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HOUSEHOLD SAVING IN CHILE (1988 AND 1997): TESTING THE LIFE CYCLE HYPOTHESIS*

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ABSTRACT

Saving behavior at the household level in Chile has not been analyzed in recent decades. Based on 1988 and 1996-1997 Chilean microeconomic evidence (Household Budget Survey), this article studies household saving behavior. The analysis is extended to include broader definitions of saving such as investment in human capital and durable goods purchases. Income and permanent characteristics such as education are shown to be important determinants of the rate of household saving. Furthermore, we find an income/expenditure parallelism and positive saving rates for the elderly. At a first stage of analysis, these facts contradict the predictions of the life cycle theory, but some corrections (using demographic corrections and a different treatment of pensions) change these preliminary conclusions. Differences in credit constraints faced by different groups are studied for their likely effects on consumption smoothing. Finally, in order to study in more detail the predictions of the Life Cycle Hypothesis, saving rates of the elderly are analyzed focusing on their contradictory role found in macro and micro studies.

Keywords: household saving: life cycle hypothesis; Chile; consumption, saving.

JEL Classification: D12, E21, D19

RESUMEN

El comportamiento del ahorro de los hogares no ha sido analizado en Chile en las últimas décadas usando evidencia de origen micro. Este trabajo utiliza las Encuestas de Presupuestos Familiares de 1988 y 1996-1997 para presentar un análisis del comportamiento de ahorro de los hogares chilenos. El análisis se extiende para definiciones más amplias de ahorro tales como la inversión en capital humano y la compra de bienes durables. Se observa que el ingreso y características más permanentes tales como la educación son importantes determinantes de la tasa de ahorro de los hogares. Adicionalmente, se observa un paralelismo entre el ingreso y el consumo de los hogares y tasas positivas de ahorro en los últimos años del ciclo de vida. Si bien estos resultados son contradictorios con las predicciones de la teoría del ciclo de vida, estas conclusiones cambian cuando se utilizan correcciones relacionadas con aspectos demográficos y con un tratamiento diferente de las pensiones. Para estudiar el efecto de las restricciones de liquidez se presenta alguna evidencia de que distintos grupos de la población tienen diferentes grados de acceso al mercado financiero. Finalmente, para estudiar en más detalle las predicciones de la teoría del ciclo de vida, se estudia el ahorro de los jubilados con especial énfasis en los contradictorios

resultados obtenidos en los estudios que usan datos de origen microeconómico respecto de los estudios que usan datos agregados.

INTRODUCTION

There is an increasing number of studies analyzing the evolution and determinants of private saving in Chile (See Agosín *et al*., 1997; Hachette, 1998; Morandé, 1998; and Agosín, 1999). The impressive increase in the rate of private saving in Chile (from an average of 6.7% of GDP between 1960 and 1985, to an average of 15.8 % in the period 1986-97, Bennett *et al.* 1999), motivates this literature. All of these studies use aggregate macroeconomic data[1]. In this paper Chilean microeconomic data for 1988 and 1996-7 are analyzed applying the standard approach developed in the literature on microeconomic household saving behavior (See Poterba, 1994)[2].

The analysis of microeconomic evidence is an important contribution to the literature on savings, first, due to the possibility of studying at the household level the theoretical predictions on individual behavior, particularly those of the life cycle hypothesis. Secondly, micro evidence permits to decompose macroeconomic savings evolution between real individual behavioral changes and the effects of aggregating different types of individuals.

The main contributions of this paper are: (i) to study the determinants of household saving rates both at the beginning and at the end of a period of a significant and persistent GDP growth, (ii) to identify some stylized facts of the household saving behavior, (iii) to make the first group of conventional tests for the predictions of Life Cycle Hypothesis using Chilean microeconomic data, and (iv) to illustrate the relevance of the microeconomic analysis in order to avoid some aggregation problems presented in the saving literature. The last point is made in the final section of this paper where it is analyzed and explained the contradictory findings of the saving literature using macroeconomic and microeconomic data.

The last point is very important in the analysis of the Life Cycle hypothesis. As it is well known, the Life Cycle Hypothesis starts its analysis focusing in individual behavior and one of its best known predictions is related with the negative saving rates that would be observed for the elderly. However, the microeconomic results of the international literature show that older people increase their saving rates. Furthermore, this result is contradictory with the results using macroeconomic data. Hence, the last section of this paper studies in great detail the causes of this contradictory result.

The first section of this paper presents a brief description of the data and definitions used in the analysis. The second section presents a first group of stylized facts related to total saving rates, saving rates by different socioeconomic classifications, and saving rates using alternative definitions of saving. In the third section, we analyze income and expenditure age profiles to contrast some of the life cycle hypothesis (LCH) implications and predictions. In the fourth section, in order to assess some contradictions between our results and the LCH, (i) we propose and test an explanation for the income/expenditure parallelism based on demographic factors; (ii) we correct the income definition to study the effect of the pensions in the positive saving rates observed for the elderly; and (iii) we describe the evolution of household indebtedness behavior in the last decade to identify their effects on the results obtained. In the fifth section, as we mentioned above, elderly groups' saving is analyzed in depth and explanations are proposed for the contradictions found between the micro and macroeconomic studies concerning the effect of the older population on total saving. Finally, the last section presents the main conclusions.

1. DATA AND DEFINITIONS

Household saving analyzed in this article is built on the information of income and expenditures flows reported in the 1988 and 1996-7 Household Budget Survey (HBS) of the National Institute of Statistics. This survey is the main input to build the basket of goods for the Chilean Consumer Price Index, and it is mainly an expenditure survey, with a complementary income survey[3]. The first survey was carried out between the months of December 1987 and

November 1988 in Greater Santiago and the second between August 1996 and July 1997[4]. The sample size is 5076 in the first survey and around 8445 in the second. The complete database includes information about expenditure and income at the household level, information on individual characteristics such as age, educational attainment, occupational status and labor income of each member of the household.

The survey is applied in the household during a given period of time (for instance, in the 1988 survey the consultation period was 3 months), in which there are several referential periods for different kinds of goods. For instance, the habitual expenditure data is collected in a random week in the central month, while the non-habitual expenditures are collected during the three months. Furthermore, the expenditure (durable and non-durable) is accounted for at the time when the good is purchased (that is in accrued base) independent of the way the purchase has been financed. Additionally, to the purchases of the survey period, financial expenses are included, which correspondto the interests paid due to past purchases[5].

It is well known that this type of survey poses several problems, mainly related to underreporting. In order to analyze the extension of this problem in the data collected in these surveys, we compare the average household income obtained in these surveys with the average household income reported by the CASEN surveys (for Greater Santiago)[6]. In the case of the 1988 survey, there is a huge difference of around 35% in the average household real income for Greater Santiago between the HBS and the CASEN 1987[7]. While in the case of the 1996-7 HBS survey and the CASEN 1996, the difference is only 6.5%. That is, there is evidence that income is substantially underreported in the first survey, but in the second the under-reporting seems to be very limited.

With the evidence presented above, we can draw some conclusions related to our use of the survey: (i) it is inadequate to compare the figures obtained in both surveys because an important part of the changes may be due to changes in underreporting, and not to changes in saving (consumption and/or income) behavior[8]; and (ii) if we suppose there is no correlation between the degree of underreporting and the classifications used in this paper (classification by age, income and expenditure levels, and educational attainment), we can use the information for cross-sectional analysis. Nevertheless, we know that underreporting is probably higher among the rich. This is not a problem in this paper since we work with saving rates. We can assume that the proportion underreported on income and expenditure is similar within each income group, consequently the rate of saving may be compared between income groups (The same point applies for the comparisons of income and expenditure profiles). Furthermore, even if we wanted to correct for underreporting, doing so for expenditures may prove to be even more difficult than correcting income.

In general, we will refer to saving as the difference between total household income and expenditures, considering as both income and expenditures the imputed rent of owner occupied housing. In the survey, income corresponds to the household's total disposable income, excluding contributions to mandatory retirement saving and taxes, and including public and private monetary transfers, and pensions, among others. Additionally, since saving corresponds conceptually to a postponement of consumption toward the future or, in other words, to substitution between present and future consumption, other forms of saving will also be analyzed. For this purpose, the analysis is extended to include broader definitions of saving such as investment in human capital and durable goods purchases[9].

An alternative method to measure saving is to estimate changes in wealth, accounting for changes in assets and liabilities (See Bosworth *et al.*, 1991). Unfortunately, although the HBS picks up some information about these changes, the information was not registered in the database and it has been impossible to gain access to it.

