 to 1996 income dropped more than 25 percent in real terms. Real average income was only 14,928 pesos during 1996 compared with 20,030 pesos in 1994. By 2006, average household income was of 28,467 pesos, and increase of 62.8 percent with respect to its 1984's level. Looking to average consumption, it had a similar pattern as average income: it was similar from 1989 to 1994 with a drop of almost 20 percent from 1994 to 1996.

Household size decreased from roughly an average of 5 members in 1984 to an average close to 4 members in 2006. The average number of income recipients increased steadily from 1.6 to 2.19 in 1984 and 2006 respectively. In contrast, the average number of children —defined as minors younger than 15 years old, decreased from 2.06 to 1.23 for 1984 and 2006 respectively.

The average age of the household's head increased more than two years, from 44.46 in 1984 to 46.85 in 2006. These figures reflect the demographics changes experienced by the Mexican households during the last two decades. The education indicator, which is measured on a scale of 0 to 9, improves from 2.02 (corresponding to six years of schooling) in 1984 to 3.16 (more than six but less than nine years of schooling) in 2006.

5. CHARACTERIZATION OF SAVING PATTERNS

5.1 Cross-sectional Analysis ¹⁶

As stated earlier, I use the conceptual framework of the life-cycle hypothesis for characterizing the saving data. This approach is appropriate to incorporate extensions and analyze the role of financial constraints on the evolution of households saving behavior.

As a benchmark, I conduct cross sectional analysis using the ten surveys. Although the set of explanatory variables captures a broad range of potential saving determinants, my focus is on the characterization of the age-saving profiles, and, more importantly, on testing the hypothesis of whether households with modest or not access to financial resources save more than household with better access.

Both saving rates and income distribution are highly skewed and fraught with noise. The mean is overly influenced by extreme observations and the implications from a standard OLS regression may therefore be difficult to interpret. I try to attenuate the problem of outliers and measurement bias in two ways: first by applying a commonly used, albeit arbitrary, cut-off to all

¹⁶ The analysis conducted in this paper uses the expansion factors the surveys provide and that are representative for the population at large.

samples, eliminating all observations with a negative saving rate of minus 100 percent or lower. Second, besides using OLS in my estimations, I conduct median regressions where absolute rather than squared deviations are minimized, and where the object is to predict the median of the depended variable conditional on the values of the independent variables. The general estimation is described by equation (1):

$$S = \alpha_0 + \beta *AGE + \gamma *LOC + \delta *FIN + \phi *X + \varepsilon \quad (1)$$

where S represents household saving rates—defined as either total quarterly saving over total quarterly disposable income (S1) or total quarterly saving over total quarterly consumption (S2).

The explanatory variables can be grouped in the following categories:

Age: Age variables allows for life-cycle factors¹⁷. In my regressions, I include age, age squared, and an interaction term of age and income of the household head. It is reasonable to expect that individuals at their middle age would have higher income than younger and older individuals. Hence, an effect on saving independently attributed to age and income only, would yield a biased estimation.

Households' Location: A factor that limits access to financial intermediaries is households' location. The effect of physical access to financial resources is captured by controlling for household's location (LOC) in two ways. First, I assign a value of 1 to households located in urban areas—defined as towns and cities with 15,000 people or more—and 0 for rural

¹⁷ A caveat is in order here: with cross-sections we can not differentiate cohort, and time effects.

households. Second, I use the classification of INEGI and the household identifier, to identify and assign households geographical location. INEGI divides the country into seven socioeconomic regions (See the map presented in the appendix A2). Region 1 is the poorest and region 7 corresponds to the most developed (the reference group corresponds to households located in region 7).

Households' direct access to financial resources: FIN consists of a vector of dummy variables that capture households' direct access to credit (both formal and informal)¹⁸.

Two events occurring since the year 2000 have captured the attention of policy makers, academics, and the press in Mexico. These are the rapid expansion of the credit cards' market and the steady increase of transfers in the form of remittances¹⁹. It is reasonable to assert that more available credit via credit cards would loosen up households' liquidity constraints, and that households receiving remittances would be less liquidity constrained as well. Therefore, it is important to identify the effects of these variables on saving behavior. By looking at the expenditures where households report payments on behalf of credit card accounts to banks or commercial card issuers, I identify whether or not households hold credit cards. Since my interest is to identify access to credit and not whether or not households indeed use credit, I use a dummy with a value of 1 to households making credit card payments and 0 otherwise. For the

¹⁸It is not possible to identify from the survey whether the source of credit is formal finance or informal credit from relatives, friends, etc..

¹⁹ See for example: Rodriguez, I., "Creció 34% anual el financiamiento bancario vía tarjetas de crédito: BdeM" (Banks financing through credit cards growth by 34 % annually according with the Bank of Mexico), in la Jornada, Sep 29, 2007, for credit cards, and Gonzalez, A., R., "México desplaza a India como el mayor receptor de remesas (Mexico surpass India as the largest remittances recipient), in La Jornada, Nov 23, 2006 for remittances.

case of remittances, 1 is assigned to households reporting to being remittances recipients and 0 otherwise.

Households receiving pensions and/or other types of transfers such as government transfers are expected to be less liquidity constrained. A dummy for head of households receiving pension payments is included (the control is households where the head is not receiving a pension). To control for the effect of transfers, I assign 1 to households receiving transfers and zero otherwise²⁰. Households with access to health services should be less liquidity constrained and save less. A dummy with a value of 1 for households with access to health care and zero otherwise is included. I also incorporate a measure of wealth that includes the sum of both real and financial wealth, defined as a stock measure of the residual of households' expenditures minus income from transactions of physical assets and financial transactions, divided by income²¹.

Controls: X is a vector of controls that contain demographic and socioeconomic variables reported in the literature as having an effect on saving rates. Income is reported to be positively

²⁰ I consider monetary and in kind transfers from relatives and friends, scholarships and funds from government programs designed to reduce poverty or stimulate agricultural production such as PROGRESA and PROCAMPO respectively.

²¹ These transactions include deposits into, minus withdrawals from savings accounts and other savings; plus purchases of, minus sales of bonds, stocks, and other securities; plus contributions to, minus out-payments from, life insurance; plus amortization of loans made to, minus payments received from, other people; plus acquisitions of, minus sell of real state and machinery; plus expenditures of, minus income, from inheritances and dowries; plus purchases of, minus income from payments on, author's rights, trademarks, and patents; plus acquisitions of, minus sales of, jewelry, coins, precious metals and art's objects.

correlated with saving rates in both developed and developing countries²². Therefore, I include natural log of households' disposable income. For the head of the household, I include an education indicator, the indicator squared, and gender (female head of household constitutes the control group). The education indicator is constructed on a scale of 0 to 9, where 0 indicates head of household with not schooling and 9 indicates head of households with graduate studies. I also included the total number of individuals forming a household, and number of children, defined as non-income recipients younger than 15, and whether or not the head of the households receive a pension.

5.1.1 Results

Figure 7 shows cross-sectional averages of disposable income and consumption as a function of the head of the household for selected years. It suggests that consumption and income move in unparallel manner during some segments of the life cycle. This evidence is suggestive of consumption smoothing over the life cycle. The age profiles of income and consumption exhibit a hump-shaped pattern for all surveys. Income initially increases with age, but after peaking in the late 40s to early 50s, begins to decline.

Figure 8 plots median saving rates as a function of age of the head of households for selected years. In all cases, the age-saving profile exhibits a relatively flat S-shaped pattern. In the case of the surveys of 1984-1994 individuals younger than 30 years old saved a larger share of their income compared with individuals in their 30s and early 40s. The lowest saving rates were from individuals in their 30s for all cases. Saving rates started to increase for individuals in

²² See for example, Bosworth et al, 1991, Poterna, 1994, Browning and Lusardi, 1996, and Dynan et al, 2000 for developed countries and Coronado, 1998, Szekely, 1998, Attanassio and Szekeley, 1998, and Denizer and Wolf, 1998 for developing countries.

their mid 40s and continued increasing steadily afterwards, peaking after, or close to, the retirement age of 64-plus years old. The pattern in 1996 was different; due to the effects of the 1994-95 economic crises, saving rates for all age groups was consistently lower. More importantly, saving rates were in negative territory for individuals who were below the age bracket of 45-50 and slightly positive for older individuals, reaching a peak for individuals on the age bracket of 60-64. The age-profiles for 2002 and 2006 were slightly different although still with an S-shaped pattern. For these years, young households saved less, with saving rates bottoming for the youngest households. Saving increase throughout young and medium ages peaking at around ages mid to late 50s. Although still high at retirement age, saving rates were lower.

A blurry picture emerges from this descriptive analysis. The age profiles conforming to the life-cycle hypothesis should have an inverted U-shape were households save at young ages and di-save at retirement's age. This pattern is consistent for the surveys of 2000 and onwards²³. The inverted U-shape, however, is not so evident for the period before 2000. Seeking to shred some light to explain these patterns, I run cross section regressions; the results are presented below.

Tables 5 and 6 report the results of median regressions on equation (1).²⁴ The median regressions results, using saving over income (S1) as the dependent variable, are reported in table 5. The results from the regressions where the dependent variable is defined as saving over consumption (S2) are presented in table 7. Standard errors are shown in parentheses. Most of the

²³ The hump-shaped pattern is similar for the surveys of 2000 and 2004.

²⁴ I present the results of the median regressions, but I also run OLS regressions. The results are robust to estimation techniques and they are available upon request.

estimated coefficients are highly significant, consistent across specifications, and with the expected sign.

The effects of income on saving rates are consistent with previous results reported in the literature where it has been shown to be positively correlated with saving rates in both developed and developing countries (see for example, Bosworth et al, 1991, Poterna, 1994, Browning and Lusardi, 1996, Dynan et al, 2000, Coronado, 1998, Attanassio and Szekeley, 1998, and Denizer and Wolf, 1998). An additional one percent in income, holding everything else fixed increases households' saving around .14 to .20 percentage points depending on the specification. Usually the coefficients for the estimates of saving over consumption (S2) are higher.

When the interaction term of income and age is considered, the magnitude of the estimate for income is slightly modified and still remains highly significant. It is important to note that for the cases where the interaction term is significant the sign is negative, which implies that for head of households aged at the age's mean for that year, a one percent increase in income will decrease saving rates by some fraction of 0.1 percentage point. For example for 1998, the estimate of **linc** is equal to 0.196 and the coefficient for **linc_age** is equal to -0.0008583 implying that individuals, say of age 45.5 (age's mean of households head for 1998), will increase their saving rate by only 0.157 compared to the estimate of 0.196 percentage points obtained if the interaction term is not included.

For the demographic variables, the estimate age profiles are significant for all the studied years with the exception of 1984 (when SR2 is used). Until 1998, the age effect was negative with a highly significant non-linear effect for most cases and for both definitions of saving rates. The sign on the age's estimate becomes positive after 1998. Ignoring cohort effects, this implies that until 1998, the observed age profiles on saving rates have a U-shape, and afterwards

throughout the period 2000-2006 the age profiles of saving rates have an inverted U-shape. A possible explanation for the U-shaped saving rates would be that younger households faced tighter credit conditions in the 80s and 90s due to an incipient or shallow financial system and the financial and banking crises of the mid 1990s. Another explanation advanced by Butelman and Gallego (1997) for Chile is that middle aged households need to pay back their debts acquired when family was at younger stages. The U-shape results are similar to those reported by Denizer and Wolf (1998). These authors conducted cross sectional regressions using data for transition economies; they reported that greater precautionary saving was observed for older households.

For the period 2000-2006, the age profiles take an inverted U-shaped. This behavior is in line with the lifecycle- hypothesis where households save at young age and disave at old age. This change in saving behavior is important and could be partially attributed to a more stable macroeconomic environment and to an improved formal financial system.

In general the variables capturing the impact of access to finance are negatively related with saving rates and highly significant for most years (see tables 5 and 6).

For the location variables, urban households and households located in more developed regions save a smaller share of their income, other factors held constant, than rural households and households in the least developed regions. For example, in 1998 urban households saved 7.1 percentage points less of their income than rural households²⁵. These results constitute evidence of the effects of household's location on saving rates and reinforce the conclusion that

²⁵ The values for the coefficients on regions are not presented to save space. The regressions include dummies for each socioeconomic region. Their coefficients have, in general, a similar pattern, i.e. households located in regions with lower socioeconomic conditions save proportionally more than those located in higher socio-economic regions.

households in urban areas and in wealthier locations are less liquidity constrained, so they save proportionally less than their counterparts.

Households with better access to financial resources—in the form of access to credit (formal and informal), credit cards, remittances, transfers, and net financial wealth—save less, in general, than households lacking direct access to financial resources. The estimates of the variables that capture access to credit have, the expected, negative sign and a sizable economic significance for both definitions of saving, S1 and S2. In 1984, however, the estimates for the variables **Dcredit**, **Dccard** and **Dremit** were positive for both S1 and S2 but not significant in the case of S1. These results can be explained in the context of the stage of the financial system at that time; for most of the 1980s the financial system was in disarray, and with the nationalized banks mostly lending to the government, the availability of credit for the private sector was scarce. Note that the coefficients on access to credit resources (**Dcredit**) are relatively higher, in absolute terms, for the years of 1989 thru 1994 reaching their highest absolute point in 1989. The first set of macroeconomic reforms, including financial liberalization, was launched at the end of the 1980s, so these estimates could be capturing some of the effects of these events. Similar results are obtained for holding credit cards (**Dccard**) and remittances' recipients (**Dremit**) variables, which could also be capturing the limited access to financial resources at the beginning, and the effects of financial liberalization latter on. In most cases, households that hold credit cards save at least 5 percentage points less compared with those without credit cards—there are two exceptions: the year of 1992 for the two definitions of saving and in 1996 using S2; for 1992, the coefficient has the expected sign but it is small and not significant, and for 1996 it's significant and of considerable size but with a positive sign. The results for 1996 are not surprising, in the aftermath of the peso's crises, the banking system collapsed, and households

with better financial culture (those holding credit cards) opted for increase their saving. For **wealth**, the coefficients are negative and highly significant for all years and all specifications although their magnitude differs considerably for the years of 1984, 1989, and 1996. The interpretation of these estimates for the periods 92-94 and 98-06 is straightforward: for example in 2000, one percentage point increase in wealth decreases saving by 0.629 percentage points when S1 is the dependent variable. The smaller magnitude in terms of absolute value of the coefficient for wealth in 1984, 1989 and 1996 coincides with periods of high real interest rates in the country. Thus, households would be partially lending their accumulated wealth for those years.

Households receiving remittances saved less than non-recipients for all years and specifications since 1989. The coefficients for this variable oscillated between -0.17 in 1992 to -0.025 in 2006 for S1 and from -0.205 in 1992 to -0.036 in 2006. Fajnzylber and Lopez (2007) suggest that for remittances recipients the propensity to save out of the remittances income is lower than the corresponding saving rate from non-remittances income. However, these authors do not provide any explanation for such behavior. In Mexico, remittances recipients are generally at the lower percentiles of the income distribution. Hence it is reasonable to assume that this source of income might serve as a substitute of saving to smooth consumption.

The coefficient for house ownership, **Down**, is positive and highly significant for most cases and for both definitions of saving rates for the period of 1984- 2000. It becomes negative for the period of 2002-2006, but only significant at 5 percent level for 2002. Calderon (1998), using the same ENIGH micro data, finds a negative relationship between home ownership and saving rates for 1992 and 1994. This author argues that financial liberalization and the credit expansion of the early 1990s allowed homeowners to use their houses as collateral to get credit

for consumption, which in turn decreased their saving rates. These results are at odds with the findings in this paper because Calderon conducts his analysis using only the top four deciles of the income distribution and included fewer explanatory variables. In order to reach more valid conclusions for the whole population, the inclusion of all income groups into the analysis and the minimization of omitted variables bias are necessary conditions that would yield more reliable results. A rather more plausible explanation for the positive impact of home ownership on saving rates is that this variable could be capturing some income effect. Homeowners would be saving more because they have higher income compared with households that do not own their dwelling.

