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A DYNAMIC OF HOUSEHOLD DECISION MAKING,

THE MEXICAN CASE

Abstract

In this paper we analyze the relationships between family structure, human capital accumulation and returns, labor force participation and household consumption and savings decisions for the Mexican households. We use as theoretical framework the Life Cycle Model and our analysis is based on a synthetic panel technique as proposed by Browning, Deaton and Irish (1985) that allow us to track the average behavior of cohorts over successive surveys. Mexico went through important demographic and socioeconomic changes between the mid 70's and mid 80's, as a consequence of the different policies implemented by the government as well as some institutional changes, including an important birth control program and the expansion of educational opportunities. The observed reduction in fertility and the increase in the scholarity of women are likely to increase women labor force participation. Most of this process is dominated by age and cohort effects. In terms of consumption-saving decisions, we find that this reduction in the number of children and the increase in women's labor force participation, reinforced by higher investment in education and higher rate of returns, were translated in higher saving rates for younger cohorts, particularly those were the head has higher educational levels.

Resumen

En este trabajo se analizan las relaciones entre estructura de familia, acumulación de capital humano y sus retornos, la participación de la laboral además de las decisiones de consumo y ahorro de los hogares mexicanos. Se usa el Modelo del Ciclo de la Vida como marco teórico y el análisis se basa en el uso de un panel sintético como el propuesto por Browning, Deaton e Irish (1985), que nos permite seguir el comportamiento promedio de los cohortes a través de las distintas encuestas. México ha pasado por importantes cambios demográficos y socioeconómicos entre mediados de los 70's y mediados de los 80's, como consecuencia de distintas políticas implementadas por el gobierno así como por cambios institucionales, incluyendo un importante programa de control natal y la expansión de oportunidades educacionales. La observada reducción en las tasas fecundidad así como incremento en los niveles de escolaridad de las mujeres, que incrementaron su participación en la fuerza laboral. La mayoría procesos son capturados por los efectos cohorte y edad. En términos de las decisiones de consumo-ahorro, se encontró que la reducción en el número de hijos y el incremento de la participación de la mujer en la fuerza laboral , reforzado por una gran inversión en educación y tasa de retorno mayor, se tradujo en tasas de ahorro mayores para los cohortes jóvenes, particularmente aquellos donde el jefe de familia tiene mayores niveles de educación.

I. Introduction[1]

During the last decades, Latin America has been going through an intensive transformation process related to changes in demographics and in the use and return of human capital. Among the most significant transformations, we find the changes on family structure and fertility, a transition from relatively young, to an older population, the increase in labor force participation of women and the growth in educational attainment. These changes have important implications for behavioral household decisions since they may systematically alter the marginal utility of consumption over the life cycle. Mexico has not been an exception and these transformations have been concentrated over the past two decades, intensifying the pressures on institutions.

There have been important changes in the size of families related to the intensity of demographic transition. The total fertility rate fell from 6.4 in 1950 to 1955, to 3.2 in 1990 and 2.8 in 1995, one of the largest absolute and relative declines over the period of any country in Latin America. The evolution of family structure has also undergone important, although somewhat less dramatic, changes. Compared with other Latin American countries, a large percentage of Mexican households are composed of nuclear families. Similarly, unipersonal and multiple households are less common in Mexico than in other countries of the region. While extended families are still present in family structure in Mexico, they appear to be less common than in the past. Although the proportion of female-headed households has also increased, female headship still continues to be somewhat less common in Mexico than in other countries of the region.

Between 1970 and 1990, the growth of the labor force participation of Mexican women has been more rapid than in other Latin American countries. Over this period, the participation rate for women grew by 256%, as compared to a 99% for men. Between 1970 and 1980, the economically active female population increased rapidly from 15.2% to 26.3% surpassing the rate of 23.5% for the whole region. In terms of educational attainment, Mexico has shown substantial advances over the past decades, which are a result of a complex interaction between supply and demand factors. During the 70s, school enrollment rates increased from 41.6% to 57.7% among males aged 12 and 19, while for females the increase went from a 32% to 52.2%.

As mentioned above, all these changes may have an important effect on household decisions such as consumption and saving. With respect to the latter, two issues have

been particularly relevant for the Mexican case. The first one is related to the recent decline in the rate of domestic saving. According to official data, the gross domestic saving rate attained its highest level during the 80's, when it represented 21% of GDP as an average. After 1988 this rate declined to a level lower than 16% in 1994. A large part of this drop has come from a fall in the rate of private saving. This rate declined continuously from a level around 18% of GDP in 1988 to 10.5% in 1992, showing a slightly recovery since 1993. The second issue is related to retirement saving. One of the most important reform initiatives of the current political administration has been the change to the Mexican Social Security Institute (IMSS). Mexico recently substituted the state-run pay-as-you-go pension system with a defined contribution fully funded scheme with individual accounts. Although the main reasons for this reform were the increasing financial problems being faced by the old system and changes in demographic trends, it has been emphasized that this reform will foster domestic saving. Nevertheless, there is almost no knowledge about the way pensions affect individuals consumption and saving decisions, or how family structure interacts with the pension system and consumer behavior for the Mexican case. In the short run, cyclical effects are relevant and can explain some of the movements in the observed saving rates, but from a longer-run perspective, savings behavior is sensitive to changes in family structure, changes in population structure, fertility rates and life expectancy. Therefore, it is important to consider both kind of effects to improve our understanding of this variable.

What is interesting to mention is that the majority of these demographic and socioeconomic changes occurred between the mid 70's and mid 80's, as a consequence of different policies, as well as some institutional changes, implemented by the government. In particular, together with the Health National Plan in 1973 and a new Population General Law in 1974, the government tried to affect the demographic trends, by implementing an aggressive birth control program that was spread among the population throughout the public health system. Also, during these years there was an important public education program with the main objective to substantially increase the supply of education and to reduce the illiteracy rate. For example, in 1974 the Metropolitan University was created in Mexico City. These efforts also included the creation of new institutes for technological studies, the creation of new centers at a high school level associated with the National University, the implementation of an Adult Educational Program and the expansion of educational infrastructure to rural areas. As a consequence of these efforts, there was a drastic decrease in the fertility rate, and a substantial expansion in the demand and supply for education that affected the family structure, human capital investment and labor force participation, in particular for the women.

The main objective of this study is to contribute to the understanding of some of these issues by an explicit analysis of the behavioral relationships between family structure, human capital accumulation and returns, labor force participation and household savings. In particular, our basic hypothesis is that the observed reduction in fertility, explained by the spread of birth control programs and the increase in the

scholarity of women, are likely to increase women labor force participation. This trend might be reinforced by the spread of public social security and the improvement in the functioning of the financial system that reduced the security motive for children. Most of this process is dominated by age and cohort effects. In terms of consumption-saving decisions, we expect that this reduction in children and the increase in labor force participation, reinforced by higher investment in education and higher rate of returns, might be translated in higher saving rates for younger cohorts. In any case, this is an empirical question since at the theoretical level there are many offsetting effects.

Since the issue analyzed in this study involves dynamic phenomena, we follow a theoretical framework as the one proposed by the Life Cycle Model (LCM). Even if this model does not fully explain this behavior, it is useful to analyze household life cycle patterns in a dynamic context. Since our database is not a panel, we are forced to use an average cohort approach as proposed by Browning, Deaton and Irish (1985) and widely followed now in this literature. By constructing a synthetic panel, we can track the average behavior of the variables of interest for these groups for successive surveys. By considering repeated cross sections we can control for cohort effects and identify the life cycle profile of different cohorts.

This paper has the following structure. In section two we discuss the data used in the analysis, the construction of our main variables and the methodology and construction of cohorts. Section three presents a description of family structure, in particular headship, household type and composition. We also include in this section a brief revision of recent fertility trends. In section IV we discuss human capital, its stock, returns and investment. Labor force participation is presented in section V while in the sixth section we analyze household consumption and saving behavior using synthetic panel analysis. We conclude with some final comments.

II. Data, Variables Definition and Cohort Construction

Data

The data used in this study are drawn from the *Encuesta Nacional de Ingreso y Gasto de los Hogares* (ENIGH). Although the Mexican government has been conducting these surveys since the 1950's, it is only recently that concepts and methodology have been made comparable across years. We use the surveys from 1984, 1989, 1992, 1994 and 1996. The ENIGH is conducted by the National Institute of Statistics, Geography and Informatics (INEGI) and undertaken during the third quarter of each year using a stratified sampling of households. This survey is not a panel; individual households are not followed through time. The sample size varies between surveys. In 1984 it included 4,737 households, 11,531 in 1989;

10,530 in 1992; 12, 815 in 1994 and 14,042 in 1996. The ENIGH sample is representative of the universe of Mexican households.

The data include detailed information on income by source, and expenditure by type, at the household level. Emphasis is placed on obtaining detailed and accurate information about family consumption. Both income and consumption data include a monetary and an in-kind component. Consumption includes total expenditure on durable and non-durable goods as well as home-produced goods and services. The data on income and expenditure are supplemented by a rich set of economic, demographic and sociological variables at the individual level. Unfortunately this survey does not include information about individual or family holdings of wealth.

Methodology and Construction of Cohorts

The kind of analysis that we are performing in this study involves dynamic phenomena. That is, we are interested in looking at changes in the economic environment faced by households that affect their structure and behavior, such as family size, family composition, labor force participation and consumption and saving decisions. Therefore, it is natural to follow a theoretical framework as the one proposed by the Life Cycle Model (LCM). Even if this model does not fully explain this behavior, it is useful to analyze household life cycle patterns in a dynamic context since many of these variables have distinct and characteristic life-cycle profiles. For example, according to the LCM, consumption and saving for a consumer evolve during his life according to his age and based on intertemporal allocation criteria. One of the most popular implications of the basic model is that consumers save during working years and dissave during retirement. Therefore, saving follows a hump-shaped pattern. A similar profile in average family size is induced by the natural process of bearing and raising children. For this purpose it would be desirable to track the behavior of the same individual over time to analyze the implications of this model. Since the ENIGH is not a panel, we are forced to use an average cohort approach as proposed by Browning, Deaton and Irish (1985). This technique consists in constructing a synthetic panel by aggregating relevant information, like income and consumption, over individuals of a same group of households or cohorts. These cohorts are defined according to fixed criteria, such as the year of birth of the self-declared household head or the year of birth of the oldest male in the household (as long as this person is related to the previously defined head). After defining the cohorts, we can track the average behavior of the variables of interest for these groups for successive surveys. By considering repeated cross sections we can control for cohort effects and identify the life cycle profile of different cohorts. Although this technique has many advantages over most panels, it is important to keep in mind that there are some restrictions. For example, it is important that the population used for the analysis is not much affected by immigration, emigration or family dissolution. Also, we cannot identify separately

the cohort, age and time effects, as discussed by Attanasio (1998). In this case, it is necessary to make some identifying assumption to decompose these effects.

We define our cohorts over five-year intervals. Headship will be defined as self-declared, but we try two other alternatives. In the first one we consider the male with higher income while in the second one, we consider the year of birth of the oldest male in the household (as long as this person is related to the previously defined head). As a first approach, we include household heads between 15 years old and 100 years old. This definition will be used for the analysis of demographic and other socioeconomic factors. For our consumption and saving analysis in section VI we consider household heads only until 85 years of age. This, because the cells containing the oldest heads are too small and too noisy. It is also expected that for the older cohorts, its members are dying in a significant number or are leaving their role as heads, making its interpretation less clear. Since we have five surveys, we have 17 cohorts (15 cohorts in the second case). Definitions and cell sizes are presented on table 1. Along our study, we consider alternative aggregations of our households to analyze the behavior of different groups with similar characteristics. For example, we consider a division between extended and nuclear families or by level of education. Finally, we also analyze the behavior of cohorts of individuals.