II. SAVING RATES

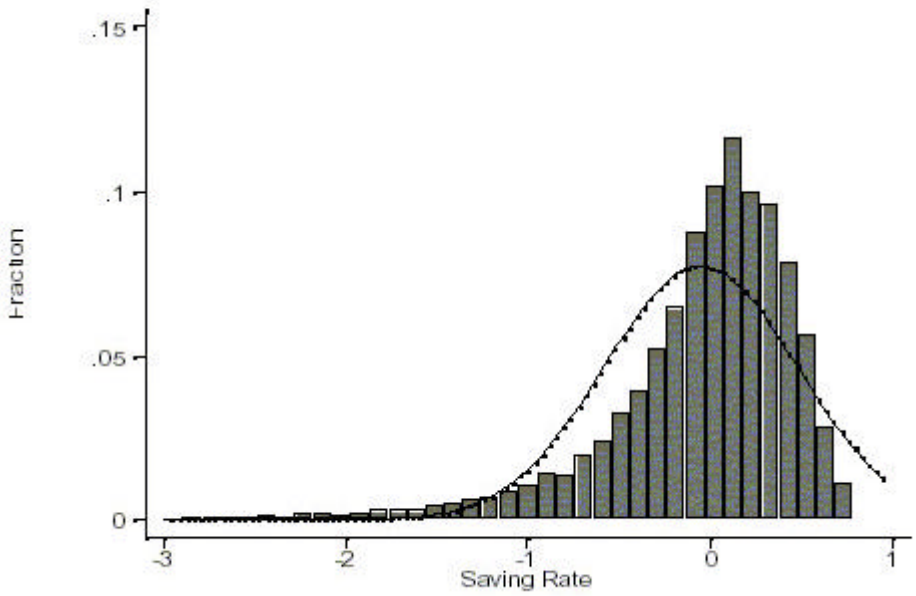
a) Aggregate Rates

The average rate of household saving is defined as the simple average of household saving

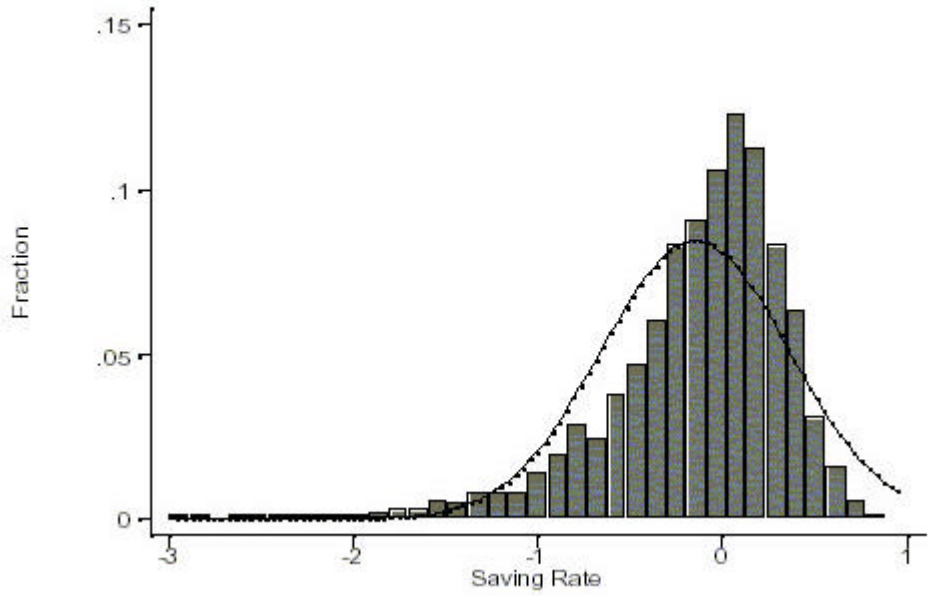
rates without weighting by their share in total income. The average rate of household saving in the sample is negative during 1988 at a level of -21.8% and for 1996-97 this rate is also negative at -9.2%. The corresponding median, on the other hand, is -6.8% in 1988 and 4.3% in 1997. The large difference between the average and the median is due to households with highly negative saving rates (see figures 1a and 1b).

FIGURE 1
SAVING RATE DISTRIBUTION (INCOME BASE)

a. 1988



b. 1996-97



This high rate of dissaving is explained because the average is strongly influenced by households that report very low income and high expenditure levels. Indeed, the reported minimum saving rate is -26,000% in 1988 and -12,000% in 1996-7. There are two possible explanations for these extremely negative rates: negative transitory income shocks and income underreporting among the families in the lowest quintile, among whom the negative

rates are concentrated[10].

However, when analyzing the observations with saving rates below -100% for both surveys we observe that some of them have their head of household unemployed, and -in general- their educational level is superior to that of the rest of the individuals in their quintile. All this leads us to think that, to a great extent, rather than errors, these rates are probably due to negative shocks to the income of these households that do not affect expenditures in the same magnitude, thanks to savings accumulated in the past or indebtedness against future income.

Finally, the average rate represents the simple average of the household saving rates, i.e., it is not weighted for the household's share in total income. At least for that fact, it should differ from the saving rate calculated in National Accounts which computes saving adding total income and total expenditures of the economy. That is algebraically equivalent to the average household saving rate weighted by income; from now on this rate will be denominated the weighted average saving rate. This last calculation, with the information of the HBS, gives a rate of saving of 3.9% of total income in 1988 and 6.1% in 1996-1997[11].

b) Average rate of saving by income quintiles

In this section we analyze saving rates by income. This classification is relevant to understand what determines saving, but it has the problem that transitory shocks to income will not only affect the rate of household saving but they will also affect our classification of households in the different income quintiles. This last effect accentuates the positive relationship between saving rate and income level found in the international evidence (For a complete review of the international evidence, see Butelmann and Gallego, 2000).

Consistent with the international evidence, Table 1 shows that the rate of saving -average and median- grows rapidly as we move from lower to higher income groups both in 1988 and in 1996-7[12]. In the Chilean case the saving rate is negative for all quintiles, except for the highest income group in 1988 and for the two highest income quintiles in 1996-7 (also the third quintile shows a positive median saving rate). In general, for developed countries, the negative saving rate is observed only for the lowest income quintile (Bosworth *et al.*, 1991; Poterba, 1994). In Mexico, on the other hand, -depending on the year- approximately the first 4 deciles would show negative saving (Székely 1998).

This evidence on the relationship between income and saving rates is consistent with the positive correlation between income level -and income growth- and private saving rates using macro data (Loayza *et al.* 2000). A theoretical basis for this evidence can be found in a Stone-Geary type of utility function in which individuals start saving at a constant marginal rate after attaining a certain level of income (in general a level of income needed to cover basic needs). The average rate of saving converges up to the marginal rate. A similar line of argument, for the correlation between saving rates and income level, is that the inheritance motive has a high-income elasticity.

TABLE 1:
SAVING RATE BY INCOME GROUPS (%)

	Year	Total	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Average	1988	-21.8	-72.5	-29.2	-14.3	-4.9	11.6
	1996-7	-9.3	-37.5	-17.6	-5.2	1.4	12.5
Median	1988	-6.8	-41.9	-18.9	-4.2	1.7	17.3
	1996-7	4.3	-17.6	-3.1	6.2	10.9	22.9
Weighted Average	1988	3.9	-59.9	-28.4	-13.8	-4.3	17.6
	1996-7	6.1	-32.3	-17.3	-4.7	2.0	17.0
Share of Total Income	1988	100	3.7	7.0	11.1	18.6	59.5
	1996-7	100	4.8	8.5	12.5	19.7	54.6
Average Income	1988	264.1	49.7	92.5	146.3	246.1	785.1
(1997-Thousand Ch $)	1996-7	574.3	136.8	243.2	359.0	565.7	1566.3

c) Average rate of saving by expenditure quintiles

Since the classification of households by income quintile is influenced by transitory shocks to this variable, the analysis is complemented with the relationship between saving rate and the household's expenditure quintile, which should be more stable than the income classification if we believe in some version of the permanent income hypothesis. As a matter of fact, based on the theory, we should not expect any relation between saving rates and permanent income.