Another demographic variable related with saving is household's size. Households with a larger number of members save less than smaller households. An additional household's member decreases saving rates by 1 to 2.5 percentage points during the studied period with the exception of 2004 where the results were not significant. These results are robust to both definitions of saving. The opposite effect, with a similar dimension, is observed for the number of earners variable. Households with more members with earnings are able to save more. The coefficient number of children is also negative for all years but its significance is weaker. These results are in line with previous findings in the literature (Bosworth et al., Browning and Lizardi, 1996, Coleman, 1998).

The impact of the household head's gender is irrelevant during the period 1984-1998, but it becomes significant after 1998 where households headed by males save more. For example, in 2000 households headed by males saved 3.4 and 4.2 percentage points more compared with households headed by females using S1 and S2 respectively.

The effects of education are very strong but at odds with the typical finding of a positive education elasticity of saving for advanced economies. The estimates have negative sign

implying that saving rates decline with education, *ceteris paribus*. The pattern is consistent with a flatter expected income profile for less educated households. Households with lower educational attainment would save more since the smoothing hypothesis predicts lower saving rates for households with steeper expected income profile.

5.2 Saving's Dynamics: Synthetic panels

Saving is essentially a dynamic phenomenon. In order to disentangle its determinants, it is necessary to follow individual behavior over time. The ENIGH survey, however, is not a panel, as individual households are not followed through time. Therefore, I am forced to use an average cohort approach as proposed by Browning Deaton and Irish (1985) and now widely used in this literature. This technique consists of constructing a synthetic panel by aggregating relevant information, such as income and consumption across a group of households that have a common characteristic, which forms a cohort.

I define the cohorts according to the year of birth of the self-declared household head. Individuals born within a five-year interval form each cohort. For example, head of household born between 1955 and 1959 formed a cohort; head of households born between 1960 and 1964 constitutes another cohort, and so on. The choice of the interval defining the cohort is arbitrary. A shorter interval would reduce within cell heterogeneity but at the cost of reducing the number of households within each cell.

I restrict the empirical analysis to households with heads aged 25-64 years old²⁶. Table 3 presents the list of cohorts' definitions and their cell sizes. There are 13 cohorts and 96 cells with sizes ranging from 129 to 2940 household's heads; the total sample size is 105,851 households. Table 4 presents the median values of the saving rates by cohorts and surveys.

With these cohorts, I can track the average behavior of the variables of interest for successive surveys. By considering repeated cross sections I am able to control for cohort effects and identify the life cycle profile of different cohorts. Even if the life cycle motive is not the main reason for saving, life cycle profiles could be informative about alternative reasons for saving.

Once one estimates the average or median saving rate of a given cohort at a given point in time, it is important to consider the factors that potentially could affect it. The profiles present three simultaneous effects likely to be important: time, cohort and age effects. The first one corresponds to the effects of business cycles; this means that the saving rates in, say, 1989 compared to 1984, may be higher due to higher economic growth and not attributable to the intertemporal decisions of individuals. The second one refers to generational differences; individuals born in 1920 would behave differently than individuals born in 1975. For the cohort effect, households forming cohort 5, whom head was 30 years old in 1992, constitute the baseline group. Therefore, the effects of cohort 5 are null and the effects of the remaining groups are evaluated in relation with cohort 5. The third effect is the life-cycle effect. I decompose the

²⁶ By imposing this restriction, I seek to mitigate many concerns associated with the effects of changing headship, differential migration, and differential mortality by age group (Deaton and Paxson, 1993 and Attanasio and Szekeley, 2004). McKenzie (2001) finds that for households with heads aged 25-65, changes in household headship explain at most from 0.1 to 0.5 percent of the 6-7 percent consumption growth

contributions of these three effects to saving by using the approach of Deaton and Paxson (1994)²⁷.

Since a person's age added to their birth year gives the current year, there is an exact linear relationship between the age, cohort and time effects. For this reason it is not possible to separate these three effects without further restrictions. Deaton and Paxson (1994) identify age and cohort effects by imposing the constraint that the year effects must add up to zero and be orthogonal to a time trend. With this constraint, the changes in income and consumption, and consequently on saving, over time are attributed to age and cohort effects almost entirely, and time effects are reduced to cyclical variation. To obtain the smoothed age profiles on saving I estimate the following saving equation:

$$s_{ct} = c + \gamma C_c + f(\text{age}_{ct}) + \phi T_t + u_t \quad (2)$$

where s_{ct} is the averaged saving rates, c and t indicate cohort and year, respectively; C is a matrix of cohort's dummies where the variable for cohort 5 is eliminated. $f(\text{age}_{ct})$ is a 5 x ct matrix representing a fifth order age polynomial; T is matrix of years' dummies where one column is also eliminated. Equation (2) is estimated effectively by instrumental variables —two-stage least squares or median regressions—, where the set of instruments includes all non-redundant year-cohort dummies. In the first stage the estimator obtains cohort averages for each year and in the second stage these are regressed on the explanatory variables. By construction there is no within-year cohort cell variability in age, year of birth, or time.

²⁷ This approach is widely used in the literature; see for example Deaton (1997), Attanasio (1997), Attanasio and Szekely (1998) and (2000), Villagomez and Zamudio (2000), Fuentes and Villagomez (2001), Chamon and Prasad (2007), among others.

Additionally, I consider some of the variables examined in the cross sectional analysis. In this case, as explained by Attanassio (1998), the cohort technique fails to exploit all available information in estimation, and ones must be cautious when interpreting the results. With this caveats in place, I estimate several versions of the following equation:

$$s_{ct} = c + \gamma C_c + f(age_t) + \phi T_t + \beta X_{ct} + \varepsilon_t \quad (3)$$

where s_{ct} , C_c , and $f(\cdot)$ are defined as in equation (2); X_{ct} is a matrix of controls; the ε_t s are the residuals, γ , ϕ , and β are parameter vectors; as in equation (2) the ϕ 's are constrained to have zero mean and to be orthogonal to a time trend. I gathered the control variables into three groups: (i) time invariant variables such as households location (urban vs. rural, and socio-economic regions), education attainment and gender of the household's head; (ii) variables that may vary over the life-cycle such as household size (number of household's members), number of earners in a household, number of children (defined as non-earners younger than 15 years old), home ownership; and (iii) variables varying with time but related with liquidity constrains such as transfers, remittances, access to credit, holding credit cards, financial and real savings, access to health services, and whether or not the head of the households receive a pension.

5.2.1 Synthetic Panels' results

I start the analysis of age profiles by describing the construction and interpretation of the graphs presented for this section of the paper. Figure 9 plots the average family size against ages of the 13 cohorts in the sample. Each connecting segment represents the average family size of a given cohort as it is observed in different surveys. For instance, the youngest cohort was observed at an average age of 26 in 2006. Cohort 2 was on average 26 in 2002, 28 in 2004, and 30 in 2006, and so on. This means that each cohort is observed over a different interval of its life

cycle. However, as the survey covers a period of 22 years and cohorts are defined by a 5-year interval, the profile of each cohort overlaps with those of adjacent cohorts. That is, adjacent cohorts are observed at similar ages albeit at different points in time.

The interpretation of the vertical differences between the profiles of different cohorts observed at the same age as pure cohort effects is wrong. These differences might also reflect time effects. In general cohort, time, and age effects affect observed cohort averages. The perfect collinearity of these three variables precludes disentangling these effects without additional information. Any cohort effect could always be reproduced as a combination of age and time effects.

In the case of family size, however, it is uncontroversial to state that systematic and important ‘time’ effects can be safely ignored (see table 2, column “size”). Therefore, the substantial differences among cohorts in Figure 8 can be interpreted as negative cohort effects where younger cohorts are characterized by much smaller families. In addition to the substantial cohort effects, figure 9 shows that average family size follows a ‘hump shaped’ profile, peaking around age 48. These results are consistent with previous studies for Mexico (see for example Attanasio and Szekely (1998) Villagomez (1999)).

Figure 10 plots the median of households’ total income and consumption expenditures. Panel A plots the raw data by cohort and age subsuming all time effects into age and cohorts effects. In order to identify age and cohort effects, I proceed to remove some of the noise by assuming that cohort’s relevant variable under consideration is given by a polynomial in age with cohort specific intercepts. Therefore, I run regressions of the data on a fifth degree polynomial in age and cohort dummies. The time effects are normalized so that they have zero mean and are

orthogonal to deterministic trends. This is equivalent to interpreting all deterministic trends in the data as a function of age and cohort effects (Deaton and Paxson, 1994).

Panel B in figure 10, plots the results of the normalized cohorts, and it depicts clearer patterns of income and consumption expenditures with “hump shaped” profiles. With the exception of the cohort at the older ages (cohorts 11 and 12), the lines for younger cohorts are always above the lines of older cohorts even when they are observed at same age. These differences in income and consumption could be attributed to economic growth. For example those born in 1977 (cohort 2) have their median income at age 27 that are approximately more than 70 percent higher than income at age 27 of cohort born 20 years earlier. In general, income increases by about 82 percent between the beginning of the life cycle and its peak that occurs around age 44-49. The pattern of consumption expenditures is similar to that of income.

Figure 11 plots together income and consumption expenditures for selected cohorts. The most salient feature observed in figure 11 is that consumption tends to move in parallel to income for the youngest and oldest cohorts (cohorts 2 and 10). Cohorts at the middle of the life cycle (cohorts 4 to 8) consume most of their income and in some instances they even consume above their income at their younger ages. Then, the gap between income and consumption expenditures widens steadily, as cohorts age up to their late forties when this gap is largest. These results can be interpreted as evidence of consumption smoothing when cohorts reach their middle age. When these cohorts are in their late twenties to early thirties tend to borrow against expected future income to smooth consumption. A plausible explanation for this behavior is that at young ages cohorts are at the early stages of family formation and in the process of acquiring durables (home, furniture, etc), so their savings are very low or negative. Once cohorts reach

their middle age increase their savings considerably, this is illustrated by the widening gap between income and consumption expenditures.

Saving levels age profiles using both raw and smoothed data are plotted in figure 12, panels A and B respectively. The smoothed age profile is “hump shaped” and peaks at around age 54. This result is roughly consistent with the life cycle model, which implies that saving is highest when income is highest. Other important feature displayed in figure 12 panel B is that strong cohort effects are evident since each cohort tends to have a profile higher than that of the next older cohort. For example, comparing cohort 6 with cohort 10 both at age 47, the former in 2004 and the latter in 1984, it is observed that cohort 6 saves almost 150 percent more in real terms than cohort 10. The level of saving of a given cohort is determined by the propensity to save of that cohort and by the total amount of resources available to it. Differences in the median level of saving across cohorts can be explained by differences either in the saving propensity or in resources. It is hard to disentangle the contribution of either one of these two factors.

Figure 13 plots the implied saving rates age profiles. The age profiles smoothed presented in panel B indicate that young households save substantially less, but then saving rates gradually increase, at late thirties and early forties, reaching the peak around the late fifties, and saving start to decline afterwards. These results are consistent with the life-cycle hypothesis and reaffirm the findings of the cross-sectional analysis for the period 2000-2006.

Table 7 contains estimates of β and γ in equation (3) and of the cohort dummies, obtained by median regressions. The reference group is households in rural areas, region 7, non-schooling, headed by a female, non-owning dwelling, not access to credit, not holding credit card, not receiving transfers, not receiving pension and health services, belonging to cohort 5, and not possessing financial savings.

In column (1), I condition on variables that do not vary over the life cycle: households' location (urban vs. rural and socio-economic regions), education attainment and gender of the household's head. Location has a positive effect on saving rates: the dummies for urban and regions 2, 3, 5 and 6 are very strongly significant, and the dummies for regions 1 and 4 are also significant but at lower level. This indicates that households living in urban areas save more than rural households and that households located in region 7 have lower saving rates than households located in any of the other six regions. Higher education has a positive effect on saving: the dummy for college is very strongly significant and significant different from the other educational categories. The higher saving rates for more educated households might indicate higher level of permanent income. The dummy for male households head is positive and highly significant. The pattern of the cohort dummies indicates that cohorts 2 to 4 save more than the reference group (cohort 5). This is true for all the columns in table 8. These results are consistent with the evidence presented in the previous section and illustrated by figure 12 panel B. For the cohorts dummies 6 to 13 the coefficients are not statistically significant and negative in all cases with the exception of cohort 6.

In column (2), I add five dummies to the previous specification. These dummies are time variant and might have an impact on liquidity-constrained households; they are: home ownership, access to credit, holding credit cards, remittances, and transfers. Home ownership is highly significant and positively related with median saving rates, but relatively small. The interpretation of these results is difficult because of the life cycle pattern that characterizes home ownership. These results, however, are consistent with the evidence presented in the cross-sectional analysis section. It is likely that the positive sign of the coefficients reflects a correlation with individual's permanent income. All the remaining four explanatory variables in

this group are highly significant and the size of the coefficients is also considerable. Households with access to credit, recipients of remittances, and recipients of other transfers save less whereas households holding credit cards have higher saving rates. With the exception of the dummy for credit cards, these results are also consistent with those obtained in the cross-sectional regressions section.

In column (3), I control for the effect of receiving a pension and for having financial saving. Both dummies are highly significant and have a positive effect on saving. Notice that income's definition includes income from pensions and rent income. This is relevant particularly for the last part of the life cycle when a large proportion of income is derived from these two sources. These items could be thought of a sort of decumulation of previously accumulated assets. Therefore, income will be overstated and the old will appear to be saving more than they really are.

Finally, in column (4), I add a dummy for access to health services and three demographic variables: household's size, number of earners and the number of children, defined as minors younger than 15 years old. The variable health is positive and highly significant. It is possible that households with access to health services are those with higher incomes and more educated; this correlation would be captured by the coefficient of health. While the variable household's size is not significant, the coefficient of the variable "number of earners" is positive and highly significant as expected. Not surprisingly, the number of children variable is negative and strongly significant, probably indicating that a given level of consumption will produce different levels of utility depending on the number of children present.

6. HOUSEHOLDS' SAVING, FINANCIAL LIBERALIZATION AND AGGREGATE SHOCKS

6.1 Empirical strategy

To investigate the impact of the financial sector reforms and the financial and banking crises on household saving, I employ a difference in difference approach in which households with little or no access to finance serve as my control group. The difference in difference procedure amounts to use an appropriate variable as an instrument for access to finance and interact it with a year dummy from two or more years of data that would include the policy change or the shock under study. I discuss this approach in more detail below.

Figure 6 illustrates the business cycles of the Mexican economy in the last twenty-two years. Throughout this period the country has experienced one mild, and two severe recessions, together with the processes of financial liberalization of the late 1980s and the late 1990s.

In my analysis, I relate the economic peaks and troughs and financial liberalization processes with the credit expansions and credit contractions to households.²⁸ As a result of the financial reforms, the economy has experienced two credit expansions, the first one in 1989-94 and the second one in 2002-2006. The second credit expansion (which up to 2008 was still ongoing) was driven by a boom in credit for consumption, mostly in the form of credit cards' credit (See table 1, and figure 3). The macroeconomic conditions and the sources of the credit's funds for each credit cycle were, however, very different, so households saving's behavior is

²⁸ Mendoza and Terrones (2008) present an assessment of credit cycles for both developing and developed economies. With macro data, the authors find a positive relationship between credit booms and economic expansions. Using microeconomic data Mendoza and Terrones find a strong association between credit booms and bank-level indicators of banking fragility. Also they find that credit booms in emerging economies are often preceded by large capital inflows but not by financial reforms or productivity gain

expected to be different. On one hand, most of the first credit expansion was possible because capital inflows, especially in the form of financial savings from non-residents and an increase on banks' foreign liabilities. On the other hand, the increase on credit to households, in the second credit expansion, is based in domestic financial savings. Also the role of financial intermediaries has been different. In the first episode banks were the main participants while in the most recent credit boom other financial intermediaries have taken a more active participation.

Between the two credit expansions lays the credit contraction of 1994-2002, where we can identify the 1994-95 financial crisis, followed by a recovery period with annual growth rates of above 5 percent from 1996 to 2000, and the 2001's mild recession. These sub-periods overlap with a second wave of financial reforms adopted at the end of the 1990s and beginning of 2000. Additionally, and because the earliest comparable ENIGH survey started in 1984, I study the 1986's economic crisis using the 1984 and 1989 surveys for this particular macro shock.

