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HOUSEHOLD SAVING, HUMAN CAPITAL ACCUMULATION AND LABOR FORCE PARTICIPATION CHANGES IN THE MEXICAN RURAL SECTOR

Abstract

In this paper we analyze saving behavior of Mexican rural households using consumption and income surveys data. Our analysis emphasizes a link between fertility, education, labor force participation, and saving decisions. We exploit recent techniques based on synthetic panels that help us understand dynamic behavior of these households over the life cycle and identify cohort and age effects. We find that the increase in women labor participation seems to be consequence of better access to education and higher returns to it. The still importance of extended family reinforces this process. As a consequence, younger and educated cohorts contribute more to the saving rate in this sector.

Resumen

En este trabajo se analiza el comportamiento del ahorro en los hogares mexicanos rurales usando datos de las encuestas de consumo e ingreso. Nuestro análisis hace énfasis en la relación entre fertilidad, educación, participación de la fuerza laboral y decisiones de consumo. Se emplean técnicas recientes basadas en el uso de paneles sintéticos que ayudan a comprender la dinámica del comportamiento de los hogares a través del ciclo de la vida, además de identificar los efectos cohorte y edad. Se ha encontrado evidencia de que el incremento de la participación de la mujer en la fuerza laboral es consecuencia de un mejor acceso a la educación y mayores retornos de esta. La importancia de la familia extendida refuerza este proceso. Como consecuencia, los cohortes jóvenes y mejor educados contribuyen más a la tasa de ahorro en este sector.

I. Introduction

The need to better understand economic decisions at the household level has become evident in the last two decades as new information at the micro level has become available. In particular, the relationship between consumption and saving decisions and human capital accumulation changes and other socioeconomic and demographic factors has become a widely discussed topic. These issues are particular relevant given the recent developments that have emphasize reforms in pension systems, educational programs or poverty relief programs. There is evidence of how these demographic changes have affected, for example, the functioning of Pay As You Go (PAYG) pension systems, or have affected the saving decisions of younger cohorts compared to their older counterparts. But it is also important to understand how these changes have affected the rural population. Their understanding is crucial if we want to formulate and implement adequate policies to improve the standard of living of this fraction of the population in developing countries[1].

Although the issues presented here are not new, their analyses have been limited given the poor information and data available for rural population in developing countries. Fortunately, there have been important efforts to developed new sources of information based on more systematic surveys that offer a rich set of variables. In this paper, we attempt to understand the consumption-saving decisions of rural Mexican households using data provided by the consumption and income surveys. In particular, our analysis emphasizes a link between fertility, human capital accumulation, labor force participation and saving decisions. For example, there is an argument that suggests that the introduction of public social security, together with the development of the private credit markets, induce a reduction of fertility, as there is a decrease of the security motive for children, in particular in rural areas. This might allow a greater woman labor participation and, as a consequence of higher family income, there might be an increase in savings. Some of these relationships are theoretically ambiguous, but some empirical evidence obtained for other countries is favorable. For the Mexican case, Nugent and Gillaspy (1983) analyze the savings reduction effect of old age pension. In particular, they consider this effect indirectly through fertility behavior of Mexican rural households.

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That is, these households consider children (assets) as the most satisfactory form of old age security. They find that the introduction of a formal pension system reduced the fertility of these households due to a saving reduction effect. We believe that what has happened in the Mexican rural sector is something different, since the public pension coverage is still low in rural areas. The observed reduction in fertility is more a consequence of the public birth control programs implemented by the government during the 70's.. On the other hand, the greater women labor force participation might be more a result of a combination of the fertility reduction together with other factors, such as a better access to education and an increase in the returns to education in the rural sector, in particular for women. The presence, still relevant, of the extended family in rural areas helps to the boost in women labor participation. Finally, with respect to saving behavior, although rural saving rates are low, we expect that reduced fertility and higher women labor participation should be reflected in higher permanent income and therefore in higher contribution of younger cohorts to savings compared with older cohorts.

In this paper we exploit new techniques based on synthetic panel that can help us to better understand the dynamic behavior of these households over the life cycle and identify some of the cohort and age effects behind these changes and decisions. We follow Browning, Deaton and Irish (1985) as explained below. The structure of the paper is the following. In the next section we discuss the data employed, the pseudo-panel technique and the construction of the cohorts. In the third section we discuss recent demographic changes and their effects on family structure. Section four discusses education and labor force participation. The analysis of consumption and saving behavior is presented in section five. The paper concludes with some final comments.

II. Data and Methodology

The data that we use in this paper is drawn from the Encuesta Nacional de Ingreso y Gasto de los Hogares (ENIGH). 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. It is important to point out that this survey is not a panel. 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 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.

In this paper we estimate two consumption definitions. The first one, called C1, is obtained by subtracting from total expenditure (monetary and non-monetary items) durable goods (expenditure in furniture and household appliances, vehicles and some leisure items) and mortgage payments. The second one excluded from C1 some items that might be considered as saving. In particular we exclude expenditure on education and on health. Income is defined as total after-tax household income and includes earnings, capital income and transfers and excludes pension contributions, not reported in the surveys. The 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 using the standard formula (income - consumption)/income.

The analysis performed in this paper involves dynamic phenomena since we are interested in looking at changes in the economic environment faced by rural households that affect their consumption and saving decisions. The theoretical framework proposed by the Life Cycle Model (LCM) is useful to analyze household life cycle patterns in a dynamic context as the one proposed here. Although LCM is more suitable for the analysis of individual life cycle, it would be used as a benchmark for the analysis of household life cycle. According to the LCM, consumption and saving for a consumer evolve during his life according to his age and may be 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.

It would be desirable to track the behavior of the same individual or household 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 households of a same group of cohorts. These cohorts are defined according to fixed criteria, such as the year of birth of the self-declared household 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. It is important to mention that we cannot identify separately the cohort, age and time effects, as discussed by Attanasio (1998). This technique has many advantages over panel data, but there are also some problems when using cohort data, as discussed in Deaton (1997). In particular, we are assuming that the cohort population is constant, but migration, death, aging and family dissolution can cause problems to this assumption. In the case of rural population, migration is an important phenomenon,

but it is not possible to control for its effects. We still think that our results are valid if migration has not a systematic pattern. In this case our results are not biased. In any case, we should take with caution our results. Also, this is a reason why we do not attempt to make any comparison between rural and urban population.