Table 2 presents the results using a classification by expenditure quintiles. We notice, as expected, that there is less dispersion in saving rates by expenditure quintiles than in the case of the income quintiles. Furthermore, the positive relationship between saving rates and income becomes non-monotonic. But, as is shown in Table 6, this ambiguous relationship vanishes when other kinds of saving are considered. Put differently, once the expenditure level is used as a proxy for permanent income, and controls for the level of durable purchases are introduced, there is no correlation between permanent income and saving rates. The theory would predict a weak relation between saving rate and permanent income. The actual degree of relationship will be determined by the form of the utility function, in a setup of a traditional linear consumption function this relationship will not exist. With this finding, we may conclude that the relationship between saving rate and total income is mainly driven by transitory income.

TABLE 2
SAVING RATE BY EXPENDITURE GROUPS (%)

	Year	Total	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Average	1988	-21.8	-15.3	-24.1	-27.5	-29.4	-12.8
	1996-7	-9.3	9.9	-1.0	-7.7	-18.1	-29.4
Median	1988	-6.8	-3.5	-7.6	-12.1	-12.5	0.6
	1996-7	4.3	17.5	8.0	2.7	-3.2	-5.8
Weighted Average	1988	3.9	3.0	-1.0	-5.0	-3.3	8.6
	1996-7	6.1	25.5	15.5	12.7	8.6	-1.2
Share on Total Income	1988	100	4.8	8.2	11.6	18.8	56.7
	1996-7	100	6.4	9.8	14.0	20.7	49.1
Average Income	1988	264.1	63.2	108.0	153.3	247.6	748.4
(1997-Thousand Ch $)	1996-7	574.3	182.6	282.8	403.1	594.2	1408.9

d) Average rate of saving by educational attainment

Finally, the analysis is complemented with the relationship between saving rate and the household head's educational level, which is a better proxy for permanent income[13].

With this classification of households, in Table 3 we find a negative saving rate for most educational groups. The dissaving rate diminishes as we move toward groups with higher educational level, with the exception of the second group. This exception is probably due to a higher indebtedness capacity of that group and better access to formal mechanisms of social security compared to those of the lowest educational level group (for instance, this group has higher durable goods purchases than the lowest educational level group; see next section). The median saving rate is higher than the average for every group.

TABLE 3
SAVING RATE BY EDUCATIONAL ATTAINMENT (%)

	Year	Total	Incomplete Primary	Incomplete High School	Complete High School	Superior
Average	1988	-21.8	-27.0	-28.7	-16.0	-5.4
	1996-7	-9.3	-9.8	-15.1	-11.1	0.3
Median	1988	-6.8	-10.1	-14.3	-1.3	3.8
	1996-7	-4.3	3.7	0.0	0.2	13.0
Weighted	1988	3.9	-5.7	-10.3	7.4	11.9
Average	1996-7	6.1	0.0	0.4	2.0	12.1
Share of Total	1988	100	37.5	24.7	24.1	13.7
Households	1996-7	100	28.4	24.8	25.2	21.6
Share on Total	1988	100	19.2	14.4	30.6	35.7
Income	1996-7	100	15.2	15.8	23.1	45.8

As a consequence, with this classification of households - by educational level - a greater difference is noticed between the weighted rate and the simple average than in the case of the division for income quintiles. It is important to keep in mind that the average rate is not weighted by income and, therefore, it does not represent the contribution made by each group - in proportion to its income - to national saving. Indeed, if we calculate the rate of saving of each group weighted by the income of each household (third line in Table 3), we notice that for 1988 survey both the group with complete high school education and the one with superior education make a positive contribution to national saving with rates of 7.4 and 11.9% of their total income, respectively. While for the 1996-1997 survey every group presents a positive contribution to total saving.

The positive relationship between educational attainment and saving rate is also commonly found in the international evidence (see Avery and Kennickell, 1991; Bernheim and Scholz, 1993 and Attanasio, 1993). There are two types of explanations for this positive relationship. On the one hand there is the obvious influence of education on income and of the latter on the saving rate (as we mention above). On the other hand, there are explanations that suppose a direct relationship between educational level and saving rate. For example, people that invest more in education have a lower intertemporal rate of discount which leads them to save more as well (Browning and Lusardi, 1996)[14].

It may be possible to identify which force is leading the relationship between education and saving rate in the following way. The influence of education on income occurs through the permanent component, not the transitory income. Hence, if there is an influence of education on saving behavior it should be due to a correlation of permanent income and saving rates. But this explanation can be tested using the results presented in tables 2 and 3. Table 2 shows that only the highest expenditure quintile presents a positive saving rate for 1988 data, while in the classification by educational level the two more educated groups (37.8% percent

of households) have positive and high saving rates. The evidence for 1996-1997 is similar. It could be interpreted as if the correlation between saving rate and education is not due to a correlation between permanent income and saving rate, but due to a correlation between education and saving rate.

Another possible explanation for the positive relationship between saving and educational level - controlling for income level - is that the propensity to consume depends negatively on the proportion of human wealth in total wealth (Friedman, 1957).

e) Putting it all together: ANOVA Analysis for different household classification

We have analyzed the saving behavior of household using several classifications. Now we attempt to determine which characteristic is more informative in the classification of household in order to study saving behavior. In other words, we want to know what proportion of the total variance is explained by differences between groups in each classification.

For this purpose, we present an ANOVA analysis that allows us to calculate what portion of the total variance in saving rates is explained by each classification, i.e. the between group variance. Table 4 presents the between group variance for both surveys for the following classifications: income, expenditure and education. The division by educational group explains only 1% and 0.7% of the total variance in household saving rate for each survey. In the division by income quintiles, on the other hand, 12.3% and 7.0% of the total variance is accounted for by the between-group variance in each survey. Finally, if we classify households by expenditure quintiles, the between variance is 0.7% and 4.5% in each survey[15]. In other words, the fact that with classifications that are closer to permanent income, transitory income may have a large variance within each group. This produces a high dispersion in saving rate in each group.

TABLE 4
SAVING RATES: ANOVA ANALYSIS

Classification	Year	Between-Group Variance
Income Quintiles	1988	12.3%
	1996-97	7.0%
Expenditure Quintiles	1988	0.7%
	1996-97	4.5%
Educational Groups	1988	1.0%
	1996-97	0.7%

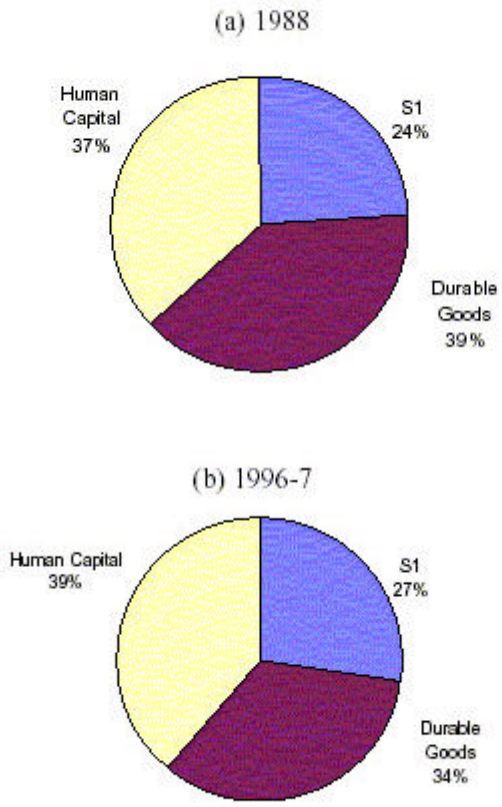
The ANOVA analysis confirms that the total variance in savings rate is better explained by differences in current income. On the other hand, permanent income is not an important determinant of saving rate.

f) Average saving rates using other definitions of saving

In this section an analysis is carried out considering two additional definitions of saving different to the one used up to now (S1). The second definition (S2) adds expenditures in durable goods. The third definition (S3) adds expenditure in durable goods as well as private investment in human capital[16].

In Figure 2, the distribution of total household saving is shown. Conventional saving comprises only around a quarter of total saving, while the rest is carried out through the purchase of durable goods and investment in human capital. These additional forms of saving partly compensate the negative rates of saving observed in some socioeconomic groups, as shown below.

FIGURE 2
SHARE IN TOTAL SAVING BY TYPE



In relation to average rates of saving of the families, including the consumption in durable goods causes an increase from -1.8% to -16.7% in 1988 and from -9.3% to -2.4% in 1996-97. Including the investment in human capital takes the saving rate to -12.0% and 4.5%, in 1988 and 1996-97 respectively. With respect to the median, it also increases although the same biased pattern shown in previous sections is present.