Table 1 Cohort Definition and Cell Size

Year of Birth	Cohort	1984	1989	1992	1994	1998	Total (percent)
			Cohort definition / and cell size				
1975-1979	1	-	-	-	86	252	337
							0.8
1970-1974	2	-	77	347	720	1070	2214
							4.1
1965-1969	3	39	580	1028	1267	1709	4623
							8.6
1960-1964	4	307	1251	1427	1634	1918	6537
							12.2
1955-1959	5	661	1448	1394	1701	1780	6974
							12.8
1950-1954	6	602	1488	1359	1475	1618	6543
							12.2
1945-1949	7	553	1324	1026	1276	1352	5531
							10.3
1940-1944	8	555	1138	987	1133	1132	4945
							9.2
1935-1939	9	472	1103	738	957	952	4220
							7.9
1930-1934	10	408	863	678	873	779	3601
							6.7
1925-1929	11	365	732	517	612	550	2776
							5.2
1920-1924	12	313	567	445	512	434	2271
							4.2
1915-1919	13	214	395	246	252	237	1344
							2.5
1910-1914	14	158	281	178	200	157	984
							1.8
1905-1909	15	102	153	85	84	63	487
							0.9
1900-1904	16	62	153	43	23	27	231
							0.4
1895-1899	17	17	28	-	-	-	43
							0.1
Total		4735	11531	10530	12815	14042	53653
(percent)		8.8	21.5	19.6	23.9	26.2	100

Variables

All variables such as family size, number of children, level of education, hours of work and age are taken directly form the surveys. In the case of consumption and saving, we estimate household variables under two basic definitions. First, we construct a measure of household consumption, C1, by subtracting from the total expenditure (monetary and non-monetary items) durable goods (expenditure in furniture and household appliances, vehicles and some leisure items) and mortgage payments. As an alternative measure of consumption, C2, we excluded from C1 some items that might be considered as saving. In particular we exclude expenditure on education and on health. A detailed list of the items included on each definition is available from the authors upon request. Income is defined as total after-tax household income and includes earnings, capital income and transfers. It should be noted that our income definition does not include pension contributions. Our nominal income and consumption variables are deflated by using the National Consumer Price Index for the month of September (1994=100). We chose this month because the interviews take place during the third quarter of each survey year. Saving is simply computed as the difference between income and consumption and therefore we have two alternative saving measures, S1 and S2. Finally, saving rates are computed by adding the savings for the same cohort divided by their income.

III Family Structure

In this section we present a more descriptive overview of recent demographic trends and changes in economic environment and how they have affected family structure.

Fertility Trends

One of the most important demographic transformation observed in Mexico has been the change in the patterns of the fertility rates, in particular during the second part of the 70's, as a consequence of an aggressive public birth control program, called responsible parenthood (*paternidad responsable*). In figure 1 we show the fertility rate for some selected years between 1930 and 1991. The rates presented are the gross fertility rate (GRFR), defined as the number of births in a year with respect to the average population of the same years, and the global fertility rate (GLFR), which relates these births to the women between 15 and 49 years old. After reaching the GLFR a maximum of 7 in 1971, this trend bends down at an accelerated speed until 1979 and then the decrease is much slower during the 80's.

Figure 1 Fertility Rate

Fertility Rate 1930-1991
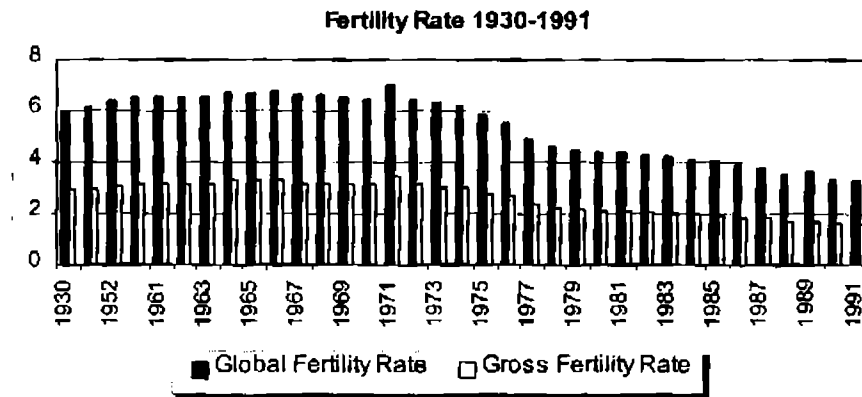
Source: Comisión Nacional de Población

If we look at specific fertility rates by age groups, it seems that the main impact of the fertility rate reduction corresponds to the age group between 25 and 29 years old, as can been seen in figure 2. That is, in only six years, the fertility rate for this group decreased by more than one third. In 1971 there were 336 births for each one thousand women of that age group, while in 1977 this number decreased to 218 births. It is important to emphasize that this age usually corresponds to the most fertile for the Mexican women. Therefore, we expect that these changes have important implications for the family size and structure.

Figure 2 Specific Fertility Rates by Age Group

**Specific Fertility Rate 1930-1991**
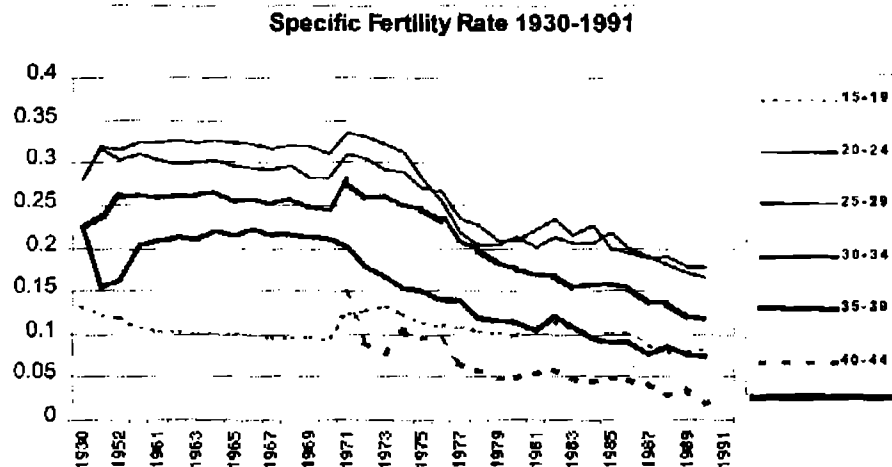
Source: Comisión Nacional de Población

Headship

Before looking at the family structure, it is important to define and to analyze who is the head of the household. It is important to identify the head because in order to analyze the dynamics of the household, we need to follow some variables in relation to the age of the head. For the purposes of this study we mainly consider the self-declared head in our surveys. In figure 3 we compare this definition with two alternative definitions. The first one includes individuals with the highest income in the household. In the second one we define the head as the oldest men in the household (or oldest women if there are not males in the household) as long as we only include individuals who are related. This figure presents the proportion of individuals who are household head by our three definitions, using cohorts of individuals.

Figure 3 Percent of Individuals as Household Head

Percentage of individuals as household head

Percentage of individuals as household head 1

Percentage of individuals as household head 2
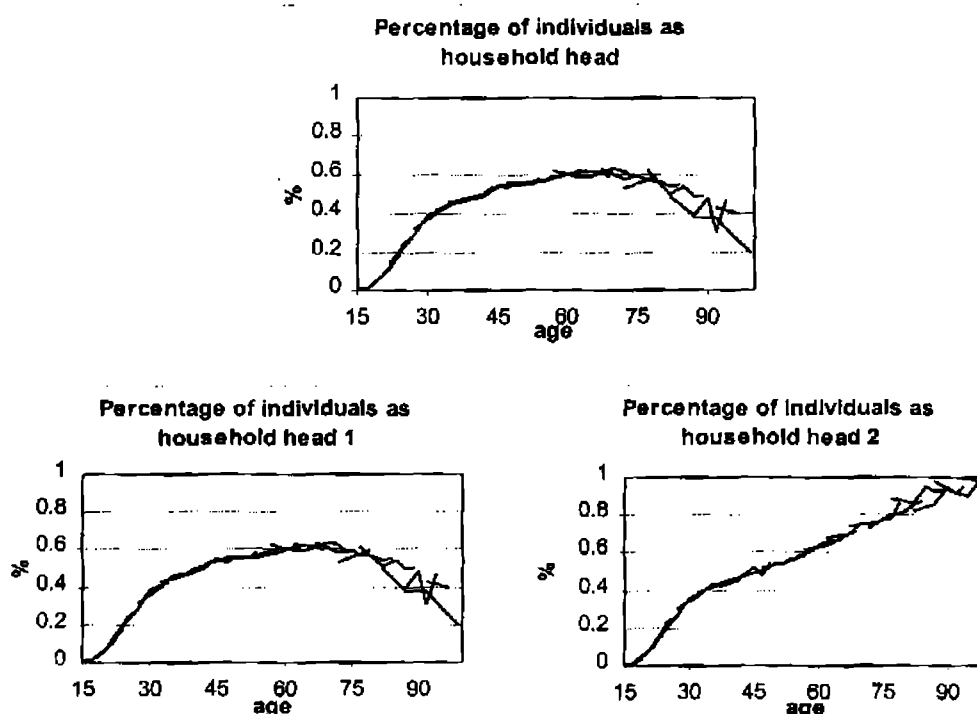
It is interesting to note that for the first two definitions, that is, the self reported definition of head and that related to the individuals with the highest income in the household, the pattern is clearly related to age. Younger or older individuals have a lower probability of being heads. This is important because the heads of the household that we observed at the two extremes of the age distribution must be

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individuals with special characteristics other than age. For example if older individuals tend to live in extended households then the older heads that we observe might be individuals with enough income to support themselves. In this case we are picking, at one extreme of the age distribution, households which are relatively richer. The same happens at the other extreme, young individuals are not typically heads. So the heads that we observe are possible individuals with enough income or productivity to live alone and to form a new family. If we use the definition of the head as the oldest individual then we have a different pattern; old individuals are now heads. These graphs can give us an idea that older people do not tend to be the head of the household, at least for the self declared definition, and so they tend to live in a household where someone else is the self reported head. This means that older individuals tend to live in extended families.

Household Type

To look further at this issue, we introduce household type. In this study we define three types of families, nuclear, extended and other types. The definitions for nuclear and extended families are almost the same as the ones in the survey, we only adjust them in the following sense: if a nuclear family has children above 30 years we consider it as extended. As children we only consider relatives of the head. Other types of household include mostly single person families. In figure 4 we report the percent of individual cohorts that belong to each of the three categories. From these graphs we see that nuclear families are the most important type of household, representing around 65% of the sample. However the importance of this type of family is not constant at different ages. It is relatively important when individuals are young, but once they have aged, the importance of nuclear families decreases. When individuals get older, extended and unipersonal families become more important. The increasing importance of other type of families can be explained by the fact that some households become single person families as a result of the dissolution of the family, via marriage of the children and death of the spouse. Extended families are important when individuals get old because they can move in with a relative, in which case they are not heads. Another possibility is that some other relative moves in with them, in which case the old individual continues to be the head.