The definition of cohorts is over five-year intervals of the year of birth of the household head. Headship will be defined as self-declared. We include household heads between 15 years old and 85 years old. Since we have five surveys, we have 15 cohorts. Definitions and cells size are presented on table 1. Throughout 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 Cell Size

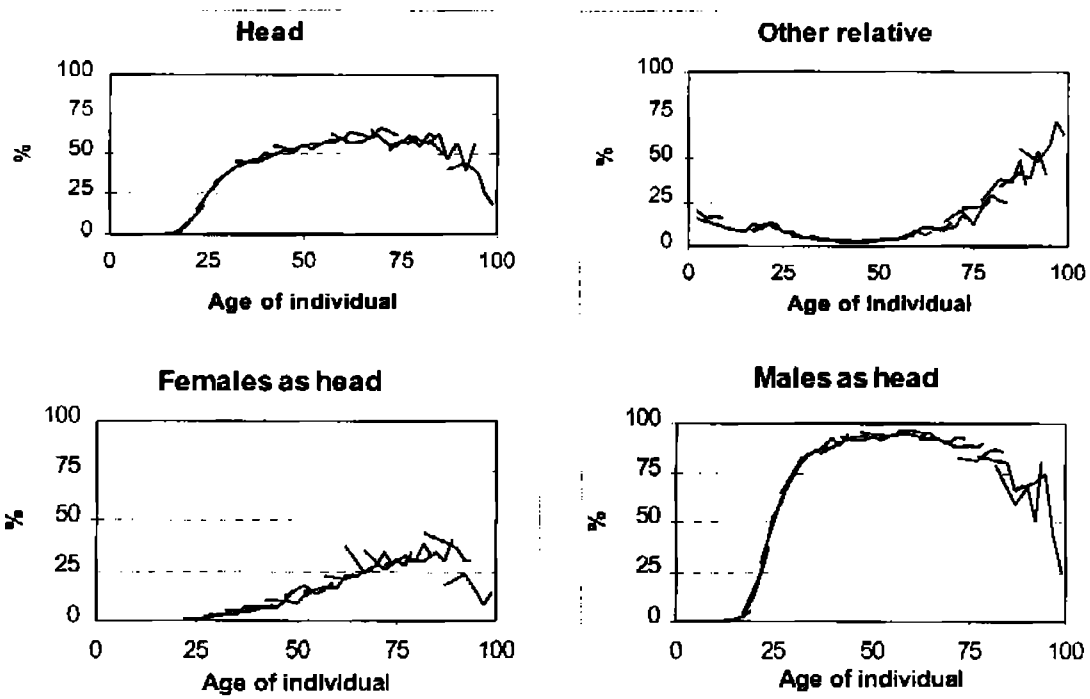
		Whole Sample					
Year of Birth	**Cohort**	**1984**	**1989**	**1992**	**1994**	**1996**	**Total**
							(percent)
1975-1979	1	-	-	-	28	70	98
							0.5
1970-1974	2	-	29	127	245	348	749
							3.8
1965-1969	3	14	197	410	485	544	1650
							8.4
1960-1964	4	99	426	491	560	611	2207
							11.2
1955-1959	5	178	485	498	602	512	2275
							11.6
1950-1954	6	207	473	527	522	517	2246
							11.4
1945-1949	7	182	462	403	491	447	1985
							10.1
1940-1944	8	202	407	400	460	374	1843
							9.4
1935-1939	9	163	424	308	416	365	1676
							8.5
1930-1934	10	134	336	305	388	291	1454
							7.4
1925-1929	11	131	260	231	269	226	1117
							5.7
1920-1924	12	126	222	216	237	165	966
							4.9
1915-1919	13	77	159	106	129	94	565
							2.9
1910-1914	14	64	130	77	101	72	444
							2.3
1905-1909	15	45	66	-	-	-	111
							0.7

III. Demographic Changes, Family Structure and Labor Force Participation

Headship

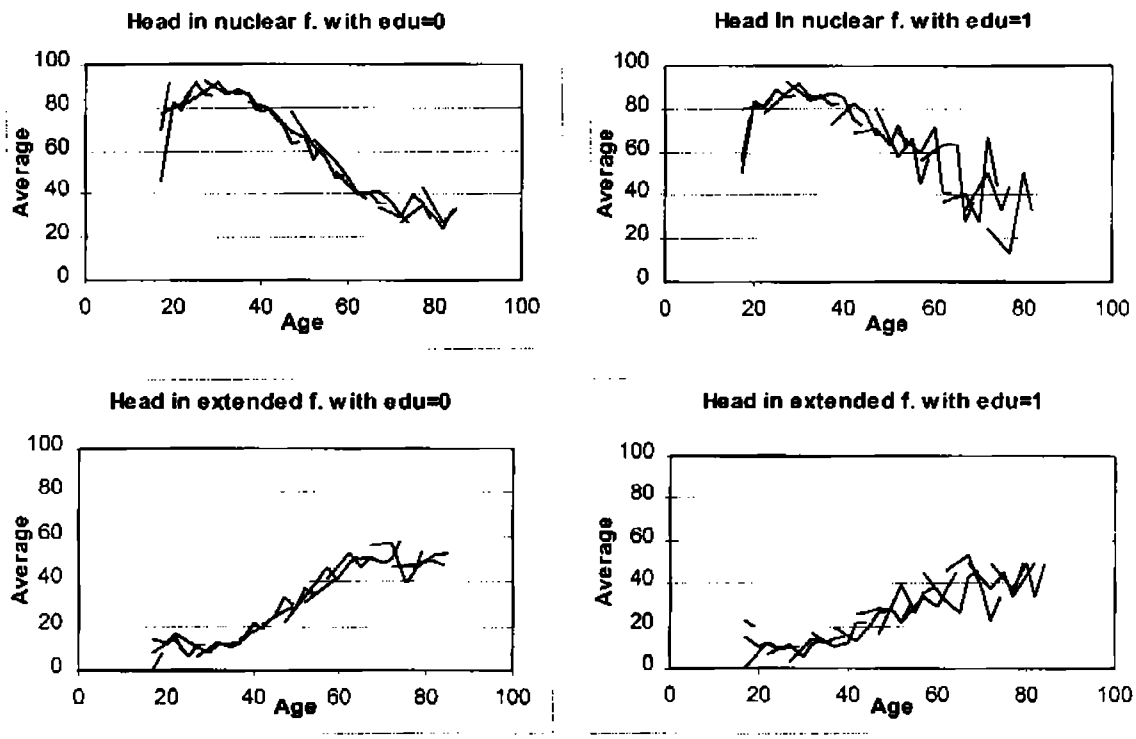
First, it is important to characterize the head of the family, since the cohorts are constructed by using information on the age of the head. In this case we want to analyze the profile of the head over the life cycle of the typical individual, in order to identify possible endogenous changes in headship. As we mentioned earlier, we consider the self-declared head in our surveys. In another paper, Villagómez and Zamudio (1999) show that for the whole Mexican population there is not a direct correspondence between the head and his age. Very young and very old individuals do not tend to be heads, and this role tends to be assigned to one individual with a particular characteristic, usually the main earner. But in the case of rural households, the probability of being old and still being the family head seems to be higher. If this is the case, we do not find important endogenous changes in the definition of the head. In figure 1 we plot the percentage of individuals who are the household head and the ones that correspond to other relatives of the head, such as parents. We also plot the percentage of males and females that are heads. Each connected segment refers to a cohort for five points in time since we have five surveys. Each cohort will overlap with adjacent cohorts. By plotting these segments we can get an idea of an entire life cycle profile.