The average saving rates weighted by income or the rate of total saving S1 was 3.9% in 1988 and 6.1% in 1997. These rates go up to 10.2% in 1988 and to 13.6% in 1997 when expenditures in durable goods are included and to 16.2% and 22.3%, in 1988 and 1996-7 respectively, when we add the expenditure in human capital.

Table 5 presents results for different definitions of saving for the different quintiles of income. There are some important changes in the results when we include other kinds of saving, using the information of both surveys. Two quintiles -and not one- have positive median saving rates after including durable good expenses for the 1988 survey. When we additionally include investment in human capital, we observe three quintiles with positive saving rates. While only one quintile presents negative median saving rate after including other kinds of saving using the 1996-7 survey. The results for weighted saving rate are very similar to the median rates for the 1996-7 survey. Furthermore, when the non-conventional kinds of saving are considered, the differences between median and average saving rates by income quintile are reduced, while the differences in the weighted saving rates increase marginally.

TABLE 5
SAVING RATES BY INCOME QUINTILES (%)

			Income Quintile					
		Year	1	2	3	4	5	Total
S_1	Average	1988	-72.5	-29.2	-14.3	-4.9	11.6	-21.8
		1996-7	-37.5	-17.6	-5.2	1.4	12.5	-9.3
	Median	1988	-41.9	-18.9	-4.2	-1.7	18.0	-6.8
		1996-7	-17.6	-3.1	6.2	10.9	22.9	-4.3
	Weighted Average	1988	-59.9	-28.4	-13.8	-4.3	17.6	3.9
		1996-7	-32.3	-17.3	-4.7	2.0	17.0	6.1
S_2	Average	1988	-67.0	-24.9	-9.1	-1.9	17.8	-16.7
		1996-7	-31.2	-10.0	0.7	8.8	20.4	-2.4
	Median	1988	-37.8	-14.4	-1.8	5.9	21.2	-3.1
		1996-7	-14.5	-0.5	9.5	15.5	28.4	8.2
	Weighted Average	1988	-54.3	-24.0	-8.8	0.2	25.0	10.2
		1996-7	-26.6	-9.7	1.2	9.3	25.1	13.6
S_3	Average	1988	-63.6	-21.1	-5.3	5.3	25.0	-12.0
		1996-7	-27.3	-4.0	6.3	16.1	31.2	4.5
	Median	1988	-34.2	-11.2	2.3	10.6	28.0	1.2
		1996-7	-11.1	4.8	14.8	21.5	36.7	14.6
	Weighted Average	1988	-50.8	-20.4	-5.0	5.7	31.9	16.2
		1996-7	-22.2	3.8	6.8	16.7	35.7	22.3

TABLE 6
SAVING RATES BY EXPENDITURE QUINTILES (%)

			Expenditure Quintile					
		Year	1	2	3	4	5	Total
S_1	Average	1988	-15.3	-24.1	-27.5	-29.4	-12.8	-21.8
		1996-7	9.9	-1.0	-7.7	-18.1	-29.4	-9.3
	Median	1988	-3.5	-7.6	-12.1	-12.5	0.6	-6.8
		1996-7	17.5	8.0	2.7	-3.2	-5.8	-4.3
	Weighted Average	1988	3.0	-1.0	-5.0	-3.3	8.6	3.9
		1996-7	25.5	15.5	12.7	8.6	-1.2	6.1
S_2	Average	1988	-13.7	-20.5	-23.4	-23.4	-3.6	-16.7
		1996-7	11.3	2.1	-2.8	-9.6	-12.9	-2.4
	Median	1988	-1.2	-4.5	-8.1	-7.7	6.9	-3.1
		1996-7	18.9	10.3	6.9	1.9	2.4	8.2
	Weighted Average	1988	4.4	1.5	-1.7	1.1	17.2	10.2
		1996-7	26.6	17.9	16.0	13.7	10.3	13.6
S_3	Average	1988	-11.7	-17.8	-19.4	-17.6	5.5	-12.0
		1996-7	13.4	5.6	2.6	-1.8	2.4	4.5
	Median	1988	0.3	-2.7	-4.3	-2.3	15.2	1.2
		1996-7	20.8	13.5	11.1	8.7	16.9	14.6
	Weighted Average	1988	6.1	3.7	1.8	5.7	25.1	16.2
		1996-7	28.1	20.6	20.2	19.9	23.5	22.3

TABLE 7
SAVING RATES BY EDUCATIONAL ATTAINMENT (%)

		Year	Incomplete Primary	Incomplete High School	Complete High School	Superior	Total
S_1	Average	1988	-27.0	-28.7	-16.0	-5.4	-21.8
		1996-7	-9.8	-15.1	-11.1	0.3	-9.3
	Median	1988	-10.1	-14.3	-1.3	3.8	-6.8
		1996-7	3.7	0.0	2.0	13.0	4.3
	Weighted Average	1988	-5.7	-10.3	7.4	11.9	3.9
		1996-7	0.0	0.4	2.0	12.1	6.1
S_2	Average	1988	-23.1	-22.8	-10.3	9.9	-16.7
		1996-7	-4.1	-7.9	-3.5	7.6	-2.4
	Median	1988	-6.7	-9.1	2.5	8.9	-3.1
		1996-7	6.4	3.5	6.8	17.4	8.2
	Weighted Average	1988	-2.6	-4.8	15.5	18.6	10.2
		1996-7	6.0	7.4	9.8	20.2	13.6
S_3	Average	1988	-19.7	-19.2	-4.5	9.6	-11.9
		1996-7	0.3	-2.5	3.8	18.7	4.4
	Median	1988	-3.6	-5.9	6.8	17.1	1.2
		1996-7	10.1	8.7	13.2	27.2	14.6
	Weighted Average	1988	0.1	0.0	21.3	26.6	16.2
		1996-7	11.2	13.3	18.0	31.2	22.3

The evidence shown in tables 5 and 6 lends support for the hypothesis that part of the relation between saving rates and income presented above is explained by transitory shocks to income. On the other hand, when the saving rate (S3) is weighted by income (equivalent to the rate of total saving of the educational group), no group contributes negatively to aggregate saving and the two groups with higher education sustain positive and high saving rates in 1988, while every group has high and positive saving rate in 1996-1997. As a conclusion one can assert that other forms of saving compensate an important part of negative conventional saving.

III. AGE PROFILES

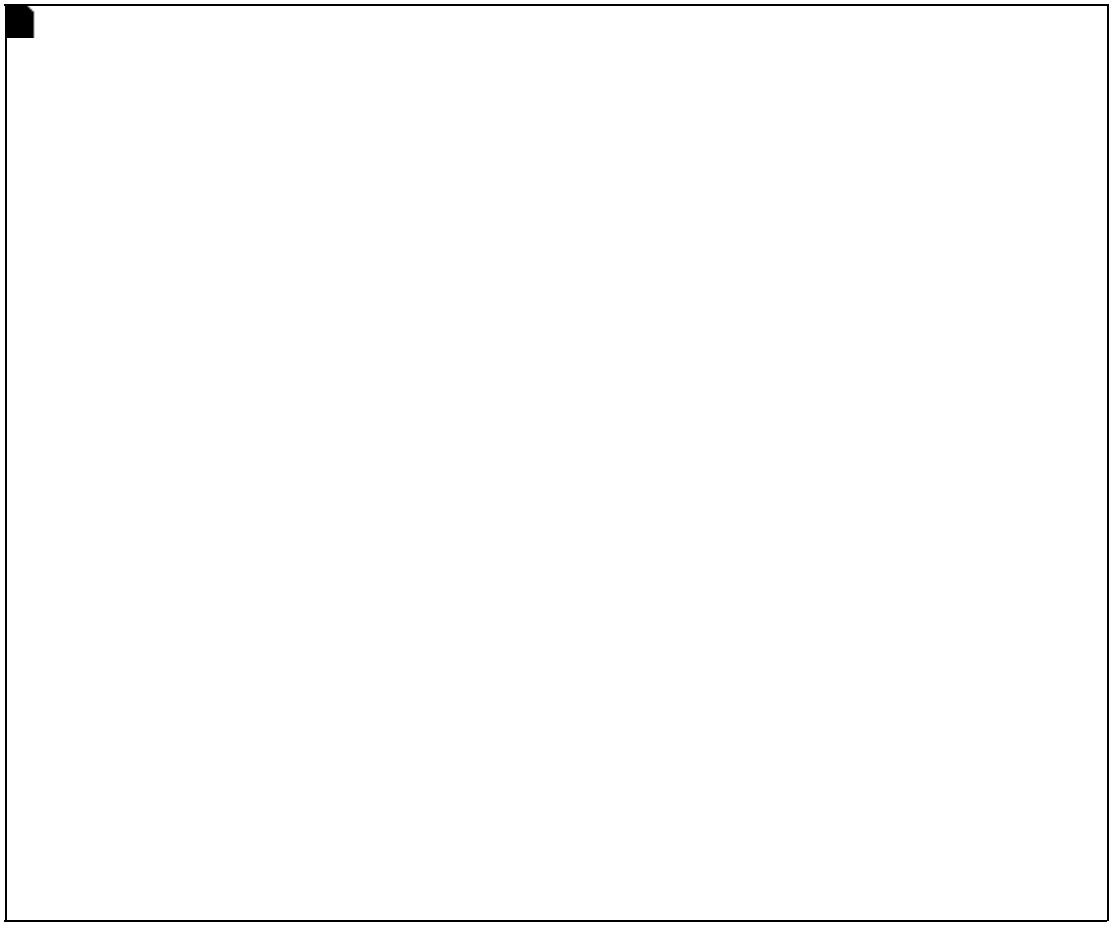
A common way to study saving behavior in the literature is to analyze age profiles for consumption, income and, therefore saving. This approach is derived from the denominated life cycle hypothesis originally developed by Modigliani and Brumberg (1954) who proposed that consumption is not a function of current income but of wealth and expected flows of future income[17]. The behavior of consumption through life would be independent of the behavior of income, and saving would have a U-inverted shape, with low or negative saving at the beginning of working life (when income is low), positive saving during the period of high income and negative saving toward the end of the life (during the period of retirement and before retirement when income is lower). However, international evidence shows high parallelism between consumption and income profiles, with a high correlation between both variables[18]. In this section evidence on income profiles and consumption of Greater Santiago households using 1988 and 1996-97 HBS Surveys will be analyzed.