To further analyze the relationship between household head and type of family, we present in figure 5 the proportion of household heads and no-heads leaving in both types of families. It is interesting to note that headship in nuclear families is important for cohorts between 35 and 55 years old, decreasing its relevance after this age. The proportion of no head members also decreases systematically with age. In the case of extended families, the relevance of heads starts to increase slowly, reaching a maximum for cohorts at around 65 years old and then there is a slight decrease. On the other hand, the proportion of no head members in extended

families increases after 45 years of age. From these graphs we conclude first, that as individuals age they tend to live in extended families, and second, headship becomes less important as individuals become older. As mentioned above, it seems that older people move with other relatives or their relatives move with them, but then the head is a younger individual. It also seems that some of the older individuals that are heads live alone.
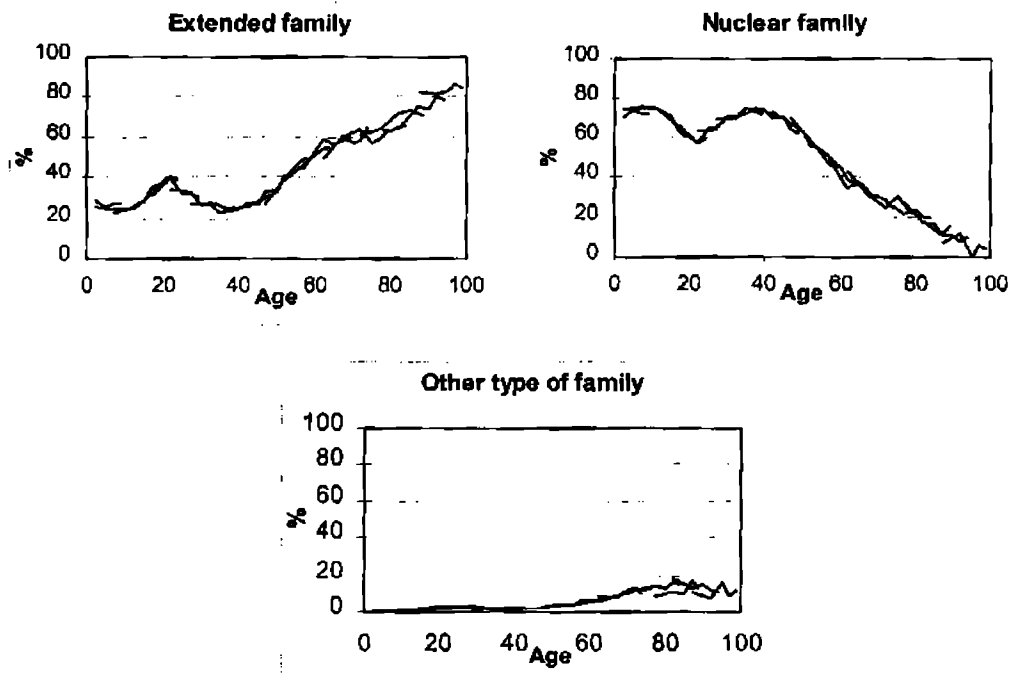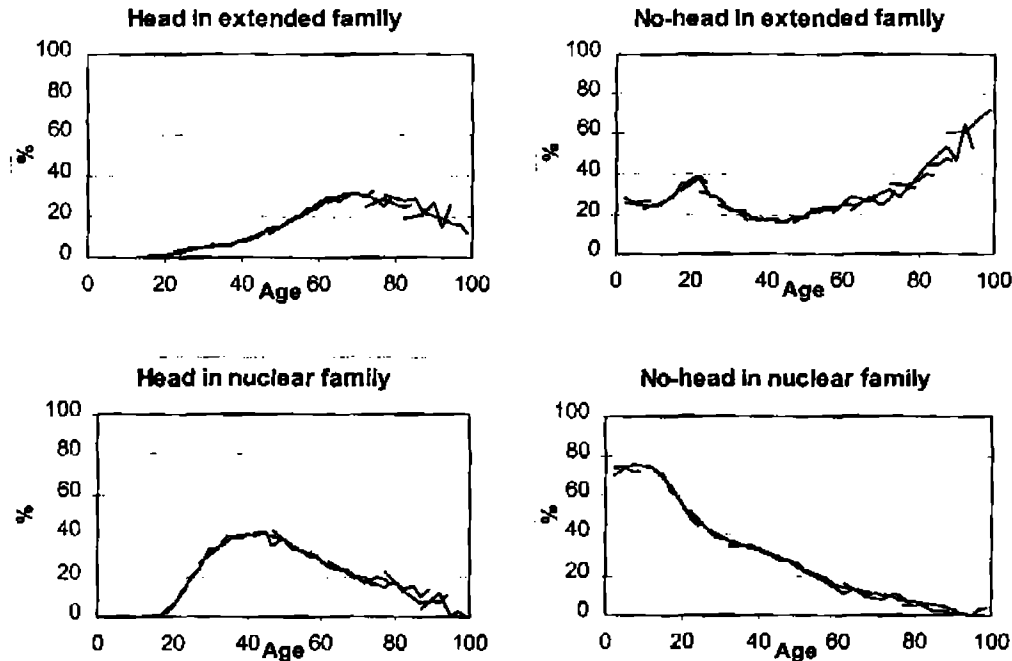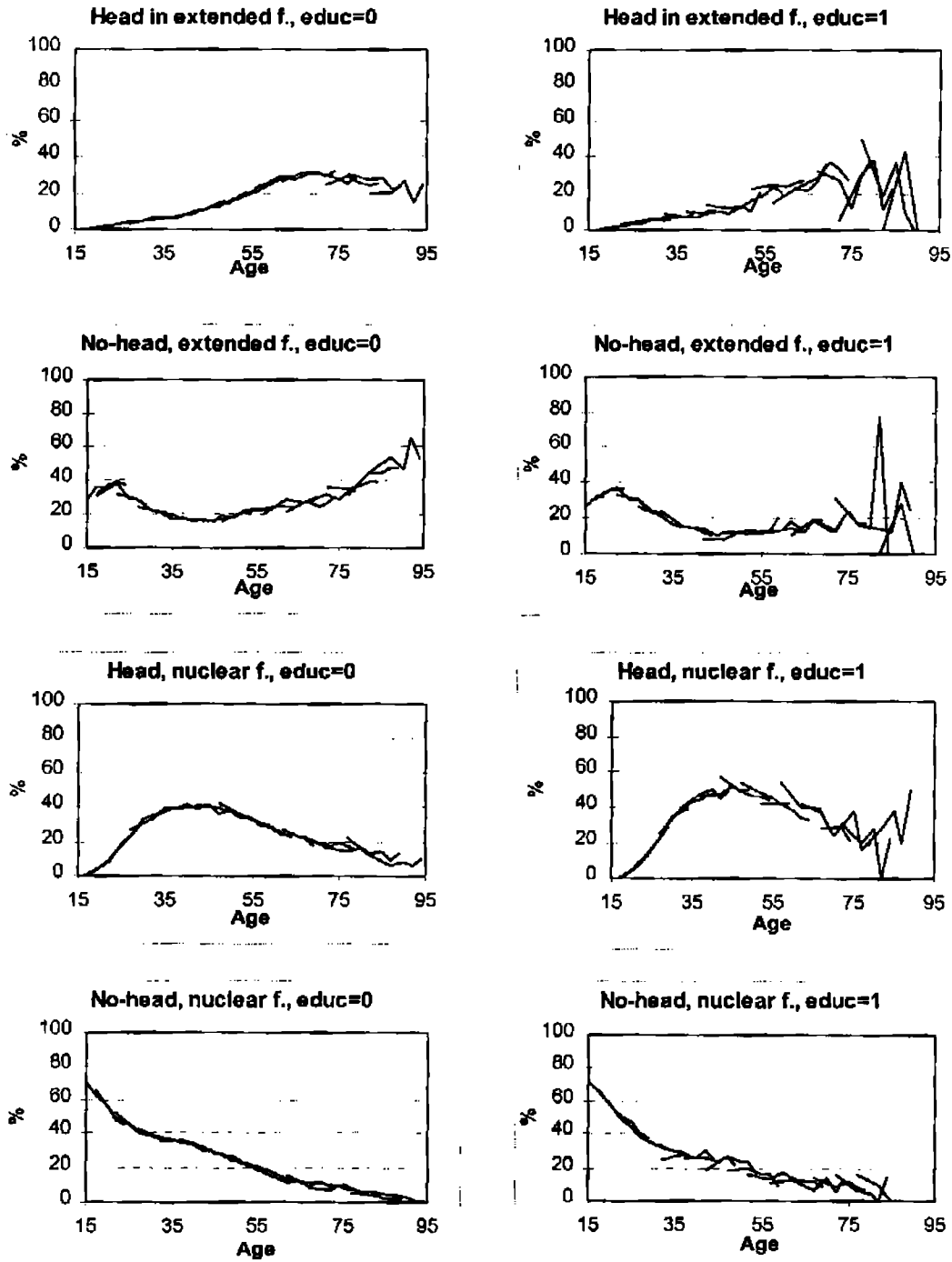
Figure 4 Type of Household
(Percentages)

Extended family

Nuclear family

Other type of family

Figure 5 Heads by Type of Household
(Percentages)

Head in extended family

No-head in extended family

Head in nuclear family

No-head in nuclear family

Finally, we can add another dimension to this analysis by looking also at the level of education. For this purpose we split our sample in two groups. The first one, edu=0, includes cohorts where the head has primary education or no instruction, and edu=1 considers secondary or higher education. In other papers the splitting includes more groups, but we prefer to keep only two definitions since cell size is bigger. In figure 6 we present these results as the proportion of heads and no-heads by type of family and by education level. The most interesting feature of these graphs is that they confirm that as individuals become older their role as head decreases, in particular for those with a lower educational level. In the case of heads with higher education, no only the decrease is less accentuated but the profile is noisier as well. Another interesting feature is that in the case of extended families with lower education, there is a clear tendency the individuals to live in extended families and not to be the head, meaning that this type of individuals need economic support when they get older. On the contrary, in the case of individuals with higher education, we find that an important proportion of older individuals is heads. This is important because, as we said earlier, the households that we observe at one extreme of the age distribution, are households with special characteristics. In this case we see that these households correspond in a greater proportion to heads with higher education, meaning richer.

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Figure 6 Household Heads by Type of Family and Educational Level
(Percentages)

Head in extended f., educ=0

Head in extended f., educ=1

No-head, extended f., educ=0

No-head, extended f., educ=1

Head, nuclear f., educ=0

Head, nuclear f., educ=1

No-head, nuclear f., educ=0

No-head, nuclear f., educ=1

Household size and composition

Our next step is to explore in more detail the size and composition of the Mexican families. In figure 7 we present the family size for the whole sample and by type of household. In general, these profiles have a shape of an inverted "U" and reach a maximum of six members at around 49 years of age for the whole sample and the nuclear family, and seven in the case of the extended family. There is not too much difference in family size when we consider the type of family.

Figure 7 Family Size

Family size

Family size, nuclear

Family size, extended

Family size, educ=0

Family size, educ=1
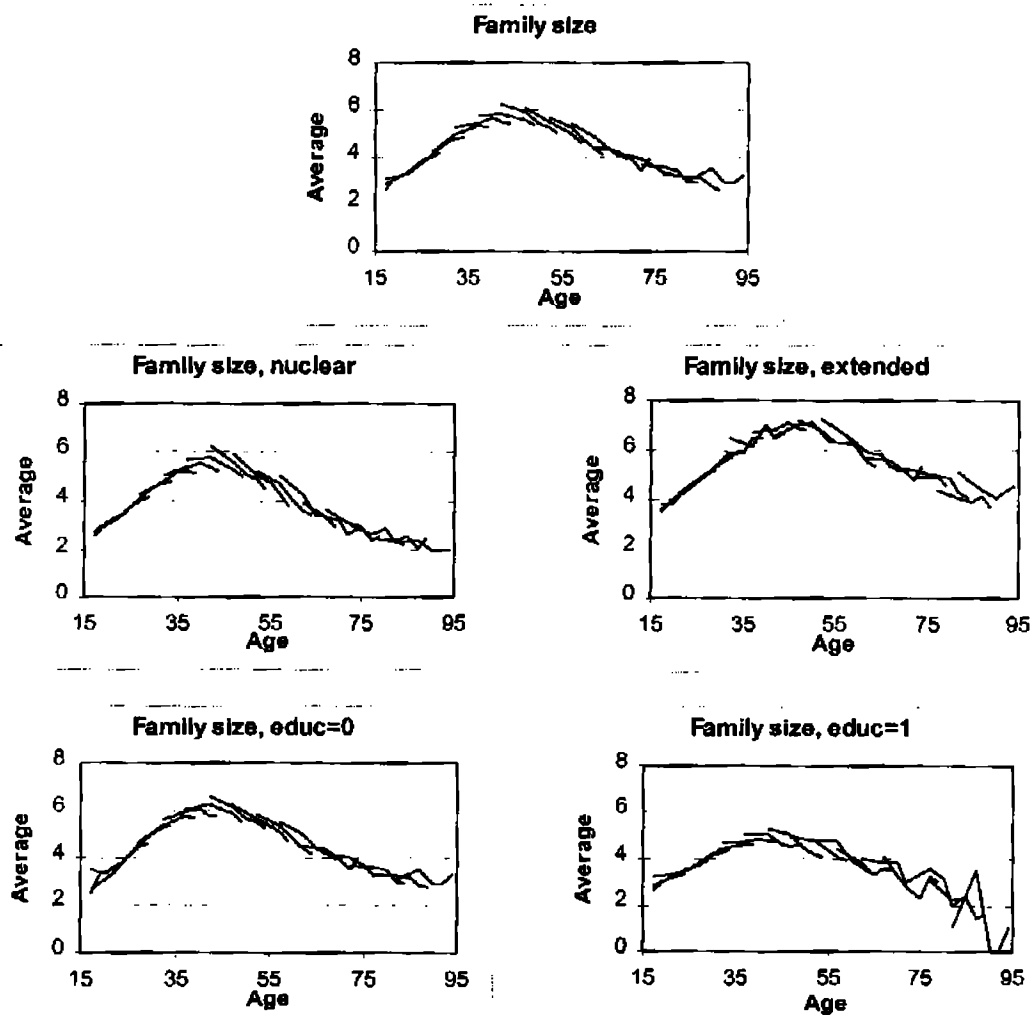
What is more interesting from these graphs is the fact that for cohorts between an age of 35 and 55 we can distinguish a cohort effect, since their profiles shift up. That is, family size tends to be smaller for younger cohorts. This might reflect in part the changes in fertility trends discussed above as a consequence of public birth control programs. It should be remembered that the group age that showed a more drastic fertility reduction was the one between 25 and 30 years old in 1975, and these women are part of the cohorts that show now a decrease in size. Finally, if we split our sample in terms of educational levels, we find more interesting differences in family size. In this exercise, it is clear that cohorts with lower educational levels are much bigger -reaching a maximum of 6.5 members- than cohorts with more education. For the later the maximum number of members is around 5. Also, in this case we find the same cohort effects but for families with higher education, these effects are still present for older cohorts.