Figure 1 Headship



Headship increases with age reaching a maximum at around 80 years. After this age the profile bends down. Also, mainly males perform this role. We should remember that in rural areas, cultural patterns where males have a clearer role as family heads are still stronger. In the case of females, headship is more relevant for older ages and it is possible that it is related mostly to the death of the husband since the incidence of divorces is still low among these families. In any case, after an age of around 80 years old, other relatives, other than spouse and children, are the most important members in the family, suggesting that parents move in with their children or other relatives as they become older.

Figure 2 Headship by Type of Family and Educational Level



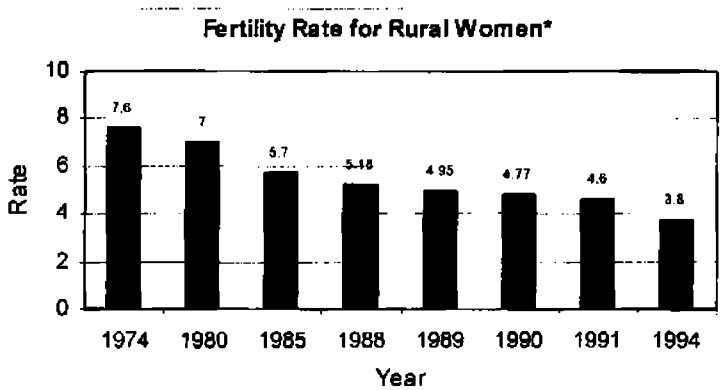
In figure 2 we look at headship by type of family and level of education. We consider nuclear and extended families. Although we use the survey definitions, we make a small adjustment by considering also as an extended family, a nuclear family with children above 30 years old. With respect to the educational level, we split our sample into two groups. The first one, that we called edu=0, includes individuals with no instruction or less than completed primary education. The second group, edu=1, includes individuals with completed primary education and higher levels.

This division allows us to keep our cells of a reasonable size. What is interesting from these graphs is that headship in nuclear families reach a maximum before an age of 40 years old and then, the profile bends down, at a faster speed in the case of individuals with lower education. On the other hand, headship in extended families increases with age continuously, regardless of the education level. This result is somehow expected since it is known that extended families are still important in Mexican society, and particularly in rural areas, as we will later see.

Fertility and Family Structure

The structure of the family has been changing during the last decades in most of the developing countries, reducing its size, in particular as a consequence of a reduction in fertility. But these changes seem to be less pronounced in the case of rural areas compared with urban areas. At least this is the case observed in Mexico. In figure 3 we show the fertility rate for rural areas for some selected years between 1974 and 1994. It is clear how these rates have been decreasing since the 70's, and we think that this is a consequence of the fact that during the 70's the Mexican Government implemented an aggressive birth control program.

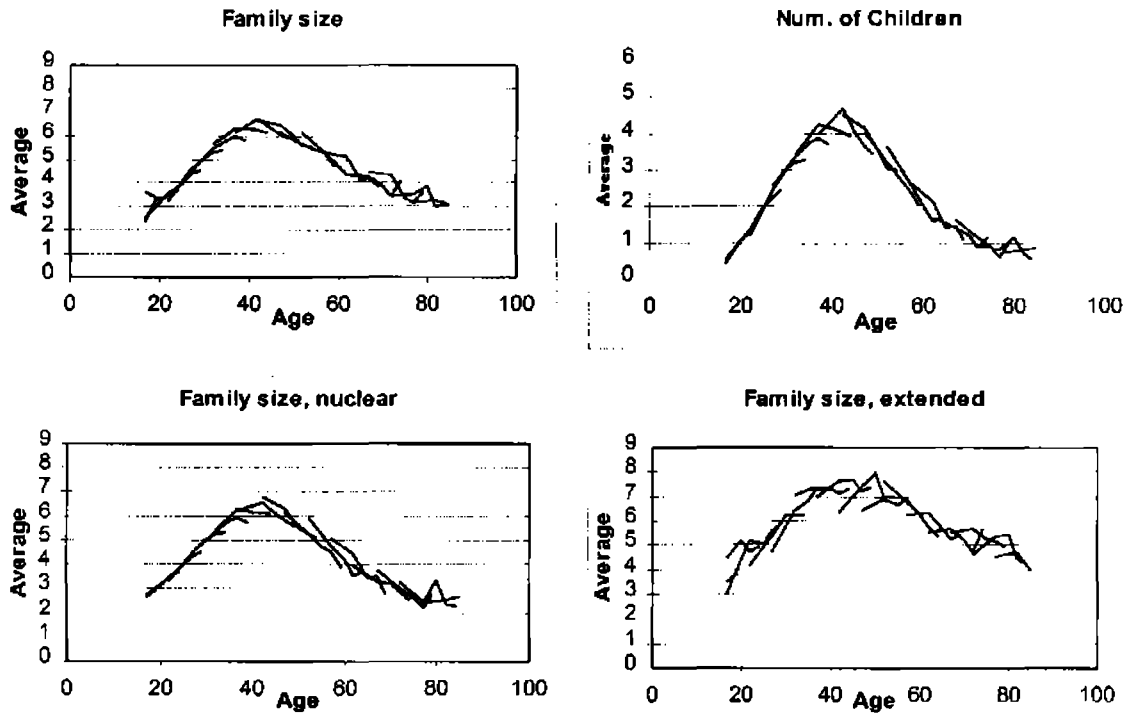
Figure 3 Fertility Rates



It is expected that these changes in fertility rates have affected family size. In figure 4 we present the information for this variable for the Mexican rural population using a cohort analysis. On average, rural households reach a maximum average size of 6.5 members at around 40 years old of the household head, having on average around 4.5 children. In the case of extended families, their size increases by around one more member. The profile of extended family size is flatter. In this case we can expect that consumption and income profiles be also flatter, reflecting the fact that there are more adults in the family and more workers. What is clear from the figure is that we do not find strong changes in the size of the family that can be explained