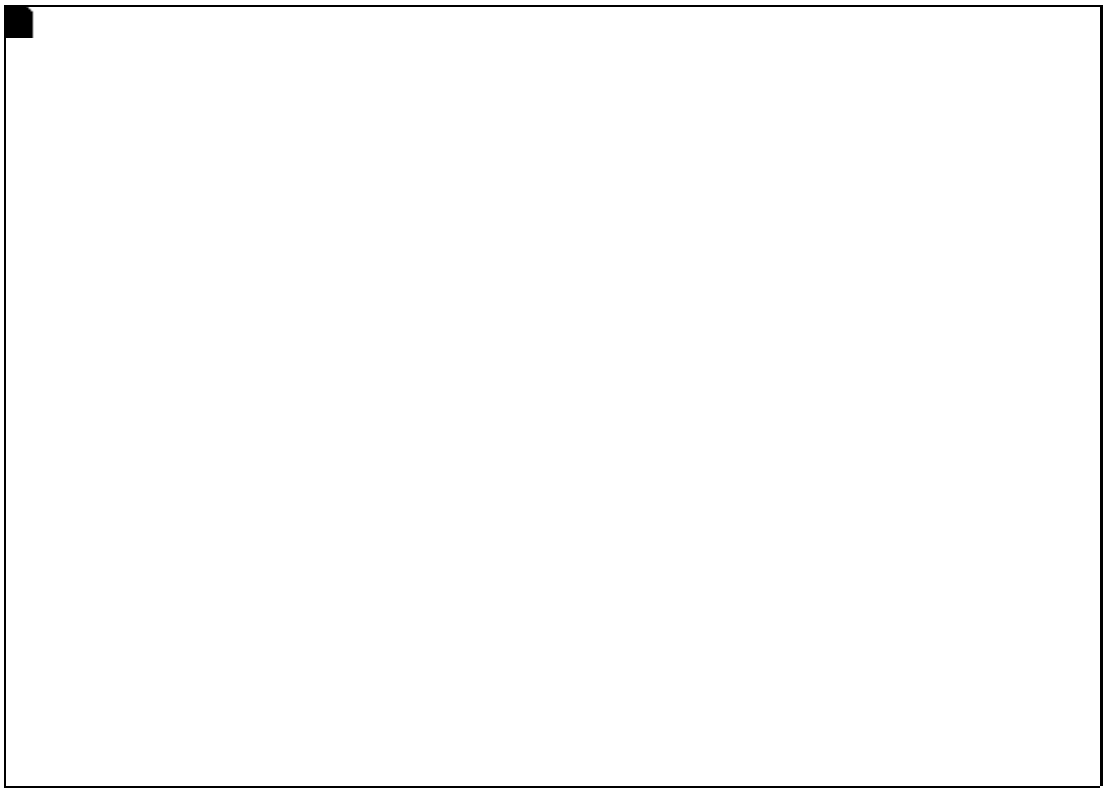
a) Age profiles for the whole sample

In general we will consider smooth profiles for household head's age, between 20 and 80 years. These adjustments are common in the literature. On the one hand, we classify households according to the head's age since in most of the cases it determines income profile of the family. The age range is limited because for very young and old ages an important selection phenomenon takes place on the type of individuals who are considered heads. For example, among the poor, old people who were formerly heads become part of households where they are no longer heads (see Deaton, 1997 for further details). Additionally, due to noise in the information on saving, we have decided to use two alternative smoothing techniques. On the one hand, following Deaton (1997), we use 5 years moving averages, as

an alternative method we use a polynomial of fifth degree on age (see, for example, Gourinchas and Parker, 1999).

In this section we are analyzing the shape of the profiles to explore the existence of independence between expenditure and income, but we should expect expenditure above income in many cases due to the high degree of underreporting for the earlier survey. These smoothed profiles -both average and medians- are shown in Figure 3 for both surveys; they show no independence between income and expenditure. Comparing medians and averages gives very different results; in both surveys the period of indebtedness is shorter in the case of average than for the medians. This important difference is explained by the greater importance of rich individuals when calculating averages. Furthermore, there is no evidence of dissaving -or lower saving- during the old age. Another relevant point is that the saving profile has a positive slope, not an inverted U-shape as predicted by the LCH. This fact is also found in other studies. For instance, Gourinchas and Parker (1999) find a saving profile with a similar increasing slope -between 25 and 65 years- and the explanation is that people start to save for retirement only after age 40. Similar evidence is found in Attanasio and Székely (2000) for some developing countries.





The dependence relationship between income and expenditure -seen in the average profiles of Figure 3- is what is known in the literature as the "consumption/income parallelism" with wide empirical support evidence in the literature[19]. However a difference in the Chilean case is the fact that young households do have negative saving, in accordance with the life cycle hypothesis.

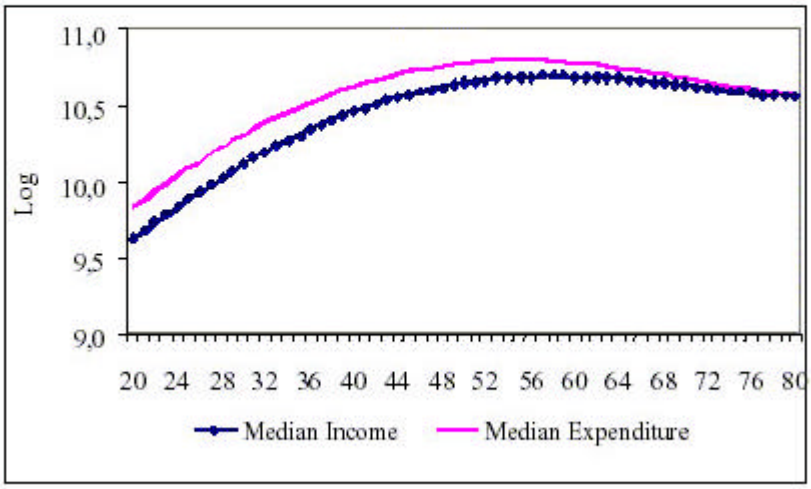
b) Age profiles for educational level

For the reasons exposed in the previous section, we prefer to concentrate the analysis on the income and expenditure profiles for different educational levels (not for income levels). Although in a cross-section we still have the problem of not following the same household as it ages we are, at least, analyzing the profiles of households with a key characteristic in common. Furthermore, this characteristic is related with their permanent income and, therefore, there will not be movements from one group to another due to transitory changes in income. Finally, this classification permits and recognizes a certain level of heterogeneity in the preferences of the households (Gourinchas and Parker, 1999).