By looking at the number of children we can complement the information above. As can be seen in figure 8, on average, Mexican families reach a maximum of around 4 children at a cohort age of 40-45 years. In this exercise we do not present the information by type of family since they are very similar, but if we consider educational level, we have once again a difference between both groups. As expected, families with lower education tend to have more children than families with higher education. Still, we have the same cohort effects mentioned above, but they are more pronounced in the case of the families with more education, suggesting that the impact of the public birth control program was stronger for this group of the population.

Figure 8 Number of Children

Num. of children

Children, educ=0   **Children, educ=1**
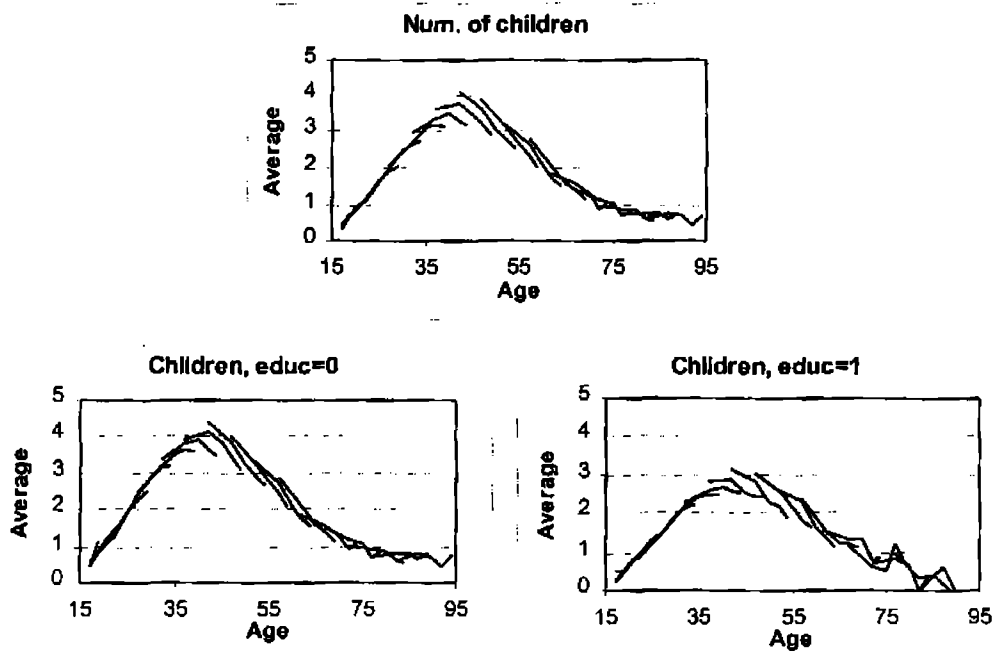
In figure 9 we present the composition of the family by considering its members in terms of their position reported in the surveys: the head, spouse, children and other relatives. What is more interesting from these graphs is that for older cohorts, the most important type of member corresponds to "other relatives". This fact reinforces our analysis about headship meaning that older people tend to move with their children or other relatives or the other way around, but the head turns out to be a younger member of the family.

Figure 9 Family Composition
(Percentages)
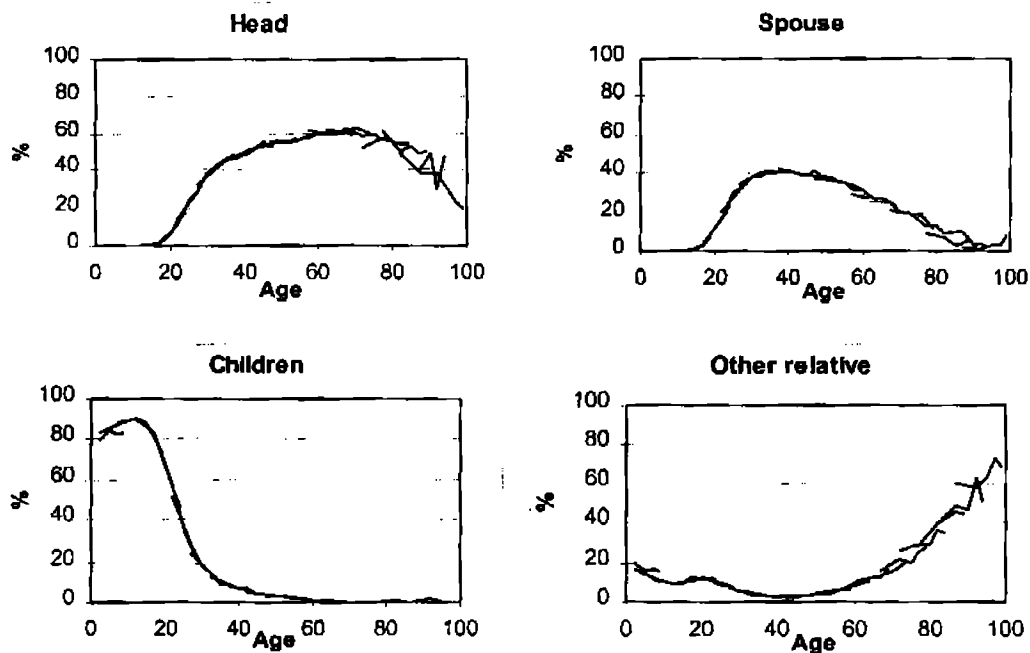
IV Human capital

As mentioned above, during the mid 70's, the Mexican government implemented a broad program to expand public education at all levels. These measures included a program for adult's education, the spreading of the public education system to rural areas, the creation of a system of education at the technological and high school levels and the creation of new universities around the country. As a result of these measures, opportunities for education were expanded, having a particular effect on women. In this section we characterize the education attainment of the Mexican

population. We start looking at the stock of human capital, moving to the returns of education and finally discussing investment in human capital.

The Stock of Human Capital

For this analysis we use as the main variable the average years of completed formal education. This average is computed for individuals only above 14 years of age and not older than the cohort born between 1900 and 1904. Also in this case, we do not consider other types of human capital accumulation. In table 2 we present the stock of human capital for the total sample and for the five survey periods.

Table 2 Schooling Average Whole Sample

Schooling average				
Individuals above 14 years				
Cohort 1984	1989	1992	1994	1996
Overall 5.72	6.46	6.14	6.21	6.59
1980-1984 ----	----	----	----	7.54
1975-1979 ----	----	7.30	7.38	8.19
1970-1974 ----	7.84	8.03	8.18	8.39
1965-1969 7.31	8.52	7.73	7.72	8.11
1960-1964 7.60	8.08	7.08	7.20	7.20
1955-1959 6.86	7.23	6.28	6.28	6.54
1950-1954 6.05	6.18	5.48	5.57	5.53
1945-1949 5.27	5.49	4.73	4.68	4.78
1940-1944 4.56	4.68	4.22	3.96	4.05
1935-1939 3.79	4.09	3.75	3.48	3.27
1930-1934 3.84	3.58	3.16	3.16	2.93
1925-1929 3.12	3.29	2.63	2.73	2.37
1920-1924 2.80	2.98	2.32	2.62	2.38
1915-1919 2.84	2.74	2.34	2.19	2.20
1910-1914 2.67	2.34	2.16	1.85	1.98
1905-1909 2.10	2.45	1.67	1.94	1.69
1900-1904 1.52	1.57	0.89	0.76	0.82

As has been shown in other studies, the stock of human capital typically does not change very much over the life cycle, except during the first years when individuals invest in their education (school). Also the stock does not change very much year after year, except for younger cohorts who did not complete their education. Therefore, we think that in this case the differences observed in the stock of human capital represent mainly cohort effects. Following this interpretation, table 2 shows the large differences in education attainment of different cohorts. For example, the five older cohorts have, in average, less than 3 years of schooling, while for the five younger cohorts this number is above seven years. We also see that the most important changes in this trend can be located for cohorts born after 1960, which are

the ones who probably were the most affected by the public policy measures implemented during the 70's. This latter change can be related to a time effect. Although we are dealing with stocks and not flows, the important increase in the average stock for the whole sample between 1984 and 1989 can be associated to the expansion of educational opportunities at the end of the 70's. In any case, it is important to say that this increase can be explained principally by the educational effort of younger cohorts.

In tables 3 and 4 we present schooling average for the total sample separating by gender. As expected, the stock of human capital is higher in the case of men. But what is more interesting from this information is that the differences between males and females for younger cohorts are much smaller than in the case of older cohorts. In this case, we think that the closing of the educational gap between males and females for younger cohorts reflect the spread of educational opportunities after the 70's. In the case of women, there is also the effect derived from the reduction in fertility, allowing women to stay for a longer period of time, in school.

Table 3 Schooling Average Women

Schooling average				
Women				
Cohort	1984	1989	1992	1994	1996
---	---	---	---	---	---
Overall	5.33	6.18	5.93	6.02	6.35
1980-1984	—	—	—	—	7.51
1975-1979	—	—	7.32	7.47	8.13
1970-1974	—	7.93	7.94	8.15	8.36
1965-1969	7.18	8.37	7.59	7.57	7.94
1960-1964	7.10	7.79	6.74	6.88	6.90
1955-1959	6.34	6.64	5.94	5.77	5.88
1950-1954	5.51	5.59	5.00	5.24	5.01
1945-1949	4.78	5.06	4.21	4.25	4.26
1940-1944	3.93	4.40	4.02	3.62	3.71
1935-1939	3.57	3.65	3.47	3.00	2.93
1930-1934	3.46	3.27	2.83	3.13	2.62
1925-1929	2.71	2.94	2.31	2.51	2.01
1920-1924	2.49	2.70	2.14	2.24	2.27
1915-1919	2.58	2.39	2.22	2.04	2.10
1910-1914	2.56	2.19	1.66	1.92	1.95
1905-1909	2.03	2.34	1.52	1.92	1.63
1900-1904	1.74	1.53	0.88	0.89	0.50

Table 4 Schooling Average Men

Schooling average				
Men				
Cohort	1984	1989	1992	1994	1996
Overall	6.13	6.76	6.37	6.41	6.85
1980-1984	-----	-----	----	-----	7.57
1975-1979	-----	-----	7.27	7.29	8.25
1970-1974	----	7.75	8.13	8.22	8.43
1965-1969	7.43	8.68	7.89	7.89	8.29
1960-1964	8.14	8.39	7.43	7.55	7.53
1955-1959	7.40	7.91	6.64	6.83	7.26
1950-1954	6.61	6.81	6.00	5.92	6.08
1945-1949	5.81	5.95	5.23	5.15	5.33
1940-1944	5.21	4.95	4.42	4.31	4.41
1935-1939	4.01	4.59	4.04	3.93	3.63
1930-1934	4.27	3.91	3.48	3.18	3.27
1925-1929	3.51	3.67	3.00	2.95	2.76
1920-1924	3.16	3.29	2.48	3.03	2.49
1915-1919	3.13	3.18	2.48	2.36	2.31
1910-1914	2.80	2.49	2.78	1.77	2.01
1905-1909	2.16	2.57	1.79	1.97	1.76
1900-1904	1.21	1.63	0.89	0.58	1.10

Returns to Schooling

Another dimension to analyze human capital is the one related to the returns in education. In this section we present a brief characterization of the evolution of these returns for the Mexican case. With respect to this variable, we can consider several ways to measure them. In this paper we use the so called "mincerian equation" to obtain the estimates (Mincer, 1974). In this methodology we estimate equations where the dependent variable is the natural logarithm of income or wages and the regressors are the variables that measure schooling, labor experience, labor experience squared, natural logarithm of hours worked and a set of dummy variables that indicate gender and area of residence. The schooling variables are years of education. The experience variable, actually the potential labor experience variable is measured like usual: age, minus years of schooling, minus 6. In all the cases presented we restrict the estimation to include only individuals who worked for at least one hour in the previous week and have a positive income. To estimate the returns we considered all type of occupations and positions in the job. That is, we included employers, employees and self-employed. With respect to income we included all sources of income, except capital income and non-monetary income.