by cohort effects.[2] There are still some shifts in the family size profile for cohorts above 40 years old, and clearer in the case of nuclear families. Family size for younger cohorts is slightly smaller than for older cohorts. This is interesting because these cohorts, that were around 20 years younger during the seventies, were also a target population for the public birth control programs. Most of the other effects seem to be age-effects. The reduction in the number of children seems to respond more to a process of family dissolution. That is, as these children grow up they tend to leave their parent's house to form new families. From the results above we can conclude that although there has been a reduction in fertility and family size in rural areas, it has not been as strong as has been suggested by other authors.

Figure 4 Family Size

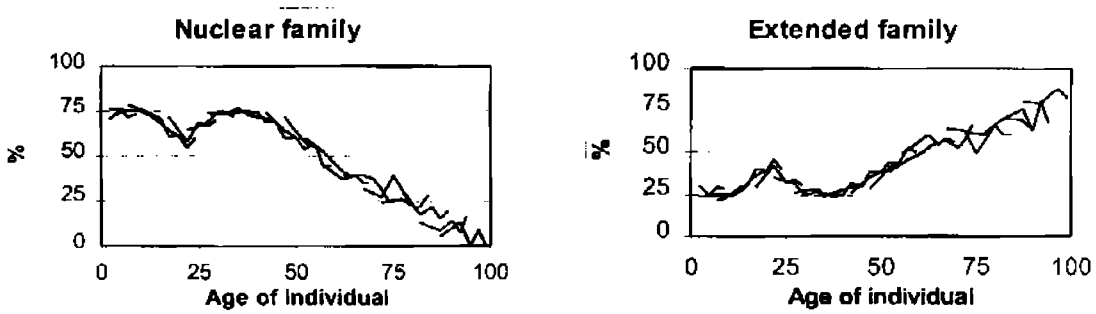


Also, the reduction in average family size is not so pronounced for older cohorts. Still at an age of 70 years old for the household head, the number of family members is around 4. One possible reason for this behavior is the role played by the extended family, which still represents around 30% of family types in rural areas. In figure 5 we show the profiles for individual cohorts by type of family. The extended family includes other relatives and the children of the principal couple if they are above 30 years old. At an age of 70 years old, around 50 percent of the individuals in rural

[2] Although the profile shows cohort, age and time effects simultaneously, we think that for these demographic variables it is reasonable to assume that most of the changes are due to cohort effects.

areas live in extended families, and this amount increases to 75 percent at around 85 years old. Again, in this case we do not find important cohort effects. But what is interesting is that the profiles are not smooth for each cohort showing breaks that suggest some time effects. That is, that the hard economic times faced by our country during the last two decades have produced more variability in family types.

Figure 5 Household Types



Up to here we find that there is a reduction in fertility rates in rural areas, but we do not find strong cohort effects in family size. This reduction seems to be more a consequence of public programs, in contrast with the arguments that the spread of public social security, as well as the improvement in private credit markets has reduced the security motive for children and the role of the extended family. According to the ENIGH, from the individuals that reported an income from a pension, only around 20% are located in rural areas. On the other hand, in 1991 only 18% of the workers in rural areas were covered by public social security.[3] Finally, it is well known that the development of the financial markets has been uneven between urban and rural areas.

IV. Education and Labor Force Participation

During the mid 70's the Mexican government implemented a broad program to expand public education at all levels, including a program for adults education and the spreading of the public educational system to rural areas. As a consequence of these efforts, there is an important increase in human capital accumulation for younger cohorts in rural areas. In table 2 we report the stock of human capital measure as the average years of completed formal education and computed only for

[3] For a further discussion of pension coverage in Mexico see Solís and Villagómez (1999).

individuals above 14 years of age and not older than the cohort born between 1900 and 1904.

Table 2 Schooling Average

Schooling average Individuals above 14 years					
Cohort	**1984**	**1989**	**1992**	**1994**	**1996**
Overall	3.94	4.11	4.14	4.20	4.55
1980-1984	-	-	-	-	6.64
1975-1979	-	-	6.15	6.20	6.59
1970-1974	-	6.27	6.24	6.19	6.30
1965-1969	5.77	5.99	5.60	5.69	5.76
1960-1964	5.33	5.11	4.45	4.68	4.73
1955-1959	4.60	4.21	3.77	3.57	3.96
1950-1954	4.06	3.41	3.13	2.97	3.10
1945-1949	3.42	2.84	2.59	2.35	2.32
1940-1944	3.17	2.49	2.30	2.06	2.07
1935-1939	2.53	2.05	2.10	1.89	1.70
1930-1934	2.35	1.89	1.51	1.57	1.61
1925-1929	1.92	1.47	1.46	1.39	1.23
1920-1924	1.87	1.61	1.27	1.40	1.30
1915-1919	1.92	1.36	1.26	1.31	0.89
1910-1914	1.69	1.24	0.79	1.01	0.86
1905-1909	1.58	1.06	0.82	0.76	0.63
1900-1904	1.43	0.52	0.25	0.23	0.37

In general, stock of human capital does not change dramatically over the life cycle only at school age, but from the table it is clear how there is an important increase in average schooling for younger cohorts compared with older cohorts. Moreover, the increase in the stock of human capital seems to be higher for those cohorts born at the end of the 50's and during the 60's.. In the case of the last three cohorts in 1996, the average years of schooling is above 6, showing that there is a tendency of younger individuals to complete their primary education. This tendency is reinforced if we look at the information for school enrollment as presented in table 3. This data is available only for the last three surveys, 1992, 1994 and 1996.