In figures 4 to 7 we observe first that there is a high degree of parallelism between income and expenditure, especially among less educated groups[20]. As we move towards groups with higher education a pattern closer to that predicted by the life cycle hypothesis is observed. Particularly in Figure 7 we observe a higher degree of independence for the income and expenditure profiles with an early period of indebtedness and a flatter consumption profile. This behavior of the higher educational groups which is closer to the theory predictions is probably explained by easier access to credit, as we show in section IV.c.

FIGURE 4
AGE SMOOTHED PROFILES INCOMPLETE PRIMARY EDUCATION
(FIFTH ORDER POLYNOMIAL)

a. 1988



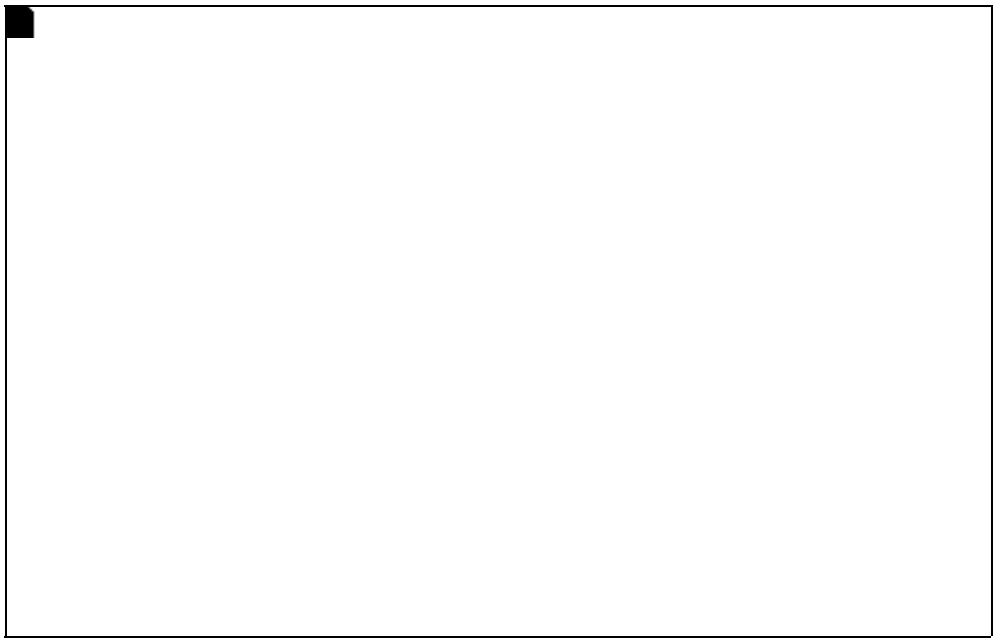


FIGURE 5
AGE SMOOTHED PROFILES INCOMPLETE HIGH SCHOOL EDUCATION
(FIFTH ORDER POLYNOMIAL)

a. 1988

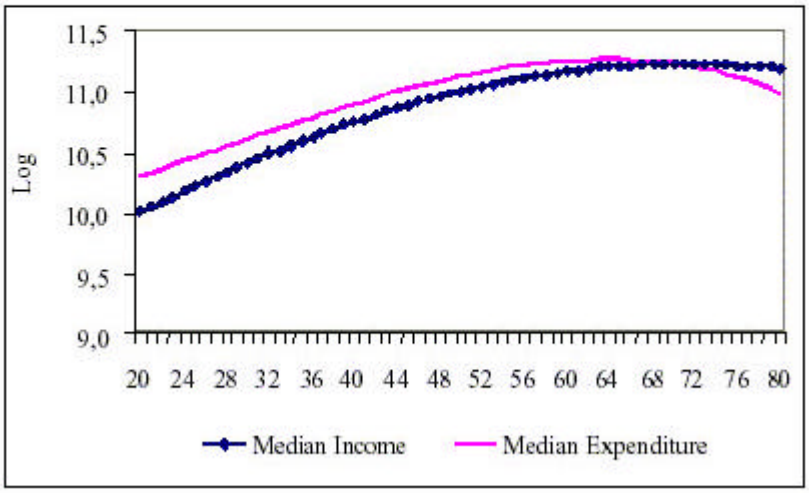


FIGURE 6
AGE SMOOTHED PROFILES COMPLETE HIGH SCHOOL EDUCATION
(FIFTH ORDER POLYNOMIAL)

a. 1988

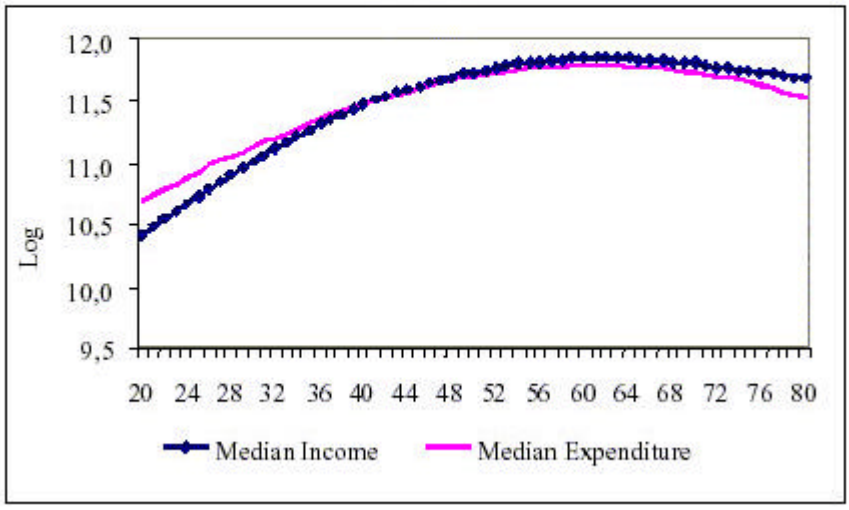
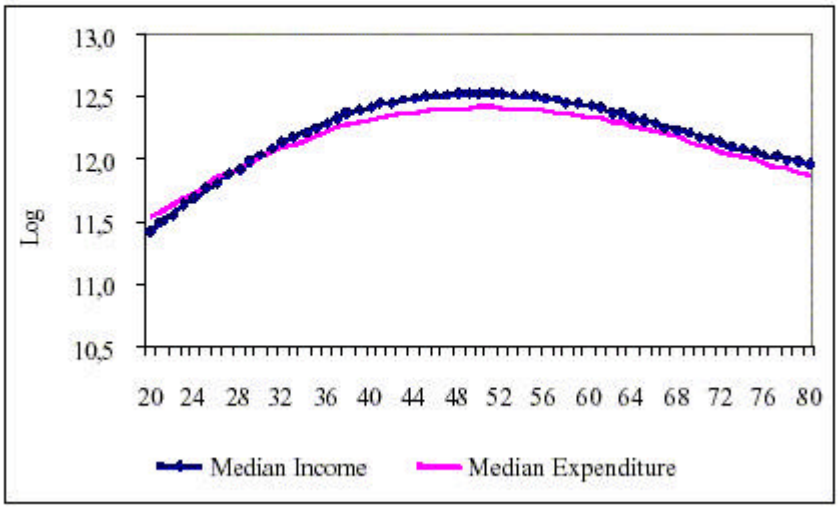
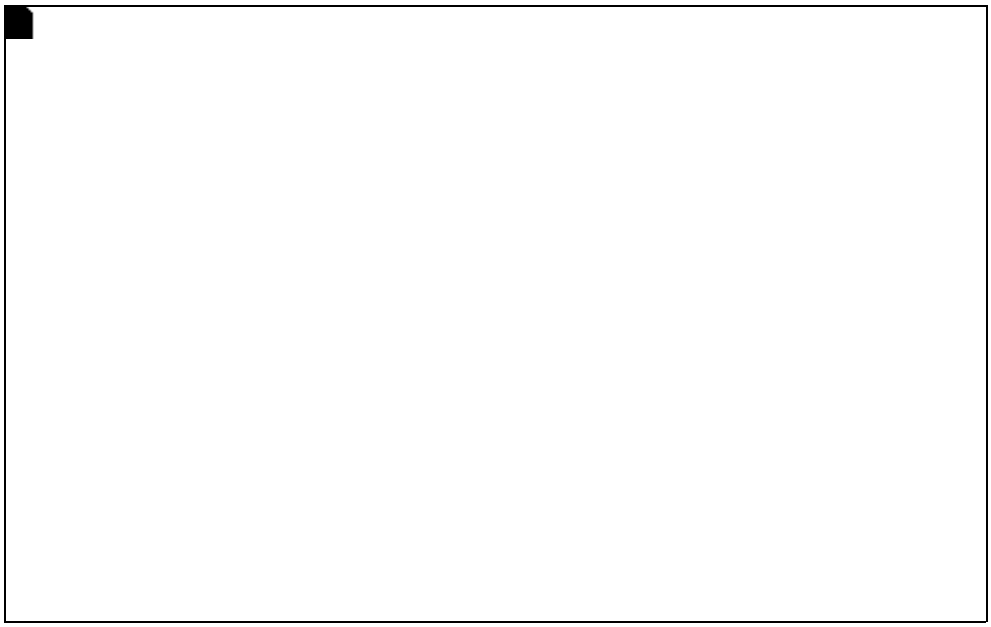