Based on the timing of the business and credit cycles, I pooled pairs of surveys forming six periods: 1984-1989, 1989-1992, 1994-1996, 1998-2000, 2000-2002, and 2002-2006. The second and last periods correspond to the times of both credit and economic expansions, while the first and third are recession periods accompanied with credit contractions. The 1998-2000 and the 2000-2002 are periods of economic expansion within a credit contraction environment for the former, and recession with the takeoff of the boom of credit for consumption for the latter. Table 8 summarizes the credit conditions together with the reforms and the macroeconomic environment prevailing in each period.

The effects of macro shocks and financial liberalization on households' saving decisions, *ceteris paribus*, should be stronger for households with better access to the financial system. The literature on access to finance extensively agrees that household' income, education, and wealth

are important determinants of access to financial services.²⁹ Another factor influencing access to finance may be Household's location. Households located in small communities would have considerably less or none financial services' providers. This implies that the effects of financial liberalization and negative macroeconomic shocks should be stronger for urban, more educated, high-income households.

Table 9 presents the estimates of probit regressions capturing the effects of income, education levels, and community size on the probability that households hold credit cards. For the whole period, the discrete change on the probability of a household holding a credit card increases significantly for households with higher levels of income and education, and for urban households. For example in 1989-1992, for income levels, the coefficient increases from 0.08 for the second income quartile to 0.46 for the top quartile of the income distribution. For the case of education groups, the coefficient increases from 0.07 for households with primary education to 0.56 for households with college degree. Although smaller, location's size coefficients are also highly significant.³⁰ One more example is the period 2002-2006, where the coefficient on income levels increases from 0.122 for the second quartile to 0.45 for the fourth quartile, and the coefficient on education levels increases, more than fivefold, from 0.09 for households with primary education to 0.56 for households with college degree. The same pattern is observed for the rest of the six sub-periods. These results are evidence that access to financial instruments, or more generally to the financial system, depend significantly on household's income and education level, and on whether households are located in urban or rural areas.

²⁹ For a more extensive discussion on the access determinants to financial services see for example Djankov et al. (2008) and the references therein.

³⁰ The 1984 and 1989 ENIGH surveys only differentiate rural (less than 15,000 inhabitants) and urban (with more or equal to 15,000 people) areas.

The permanent income and the life-cycle hypotheses imply that saving should be a function of income and age. Other demographic characteristics are also relevant in determining household saving behavior. Therefore, in my specification saving rates will depend on the demographic characteristics of the households, household income, real and financial wealth, transfers, and the dummy variables relating to the access to financial services. By analyzing the impact of these variables on saving rates I am seeking to answer two important questions: (i) does the saving behavior of households with better access to the financial system differ from that of households with little or no access to finance in the presence of credit contractions or credit expansions? And (ii) did the impact of the credit expansions on households saving was comparable?

These issues are investigated using the regression equations

$$S_i = \alpha_0 + \alpha_1 Dhinc_i + \alpha_2 Dyear_i + \alpha_3 (Dhinc * Dyear)_i + X_i \beta + \varepsilon_i \quad (4)$$

$$S_i = \delta_0 + \delta_1 Dedu_i + \delta_2 Dyear_i + \delta_3 (Dedu * Dyear)_i + X_i \beta + \varepsilon_i \quad (5)$$

$$S_i = \gamma_0 + \gamma_1 Durban_i + \gamma_2 Dyear_i + \gamma_3 (Durban * Dyear)_i + X_i \beta + \varepsilon_i \quad (6)$$

where S_i is the households saving rate for household i , defined as disposable income minus consumption divided by consumption. *Dhinc*, *Dedu*, and *Durban* are dummies capturing the degree of access to finance. In particular, *Dhinc* is constructed by assigning one to households in the third and fourth income quartiles (denominated as high income households), and zero otherwise.³¹ The second variable, *Dedu*, corresponds to more educated households; here I

³¹ The reason for choosing households in the two higher income quartiles as high income's households, and households with at least 12 years of schooling is because the large jump in

include households with, at least, completed high school. The variable *Durban* corresponds to households located in communities with 15,000 or more people (denominated urban communities). For each variable the base groups are low income's households (households in the first and second lower income quartiles), households with secondary or lower education, and households located in rural areas (in villages with less than 15,000 people). The interaction terms in equations (4)-(6) captures the effects of financial liberalization or economic downturns on saving for households with good access to finance³².

6.1.1 Difference in Differences estimator

In recent years, the difference in difference approach has been used extensively to estimate behavioral responses to changes in policy, for example tax policy. In most cases the sample population is divided into those affected by the policy (the treatment group) and those who are not (the control group). In order to control for systematic differences between the control and the treatment group we need two years of data, one before the policy change and one after the change. The first difference is over time, and it reflects changes in the behavior within each group. The second difference is the difference in the first differences, which reflects how the behavior of those affected by the policy is modified relative to those who were not affected.

Let C be the control group, in this exercise the control group corresponds to households with not access to finance, and T the treatment group—households with access to finance. Let dT

probability of holding credit cards between the second and third income quartiles, and between households with secondary and high school education for all periods.

³² It is true that other economic events, which channel transmission was not the financial sector, could have affected households saving rates. These events, however, would have a different impact on all households regardless of their access to financial services. Therefore, the impact of macroeconomic events not correlated with the financial sector on households saving rates can be identified throughout the year dummies included in the regressions.

be a dummy equal to one for households with access to finance (the treatment group T) and zero otherwise. Let d_2 be a dummy variable for the second (post-policy change) time period, the equation of interest is:

$$y = \beta_0 + \delta_0 d_2 + \beta_1 dT + \delta_1 d_2 dT + \text{otherfactors} \quad (7)$$

where y is the outcome variable of interest (saving rates). Without other factors in the regression,

$\hat{\delta}_1$ will be the difference-in-differences estimator:

$$\hat{\delta}_1 = (\bar{y}_{2,T} - \bar{y}_{2,C}) - (\bar{y}_{1,T} - \bar{y}_{1,C}), \quad (8)$$

Where the bar denotes average, the first subscript denotes the year, and the second subscript denotes the group. When explanatory variables are added to equation (8) (to control for the fact that the populations sampled may differ systematically over the two periods), the OLS estimate of δ_1 no longer has the form of (8), but its interpretation is similar.

6.2 Results

The results obtained from estimating equations (4) - (6) for the six periods are presented in tables 10-16. Each table displays the results pertaining to each macroeconomic shock and includes the three proxies for accessibility to formal finance, i.e. high income, more educated, urban households.

6.2.1 Period 1984-1989 Credit contraction, crisis and recession.

As table 10 shows, for 1984-1989, the interaction coefficient between the 1989 dummy and the high-income dummy (*Dyear89xhinc*) is both economic and statistically significant and with the expected positive sign. This result is consistent with those obtained for the interaction coefficients between the year dummy and the high schooling dummy (*Dyea89xedu*), and

between the year dummy and urban dummy (*Dyea89rxurban*). High income households, more educated households, and urban households increased their saving rates by 6.0, 7.0, and 5.4 percentage points respectively. These results constitute evidence indicating that households with better access to financial services increased their saving rates during the period encompassing the 1985-1986's economic crisis.

Given the complicated macroeconomic environment prevalent in Mexico for most of the 1980s, these conclusions should be taken with caution. Subsequent to the 1982's debt crisis, from 1984 to mid-1985, the country experienced a short period of positive growth. Then in the second half of 1985 and in 1986 a pronounced decline in the international prices of oil or "the oil shock" caused another balance of payments crisis where growth slowed and inflation accelerated. From 1986 to the end of 1988 the country experienced hyperinflationary rates and negative real interest. The financial sector consisted of the nationalized banks, which favored lending to governmental entities over private business or consumers. Within this complicated scenario, it is hard to disentangle the specific causes of the increase in saving rates of urban households with higher income and better educated. But the credit contraction and the drop of income growth still might be considered as important factors influencing households' saving behavior.

6.2.2 Period 1989-1992: financial liberalization and credit expansion

This was a period of credit expansion. For example the accumulated growth rate of credit for consumption was more than 174 percent in 1992 with respect to 1989 (see table 1). The credit expansion was driven by the financial liberalization undertaken in the late 1980s and the flow of external funds that followed. More availability of credit should have greater impact on saving

rates for households with better access to finance. In this case these households would reduce their saving rates.

The regressions' results presented in table 11 show that, indeed, the coefficients of the interaction between the 1992 dummy and the high-income dummy, and the interaction term of year and urban dummies respectively have the expected negative sign. Even though the *y92xDedu* was positive, it was not significant. The estimate for *y92xDurban* shows that urban households saved 5.3 percentage points less than rural households at one percent level of significance. These results indicate that financial liberalization decreased saving rates for high income, urban households but not for more educated households.

6.2.3 Period 1994-1996: credit contraction and crises

The results presented in table 12 show that the coefficients for the interaction between the 1996 year dummy and the three proxies for accessibility to financial resources are highly significant and with the expected positive sign. High income households save almost 4 percentage points more when facing the credit contraction and crisis. While more educated households increased their saving rates by almost 6 percentage points, urban households increased their saving rates by 2.5 percentage points. Notice that the peso crisis had an extremely widespread impact, lowering income and consumption for all age groups and education levels. McKenzie (2003) documented, however, that less-educated, rural households experienced the smallest drops in income compared with urban households with highly educated household heads, and households' members working in financial services and construction suffered the greatest declines. This differential in income drop would be exerting a downward bias over the estimates

strengthening the conclusion: that, once again, these results constitute evidence that the effects of credit contraction are of first order for households with better access to finance.

6.2.4 Period 1998-2000: financial reforms, credit contraction, and positive growth.

In the aftermath of the peso crises, the Mexican economy managed to recover relatively fast. The country restarted, at the end of 1996, its positive economic growth—an expansion that lasted until 2001. The driving force behind this swift recovery was the exports sector. In contrast, the financial sector was in disarray, with a massive banking crisis that forced the government to intervene by rescuing the ailing banks. It was a period of mergers, acquisitions, liquidations and profound changes of the regulatory framework of the financial system. Furthermore, at the end of 1997 a large pension reform started to be implemented. As table 1 indicates, however, the credit contraction persisted with an increasing negative real growth rate of credit. The scarcity of credit was acute for all types of credit until 2000 when the growth rates of consumption's credit entered into positive territory fostered mainly by credit cards' credit.

One can argue that it takes time for the financial and pension reforms to exert a positive impact on the availability of credit, and consequently to have any impact on households' saving behavior. But under a scenario of an expanding economy, at average rates of 5 percent during this period, and the positive impact of the reforms on people's expectations, it is reasonable to anticipate a decrease of saving rates for households with better access to finance. These are the results for the estimates of the interaction terms between the year 2000's dummy and high income and urban households presented in table 13. Although the latter is not significant and smaller, the former is significant at 1 percent level indicating an increase of 3.9 percentage

points on the saving rates for high income households. More educated households decreased their saving rates by 2.5 percentage points but with weaker level of significance.

6.2.5 Period 2000-2002: mild recession in 2001

In this period the accumulated growth rate of total credit was still negative as table 1 illustrates. Although the scarcity of credit was acute, especially for mortgage credit and credit for firms, banks restarted lending activity in 2000. Since then, credit for consumption and in particular credit for credit cards has experienced an explosive growth (see table 1). Another important feature in this period is that in 2001 the Mexican economy experienced a mild recession due to its large dependency on the exporting sector, which was heavily hit by the US recession.

Given these conditions, we have a combination of offsetting forces affecting simultaneously households' saving rates. On one hand the positive effects of the financial reforms and the re-starting of banking lending for consumption, and on the other hand, the contraction of the economy. Hence these results should be taken with caution. According with the results presented in table 14, urban and high income households' reaction to the situation described above was to decrease their saving rate by 3.1 and 0.8 percentage points respectively. While the estimate for urban households is highly significant, the one for high income is not. The interaction term when more educated households are used indicates an opposite effect, i.e. more educated households increased their saving rates by 2.6 percentage points but this estimate is significant at 10 percent level, however.

6.2.5 Period 2002-2006: credit expansion (especially credit for consumption)

It was until 2006 that the growth rate of credit started to be positive again (see table 1). Although bank lending was lower in real terms, credit across loans types was unequally affected. Total and mortgage credit steadily declined, but consumer lending expanded dramatically, fueled mainly by a booming in credit card lending (see figure 3). On the real side, in 2002, however, the economy started to recuperate, showing a positive, albeit small, growth rate. The economic expansion lasted for the rest of the studied period and beyond. In the absence of crises and with economic and credit expansion, it is expected a relaxation of liquidity constraints, especially for households with better access to finance.

Table 15 presents the results of the regressions for this period. Urban and high-income households increased their saving rates by 2.9 and 1.9 percentage points. In contrast, more educated households drop their saving rates by 3.1 percentage points. These estimates are significant at one percent. It is hard to rationalize the opposite response of urban and high income households on one hand and more educated households on the other hand to saving behavior under the same benign economic and credit conditions. A plausible explanation is that education level can be viewed as a proxy for permanent income. In this period more educated households did not experience negative transitory shocks. Hence, the relaxation of liquidity constraints for this group of households allowed them to smooth consumption by consuming more and reducing their saving rate.

7. CONCLUSIONS

Using microeconomic data from households' surveys, I characterize households saving behavior in Mexico during 1984-2006. Both the country and the time span constitute elements of great interest if one is looking to understand how households saving are impacted by structural macroeconomic reforms, financial liberalization, and negative macroeconomic shocks such as economic and banking crisis in an important emerging market economy. The analysis is conducted under the framework of the life-cycle hypothesis, and it incorporates the role of liquidity constraints.

The contribution of this paper is in various dimensions. First, it extends the study of households saving patterns in Mexico ten more years beyond the studies of Villagomez and Zamudio (2000), Attanasio and Székely (2000), and some other authors who use the same data but only up to the 1996 survey.

Second, using cross-sectional analysis and synthetic panel methods, the paper analyses whether the drop in households saving rates was induced by changes in demographics and tastes, and to what extent this change in saving behavior was influenced by the financial liberalization, and the incidence of credit cycles and economic crises. The results from the median regressions for each cross-section (survey) indicate that in the period of 1984-1998 households exhibit a U-shaped age profile. This is inconsistent with the life-cycle hypothesis and more in line with precautionary motives for older households and the presence of liquidity constraints for younger households. The analysis also reveals that after 1998 in the period 2000-2006 the age profiles exhibit the typical inverted U-shape, which is what the LCH predicts. This change is important and could partially be attributed to a more stable macroeconomic environment and to an improved financial system.

The effects of income on saving rates are consistent with previous results reported in the literature where it has been shown to be positively correlated with saving rates. In general, the results obtained with the cross-sectional analysis are consistent with those obtained using synthetic panel methods. However, the former technique allows identifying cohort effects. The paper presents evidence of the role of liquidity constraints on households saving. Variables relaxing liquidity constraints such as access to credit, holding of credit cards, remittances and other transfers, are found to be negatively related with households saving.

Third, this exercise offers evidence on the impact of macroeconomic reforms, in the form of financial liberalization and other financial reforms, financial crises and the credit cycles on households saving behavior. The impact of positive or negative macroeconomic shocks channeled towards the credit cycles are greater for households with better access to formal finance, namely high income, more educated, urban households.

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Table 1

Accumulated real growth rate of credit during selected periods

	Total credit	Mortgage	Consumption's credit	Credit cards' credit
Base year 1989 ¹				
1989-1990	27.00	15.40	74.70	n.a
1989-1991	55.40	16.10	176.30	n.a
1989-1992	92.40	239.50	174.00	n.a
1989-1993	118.30	358.60	154.70	n.a
1989-1994	188.10	478.90	155.40	n.a
Base year 1994				
1994-1995	-12.89	13.94	-38.92	-40.07
1994-1996	-26.35	12.53	-60.90	-62.78
1994-1997	-34.57	5.86	-68.64	-69.65
1994-1998	-41.76	-3.25	-74.11	-75.12
1994-1999	-45.87	-19.18	-74.76	-74.68
1994-2000	-52.52	-38.90	-70.86	-70.20
Base year 2000				
2000-2001	-12.41	-20.80	25.64	21.94
2000-2002	-11.25	-29.85	65.00	49.34
2000-2003	-14.05	-41.17	130.33	85.21
2000-2004	-14.09	-43.43	226.01	164.07
2000-2005	-4.21	-29.37	382.78	321.75
2000-2006	10.14	-8.57	565.35	511.68

Source: Banco de Mexico

¹Figures using the base year 1989 were taken from Aportella (2001)
ear 1989 were taken from Aportella (2001)

Table 2
Table of means, medians, and rates of selected variables, ENIGHs 1984-2006.