Table 3 School Enrollment

School enrollment Percent of individual in age group who are students				
Age	**Overall**	**1992**	**1994**	**1996**
5 - 6	74.6	65.5	76.2	81.7
7 - 11	94.4	91.8	94.9	96.2
12 - 15	65.6	62.8	65.9	67.9
16 - 18	21.2	21.5	19.9	22.2
19 - 25	6.7	5.9	6.3	7.6

This table shows the percentage of individuals in five different age groups who are student for our last three surveys. It is interesting to see that for the age group between 7 and 11 years old, which correspond mostly to the primary level of education, enrollment for 1996 is over 96% and it increased in the period considered. Also, it is interesting to see that for kids with and age between 5 a 6 years old, school enrollment has increased substantially in the last five years, almost 20 percentage points.

Finally, we look at the rate of returns to schooling. We present this information in table 4 splitting the educational levels into primary, secondary and superior levels and also considering decomposition by gender, males and females.

Table 4 Rates of Return to Schooling by Gender

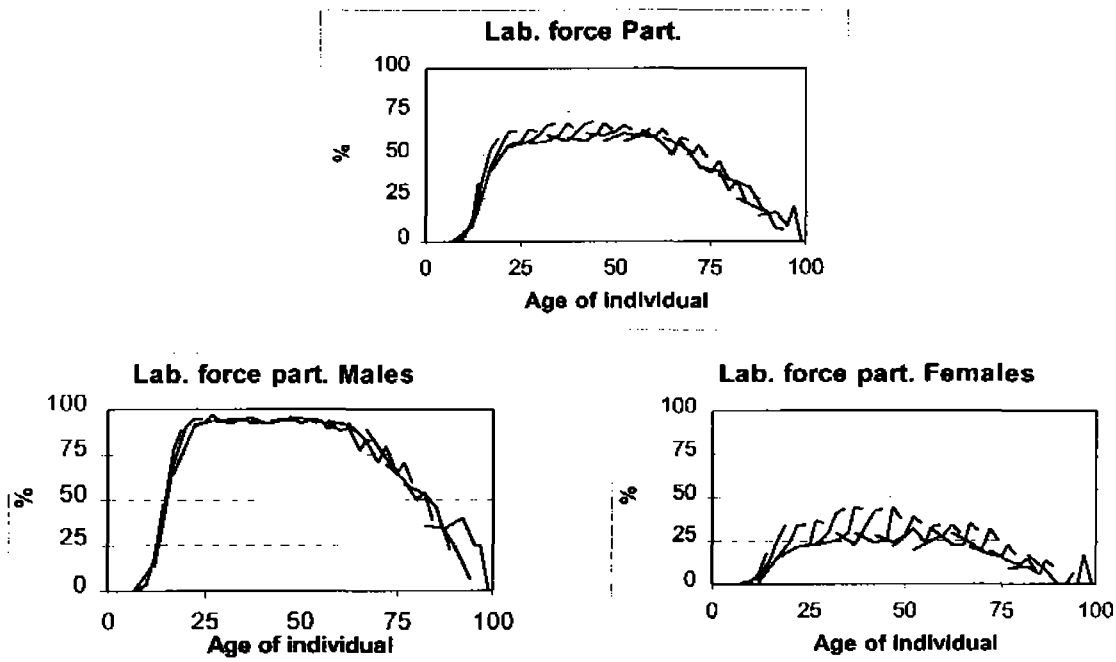
Rates of return to schooling by gender*									
	Primary			Secondary			Superior		
	Overall	Women	Men	Overall	Women	Men	Overall	Women	Men
Overall	11.5	13.7	10.5	15.8	18.6	13.51	19.8	23.3	19.1
1984	13.6	12.4	14.0	18.6	20.7	16.35	7.0	10.0	6.8
1989	11.2	10.5	11.1	14.4	14.0	14.01	9.0	15.8	6.1
1992	13.2	14.7	12.6	14.4	15.8	13.59	22.2	17.6	24.7
1994	12.7	16.7	10.9	15.8	20.6	11.93	23.8	28.0	23.3
1996	10.4	12.4	9.4	16.2	19.1	13.95	26.5	30.3	25.2

*For all types of workers and all types of income

To estimate the rate of returns we use the so called "mincerian equation" where the dependant variable is the natural logarithm of income or wages. The regressors are the variables that measure schooling, labor experience, labor experience squared, natural logarithm of hours worked and a set of dummies variables that indicate gender and area of residence. The schooling variable is years of education and the experience variable is measured with age, minus years of schooling, minus 6. The variable reported is the return to an extra year of education. In general, these returns are an increasing function of the level of education, therefore returns are higher for superior education. It is interesting to see that, in general, returns have been increasing for the whole period, but during the 90's there is substantial increase, in particular for superior education. This result should be taken with caution given the small percentage of individual with higher education in the rural sector. This pattern can be explained, in part, by changes in the structure of the Mexican Economy that resulted in a more open and competitive economy. As a result of this, there is an increase in the demand for skilled workers, so those individuals with higher education have benefited from this process. Moreover, this effect has been higher for women.

If we move to the issue of labor force participation, the changes observed are more important. As it is show in figure 6, individuals in rural areas tend to stay longer in the labor force. Still at 65 years old, a typical retirement age, the participation in rural areas is around 50 percent. Also, there are some cohort effects represented by the upward shifts in the profile. Younger cohorts are incorporating at an early age to the labor market. Much of this trend can be explained by important changes in women labor force participation. As can be seeing in figure 6, although male labor force participation is higher than expected, the profile for labor force participation for females shows strong cohort effects. There are important upward shifts for younger females cohorts, but still they are also relevant for older cohorts.