FIGURE 7
AGE SMOOTHED PROFILES SUPERIOR EDUCATION
(FIFTH ORDER POLYNOMIAL)

a. 1988





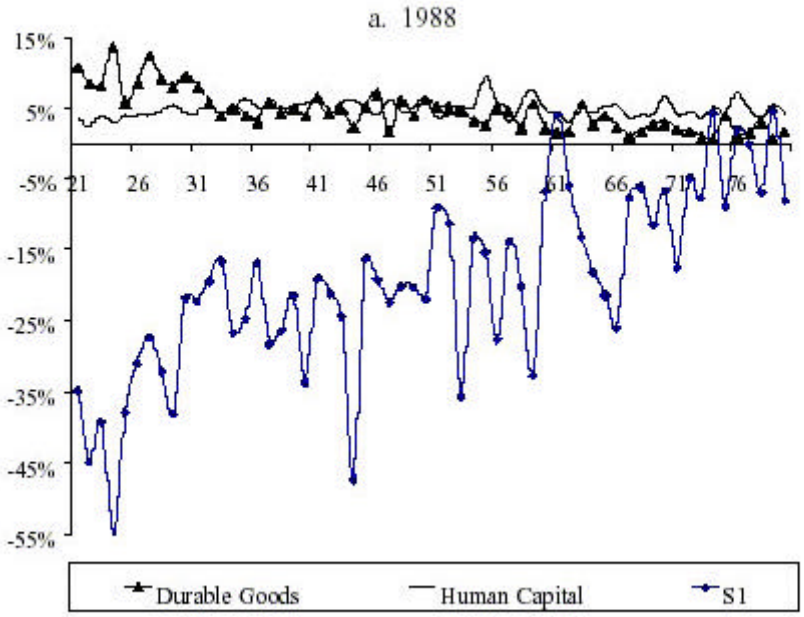
From these age profiles (both for the whole sample, and by educational groups) two stylized facts emerge. First, there is an important degree of parallelism between income and consumption profiles, which is against the prediction of the LCH in which consumption would be independent of current income. In section IV we will explore an explanation for the "consumption/income parallelism". Second, older people do not dissave and -as we will see below- have a higher rate of saving. Even in the case of individuals with higher educational attainment- who have saved early in life- saving remain positive after retirement. Both stylized facts are common in the international evidence and contradict the predictions of the LCH. Furthermore, the second stylized fact -positive saving of the elderly- can be due to the definition of income considered in this study, as we analyze in the next section.

c) Profiles and other definitions of saving

Finally, in Figure 8 the age profiles of the three saving rates (S1, S2 and S3) are shown. In general, we conclude that savings S2 and S3 present an age pattern. Consumption in durable goods takes place early in life decreasing sharply up to age 35 and slowly decreasing after that

age. Investment in human capital, on the other hand, takes place throughout lifetime (probably through different kind of goods in different ages, since we include in this category both education and health expenses). Actually, the partial correlation between the average rate of expenditure in durable goods by age and S1 by age is -0.8 and -0.7 (statistically significant) for both surveys, and the partial correlation between the human capital expenditures and S1 is -0.03 (statistically not different of 0) for 1988 and -0.3 (statistically significant) for 1996-7 survey.

FIGURE 8
SAVING RATE AGE PROFILES BY TYPE OF SAVING



IV. DOES THE LIFE CYCLE HYPOTHESIS HOLD

In this section we study the parallelism between income and expenditure, observed in the Chilean case and in most of the international evidence. Several factors may produce this parallelism without inducing a rejection of the LCH implications. On the one hand, correction

for the demographics of the household takes account of most of the parallelism between consumption and income (see Attanasio, 1999). On the other hand, proper treatment of pensions reconciles the empirical evidence with the theoretical prediction of negative saving for the elderly (Modigliani, 1988; Japelli and Modigliani, 1998). Finally, it is important to study the presence of liquidity constraints and their effects on the allocation of resources along the life cycle.

In this study we plan to analyze three explanations: (i) the influence of demographics on the consumption profile; (ii) the fact that pensions cannot be considered income, but a dissaving even in a Pay-As-You-Go System (because they would be a de-accumulation of an implicit debt from the government to the taxpayers); and (iii) the effect of liquidity constraints in the profiles analyzed (as much as our data allows).

a) Parallelism: Influence of demographics in the consumption profile

On the one hand, parallelism may be explained by the confusion between age and cohort effects. With our data it is not possible to follow the same individuals along their lifetime as would be ideal using panel data; rather we describe the behavior at different ages of a cross-section of different individuals.

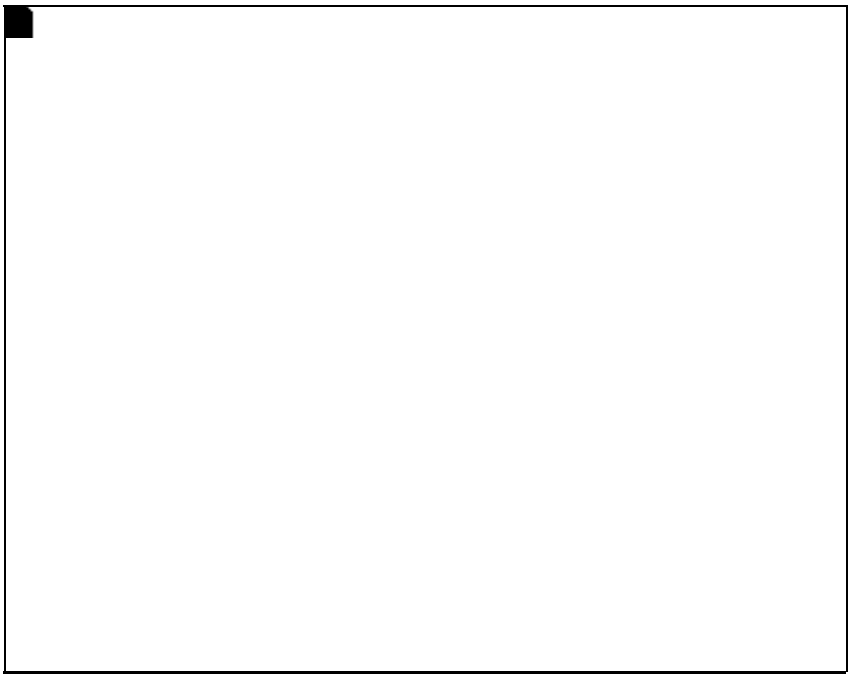
It is likely that if the same people were followed along their lives, a pattern closer to that predicted by the life cycle hypothesis would emerge. In our case, at most we will have access to two cross sections which will not allow us to study formally this situation.

Now the influence of demographics on the consumption profile is considered. We correct consumption profiles of the 1988 and 1996-7 surveys by demographic characteristics of the households (number and ages of individuals). We see that parallelism disappears with this correction for most of educational groups but consumption profiles still have positive slopes. We then propose some explanations for that increasing pattern of consumption.

The life cycle hypothesis predicts the behavior of an individual consumer; nevertheless, we observe total household consumption. In this section we correct for the size and composition of the household in order to analyze how individual consumption changes through the individual lifetime. Then, we compare it with the income profile to see if this correction breaks the parallelism. Another explanation for the parallelism is that we only observe market purchases and not domestic production. It is possible for consumption to remain constant but its composition between goods acquired in the market and goods made at home may change with time allocated to the labor market and, by consequence, with income, especially when women are changing their labor market participation (Ghez and Becker, 1975; and Baxter and Jermann, 1999 recently). In that case, observed consumption and income would move together without denying life cycle hypothesis predictions.