Year	Obs	Income ¹	Consum ¹	Saving ¹	Income ²	Consum ²	Saving ²	SR1 ³		SR2 ⁴		Head age	Size	Education Indicator	# children	# inc recipients
								Mean	Median	Mean	Median					
1984	4320	17453.91	15178.5	2275.41	12303.45	11183.13	894.03	6.92	9.23	36.19	10.16	44.46	5.03	2.02	2.06	1.6
1989	10541	20783.07	16420.16	4362.757	13372.24	11639.59	1208.03	8.19	12.5	38.39	14.24	45.27	4.94	2.44	1.83	1.73
1992	9601	20063.97	16105.16	3958.82	12490.38	10980.34	925.15	7.72	10.5	40.00	11.72	44.39	4.81	2.32	1.85	1.68
1994	11644	20030.23	16609.69	3420.542	12388.31	11221.90	771.33	5.34	8.96	27.58	9.84	45.05	4.70	2.39	1.68	1.77
1996	12919	14928.05	13067.76	1860.298	9553.71	9338.08	158.02	-0.22	2.42	17.51	2.48	45.04	4.61	2.57	1.59	1.81
1998	9831	16924.83	14067.93	2856.904	10409.02	9802.20	429.97	3.23	6.21	25.24	6.21	45.52	4.36	2.71	1.53	1.84
2000	9643	22407.12	19158.5	3248.624	14855.58	13830.57	775.35	4.54	6.72	15.41	7.23	46.47	4.18	2.80	1.26	1.95
2002	16397	22945.28	19965.61	2979.666	15952.3	14326.34	1083.73	6.37	8.63	18.04	9.45	46.87	4.21	2.80	1.41	2.05
2004	21934	28436.53	24561.01	3875.512	18730.98	16970.3	1191.37	4.76	8.01	17.62	8.71	46.83	4.04	3.20	1.29	2.05
2006	19277	28467.1	24798.42	3668.675	19703.01	17757.15	1311.30	4.60	7.83	17.33	8.50	46.85	3.94	3.16	1.22	2.19

Notes: Means and medians of income, expenditures and savings are in 2002 Mexican pesos.

Computations effected after eliminating extreme values. Saving rates values are restricted to -100 and 100 percent.

¹Means

²Medians

³SR1=Y-C/Y

⁴SR2=Y-C/C

Table 3
Cohorts definitions and cell sizes by head of household

Cohort	Year of Birth	Average Cell Size											Total	Percentage	
			1984	1989	1992	1994	1996	1998	2000	2002	2004	2006			
1	1980-1984	304	—	—	—	—	—	—	—	—	—	—	538	538	<i>0.51</i>
2	1975-1979	922	—	—	—	—	—	—	—	148	755	1811	1847	4561	<i>4.31</i>
3	1970-1974	757	—	—	—	—	501	804	940	1707	2699	2445	9096	9096	<i>8.59</i>
4	1965-1969	1145	—	—	638	1237	1651	1250	1197	2111	2940	2460	13484	13484	<i>12.74</i>
5	1960-1964	1920	—	1214	1361	1591	1858	1401	1305	2252	2835	2465	16282	16282	<i>15.38</i>
6	1955-1959	1648	523	1401	1347	1640	1724	1318	1140	1778	2503	2080	15454	15454	<i>14.60</i>
7	1950-1954	1502	574	1441	1301	1414	1564	1167	1045	1866	2158	1869	14399	14399	<i>13.60</i>
8	1945-1949	1236	526	1262	980	1246	1327	957	821	1415	1734	1463	11731	11731	<i>11.08</i>
9	1940-1944	994	531	1107	952	1098	1109	793	788	1215	1558	696	9847	9847	<i>9.30</i>
10	1935-1939	700	455	1079	721	933	945	630	452	381	—	—	5596	5596	<i>5.29</i>
11	1930-1934	551	388	840	667	859	424	129	—	—	—	—	3307	3307	<i>3.12</i>
12	1925-1929	360	347	723	182	—	—	—	—	—	—	—	1252	1252	<i>1.18</i>
13	1920-1924	304	304	—	—	—	—	—	—	—	—	—	304	304	<i>0.29</i>
	Total		3648	9067	8149	10018	11103	8449	7836	13480	18238	15863	105851		
	Percentage		3.45	8.57	7.70	9.46	10.49	7.98	7.40	12.73	17.23	14.99	100	100	

Table 4

Cohorts saving rates
(Median values)

Year of Birth	Cohort	1984	1989	1992	1994	1996	1998	2000	2002	2004	2006
1980-1984	1	—	—	—	—	—	—	—	—	—	2.98
1975-1979	2	—	—	—	—	—	—	10.15	6.40	4.64	4.46
1970-1974	3	—	—	—	—	-3.05	2.79	2.88	6.04	4.22	3.73
1965-1969	4	—	—	6.82	2.43	-1.46	-2.20	4.47	5.99	4.33	4.11
1960-1964	5	—	9.79	2.88	3.59	-4.88	-0.52	5.29	7.71	6.34	7.76
1955-1959	6	3.37	5.53	3.09	3.30	-2.69	0.95	5.65	8.49	8.75	9.56
1950-1954	7	2.09	7.17	4.30	4.30	-0.89	4.67	7.33	10.23	8.76	10.69
1945-1949	8	5.13	4.80	8.65	7.42	1.77	4.37	10.78	10.61	10.34	11.60
1940-1944	9	6.46	11.45	8.88	10.36	4.29	9.61	8.49	11.62	11.22	10.49
1935-1939	10	6.46	10.43	15.32	11.06	5.41	10.46	7.87	10.00	—	—
1930-1934	11	8.52	11.94	16.48	11.24	3.20	7.95	—	—	—	—
1925-1929	12	7.70	17.48	12.54	9.75	—	—	—	—	—	—
1920-1924	15	17.95									

Table 5

Median regressions of saving determinants 1984-2006 Dependent variable: $S1=S/Y= \text{Income-Consumption/Income}$

Coefficient	1984	1989	1992	1994	1996
Linc	0.140*** (0.021)	0.197*** (0.016)	0.206*** (0.013)	0.143*** (0.014)	0.201*** 0.014
age	-0.001 (0.005)	-0.004 (0.003)	0.000 (0.003)	-0.004 (0.003)	0.003 (0.003)
age squared	0.000* (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)
Linc_age	0.000 (0.000)	0.000 (0.000)	-0.001 (0.000)	0.000 (0.000)	-0.001 (0.000)
Durban	-0.067*** (0.013)	-0.079*** (0.012)	-0.144*** (0.010)	-0.057*** (0.011)	-0.060*** (0.009)
Dcredit	0.007 (0.021)	-0.215*** (0.018)	-0.115*** (0.013)	-0.196*** (0.015)	-0.193*** (0.013)
Dccard	-0.013 (0.030)	-0.152*** (0.018)	-0.021 (0.015)	-0.099*** (0.015)	0.113*** (0.021)
Dremit	0.054 (0.035)	-0.050** (0.025)	-0.170*** (0.021)	-0.163*** (0.025)	-0.061*** (0.016)
wealth	-0.045*** (0.003)	-0.062** (0.017)	-0.455*** (0.017)	-0.373*** (0.014)	-0.004*** (0.000)
Down	0.011 (0.012)	0.037*** (0.010)	0.023*** (0.009)	0.032*** (0.009)	0.025*** (0.009)
Dtransfers	-0.047*** (0.017)	-0.070*** (0.015)	-0.065 0.012	-0.052*** (0.012)	-0.016 (0.010)
Djub	-0.050 (0.032)	0.017 (0.022)	0.052*** (0.020)	0.053*** (0.018)	0.040** (0.017)
Dhealth	-0.029** (0.013)	-0.063*** (0.009)	-0.033*** (0.009)	-0.004 (0.009)	0.008 (0.008)
size	-0.015*** (0.005)	-0.013*** (0.004)	-0.015*** (0.004)	-0.019*** (0.004)	-0.021*** (0.004)
Dmale	0.004 (0.016)	-0.005 (0.013)	0.006 (0.011)	0.014 (0.011)	0.002 (0.010)
# earners	0.012 (0.008)	0.027*** (0.006)	0.019*** (0.005)	0.017*** (0.006)	0.023*** (0.005)
# children	-0.005 (0.006)	-0.004 (0.005)	-0.001 (0.004)	-0.001 (0.005)	0.008* (0.005)
education	-0.050*** (0.009)	-0.017** (0.008)	-0.021*** (0.006)	-0.023*** (0.006)	-0.030*** (0.006)
education squared	0.002** (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.002 (0.001)
constant	-1.012*** (0.206)	-1.515*** (0.153)	-1.560 (0.124)	-1.151*** (0.133)	-1.623 (0.126)
N	4320	11644	9601	11644	12919
Pseudo R-square	0.0702	0.0898	0.1244	0.1139	0.1021

Table 5 (Cont')

Median regressions of saving determinants 1984-2006 . Dependent variable: $S/Y = \text{Income-Consumption/Income}$

Coefficient	1998	2000	2002	2004	2006
Linc	0.196*** (0.015)	0.132 (0.016)	0.142*** (0.009)	0.149 (0.013)	0.159*** (0.014)
age	0.002 (0.003)	0.004 (0.003)	0.006*** (0.002)	0.001 (0.003)	0.006 (0.003)
age squared	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Linc_age	-0.001*** (0.000)	0.000 (0.000)	-0.001*** (0.000)	0.000 (0.000)	-0.001** (0.000)
Durban	-0.071*** (0.011)	-0.007 (0.010)	-0.052*** (0.006)	-0.050*** (0.010)	-0.028*** (0.009)
Dcredit	-0.083*** (0.016)	-0.058*** (0.016)	-0.090*** (0.007)	-0.110*** (0.012)	-0.067*** (0.011)
Dccard	-0.110*** (0.020)	-0.075*** (0.023)	-0.058*** (0.011)	-0.050*** (0.011)	-0.099*** (0.009)
Dremit	-0.111*** (0.020)	-0.053*** (0.017)	-0.056*** (0.009)	-0.050 (0.014)	-0.025*** (0.014)
wealth	-0.522*** 0.019	-0.629*** (0.014)	-0.521*** 0.009	-0.428*** (0.014)	-0.498*** (0.018)
Down	0.025*** (0.010)	0.002** (0.001)	-0.012** (0.005)	-0.008 (0.008)	-0.002 (0.005)
Dtransfers	-0.037*** (0.012)	-0.017* (0.010)	-0.027*** (0.005)	-0.036*** (0.008)	-0.034*** (0.008)
Djub	0.025** (0.018)	-0.007 (0.018)	0.038*** (0.009)	0.034*** (0.012)	0.027** (0.012)
Dhealth	0.005 (0.009)	0.017* (0.010)	0.023*** (0.005)	0.014** (0.007)	0.018** (0.007)
size	-0.024*** (0.004)	-0.016*** (0.004)	-0.009*** (0.002)	-0.001 (0.004)	-0.010*** (0.003)
Dmale	0.007 (0.011)	0.034*** (0.011)	0.026*** (0.005)	0.014 (0.008)	0.012*** (0.007)
# earners	0.028*** (0.006)	0.020 (0.005)	0.019*** (0.002)	0.020 (0.004)	0.022*** (0.004)
# children	0.006 (0.005)	0.010 (0.006)	-0.005** (0.003)	-0.014 (0.004)	-0.010** (0.004)
education	-0.028*** (0.007)	-0.013 (0.007)	-0.030*** (0.003)	-0.019 (0.006)	-0.009 (0.006)
education squared	0.001* (0.001)	0.000 (0.001)	0.002*** (0.000)	-0.001 (0.001)	-0.001* (0.001)
constant	-1.535*** (0.137)	-1.284 (0.159)	-1.237*** (0.088)	-1.296 (0.125)	-1.494*** (0.137)
N	9831	9643	16397	21934	19277
Pseudo R-square	0.1359	0.1315	0.1021	0.1085	0.1224

Notes: ***, **, and * denote significance at 1%, 5% and 10% respectively. Standard errors are in parentheses. Regressions include dummies for seven socio-economic regions.

Table 6
Median regressions of saving determinants 1984-2006. Dependent variable: $S/C = \text{Income-Consumption}/\text{Consumption}$

Coefficient	1984	1989	1992	1994	1996
Linc	0.174*** (0.014)	0.216*** (0.019)	0.222*** (0.023)	0.154*** (0.021)	0.174*** (0.016)
age	-0.004 (0.003)	-0.013*** (0.004)	-0.010** (0.005)	-0.010*** (0.004)	0.000 (0.003)
age squared	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Linc_age	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001** (0.000)
Durban	-0.094*** (0.009)	-0.099*** (0.015)	-0.179*** 0.018	-0.079*** (0.016)	-0.054*** 0.010
Dcredit	0.010 (0.014)	-0.183*** (0.021)	-0.110*** (0.023)	-0.150*** (0.023)	-0.152*** 0.015
Dccard	-0.014 (0.020)	-0.189*** (0.021)	-0.004 (0.027)	-0.110*** (0.022)	0.037 0.024
Dremit	0.099*** (0.024)	-0.088** (0.031)	-0.205*** (0.038)	-0.195*** (0.038)	-0.075*** 0.019
wealth	-0.051*** (0.002)	-0.050** (0.020)	-0.545*** (0.031)	-0.456*** (0.021)	-0.018 (0.000)
Down	0.024*** (0.008)	0.050*** (0.012)	0.028* (0.016)	0.048*** (0.014)	0.021** (0.010)
Dtransfers	-0.059*** (0.012)	-0.090*** (0.017)	-0.084*** (0.021)	-0.046*** (0.018)	-0.022* (0.012)
Djub	-0.011 (0.022)	0.035 0.026	0.059* (0.035)	0.035 0.027	0.042** (0.020)
Dhealth	-0.055*** (0.007)	-0.082*** (0.011)	-0.052*** (0.015)	-0.006 (0.013)	0.006 (0.010)
size	-0.02*** (0.003)	-0.020*** (0.005)	-0.025*** (0.006)	-0.026*** (0.006)	-0.023*** (0.004)
Dmale	0.000 (0.011)	-0.009 (0.015)	0.010 (0.019)	0.031* (0.017)	0.010 (0.012)
# earners	0.005 (0.006)	0.045*** (0.007)	0.022** (0.010)	0.023*** (0.008)	0.031*** (0.006)
# children	-0.002 (0.004)	-0.000 (0.006)	0.004 (0.008)	-0.002 (0.007)	0.009* (0.005)
education	-0.053*** (0.006)	-0.032*** (0.009)	-0.027*** (0.011)	-0.034*** (0.009)	-0.032*** (0.007)
education squared	0.002*** (0.001)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002** (0.001)
constant	-1.209*** (0.138)	-1.570*** (0.179)	-1.570*** (0.222)	-1.201*** (0.202)	-1.386*** (0.146)
N	4320	10541	9601	11644	16397
Pseudo R-square	0.0426	0.0635	0.0921	0.0897	0.0920

Table 6 (Cont')

Median regressions of saving determinants 1984-2006. Dependent variable: $S/C = \text{Income-Consumption}/\text{Consumption}$