In table 5 we report the returns to an extra year of education dividing our sample by educational levels, the year of the survey and by gender. In general, we see that the returns are an increasing function of the level of education. That is, the returns to secondary education are higher than to primary education, being the returns to

superior education the highest. It is interesting to see that over the whole period considered in this analysis the differences in these returns increased, but in particular the returns to higher education. This evolution can be explained by the structural changes that have occurred in the Mexican economy, in particular the move to a more open and competitive economy, with the consequence of a possible increase in the demand for better educated and more qualified workers. In fact, there is a discussion in Villagómez (1998) that offers some empirical evidence about the positive impact of the opening of the economy on qualified labor demand compared with non-qualified labor. It is important to note that the returns did not decrease during the years of economic crisis in 1995-96. We believe this means that better educated individuals were able to cope better with the crisis.

Table 5 Returns to Schooling by Gender

Rates of return to schooling by gender*						
	Overall	1984	1989	1992	1994	1996
Primary						
Overall	10.7	14.6	9.5	10.8	9.8	9.0
Women	11.2	11.9	10.4	10.1	12.5	10.8
Men	10.2	13.6	10.1	11.3	10.7	8.7
Secondary						
Overall	13.9	14.5	11.1	13.3	14.7	14.3
Women	15.6	16.8	12.2	15.5	17.8	16.1
Men	12.1	12.4	10.4	12.4	12.2	13.9
Superior						
Overall	17.5	9.6	14.3	17.0	21.0	20.0
Women	17.1	8.6	14.3	15.9	20.3	19.7
Men	19.0	13.3	16.2	19.3	21.7	19.5

*For all types of workers and all types of income

Another interesting feature of this table is that in general, returns for females have been higher, showing an increasing tendency during the period. This is important since higher educational level for females and higher premium for the investment in education can only produce higher labor participation due to the increased opportunity cost of not working.

To further analyze this issue, in tables 6 and 7 we investigate if there are age or cohort effects on the return on education. First we split the whole sample by age and second by cohort. In this case we dive our sample in three levels of education, primary, secondary and superior. We also see that the highest returns correspond to the younger cohorts, especially in relation to the higher levels of education.

Table 6 Rates of Return by Age

Rates of return to schooling by age group*					
Primary		Secondary		Superior	
12-40	41-97	12-40	41-97	12-40	41-97
Total	10.18	10.43	14.18	12.84	18.41	13.15
1984	12.52	13.75	16.76	9.60	11.30	7.66
1989	10.59	9.53	12.22	7.98	14.84	13.91
1992	10.72	10.23	13.92	13.17	17.42	14.61
1994	11.42	10.71	14.88	15.65	22.22	12.19
1996	8.20	10.29	15.10	14.26	20.64	14.28

*For all types of workers and all types of income

Table 7 Rates of Return by Cohort

Rates of return to schooling by cohort						
Cohort	Schooling	1984	1989	1992	1994	1996
1965 - 1984		21.1	11.6	10.9	9.8	7.2
1940 - 1964	Primary	12.9	10.4	11.4	12.2	10.3
1890 - 1939		14.4	10.2	9.3	11.1	10.3
1965 - 1984		27.4	14.4	15.2	16.1	15.5
1940 - 1964	Secondary	14.8	10.7	13.6	14.7	14.3
1890 - 1939		9.0	8.1	12.2	13.1	14.1
1965 - 1984		—	19.3	20.7	24.8	23.5
1940 - 1964	Superior	9.7	13.9	16.2	18.2	16.8
1890 - 1939		8.3	13.4	16.2	14.5	14.2

What we can conclude from this subsection is that: 1) The average year of education is 6.3, which is low for international standards. It has increased from 5.7 in 1984 to 6.6 in 1996, but the increase can only be explained by the educational effort of younger cohorts. 2) The returns to education have increased from 1984 to 1996 for secondary and superior education. 3) Returns for women have been higher during the 90's.

Investment in human capital

Finally, in this section we explore the trends in human capital investment. That is, we want to characterize the changes in enrollments and educational attainments of the children. It would be desirable to study these effects by using a cohort approach,

unfortunately this information is only provided by the last three surveys, leaving us with only three points and making the interpretation of the cohort profiles more difficult. In any case, we still present our results in a more simple way since school enrollment ratios offer another perspective of the educational attainment of new cohorts. In table 8 we present the percentage of individuals in each specific group of age who are attending school. We consider individuals from 5 to 25 years old, divided in five groups. We only consider individuals who are relatives of the head but not the head or the spouse.

Table 8 School enrollment

School enrollment				
Percent of individual in age group who are students				
Age	Overall	1992	1994	1996
5 - 6	80.4	72.7	80.8	86.3
7 - 11	96.2	94.9	96.3	97.0
12 - 15	76.2	74.4	75.8	78.2
16 - 18	39.4	38.6	37.3	42.2
19 - 25	20.4	19.7	20.1	21.1

From this table, it is clear that school enrollment has increased over the sample period. Table 9 reports school enrollment for the same groups of age as above, but we now split our sample by the educational level of the household head. As a general feature we find that households where the head is more educated, are investing more in education. However, there are no significant changes over the period, except for the case of the group between 5 and 6 years old and, in particular for those with lower education.

Table 9 School enrollment

School enrollment								
	Overall		1992		1994		1996	
Age	Educ=0*	Educ=1*	Educ=0*	Educ=1*	Educ=0*	Educ=1*	Educ=0*	Educ=1*
5 - 6	76.0	90.8	68.6	84.6	76.5	91.2	82.3	94.5
7 - 11	95.1	99.2	93.7	98.9	95.4	99.2	96.1	99.3
12 - 15	71.7	93.8	70.1	93.8	71.2	94.3	73.6	93.5
16 - 18	31.4	73.8	30.6	75.9	30.1	70.8	33.5	74.7
19 - 25	14.4	46.8	14.6	44.9	14.2	48.8	14.6	46.5

* Educ=0 or 1 indicates the educational level of the household head

V. Labor Force Participation

In this section we analyze the life cycle labor force participation of different individuals of the Mexican society. We characterize the behavior of different groups dividing by gender and by education level. But in particular, our analysis emphasizes the evolution of women labor force participation, connecting it to the changes in fertility and educational attainments discussed above. It is our believe that this is one of the most significant changes observed during the last decades in the Mexican labor market, as has happened in other Latin American countries. Labor supply can be explained by labor participation and hours worked. We deal basically with the first issue, although we present some results for the number of hours. Labor force participation is easier to analyze when we rely on information of the individuals. Therefore we start our analysis by looking at participation over the life cycle of individuals cohorts rather than cohorts of household heads. Typically, labor force participation can be explained or is correlated, with variables like age, gender, educational attainment, marital status, and the presence of children, among other variables. Figure 10 presents the percentage of individuals in each cohort-year that participate in the labor market and the average number of hours worked. It is clear that in this case, age produces an important effect on participation, the profile has the form of an inverted "U". Cohort effects are also important, younger cohorts tend to participate more in labor markets as expected. A similar pattern can be found with respect to hours worked per week.

Figure 10 Labor Force Participation and Hours Worked per Individual
(Percentages)
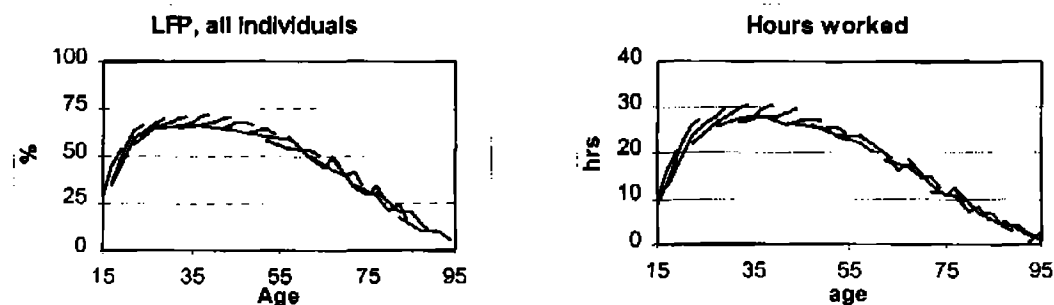
If we split our sample by gender, we still keep the inverted "U" form, but now we find some interesting differences. In figure 11 we present these results. As expected, participation for males is higher, but it is hard to distinguish substantial cohort effects. On the other hand, the profile of female participation is flatter, giving a

lower participation rate, but in this case we see important cohort effects. There is a clear tendency for younger women to increase their participation in the labor market. These effects are also clear when we look at the results on the average hours worked. But in this graph we also see that for women between 20 and 40 years old, there is an important increase in hours worked during the 90's. This fact must be connected to the decrease in fertility, the increase in women's education and the higher rate of returns on their education, as discussed above.

Figure 11 Labor Force Participation of Individuals by Gender
(Percentages)
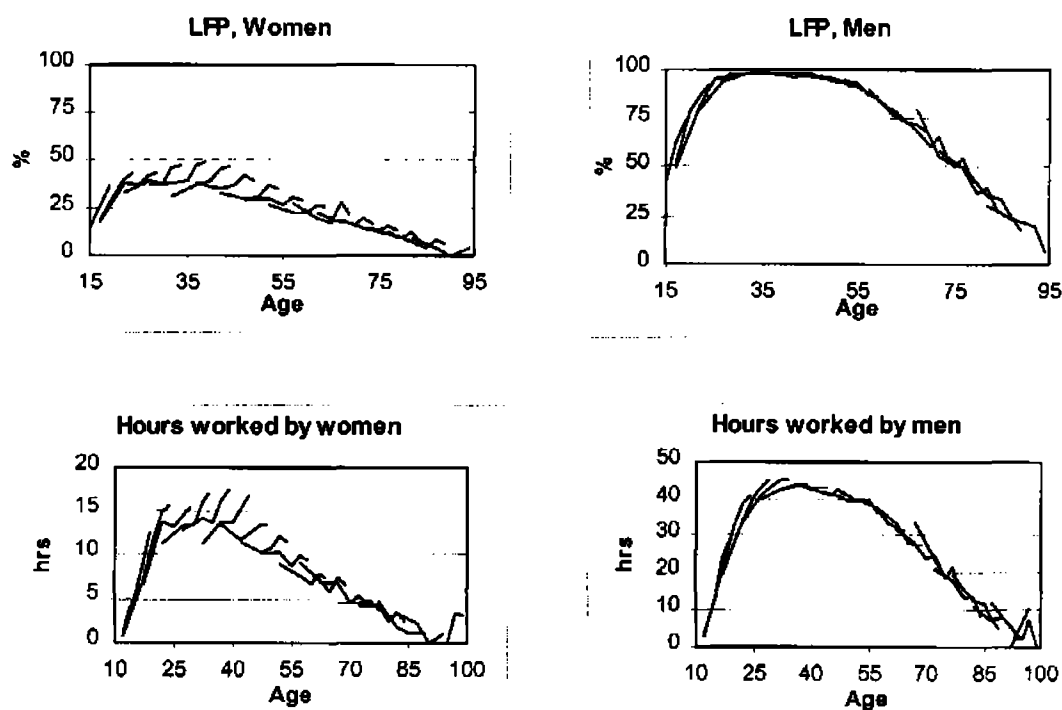
To further analyze this issue, we consider the splitting of our sample by gender and educational level and present these results in figure 12. In the case of men, we do not find substantial differences between educated and non-educated individuals. Educated individuals tend to incorporate later to the labor market and the cohort effects for younger individuals are smaller. For females, participation is higher for women with higher education, over 50 % for younger individuals. But in the case of women with lower education, although their participation is lower, we find substantial cohort effects. That is, younger women with primary or lower educational level are participating more in the labor market compared with older women. At first, this result seems strange since we mentioned before that returns

from higher education were higher, but looking more carefully at our information, we can explain this behavior by the following argument. The profile for this group of women shifts up substantially for the last two surveys and it is for these two years, 1994 and 1996, that we find these rates of return for education at the primary level for women were particularly higher with respect to the rates for men, at the same level. In any case, the increased labor force participation of women is explained by the increase in educational attainment and by the increase in participation of low educated women.