Figure 6 Labor Force Participation by Gender



On possible explanation for this increased labor force participation of women is the decrease in fertility. But as mentioned above, we do not see important changes in rural areas in the number of children. We think that there are other two important factors that explain this higher participation. First, there is evidence that the returns to education have been higher in rural areas than in urban areas for most part of the 80's and 90's., as discussed above. As the availability for more education for women has spread in rural areas during the 70's, higher opportunities and higher relative wages have estimulated the participation of women in the labor market. Second, the length of the economic crisis in Mexico during the 80's and after 1994 has forced the participation of more family members into the labor market. In this case, the

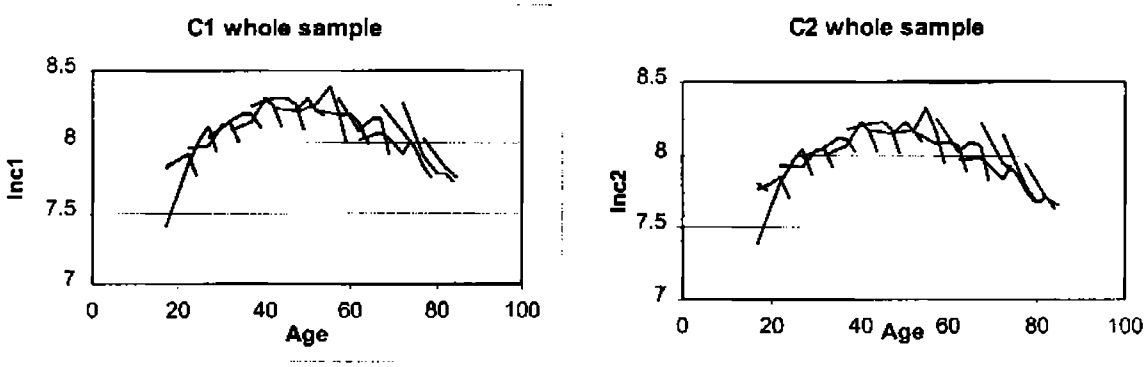
prevalence of the extended family in rural areas allows the increased labor force participation of women as long as there is a female relative that can take care of young children.

Up to here, we can conclude that the increase in women labor participation is more a consequence of better access to education and higher returns to it, and that fertility reduction plays a less important role. The importance of the extended family reinforces this argument.

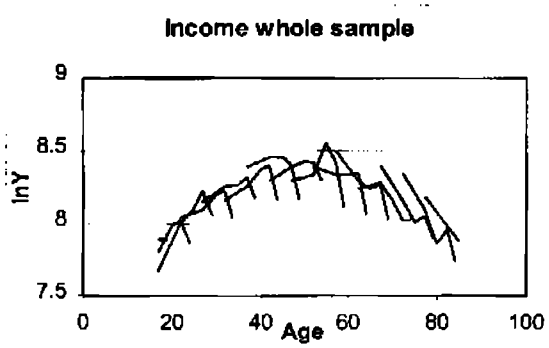
V. Consumption and Saving Behavior

In this section we analyze the consumption-saving behavior of Mexican rural households. In figure 7 we present the consumption and income profiles for these households. We present the two consumption definitions mentioned above. First, these profiles are very similar to the ones obtained in other papers[4]. Second, it should be noted that both are very similar. The reason for it is that the main difference between our two consumption definitions is that C2 excludes health and educational expenses. But in Mexican rural areas most of these services are provided by the state, representing a very low participation of a typical household budget. This in opposite to families in urban areas where private health and education services are more common and represent a higher proportion of family budget.

Figure 7 Consumption and Income Profiles

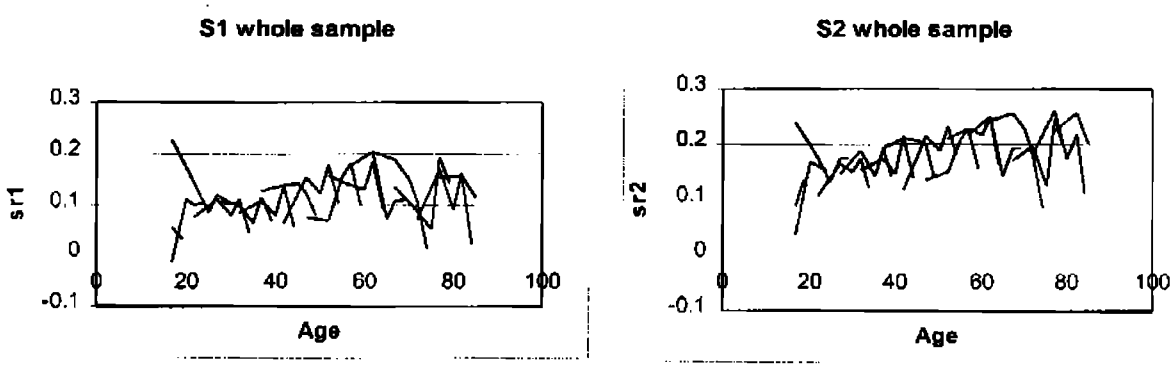


[4] See Attanasio and Székely (1999) and Solís y Villagómez (1999).



Since the consumption and income profiles track each other very closely, the saving profiles do not take the expected hump-shaped form as suggested by the life cycle model. These profiles are presented in figure 8. The saving rates are almost flat until the household head reaches an age of around 40 years old. After this point, the profile bends up reaching a maximum at around 60-65 years old. We do not see a clear bending down of this profile from this age on as is suggested by the LCM, when it is expected that individuals start to disserve during their retirement years. This behavior could be explained by the increase in the importance of the extended family at this time of the life cycle for rural households, where younger adults move in with their parents, increasing income and possible savings. Another possibility is changes in headship, but we already showed above that in rural areas, headship is strongly related with age, maybe as a consequence of cultural factors.

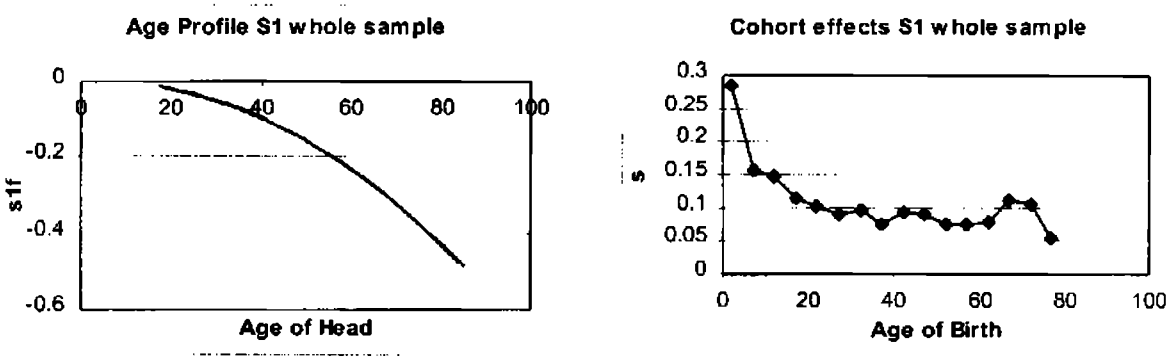
Figure 8 Age-Saving Profiles



It is difficult to find a clearer trend from these figures because the profiles tend to fluctuate a lot. This can be a consequence of noise derived from a relatively smaller size of our cells used. Alternatively, we might accept Deatons' (1989) buffer stock hypothesis to explain saving behavior in low-income areas. In this case, saving rates