Coefficient	1998	2000	2002	2004	2006
Linc	0.200*** (0.016)	0.152 (0.014)	0.174*** (0.016)	0.164 (0.015)	0.192*** (0.012)
age	-0.011*** (0.003)	0.003 (0.003)	0.008*** (0.003)	-0.002 (0.003)	0.006*** (0.002)
age squared	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Linc_age	0.000 (0.000)	0.000 (0.000)	-0.001*** (0.000)	0.000 (0.000)	-0.000** (0.000)
Durban	-0.083*** (0.012)	-0.015*** (0.009)	-0.068*** (0.010)	-0.055*** (0.011)	-0.040*** (0.008)
Dcredit	-0.043* (0.017)	-0.037*** (0.014)	-0.086*** (0.012)	-0.102*** (0.014)	-0.056*** (0.009)
Dccard	-0.124*** (0.020)	-0.084*** (0.020)	-0.078*** (0.021)	-0.058*** (0.013)	-0.122*** (0.012)
Dremit	-0.112*** (0.023)	-0.066*** (0.014)	-0.066*** (0.016)	-0.070*** (0.016)	-0.036** (0.012)
Dwealth	0.708*** (0.021)	0.880*** (0.012)	0.656*** (0.017)	0.578*** (0.016)	0.634*** (0.016)
Down	0.031*** (0.010)	0.003*** (0.001)	-0.015* (0.009)	-0.008 (0.009)	-0.002 (0.004)
Dtransfers	-0.034*** (0.012)	-0.019 (0.009)	-0.032*** (0.010)	-0.035*** (0.010)	-0.043** (0.007)
Djub	-0.001 (0.021)	-0.013 (0.015)	0.044*** (0.016)	0.044 (0.014)	0.026*** (0.011)
Dhealth	-0.017* (0.010)	0.015 (0.008)	0.023*** (0.009)	0.017 (0.008)	0.014*** (0.006)
size	-0.033*** (0.010)	-0.018*** (0.004)	-0.012*** (0.004)	0.000 (0.004)	-0.014*** (0.003)
Dmale	0.013 (0.012)	0.042*** (0.009)	0.030*** (0.010)	0.014 (0.009)	0.017*** (0.007)
# earners	0.030*** (0.006)	0.023 (0.005)	0.021*** (0.004)	0.026 (0.004)	0.028*** (0.003)
# children	0.016*** (0.005)	0.009 (0.005)	-0.006 (0.005)	-0.019 (0.005)	-0.010*** (0.004)
education	-0.040*** (0.008)	-0.018 (0.006)	-0.034*** (0.006)	-0.028 (0.007)	-0.015*** (0.005)
education squared	0.003 (0.001)	0.000 (0.001)	0.002*** (0.000)	0.000 (0.001)	-0.001 (0.001)
constant	-1.401*** (0.154)	-1.422*** (0.137)	-1.520*** (0.159)	-1.408*** (0.146)	-1.777*** (0.121)
N	9831	10541	16397	21934	19277
Pseudo R-square	0.1093	0.0635	0.0920	0.0994	0.1127

See notes on table 6.

Table 7
Saving rate median regressions. Dependent Variable S/Y

Variable	(1)	(2)	(3)	(4)
Urban	0.024*** (0.004)	0.014*** (0.004)	0.011*** (0.004)	-0.003 (0.004)
Region 1	0.002** (0.006)	0.013** (0.006)	0.012* (0.007)	0.018*** (0.007)
Region 2	0.017*** (0.005)	0.025*** (0.005)	0.024*** (0.006)	0.024*** (0.006)
Region 3	0.041*** (0.006)	0.051*** (0.006)	0.051*** (0.007)	0.046*** (0.006)
Region 4	0.012* (0.005)	0.017*** (0.005)	0.017*** (0.006)	0.013*** (0.006)
Region 5	0.091*** (0.006)	0.096*** (0.005)	0.092*** (0.006)	0.090*** (0.006)
Region 6	0.056*** (0.006)	0.067*** (0.005)	0.066*** (0.006)	0.056*** (0.006)
Primary	-0.009* (0.005)	-0.004 (0.005)	-0.009* (0.006)	-0.013** (0.005)
Lower Secondary	-0.005 (0.006)	-0.002 (0.006)	-0.009 (0.007)	-0.009 (0.007)
High School	0.014* (0.007)	0.016** (0.007)	0.008 (0.008)	-0.003 (0.008)
College	0.059*** (0.007)	0.047*** (0.007)	0.035*** (0.008)	0.034*** (0.008)
Male	0.038*** (0.004)	0.032*** (0.004)	0.031*** (0.004)	0.023*** (0.004)
Home owner		0.004*** (0.001)	0.004** (0.002)	0.004** (0.002)
Dcredit		-0.172*** (0.005)	-0.162*** (0.006)	-0.162*** (0.005)
Dccard		0.058*** (0.005)	0.036*** (0.006)	0.020*** (0.006)
Dremit		-0.022*** (0.007)	-0.026*** (0.008)	-0.034*** (0.008)
Transfers		-0.032*** (0.003)	-0.043*** (0.004)	-0.074*** (0.004)
Pensioner			0.052*** (0.009)	0.074*** (0.009)
Financial saving			0.165*** (0.001)	0.164*** (0.001)
Health				0.039*** (0.004)
Household size				-0.002 (0.002)
Earners				0.048*** (0.002)
Children aged < 15				-0.012*** (0.002)

Table 7 (Cont')

Cohort 1	0.003 (0.029)	0.007 (0.027)	0.011 (0.032)	0.019 (0.030)
Cohort 2	0.035** (0.017)	0.034* (0.016)	0.040** (0.019)	0.044** (0.018)
Cohort 3	0.031** (0.012)	0.024* (0.011)	0.028** (0.013)	0.033*** (0.013)
Cohort 4	0.018** (0.008)	0.021*** (0.007)	0.024*** (0.008)	0.028*** (0.008)
Cohort 6	0.009 (0.007)	0.008 (0.007)	0.004 (0.008)	0.010 (0.008)
Cohort 7	-0.007 (0.012)	-0.006 (0.011)	-0.013 (0.013)	-0.002 (0.012)
Cohort 8	-0.013 (0.016)	-0.013 (0.015)	-0.015 (0.017)	-0.005 (0.017)
Cohort 9	-0.011 (0.021)	-0.006 (0.019)	-0.013 (0.023)	-0.004 (0.022)
Cohort 10	-0.022 (0.026)	-0.021 (0.024)	-0.025 (0.028)	-0.015 (0.027)
Cohort 11	-0.007 (0.031)	0.000 (0.028)	-0.013 (0.034)	-0.008 (0.032)
Cohort 12	-0.029 (0.038)	-0.026 (0.034)	-0.035 (0.041)	-0.038 (0.039)
Cohort 13	0.070 (0.047)	0.104 (0.043)	0.091* (0.051)	0.074 (0.049)

Notes: The regressions also include a fifth order polynomial in age and year dummies constrained to sum to zero and be orthogonal to a linear trend. Standard errors are in parentheses. The regression uses 105, 851 observations.

Table 8

Timing of credit and business cycles, and financial liberalization 1984-2006

Period	Credit Expansion & Financial liberalization	Credit Contraction		Credit Expansion & Financial reforms	
	Economic expansion	Crisis and recession	Economic expansion	Economic expansion	Recession
1984-1989		X			
1989-1992	X				
1994-1996		X			
1998-2000			X		
2000-2002					X
2002-2006				X	

Table 9

Probit regressions of access to credit indicators

	1984-1989	1989-1992	1994-1996	1998-2000	2000-2002	2002-2006
Panel A						
Income Dummies						
2 nd Income quartile	0.036 (0.018)	0.079 (0.021)	0.051 (0.015)	0.022 (0.013)	0.039 (0.013)	0.122 (0.014)
3 rd Income quartile	0.140 (0.028)	0.196 (0.027)	0.127 (0.019)	0.076 (0.016)	0.071 (0.015)	0.228 (0.015)
4 th Income quartile	0.336 (0.040)	0.457 (0.034)	0.394 (0.025)	0.239 (0.025)	0.258 (0.026)	0.450 (0.016)
Observations	12029	16242	19887	15730	20984	36674
Chi-Square	385.80	730.85	1203.81	494.07	582.60	1718.55
Panel B						
Education						
Primary	0.034 (0.013)	0.070 (0.016)	0.059 (0.015)	0.028 (0.011)	0.047 (0.014)	0.094 (0.012)
Secondary	0.155 (0.042)	0.251 (0.041)	0.191 (0.033)	0.108 (0.025)	0.139 (0.032)	0.232 (0.018)
High school	0.294 (0.060)	0.403 (0.054)	0.340 (0.046)	0.166 (0.036)	0.233 (0.050)	0.358 (0.025)
College	0.471 (0.062)	0.582 (0.041)	0.593 (0.041)	0.383 (0.045)	0.451 (0.055)	0.557 (0.023)
Observations	12029	16242	19887	15730	20984	35674
Chi-Square	418.16	665.13	986.14	580.09	502.43	1496.90
Panel C						
Location's size						
more or equal to 2,500			0.034	0.013	0.017	0.034
between 2,500 & 14,999			(0.018)	(0.016)	(0.017)	(0.017)
between 15,000 & 99,999	0.083 (0.006)	0.125 (0.005)	0.157 (0.023)	0.063 (0.022)	0.063 (0.022)	0.132 (0.018)
100,000 or more			(0.008)	(0.009)	(0.011)	(0.010)
Observations	12029	16242	19887	15730	20984	35674
Chi-Square	118.45	576.53	579.09	170.48	147.07	493.46

Notes: Dependent variable equal to one if household holds a credit card. The coefficients represent the discrete change on the probability of households hold credit cards. The regressions include a constant and the dummies for income and education levels and location only. Robust standard errors are in parentheses. A weighing factor was used in the regressions.

Table 10 Effects of credit contraction, economic crisis, and recession on households' saving rate 1984-1989

	High income	Highly educated	Urban
Linc	0.125 (0.021)	0.139 (0.023)	0.153 (0.020)
Age	-0.016 (0.005)	-0.017 (0.006)	-0.017 (0.005)
Male	0.004 (0.012)	-0.012 (0.014)	0.005 (0.012)
Home owners	0.027 (0.009)	0.040 (0.010)	0.031 (0.009)
Dremit	-0.031 (0.025)	-0.030 (0.030)	0.006 (0.027)
Dcredit	-0.111 (0.017)	-0.099 (0.019)	-0.090 (0.016)
Wealth	-0.034 (0.004)	-0.036 (0.005)	-0.031 (0.004)
Health	-0.054 (0.009)	-0.060 (0.010)	-0.053 (0.009)
Pensioner	0.012 (0.024)	-0.011 (0.027)	0.015 (0.023)
Size	-0.012 (0.003)	-0.013 (0.004)	-0.012 (0.003)
Earners	0.023 (0.005)	0.030 (0.006)	0.025 (0.005)
Child <15 yo	-0.002 (0.004)	0.002 (0.005)	-0.002 (0.004)
Dtransfers	-0.070 (0.014)	-0.078 (0.017)	-0.072 (0.014)
Dyear89	0.002 (0.011)	0.014 (0.010)	-0.012 (0.013)
Dhinc	0.020 (0.016)		
Dyear89xhinc	0.060*** (0.016)		
Dedu		-0.137 (0.026)	
Dyear89xedu		0.070** (0.028)	
Durban			-0.099 (0.014)
Dyear89xurban			0.054*** (0.016)
N	12029	12029	12029
Adjusted R ²	0.0796	0.0733	0.0780

Notes: Saving rates are calculated as the difference between income and consumption divided by income. Observations with saving rates smaller than -100 percent and greater than 100 percent were eliminated. Standard errors are in parenthesis. ***, **, * denotes 1, 5, and 10 percent significance levels respectively. Regressions include an intercept, an interaction term for income and age, age and education level squared, and dummies for regions.

Table 11 Effects of credit expansion and financial liberalization on households' saving rates, 1989-1992

	High income	More educated	Urban
Linc	0.162 (0.017)	0.180 (0.012)	0.197 (0.017)
Age	-0.012 (0.004)	-0.008 (0.003)	-0.008 (0.004)
Male	0.000 (0.001)	0.002 (0.008)	0.014 (0.011)
Home owners	0.028 (0.008)	0.025 (0.006)	0.026 (0.008)
Dremitt	-0.063 (0.021)	-0.086 (0.016)	-0.041 (0.024)
Dcredit	-0.156 (0.012)	-0.162 (0.010)	-0.161 (0.013)
Wealth	-0.226 (0.015)	-0.248 (0.012)	-0.235 (0.016)
Health	-0.046 (0.008)	-0.059 (0.006)	-0.047 (0.008)
Pensioner	0.037 (0.022)	0.039 (0.017)	0.037 (0.023)
Size	-0.016 (0.003)	-0.015 (0.002)	-0.017 (0.003)
Earners	0.021 (0.005)	0.028 (0.004)	0.024 (0.005)
Child <15 yo	0.003 (0.004)	0.002 (0.003)	0.003 (0.004)
Dtransfers	-0.070 (0.012)	-0.073 (0.009)	-0.069 (0.013)
Dyear92	-0.019 (0.010)	-0.024 (0.006)	0.016 (0.012)
Dhinc	0.050 (0.013)		
Dyear92xhinc	-0.010 (0.013)		
Dedu		-0.110 (0.010)	
Dyear92xedu		0.003 (0.014)	
Durban			-0.069 (0.012)
Dyear92xurban			-0.053*** (0.015)
N	16242	16242	16242
Adjusted R ²	0.1015	0.0910	0.1013

See notes in table 10

Table 12 Effects of credit contraction and crisis on households' saving rates 1994-1996

	High income	More educated	Urban
Linc	0.145 (0.016)	0.156 (0.017)	0.161 (0.013)
Age	-0.006 (0.004)	-0.003 (0.004)	-0.004 (0.003)
Male	0.009 (0.010)	0.007 (0.011)	0.008 (0.008)
Home owners	0.030 (0.008)	0.030 (0.008)	0.027 (0.006)
Dremit	-0.093 (0.017)	-0.077 (0.019)	-0.082 (0.015)
Dcredit	-0.138 (0.010)	-0.137 (0.011)	-0.132 (0.009)
Wealth	-0.461 (0.014)	-0.451 (0.016)	-0.452 (0.012)
Health	-0.007 (0.008)	-0.015 (0.008)	-0.006 (0.006)
Pensioner	0.028 (0.018)	0.020 (0.020)	0.034 (0.015)
Size	-0.021 (0.003)	-0.018 (0.003)	-0.020 (0.003)
Earners	0.025 (0.005)	0.029 (0.005)	0.026 (0.004)
Child <15 yo	0.006 (0.004)	0.004 (0.004)	0.005 (0.003)
Dtransfers	-0.043 (0.009)	-0.045 (0.010)	-0.048 (0.008)
Dyear96	-0.033 (0.010)	-0.029 (0.008)	-0.028 (0.009)
Dhinc	0.007 (0.013)		
Dyear96xhinc	0.039*** (0.013)		
Dedu		-0.070 (0.015)	
Dyear96xedu		0.059*** (0.018)	
Durban			-0.075 (0.010)
Dyear96xurban			0.025* (0.011)
N	19887	19887	19887
Adjusted R ²	0.1183	0.1156	0.1176

See notes in table 10

Table 13 Effects of financial reforms and credit contraction on households' saving rates 1998-2000

	High income	More educated	Urban
Linc	0.157 (0.016)	0.169 (0.015)	0.175 (0.016)
Age	-0.002 (0.004)	0.001 (0.004)	-0.001 (0.004)
Male	0.000 (0.008)	0.016 (0.008)	0.021 (0.009)
Home owners	0.001 (0.002)	0.003 (0.002)	0.002 (0.002)
Dremit	-0.075 (0.014)	-0.067 (0.014)	-0.073 (0.014)
Dcredit	-0.099 (0.012)	-0.100 (0.011)	-0.097 (0.012)
Wealth	-0.526 (0.013)	-0.521 (0.013)	-0.522 (0.013)
Health	0.013 (0.007)	0.005 (0.007)	0.013 (0.007)
Pensioner	0.013 (0.016)	0.008 (0.016)	0.014 (0.017)
Size	-0.019 (0.003)	-0.016 (0.003)	-0.018 (0.003)
Earners	0.025 (0.004)	0.031 (0.004)	0.027 (0.004)
Child <15 yo	0.009 (0.004)	0.008 (0.004)	0.008 (0.004)
Dtransfers	-0.029 (0.008)	-0.032 (0.008)	-0.028 (0.009)
Dyear00	-0.021 (0.011)	-0.037 (0.009)	-0.057 (0.012)
Dhinc	0.045 (0.011)		
Dyear00xhinc	-0.037*** (0.012)		
Dedu		-0.044 (0.010)	
Dyear00xedu		-0.025* (0.015)	
Durban			-0.052 (0.009)
Dyear00xurban			0.018 (0.013)
N	15730	15730	15730
Adjusted R ²	0.1272	0.1227	0.1266