Figure 12 Labor Force Participation by Gender and Educational Level
(Percentages)
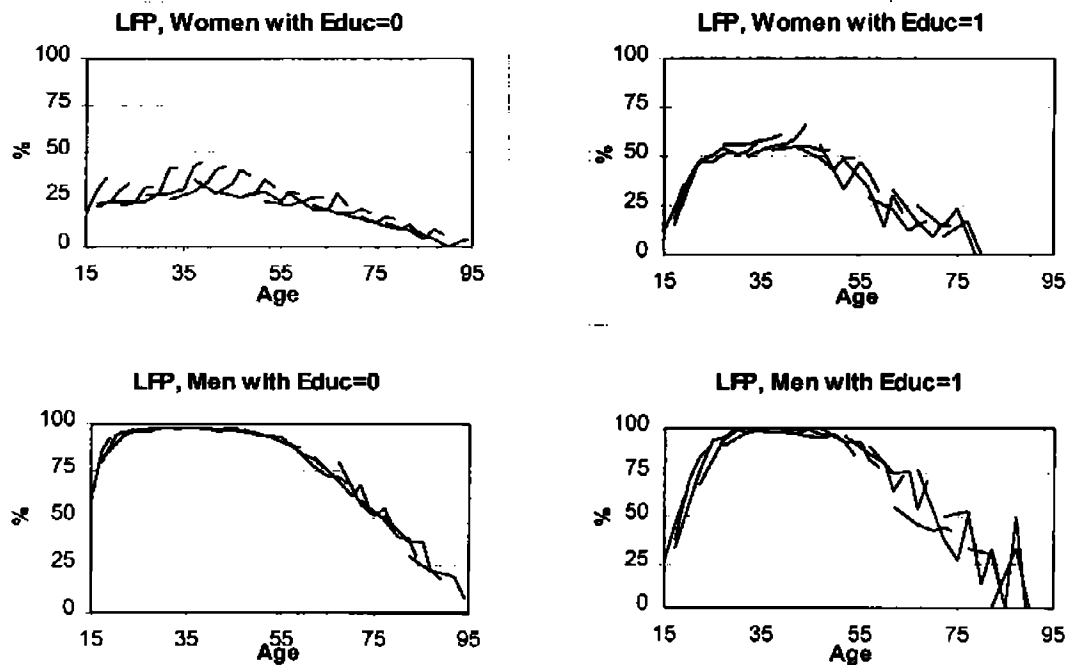
Another interesting question relates to the type of family and household composition and their relationship with labor force participation. That is, we want to see which has been the role of the extended family in terms of women labor force participation, as well as the role of women's position in the household. First, in figure 13 we present the participation of women in the labor market depending on the type of family. As expected, women in extended families have a higher participating rate. This result has been documented in Wong and Levine (1992), where they found that the presence of a woman in addition to the mother in the household can be taken as a reduction in the cost of child care in Mexico. But what is more interesting is that in

the case of nuclear families, there is an important upward shift for younger cohort of women. That is, it seems that in this case the extended family still plays a traditional role in helping women to participate in the labor market, but recent trends show that women in nuclear families are increasing their participation. Although there might be cohort effects as already discussed, it is possible that there are some time effects associated to the need to increase family income during hard economic times throughout the 80's and after the crisis of 1994.

Figure 13 Women Labor Force Participation by Type of Family
(Percentages)
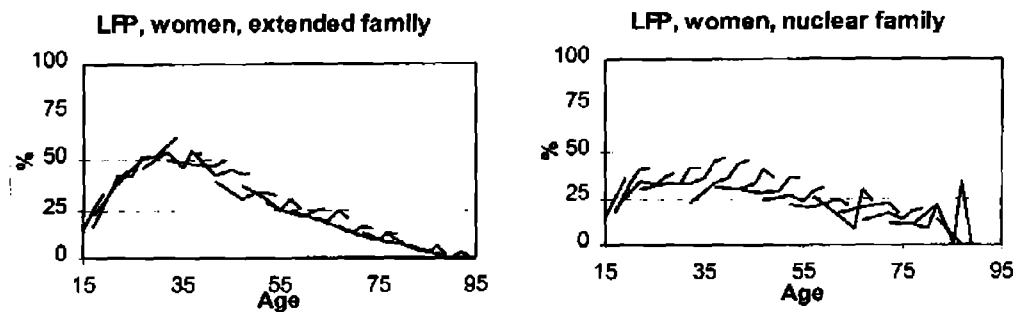
Finally, to complement the analysis above, we analyze labor force participation of the wife (husband) of household head. For this purpose we calculate the percentage of the households in every cohort-year where the partner of the head participates. The results are presented in figure 14 for the total sample and separated by educational level. In this case, it is clear that there is an important change in terms of an increase in labor force participation for the spouse of the family head. This event is generalized among all cohorts, although more pronounced for younger cohorts. Second, this change is more important for cohorts with lower educational level. That is, in the case of cohorts with higher education, labor force participation of the spouse has been higher while in the case of lower education cohorts, there is a more pronounced upward shift in the profile. Again, this fact can be explained by the need to complement family income as a consequence of hard economic times, as mentioned before. Therefore, we think that in the case of the increase in women labor force participation, the expansion in education opportunities and in their rates of returns to education, plays a more important role as an explanation factor, than fertility reduction and decrease in family size do.

Figure 14 Households with Spouse in Labor Market

Families with spouse In LM

Fam. with spouse In LM, Educ=0

Fam. with spouse In LM, Educ=1
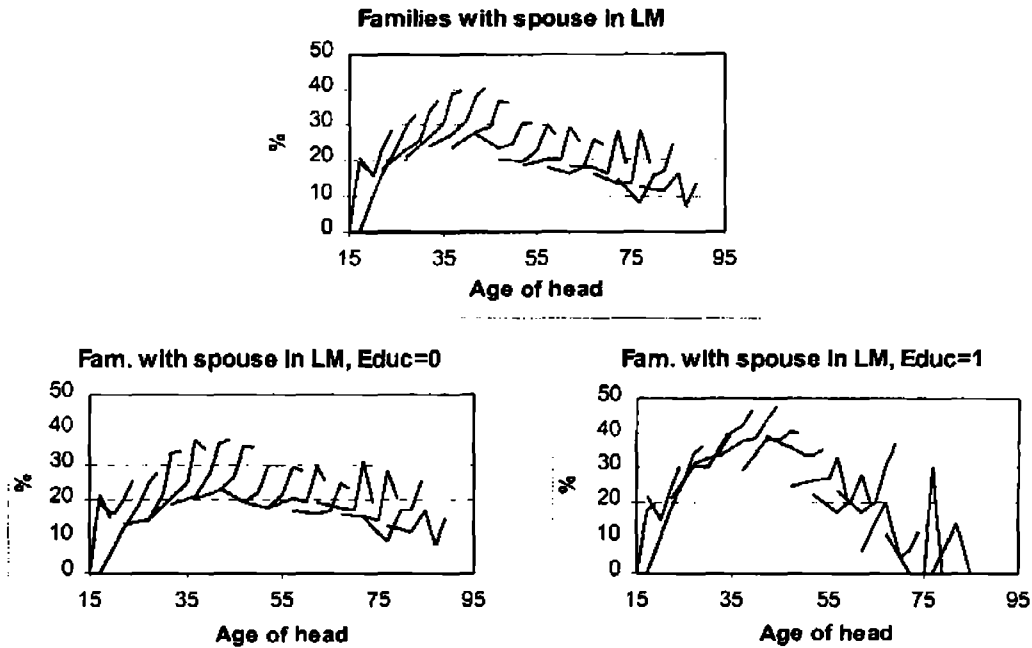
VI. Consumption and Saving Behavior

Up to here, we have characterized some of the most important changes related to family size and family composition, education attainment and labor force participation. It is expected that these changes have affected consumption and saving decisions of Mexican families. In this section we try to connect these demographic and socioeconomic changes to recent saving behavior at the household level. This is important since saving behavior has been an issue widely discussed in Mexico during the last decade. But it is only recently that the discussion has been enriched with studies based on micro data. Nevertheless, there are still few studies about this issue at the household level. Two papers dealing with demographic factors and saving behavior in Mexico that are worth mentioning are Isbister (1973) and Nungent and Gillaspy (1983). The first one finds that a program of birth control may affect the aggregate rate of saving, increasing it over the first several decades and lowering it once a higher standard of living has been attained. The second paper analyzes the savings reduction effect of old age pension. In particular, they consider this effect indirectly through fertility behavior of Mexican rural households. That is, these households consider children (assets) as the most satisfactory form of old age

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security. The introduction of a formal old age pension program might affect negatively the fertility of these rural households and that is what they find in their empirical analysis for the Mexican case. In the case of studies using micro data, to our knowledge the only ones that we can mention are Villagómez and Zamudio (1997), Székely (1998), Attanasio and Székely (1999) and Solís and Villagómez (1999). These papers have attempted to quantify saving rates at the household level and in general they use a cohort analysis based on a synthetic panel. The first paper examines whether observed consumption and saving profiles in Mexico are consistent with some implications of the basic life cycle theory, but there is not attempt to control for demographic or other socioeconomic factors. The second paper tries to measure household saving rates and to identify who saves and how much. Attanasio and Székely (1999) offer some evidence on the level and distribution of household saving. In their analysis, these authors control for cohort effects, changes in family structure and for differences along the income distribution. Finally, Solís and Villagómez (1999) also use a cohort analysis, but their focusing is on the possible effect on savings derived from the existence of a PAYG pension system. These authors also perform their analysis by controlling for some demographic variables. Our study is closely related to this work and attempts to complement and expand our understanding of household saving behavior in Mexico. It should be remembered that the private saving rates in Mexico were particularly high during the 80's, but after 1988 they started to decline substantially.

As mentioned above, in this study we include households between 15 and 85 years old. Although we use both consumption definitions, in some cases we present our analysis only for one definition since results for both cases are very similar. On Table 10 we present the aggregate values for the saving rates (including average, median and standard deviation) for our five surveys. In general, these rates are higher than the ones reported in Attanasio and Székely (1999). The differences might be due to different consumption definitions, in particular the treatment of education and health expenditures. A detailed description (by item and code) of our consumption definitions, as well as the price index used in this study is available from the authors upon request. What is more disturbing is that, unlike Attanasio and Székely (1999), we find that there is a decrease in the saving rate between 1989 and 1992. This is consistent with the evolution of aggregate private saving from national accounts. In any case, since private savings include personal and corporate savings, we need to know what happened to the latter. Unfortunately we do not have data of corporate savings.

From this information, we find that aggregate household saving increased during the 80's, and declined in 1992. After a recovery in 1994, there is again a drop in 1996. Nevertheless, it still seems that aggregate household saving in Mexico is high compared to other countries.