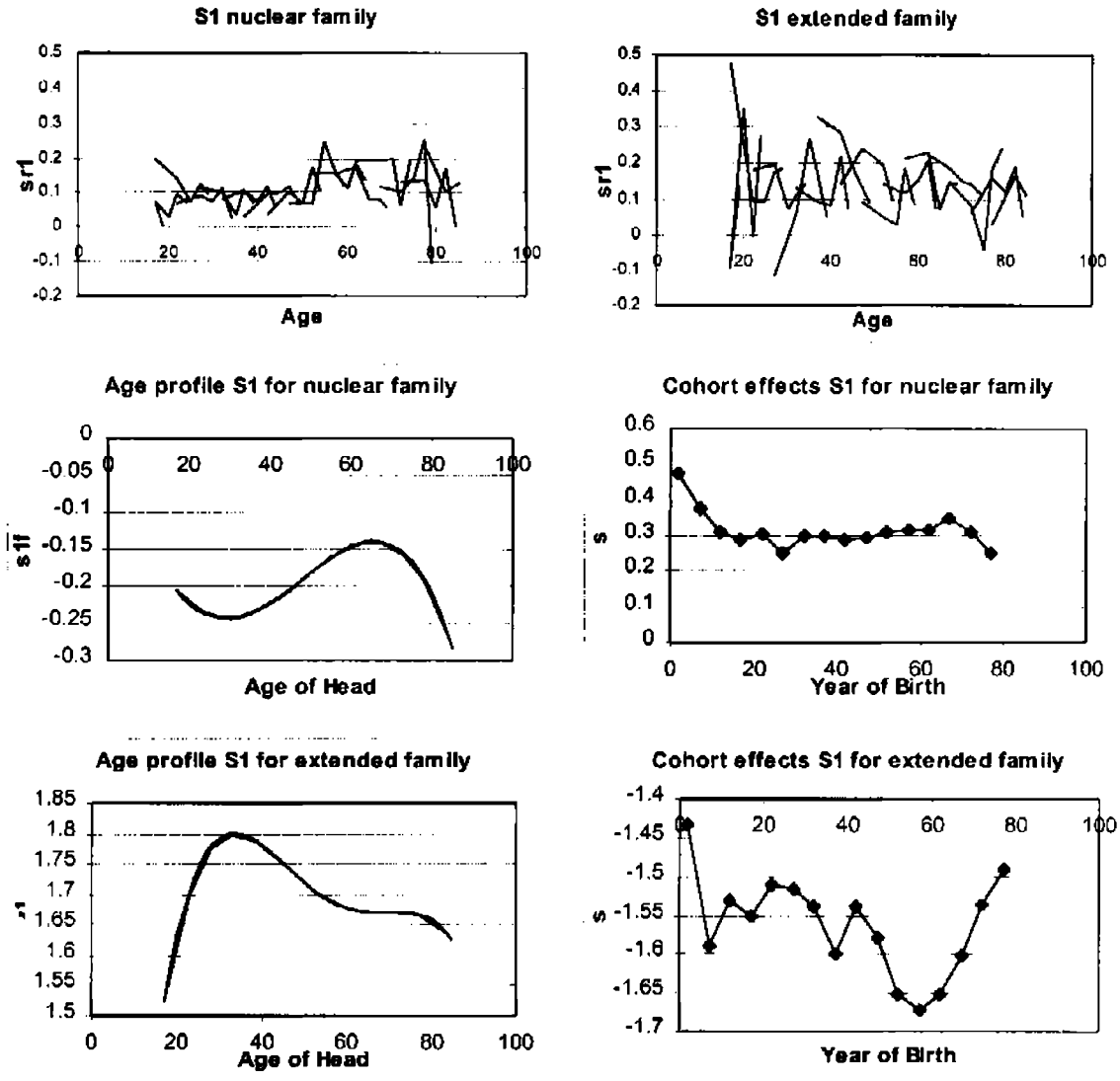
will be very volatile reflecting the fact that saving is often as negative as it is positive under the presence of a more volatile income. In this paper we do not attempt to further analyze this issue since we need more data at higher frequency. We prefer to smooth the saving profile presented in figure 8. This technique, discussed in more detail in Deaton (1997) and Attanasio (1998), consists in decomposing cohort data into age, cohort and time effects. With the first we can obtain a typical age profile, the secular trends that lead to differences in the position of age profiles for different cohorts are derived from the second effect and the aggregate effects that synchronously but temporarily move all cohorts of their profiles are obtained with the third. Since each of these effects is a linear combination of the other two, it is necessary to make an identification assumption. The procedure that we follow consist on regressing the saving rate on a n^{th} 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. This restriction is required as an identification assumption if we want to identify cohort and age effects. In figure 9 we present the age profile and cohort effect for our saving rate S1 using a 4^{th} order polynomial in age.

Figure 9 Saving Profile: Age and Cohort Effects



The age profile obtained form our exercise shows a decreasing trend for all age of household heads, while the cohort effects suggest a positive cohort effect for older cohorts because these are the ones that seem to be saving more than the younger counterparts. In any case, this is not a very systematic pattern since there are some younger cohorts with higher saving rates than their older counterparts. To further analyze the saving behavior of these cohorts, we proceed to the splitting of our sample into subgroups depending on family type and level of education. In figure 10 we present the first two groups for those households living in nuclear families and in extended families. We show the saving profiles obtained directly from our consumption and income variables, and the age and cohort effects from the decomposition exercise.