See notes in table 10

Table 14 Effects of economic downturn on households' saving rates 2000-2002

	High income	More educated	Urban
Linc	0.127 (0.015)	0.143 (0.016)	0.143 (0.013)
Age	0.001 (0.003)	0.006 (0.004)	0.002 (0.003)
Male	0.035 (0.007)	0.024 (0.008)	0.034 (0.006)
Home owners	-0.001 (0.005)	0.000 (0.006)	-0.003 (0.005)
Dremit	-0.055 (0.011)	-0.042 (0.013)	-0.057 (0.010)
Dcredit	-0.090 (0.009)	-0.093 (0.010)	-0.090 (0.008)
Wealth	-0.555 (0.011)	-0.568 (0.013)	-0.554 (0.010)
Health	0.025 (0.006)	0.021 (0.007)	0.027 (0.005)
Pensioner	0.036 (0.014)	0.032 (0.016)	0.036 (0.013)
Size	-0.011 (0.002)	-0.009 (0.003)	-0.010 (0.002)
Earners	0.016 (0.003)	0.022 (0.003)	0.015 (0.003)
Child <15 yo	0.002 (0.003)	0.002 (0.004)	0.001 (0.003)
Dtransfers	-0.024 (0.007)	-0.028 (0.008)	-0.024 (0.006)
Dyear	0.029 (0.007)	0.019 (0.006)	0.047 (0.008)
Dhinc	0.031 (0.010)		
Dyearxhinc	-0.008 (0.010)		
Dedu		-0.056 (0.012)	
Dyearxedu		0.026* (0.015)	
Durban			-0.018 (0.008)
Dyearxurban			-0.031*** (0.010)
N	20984	20984	20984
Adjusted R ²	0.1127	0.1080	0.1125

See notes in table 10

Table 15 Effects of credit contraction and crisis on households' saving rates 2002-2006

	High income	More educated	Urban
Linc	0.113 (0.009)	0.122 (0.009)	0.135 (0.009)
Age	0.000 (0.000)	0.007 (0.002)	0.005 (0.002)
Male	-0.045 (0.005)	0.018 (0.005)	-0.021 (0.004)
Home owners	-0.038 (0.008)	-0.001 (0.005)	-0.007 (0.005)
Dremit	-0.082 (0.006)	-0.039 (0.009)	-0.036 (0.009)
Dcredit	-0.495 (0.009)	-0.090 (0.007)	-0.088 (0.007)
Wealth	0.015 (0.004)	-0.501 (0.011)	-0.486 (0.011)
Health	0.032 (0.007)	0.019 (0.005)	0.019 (0.005)
Pensioner	-0.009 (0.002)	0.028 (0.009)	0.032 (0.009)
Size	0.020 (0.002)	-0.009 (0.002)	-0.007 (0.002)
Earners	-0.007 (0.002)	0.024 (0.003)	0.018 (0.003)
Child <15 yo	-0.031 (0.005)	-0.005 (0.003)	-0.008 (0.003)
Dtransfers	-0.948 (0.084)	-0.033 (0.006)	-0.029 (0.006)
Dyear	-0.050 0.005	-0.037 (0.005)	-0.059 (0.008)
Dhinc	0.022 0.007		
Dyearxhinc	0.019*** (0.007)		
Dedu		-0.041 (0.010)	
Dyearxedu		-0.031*** (0.011)	
Durban			-0.057 (0.008)
Dyearxurban			0.029*** (0.009)
N	33092	33092	33092
Adjusted R ²	0.1059	1032	0.1077

See notes in table 10

Fig 1. Savings and Growth: Latin America and East Asia (WEO, 2007)

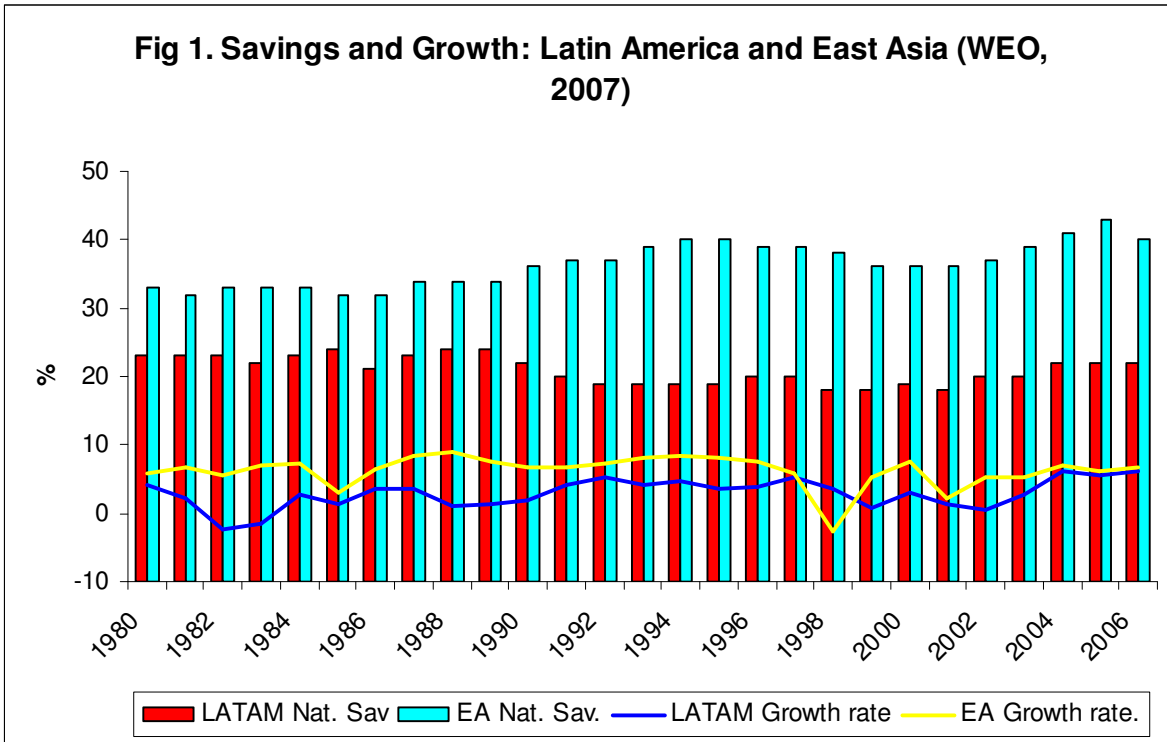


Figure 2

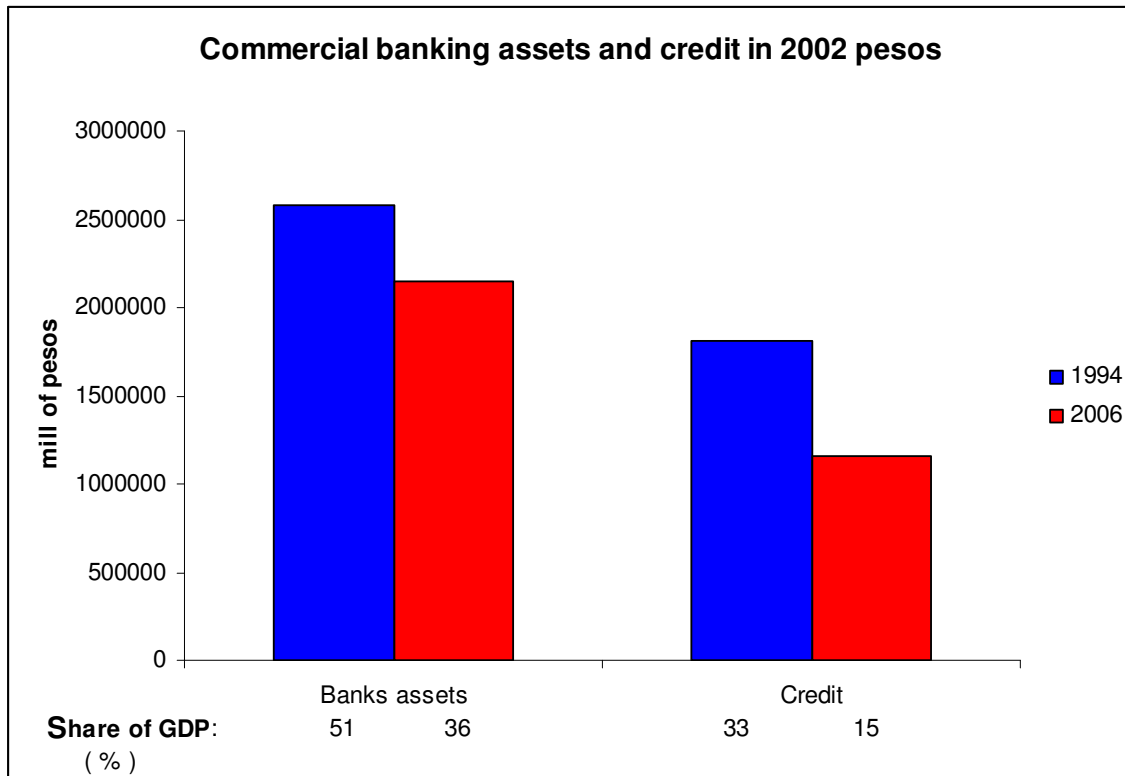


Figure 3

Total credit, credit to consumption, to credit cards, and to mortgages (mill 2002 pesos)

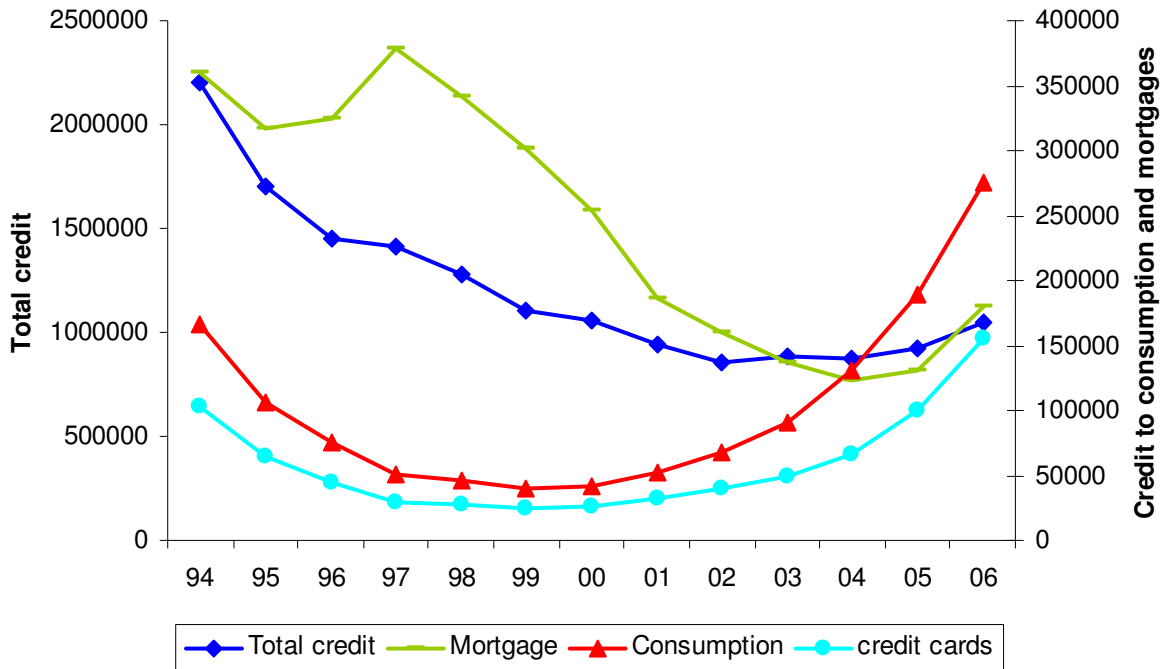


Figure 4a Share of assets (%) Dec., 1997

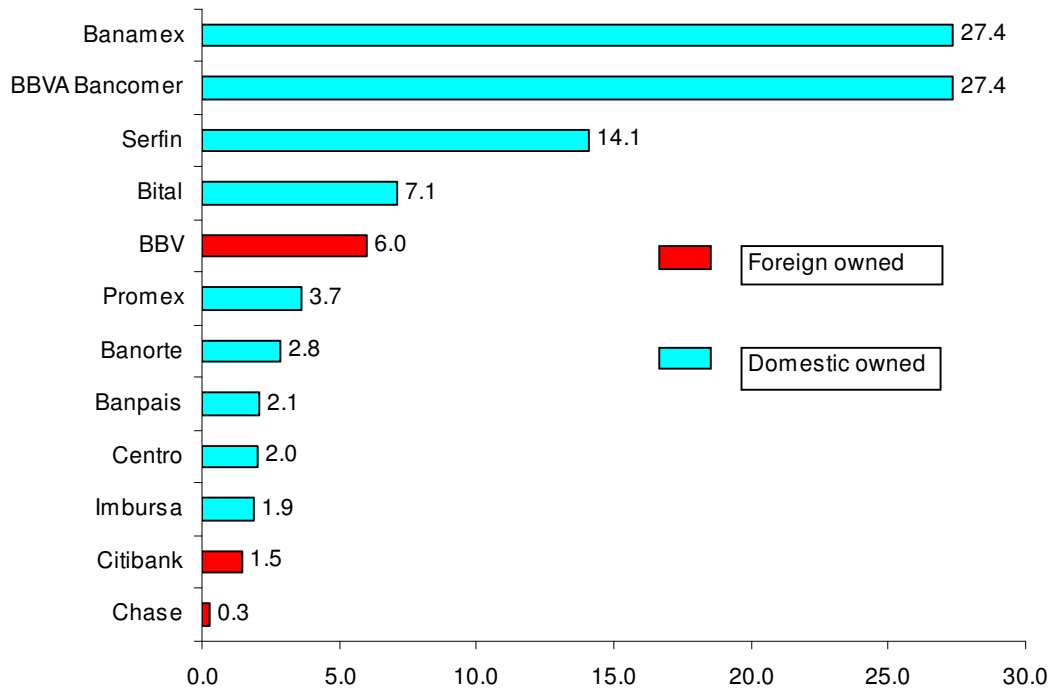


Figure 4b. Share of assets (%) Dec., 2006

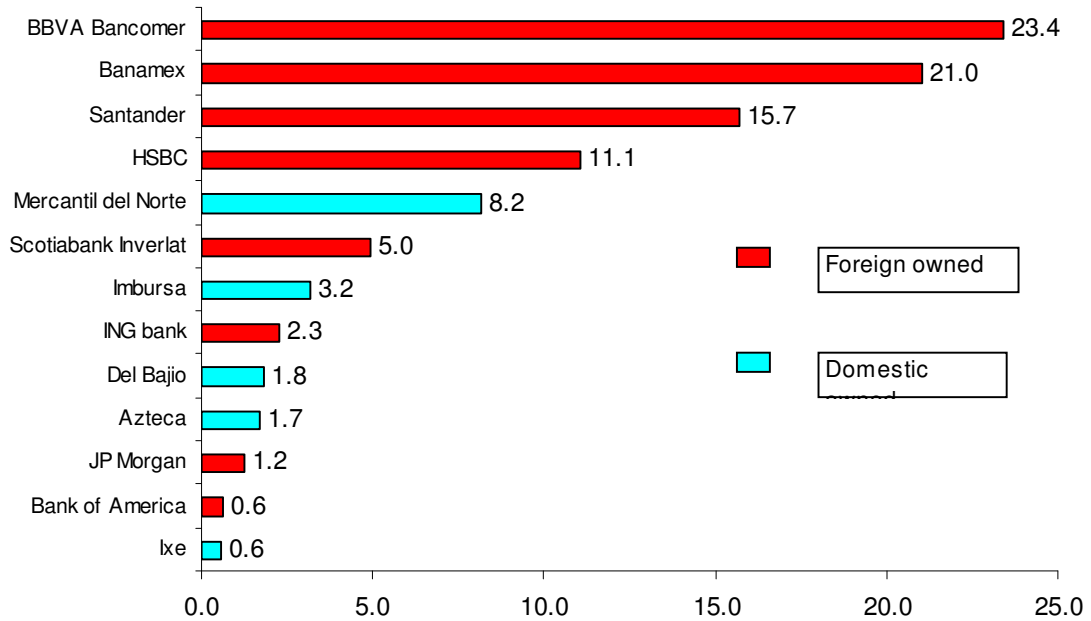


Figure 5

Median Saving Rates (selected surveys)