Table 10 Aggregate Saving Rates

| Aggregate Saving Rates			
S1	Mean	Median	Std. Dev.
1984	0.112	0.062	0.527
1989	0.155	0.073	0.839
1992	0.136	0.046	0.577
1994	0.154	0.066	0.589
1996	0.103	0.016	0.699
S2			
1984	0.183	0.114	0.541
1989	0.234	0.131	0.848
1992	0.219	0.108	0.614
1994	0.239	0.128	0.626
1996	0.206	0.086	0.734

Cohort Profiles

To characterize the life cycle profiles on savings of Mexican households and their difference across different groups, we will start our analysis by looking at the behavior for the whole sample of cohorts and for our two consumption definitions. In figure 15 we present the age consumption and income profiles.

Figure 15 Income and Consumption: Whole Sample
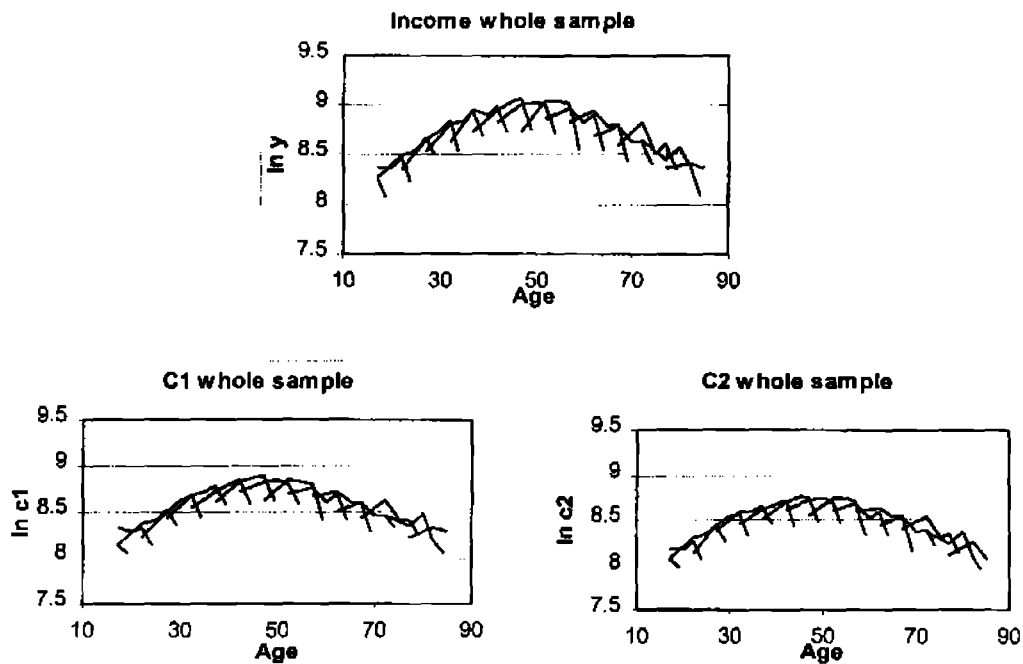
As it has been found in other studies, income profile follows the pattern suggested by the LCM, increasing up to middle age and then bending down at old ages, but the consumption profile follows the same pattern, independently of the definition used. As a first impression, we do not find any shift in the profiles that suggest a relevant cohort effect. As has been mentioned in this literature, the consumption and income profiles as the ones presented in figure 15 can be misleading if we do not control for several demographic and socioeconomic factors. In this case, family size or the number of children is relevant, given the expenditure that goes with them and that affects consumption and savings during this phase of the life cycle. To control for these factors, it would be desirable to use an adult-equivalent scale, but this is not available for our study. Instead of using a per-capita approach as in Attanasio and Székely (1999), we scale our consumption and saving data using an index that we construct arbitrarily, assigning the value of 0.3 for each child and 0.7 for second or subsequent adults. These values are close to those used in similar studies and discussed in Deaton (1997). This is a simple exercise and should be taken with caution. In Figure 16 we present the consumption profiles after applying our index.

Figure 16 Scaled Consumption profiles
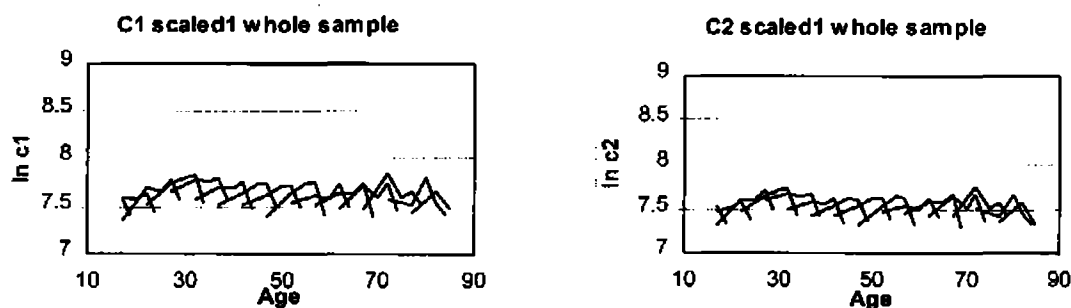
As expected, consumption profiles are much flatter after scaling for family size and structure. In any case, what is clear from both figures is that, as a first impression, there might be an important time effect in 1996 since consumption decreases systematically for all cohorts. We will come back later to this effect. Before that, we present in figure 17 the saving profiles, S1 and S2, derived from the scaled consumption and income profiles. From these graphs, it is clear that as a consequence of the close tracking of income and consumption over the life cycle, the saving profile does not take a pronounced hump-shaped form as suggested by the model, although the profile is closer to this pattern.

Figure 17 Saving Rates Profiles
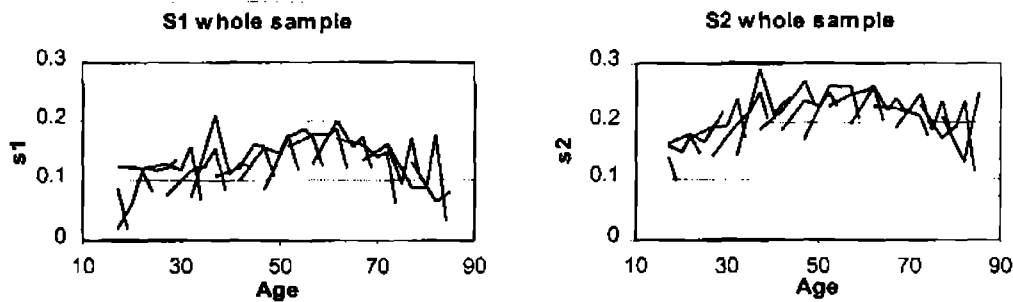
In the case of S1, the saving rate is lower and much flatter for younger cohorts until they reach an age of around 40 years. After this age, the profile rises until the household head reaches an age of around 70 years, bending down after this point. In the case of S2, the hump-shaped pattern is clearer since saving rates for younger cohorts tend to increase faster. The difference between S1 and S2 can be explained by the fact that our second definition excludes expenditures on health and education, which usually are higher for younger families during this part of their lifetime. Still we find a systematic decrease of the saving rates in 1996 for all cohorts, with the exception of the cohort where the household head is between 25 and 30 years old. We think that this behavior reflects a time effect as a consequence of the deep economic crisis faced by the Mexican economy in 1995 and 1996. Later in this paper we try to decompose cohort, age and time effects to further discuss this issue. Before showing these results, we present the estimated measures of average saving rates, S1 and S2, by cohort and surveys in tables 11 and 12.

### Table 11 Average Saving Rates by Cohort (S1)

Year of Birth	Cohort	1984	1989	1992	1994	1996
1975-1979	1	-	-	-	0.09	0.02
1970-1974	2	-	0.02	0.06	0.12	0.08
1965-1969	3	0.12	0.12	0.12	0.12	0.13
1960-1964	4	0.12	0.13	0.12	0.16	0.07
1955-1959	5	0.08	0.12	0.12	0.15	0.09
1950-1954	6	0.07	0.21	0.11	0.13	0.12
1945-1949	7	0.11	0.12	0.16	0.16	0.11
1940-1944	8	0.10	0.15	0.15	0.18	0.12
1935-1939	9	0.09	0.17	0.19	0.17	0.12
1930-1934	10	0.16	0.18	0.18	0.19	0.12
1925-1929	11	0.13	0.20	0.16	0.17	0.12
1920-1924	12	0.17	0.16	0.14	0.15	0.06
1915-1919	13	0.13	0.16	0.09	0.17	0.10
1910-1914	14	0.16	0.09	0.09	0.18	0.03
1905-1909	15	0.13	0.07	0.08	-	-

Table 12 Average Saving Rates by Cohort (S2)

		S2 %				
Year of Birth	Cohort	1984	1989	1992	1994	1996
1975-1979	1	-	-	-	0.14	0.10
1970-1974	2	-	0.16	0.15	0.18	0.15
1965-1969	3	0.16	0.18	0.17	0.19	0.22
1960-1964	4	0.17	0.19	0.19	0.24	0.17
1955-1959	5	0.14	0.20	0.22	0.25	0.21
1950-1954	6	0.14	0.29	0.21	0.23	0.24
1945-1949	7	0.19	0.22	0.25	0.27	0.23
1940-1944	8	0.19	0.23	0.23	0.25	0.23
1935-1939	9	0.17	0.26	0.26	0.26	0.21
1930-1934	10	0.23	0.25	0.25	0.26	0.20
1925-1929	11	0.20	0.26	0.22	0.24	0.21
1920-1924	12	0.23	0.22	0.22	0.21	0.18
1915-1919	13	0.19	0.24	0.18	0.24	0.18
1910-1914	14	0.23	0.17	0.19	0.24	0.12
1905-1909	15	0.21	0.13	0.25	-	-

Next, we attempt to decompose age, cohort and time effects for the saving profiles of the whole sample. For this purpose we use the same technique suggested by Attanasio (1998) as well as his identification assumption. That is, since it is not possible to separate the age, cohort and time effects, we use as an identifying assumption the idea that the linear trends observed in the data can be attributed to age and cohort effects. Therefore we regress the saving rate on a 5th order polynomial in age and cohort dummies. We include time dummies but impose the restriction that their coefficients are constrained to sum up to zero and to be orthogonal to a linear trend. We do this exercise only for S1, since results are similar for S2. The smoothed profiles are presented in Figure 18 together with the cohort effects derived from this exercise.

Figure 18 Saving Rates (S1) by Cohort Smoothed and Cohort Effects
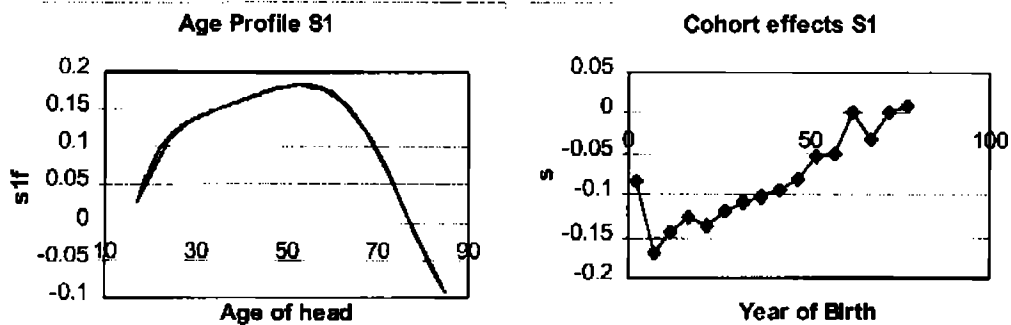
These graphs show in a more clearly way the age profile of Mexican households, bringing out the humped-shaped pattern already discussed above and suggested by the LCM. For younger cohorts up to 30 years of age, the saving rate increases rapidly slowing down after that point and reaching a maximum at around 60 years of age. Then, the profiles bend down at an accelerated rate. If we turn now to the cohort effects presented in figure 18, we find that systematically younger cohorts are saving more than their older counterparts. This is a different result as the one reported by Attanasio and Székely (1999) for the whole population. The result that younger cohorts are the ones that seem to be saving more than the older cohorts can be explained by the combination of three facts that have affected younger cohorts behavior. These factors are a consequence of aggressive public policies implemented during the 70's and that affected fertility trends and educational opportunities. First we have a tendency to a reduction in the number of children for younger cohorts as has been documented before, together with an increase in women labor force participation. In this case we are not implying any kind of causality between these two factors since it is known that both are endogenous decisions for a household. But what we think is important, is that if the public birth programs and responsible parenthood program implemented during the 70's had an important effect in family behavior. This effect must be translated into a reduction of the number of children and also, that in most cases these children are planned. In this case, we can think that parents may save more in anticipation of extra future consumption needs. Therefore, younger cohorts show a greater contribution to the saving rate than older cohorts. Still we have the educational factor that reinforces this behavior. More educational opportunities and higher returns means that younger cohorts with more years of education, are in a better position in the labor market compared with older cohorts. Since we already show above that this effect was particularly important for women, it might be the case that the incorporation of younger educated women to the labor market translated in higher financial savings for younger cohorts. This is particularly relevant for households where this event constitutes a second source of income, as has been shown for the Mexican case.