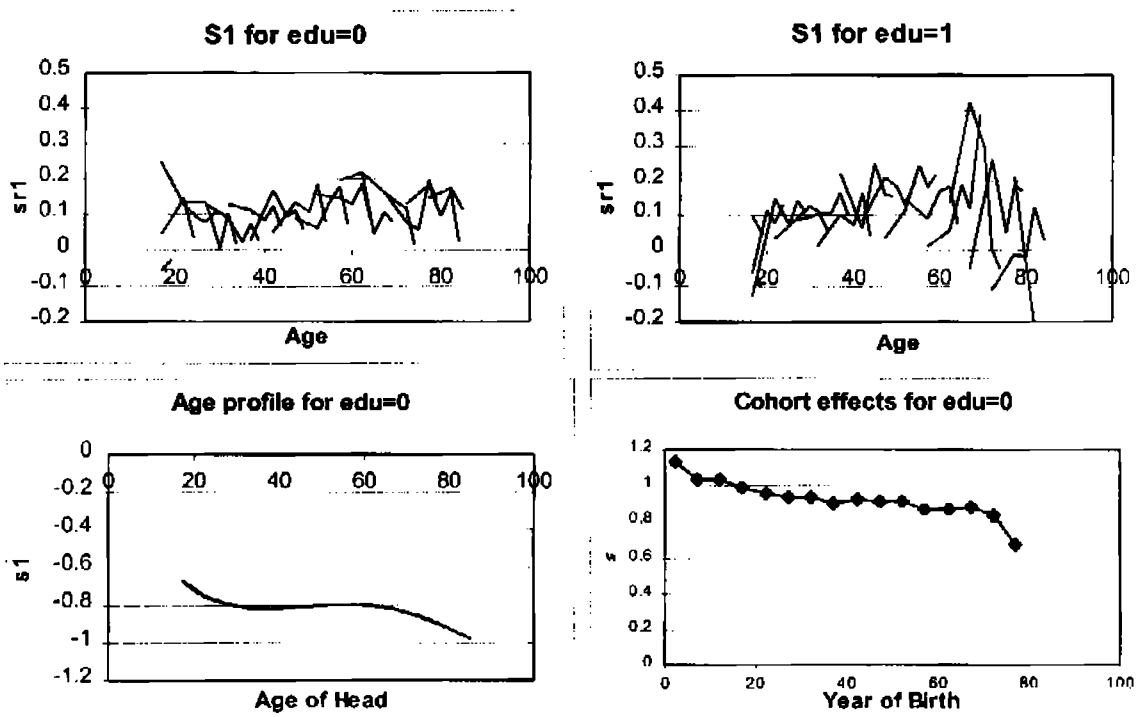
Figure 10 Saving Rates, Age and Cohort Effects by Family Type

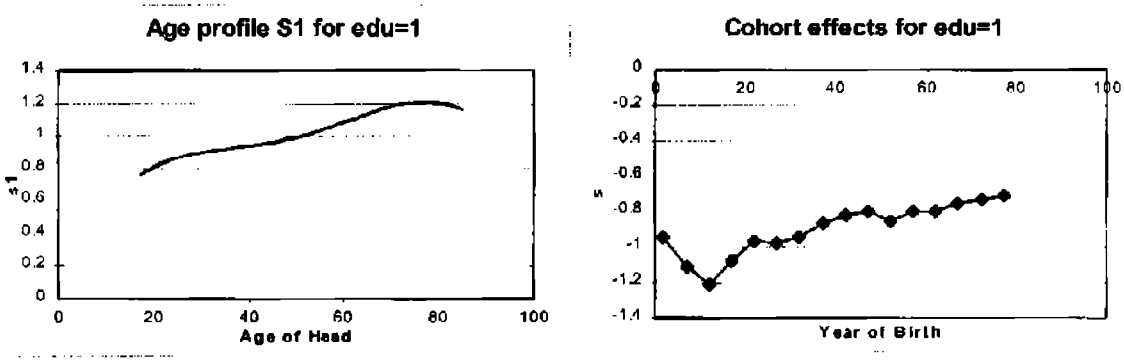


As expected, given the cell sizes, the saving profiles are too noisy. But the age and cohort effects are more informative. First, in the case of nuclear families we find that the age profile decrease reaching a minimum at an age of the household head of around 35 years. This pattern is consistent with the fact that family expenses are higher during the years when families are raising their small kids. Therefore we can expect lower saving rates during this phase of the life cycle. Then the profile bends

up reaching a maximum at an age of around 70 years and decreases again after this age. After that point, the patterns conform more to the one suggested by the LCM. If we look at the cohort effects, we find that they are relatively flat suggesting that there are no particular differences between older and younger cohorts. On the other hand, if we look at age and cohort effects for extended families, patterns are different. First, we do not see in the age profile the decrease in saving rates for younger cohorts, but the decrease in these rates for older cohorts starts earlier, at an age of around 40 years old, and after 60 years old of the head, the profile is almost flat. If we look at the cohort effects, we find that for household heads born during the first half of this century there is no clear pattern. In any case, we see that for those born during the fifties there is a decrease in their profile, but after this decade, the profile bends up substantially, suggesting that the contribution of younger cohorts to the saving rates is positive. In fact this is expected for younger cohorts because the fact of living in an extended family leave them in a better position to save. But also, we think that education plays a role. As we already mentioned, the aggressive expansion of educational opportunities during the 70's and the increase in the rate of return to education for individual in rural areas during the 80's and 90's as well as their labor force participation translated into higher income and leave younger cohorts in a better position to save compared to their older counterparts. To further analyze this issue, we split our sample by educational level. In figure 11 we present the saving profiles and the age and cohort effects decomposition.

Figure 11 Saving Rates, Age and Cohort Effects by Educational Level





The age and cohort effects for household heads with lower education are very similar to the ones obtained for the whole sample. For example the age profile shows the decrease in saving rates for younger cohorts and for very old cohorts, while the cohort effects suggest that older cohorts are contributing more to the saving rate than younger cohorts since the profile decreases continuously. But in the case of household heads with more education, the patterns look the other way around. That is, the age profile increases continuously with age while the cohort effects suggest that younger cohorts are contributing more to the saving rate than their older counterparts.

VI. Conclusions

In this paper we make a first attempt to understand the saving decisions of the rural Mexican households using data provided by the consumption and income surveys. In particular, our analysis emphasizes a link between fertility, human capital accumulation, labor force participation, and saving decisions. We also exploit new techniques based on synthetic panel that help us to better understand the dynamic behavior of these households over the life cycle and identify some cohort and age effects. Our results suggest that the increase in women labor participation in the rural sector is more a consequence of better access to education and higher returns to it, and that fertility reduction plays a less important role. The still importance of the extended family reinforces this argument. This might be reflected in higher permanent income and therefore, younger and more educated cohorts have contributed more to the saving rate in the Mexican rural sector. This is a preliminary assessment and there are still other factors that should be considered in future work. Some of these factors include mortality risk and uncertainty.

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