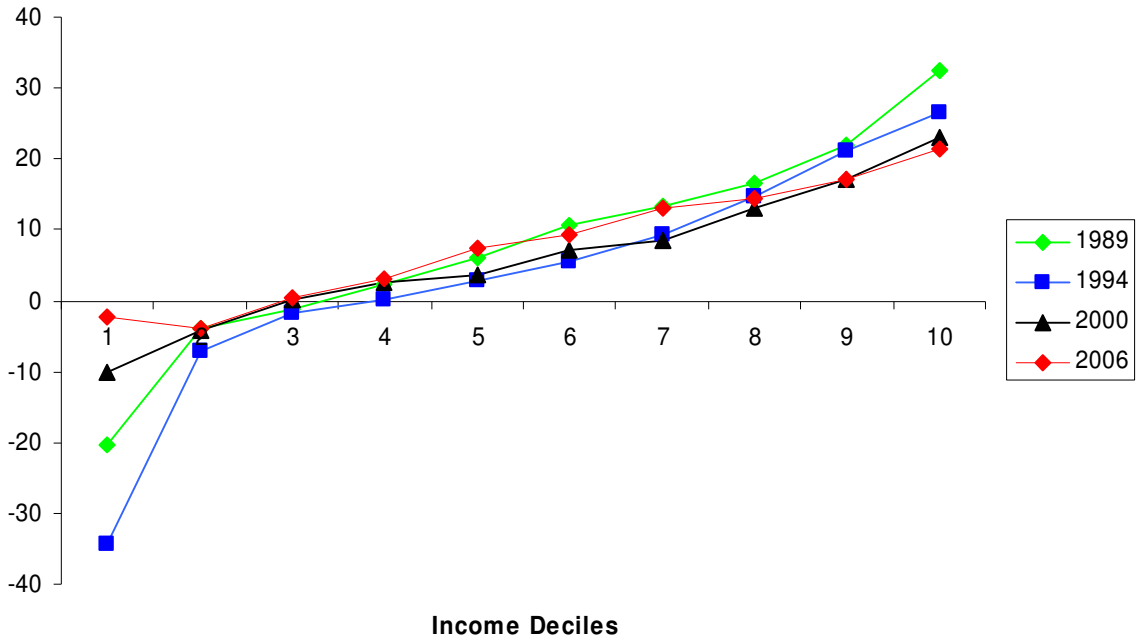
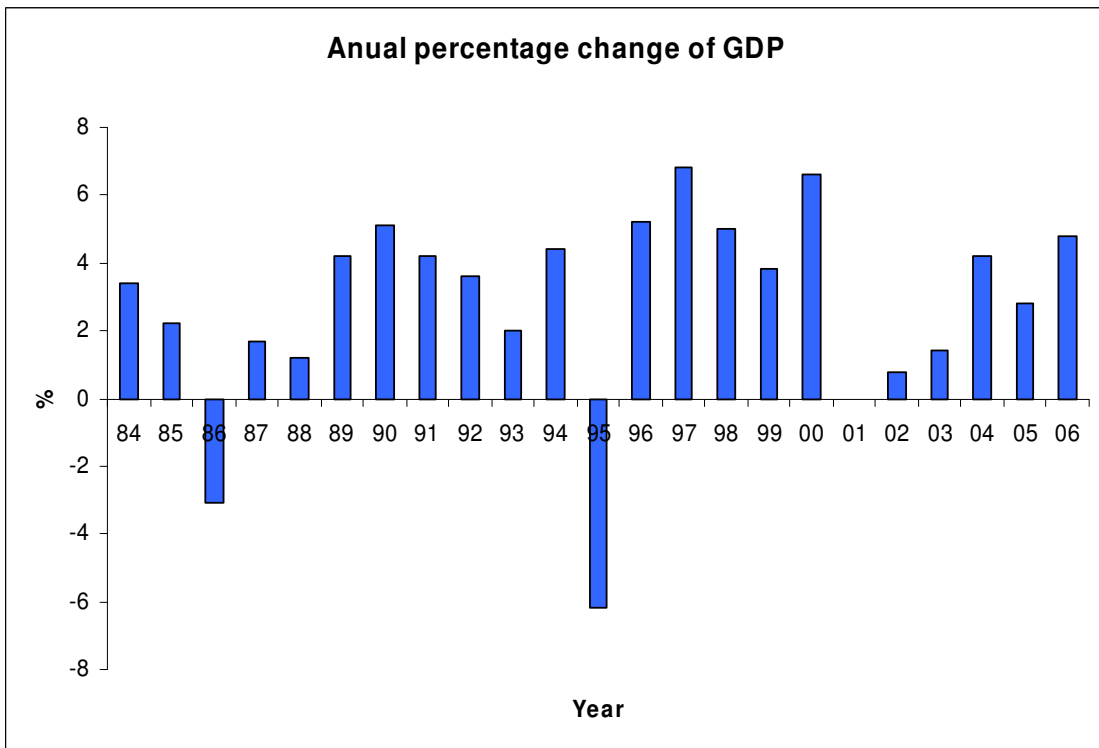
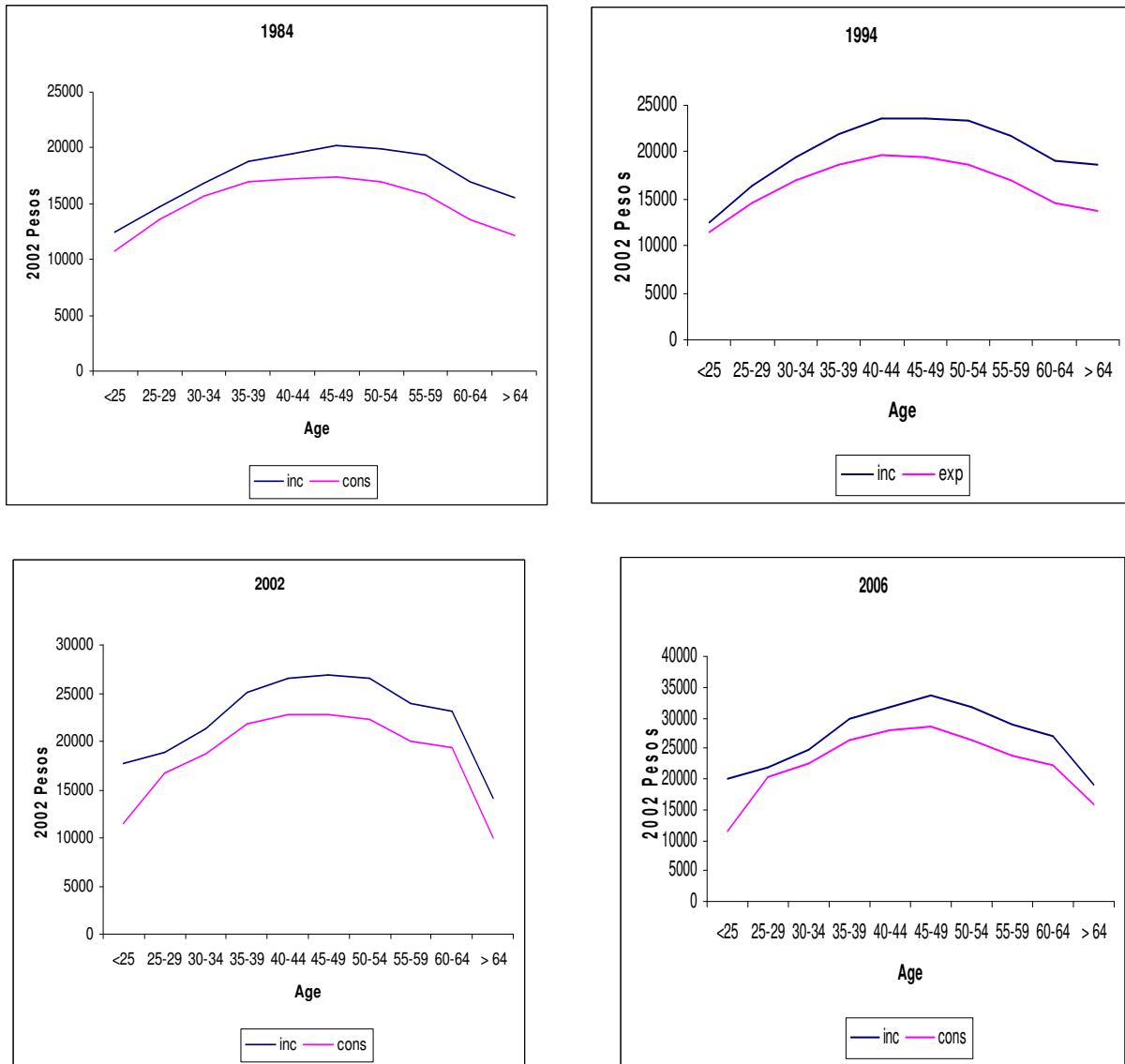


Figure 6



Source WEO

Figure 7. Average disposable income and average consumption by age of head of household



Notes: Income and consumption profiles were smoothed by combining the average of each age with those immediately above and below.

Fig. 8

Median saving rates by age of household head

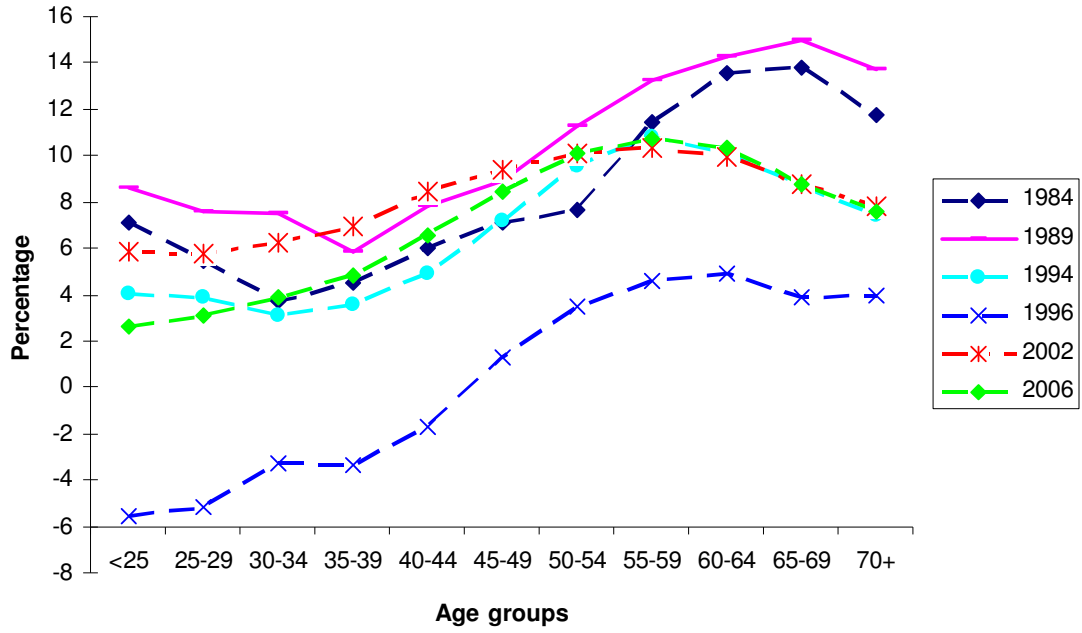


Fig 9

Family size profiles

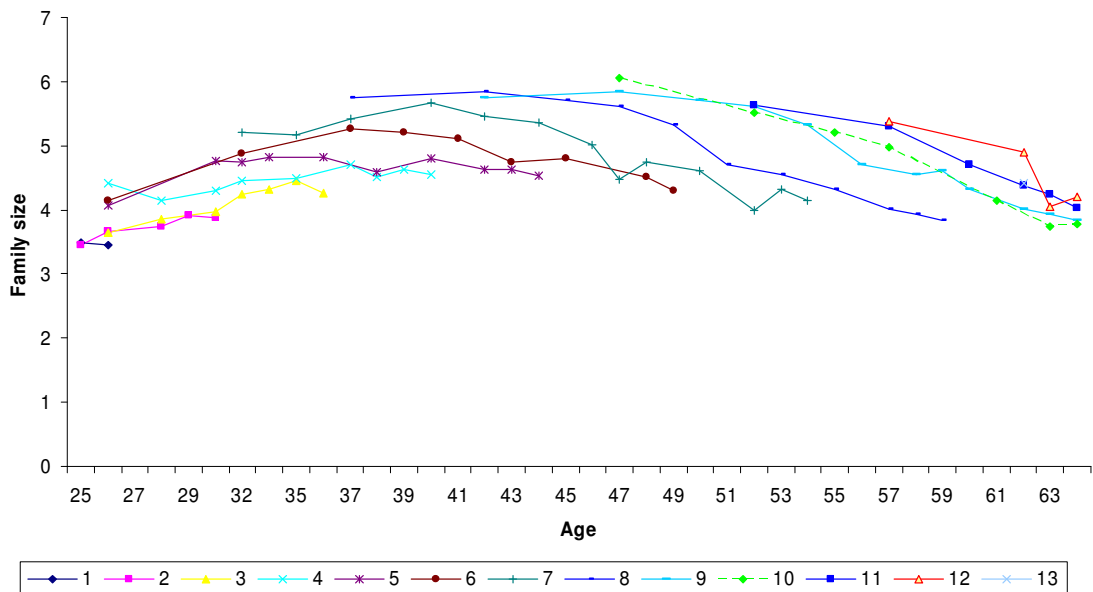
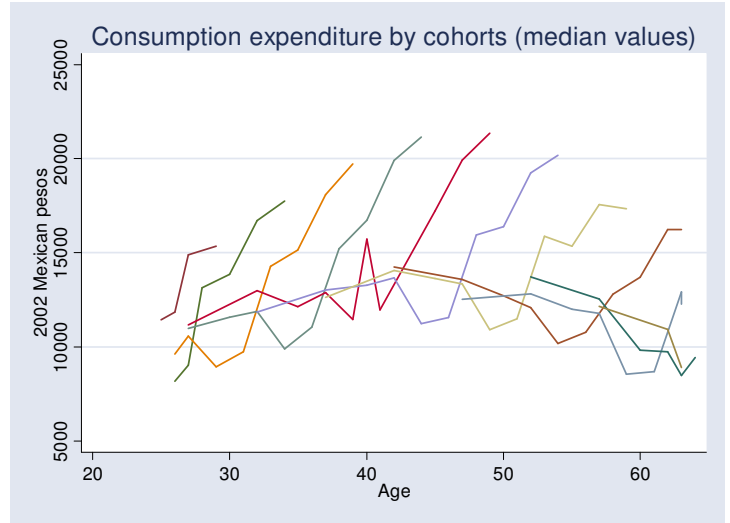
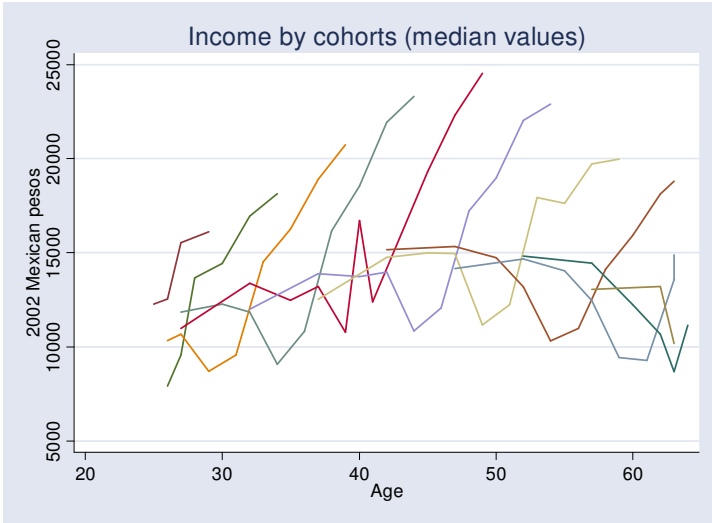