If the educational factor has played the role already mentioned, we expect to find different saving behavior among educated and non-educated households. To further analyze this issue, we control now for education level. In Figure 19 we present the household saving rates profiles (S1) by cohort and our two previous educational level groups, Edu=0 and Edu=1. The graphs are very similar to the one obtained, for example, in Attanasio and Székely (1999). The saving rates for the low education group is lower than those observed for the group with higher education. Moreover, the saving profile for households with lower education shows a slight decrease for younger cohorts, bending up after an age of 35 for the household head. In the case of household with higher education, although saving rates seem to be higher, the profile is much noisier, maybe because the cells size is smaller. In any case, there are some interesting features that can be observed in this graph. First, the saving rate in 1996 for some cohorts does not decrease, as it has been the case in almost all

profiles presented in this study. Second, the saving rates for younger cohorts do not decrease as in the case of households with lower education.

Figure 19 Cohort Saving Rates by Education Group
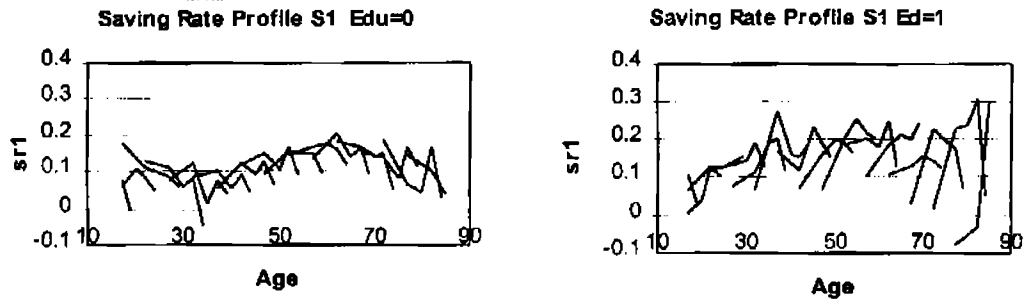
To further analyze the saving behavior of these two groups, we repeat the decomposition exercise by smoothing these profiles and looking at the age and cohort effects. Again we maintain the same identification assumption as above. In the case of households with lower education we used a 4th order polynomial while for the group with higher education we used a 5th order polynomial. These results are presented in figure 20.

Figure 20 Age and Cohort Effects by educational level

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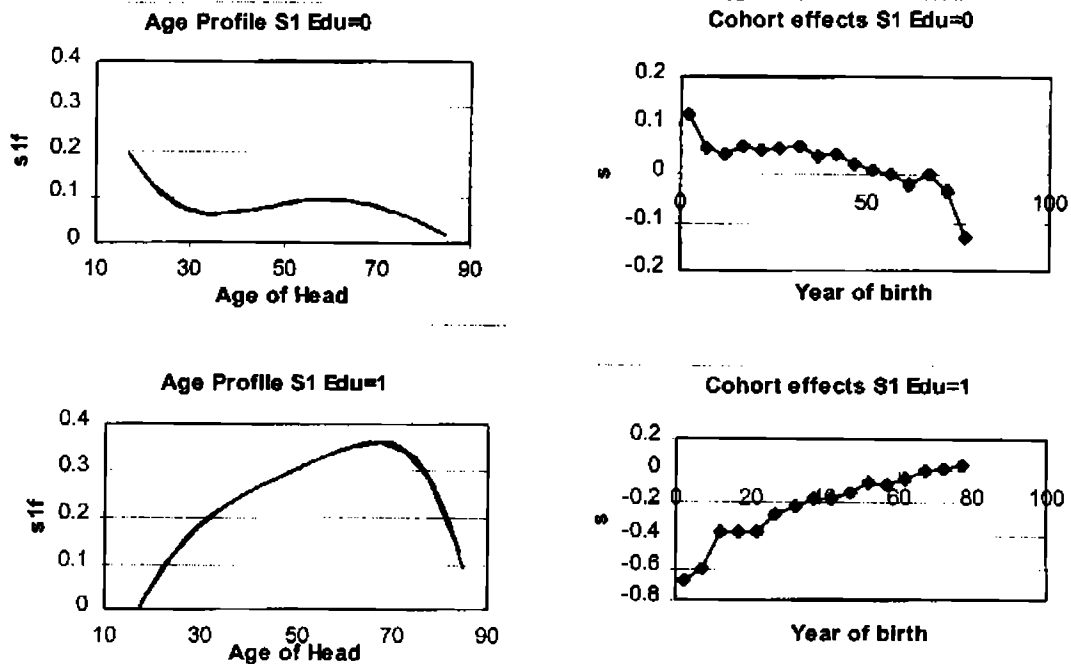
The results presented in the graphs above are very interesting. First, for the households with lower education, the age profile shows in a clearer way how saving rates decrease for younger cohorts reaching a minimum at around 30-35 years of age of the head and then bending up until the head has around 65 years old. In the case of households with higher education, the behavior of younger cohorts is completely different. Saving rates increase at a faster rate until the head has around 35 years, and then the speed of increase slows down until the head has around 70 years of age. After this point, saving rates start to decrease. But what is more important is the behavior of cohort effects of both groups. In the case of households with lower education, cohort effects decrease with the year of birth of the head. That is, older cohorts contribute more to the saving rate than their younger counterparts. This effect is opposite to the behavior observed for the whole sample but it is congruent with our explanation about household saving behavior. That is, the expansion of educational opportunities that have increased the stock of human capital of younger cohorts and the higher returns, in particular for higher level education, have put younger educated cohorts in a better position in the labor market than older cohorts and younger cohorts with lower education. This is important for the case of the Mexican economy that has faced important structural changes since the end of the 80's after the opening and liberalization of its markets. Higher educational level and higher premium for the investment in education, particularly for women, produce higher labor participation. Therefore, we expect these events to be translated into higher savings for younger cohorts, particularly for those where there is a higher labor force participation of the spouse, as is the case for Mexican households with higher education. The cohort effects for this group presented in figure 20 show clearly how younger cohorts are saving systematically more than older cohorts are.

As a final exercise we want to deal with the above mentioned time effect observed in 1996. Using the saving rate for the whole sample, we attempt to isolate the time effects. Since we already mentioned that age, cohort and time effects are not isolated simultaneously, in this case we do not use cohort dummies in our regression. To capture these cohort effects, we include in our regression some demographic variables that are mostly explained by cohort effects, and include the time dummies. In figure 21 we present our results.

Figure 21 Time effects

Age Profile S1   **Year effects for s1 ws**
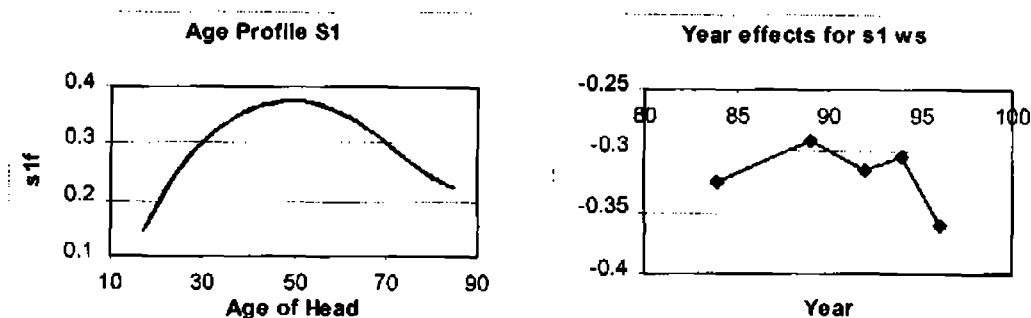
The age profile obtained after smoothing the saving profile for the whole population is very similar to the one obtained before (see figure 18), therefore we do not make any additional comment. What is interesting in this case, are the time effects. We can see that for the 1992 and 1996 surveys the time effects are negative. In particular for 1996 the effect is stronger. It should be remembered that in 1995, the real GDP decreased by more than 6% and although in 1996 there was a positive increase, the economy was still facing great instability. Moreover, most of the families were facing severe constraints, in particular in their balance sheets. An important feature of this crisis was the financial factor. Given the important credit expansion observed during the first part of the 90's and documented in Villagómez (1997), many families and firms faced a high leverage level in the mid 90's. As a consequence of the substantial increase in interest rates after the crisis and the reduction in the availability of credits, the household economy was substantially affected. In the case of 1992, although the impact is much lower than in 1996, the explanation is more difficult. The economy was growing at positive rates, but these rates decreased since 1990. However, we think that the evolution of consumption as a result of a credit boom is more important to explain this behavior in saving rates. Our data shows a small decrease in income for many of our cohorts while consumption was growing. Therefore saving rates were reduced. This credit boom was a result of the financial deregulation and liberalization implemented by the government since 1989, a fact that has been well documented in other papers like in Villagómez (1997).

VII. Conclusions

In this paper we make an attempt to analyze the behavioral relationships between family structure, human capital accumulation and returns, labor force participation and household consumption and savings decisions. For this purpose we use as a theoretical framework the Life Cycle Model and our analysis is based on a synthetic panel technique as proposed by Browning, Deaton and Irish (1985) that allows us to track the average behavior of cohorts over successive surveys.

With respect to family structure, we find that headship is closely related to gender and age. Males are usually the heads of the household; females are heads only when they are divorced, widowed or in case of single person households. With respect to age we find that heads are individuals in middle age range, individuals too young or too old are not typically heads. Older individuals tend to live in extended families. When older individual are better educated there is a higher probability of being head and of living in a nuclear family. The profile of household size has the form of an inverted "U". This form is consistent with the result that older individuals are not heads and live in extended families. There is an important cohort effect with respect to household size and number of children: younger cohorts tend to have smaller

families and fewer children. Household size is also related to the educational level of the head. Households with an educated head are smaller.

With respect to human capital, we find that there is an increase in schooling average for younger cohorts respect to their older counterparts. Also, differences between males and females for younger cohorts are much smaller than in the case of older cohorts. The average year of education is 6.3, which is low for international standards. It has increased from 5.7 in 1984 to 6.6 in 1996, but the increase can only be explained by the educational effort of younger cohorts. The returns to education have increased from 1984 to 1996 for secondary and superior education, but these returns for women have been higher during the 90's. Finally, we find an increase in human capital investment for younger cohorts.

In terms of labor force participation, there are important cohort effects with respect of spouse labor participation. For younger households there is a larger participation rate of the spouse, stronger in the case of households with an uneducated head, although the percentage participation for educated households is bigger. In general, we find an increase in women's labor force participation, which can be explained by the increased in educational attainment.

Finally, given our results with respect to changes in trends and family structure, an increase in the stock of human capital and their returns, and labor force participation for younger cohorts, and in particular for women, we expect to find different consumption and saving behavior among younger and older cohorts. Our main result with respect to this issue is that for the whole sample, cohort effects suggest that younger cohorts have contributed more to the saving rate than older cohorts have. This result is maintained for household whose head has higher education. But for households with lower education, older cohorts are saving more than younger cohorts are. We also find a strong negative time effect for 1996 that affects the behavior of all households in our sample.

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