Figure 10

Income and consumption expenditure profiles

Panel A



Panel B

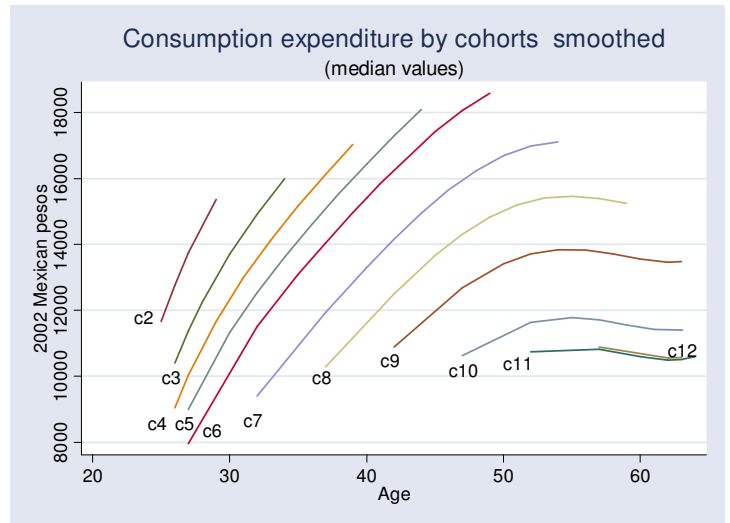
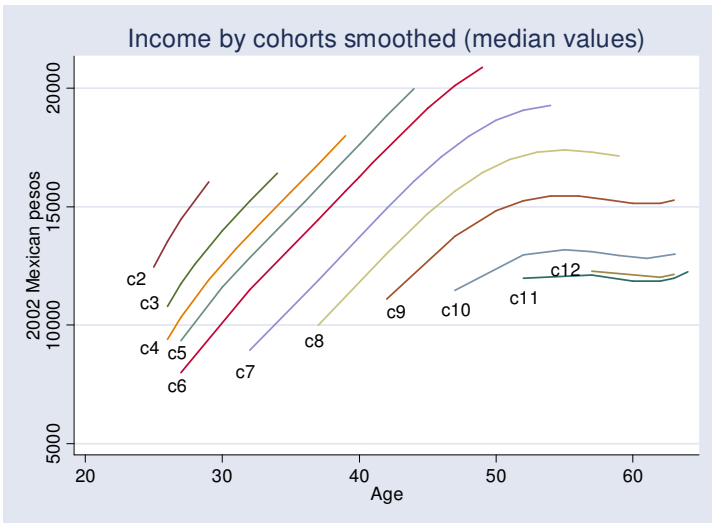


Figure 11

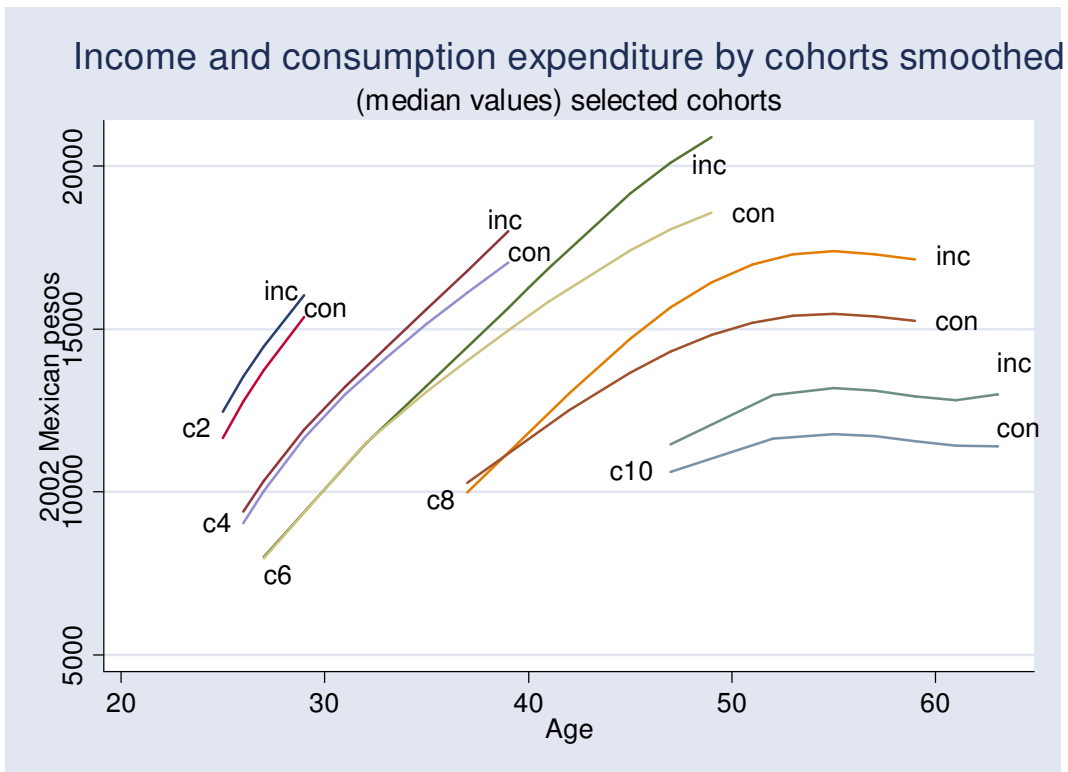
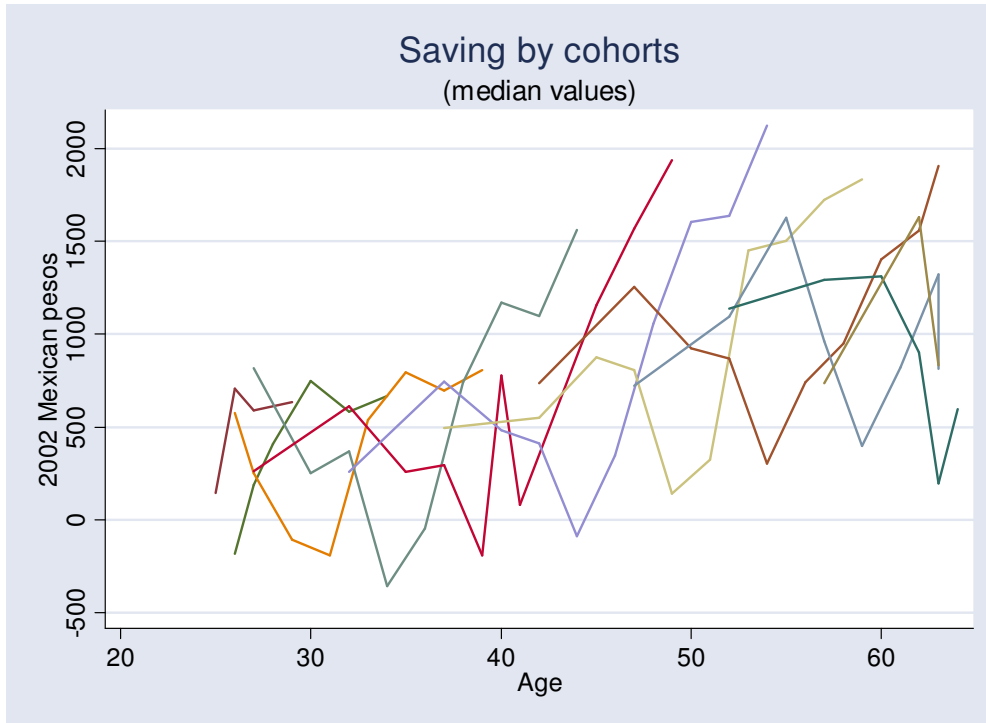


Figure 12

Panel A



Panel B

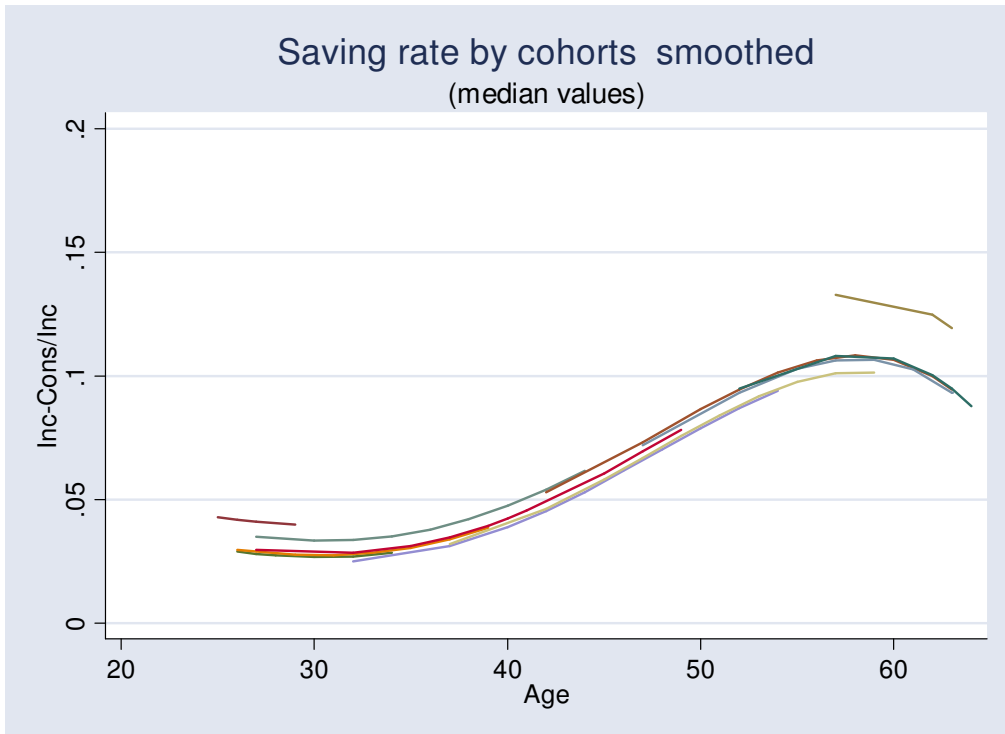


Figure 13

Panel A



Panel B



APENDIX A1. DESCRIPTION OF THE MEXICAN NATIONAL HOUSEHOLD INCOME AND EXPENDITURE SURVEY (ENIGH)³³

The ENIGH, currently collected by the Instituto Nacional de Estadística, Geografía e Informática (INEGI), has been carried out at irregular intervals since 1950; however only the surveys from 1984 onwards are comparable. Eleven rounds of the ENIGH are available. The surveys are representative at the national level, urban and rural areas and were carried out using stratified sampling during the third quarter of each survey year. The size of the survey varies from year to year, being 4,735 households in 1984, 11,535 in 1989, 10,530 in 1992, 12,815 in 1994, 14,042 in 1996, 10,952 in 1998, 11,657 in 2000, 19,856 in 2002, 25,115 in 2004, 25,443 in 2005, and 20,875 in 2006. The surveys contain extremely detailed information about the expenditure of each household, together with information on income after taxes and social security contributions, capital expenditure, and demographic variables. Information on capital expenditure further disaggregated contains information on financial and monetary expenditures such as savings accounts, payments to credit cards accounts, payments of interests; acquisition of securities: stocks, and bonds; acquisition of real state, capital goods (machinery, equipment, etc.), etc.

Information is also available on non-monetary expenditure, such as auto-consumption. A household is defined as a group of people who habitually reside in the same dwelling and who are sustained by common expenditure on food. Individuals who live together but who do not share expenditure on food with one another are defined as distinct households (INEGI, 2006).

The surveys are repeated cross-sections and not panel. However, its statistical construction allows making comparisons among different years. In other words, the surveys are strictly

³³ Encuesta Nacional de Ingresos y Gastos de los Hogares

comparable in terms of sampling frame, sampling methodology, timing (the survey is held during the last quarter of the year), recall periods, and in terms of the questionnaires that capture income and expenditures, which are the key groups of variables of interest.

The information in table A1 is a summary of general characteristics based upon the *Documento Metodologico* (methodological document) for the Household Income and Expenditure Survey 2006 (*Encuesta Nacional de Ingresos y Gastos de los Hogares – ENIGH*, INEGI).

Table A1
Summary table ENIGH-2006

1. Generic information	
Name of survey	Household Income and Expenditure Survey 2006 (<i>Encuesta Nacional de Ingresos y Gastos de los Hogares - ENIGH</i>)
Institution responsible	National Statistical Institute (<i>Instituto Nacional de Estadística, Geografía e Informática - INEGI</i>)
Frequency	No established periodicity (since 1992 until 2004 there has been one every two years, and one collected in 2005 and the last available was collected in 2006).
Survey year / Wave	2006 survey
Collection period	3 rd quarter 2006 (August to November)
Coverage	Households composed of nationals and foreigners (excluding diplomats), who usually reside in private dwellings (institutional or collective dwellings are not included) in the whole national territory
Geographic information	Federal district level
Files delivered	6 files at different levels: at the household, individual, expenditure on consumptions, capital expenditure, income and in-kind income levels.
2. Sample size	
Households	25,446 initial size, down to 20,875 in final sample
Individuals in final sample	83,624 persons
3. Sampling	
Sampling design	Stratified multi-phase sample: first, basic geo statistical areas (AGEB), stratified according to 5 geographic and socio-economic criteria, are selected, then, for urban areas only, blocks of dwellings, and finally dwellings from each area (rural areas) or block (urban areas).
Sampling frame	INEGI sampling frame for multiple purposes, constituted by demographic and cartographic information obtained with the 2000 National Census (<i>Conteo de Población y Vivienda</i>).
4. Survey instruments	Direct and indirect interview over 7 consecutive days with a basic questionnaire and a diary of expenditures.
5. Standard classifications	
Education	25 categories of national education system
Occupation	4-digit 1996 Mexican Classification of Occupations (Clasificación Mexicana de Ocupaciones - CMO)
Industry	3-digit SCIAN (Sistema de Clasificación Industrial de América del Norte), by and large the same as NAICS, used by US and Canada.
6. Income	
Reference period	6-month period preceding the interview for most income sources (1 year for self-employment income and last month for own consumption and in-kind income)
Unit of collection	Individual for most income sources (household for own consumption and in-kind income)
Period of collection	Monthly
Gross/net	Amounts are collected net of taxes and contributions; no info on taxes and contributions
7. Data editing / processing	
Consistency checks	Detailed checks carried out when keying in, editing and coding data.
Weighting	Population inflating weight equal to the inverse of the sampling probability; it makes the sample representative both at the national level and at the sub-national levels of urban versus rural areas.

Source: ENIGH Síntesis Metodológica, INEGI, 2006

Appendix A2. MEXICO'S REGIONS, INEGI's CLASSIFICATION



<p>1</p> <ul style="list-style-type: none"> 7 Chiapas 12 Guerrero 20 Oaxaca 	<p>2</p> <ul style="list-style-type: none"> 4 Campeche 13 Hidalgo 21 Puebla 24 San Luis Potosi 27 Tabasco 30 Veracruz 	<p>3</p> <ul style="list-style-type: none"> 10 Durango 11 Guanajuato 16 Michoacan 32 Zacatecas
<p>4</p> <ul style="list-style-type: none"> 6 Colima 15 Estado de Mexico 17 Morelos 18 Nayarit 22 Queretaro 23 Quintana Roo 25 Sinaloa 29 Tlaxcala 31 Yucatan 	<p>5</p> <ul style="list-style-type: none"> 2 Baja California 3 Baja California Sur 8 Chihuahua 26 Sonora 28 Tamaulipas 	<p>6</p> <ul style="list-style-type: none"> 1 Aguascalientes 5 Coahuila 14 Jalisco 19 Nuevo Leon
<p>7</p> <p>Distrito Federal</p>		