Diverse types of corrections are used. It is possible to correct expenditures for the effect of demographic variables whose impacts are estimated in regressions (Attanasio and Browning, 1995; Gourinchas and Parker, 1999) or to correct the expenditure for the number of equivalent adults (Blundell *et al*., 1994). In this paper the two approaches are used. First the number of equivalent adults correction is used. Expenditure is divided by the number of equivalent adults in each moment. As a first approach we have used the conversion of Ferreira and Litscheld (1998) , based on Contreras (1996) , to correct the profile of expenditures for equivalent adults[21]. It is important to stress that the equivalent adult formula was calculated based on 1988 data; we apply the same formula for the 1996-7 data which, may introduce biases in the adult equivalent correction.

As shown in Figure 9, dividing consumption by the number equivalent adults eliminates the U-inverted shape of the consumption profile and, consequently, consumption fluctuates around a constant average. This is true both for total expenditure and for expenditure on non-durable goods.



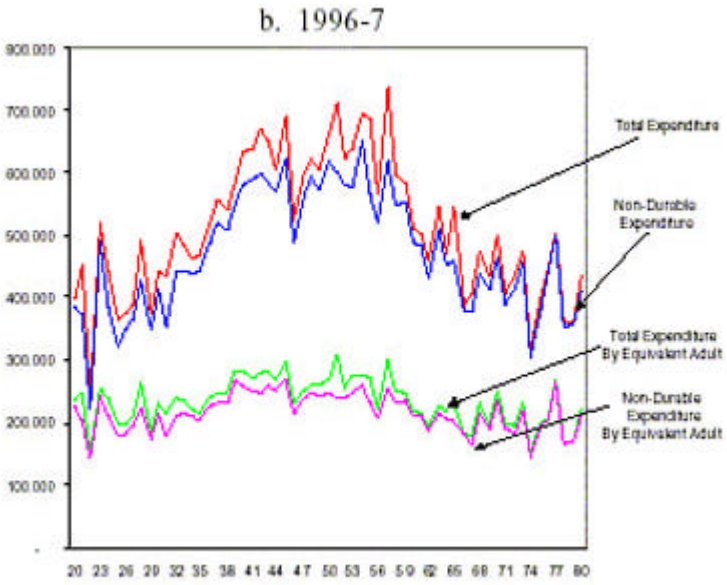
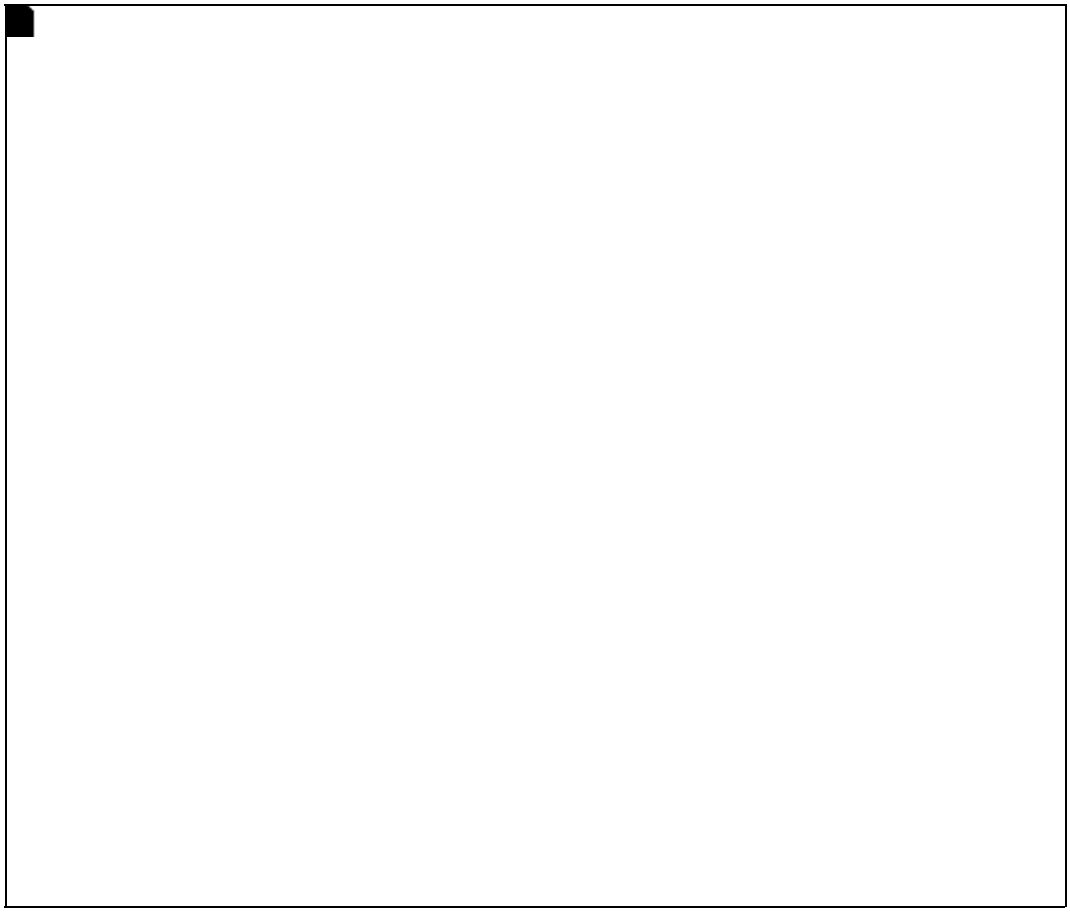
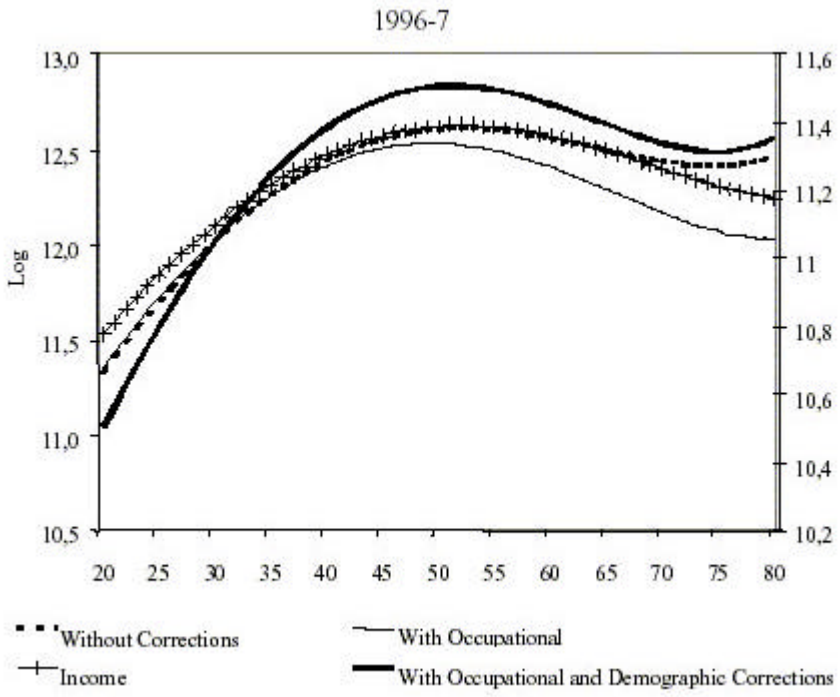


Figure 9 may lead us to conclude that, to a great extent, the parallelism between income and expenditure is due to demographic factors. A similar result is found in Attanasio and Browning (1995) and in Blundell *et al.* (1994) after incorporating corrections for demographic factors. Nevertheless, Gourinchas and Parker (1999) criticize those corrections because demographic variables may be capturing age effects as well, since age of the head of the household and the household composition may be highly correlated[22]. They propose a new correction and find that in spite of it, consumption maintains a U-inverted shape. Following Gourinchas and Parker we ran regressions for consumption including the age of the household head with and without demographic and occupational corrections (See Annex 2). In figures 10a to 10d we plot consumption profiles obtained from those regressions for different levels of educational attainment. In these figures it is possible to see that the correction for occupational variables[23] flattens the consumption profile slightly (see in Annex 2 the parameters for women's labor force participation and their significance). Particularly, when the wife works consumption is increased notoriously for young households in which we expect the presence of small children. That is partly the reason why consumption profiles without corrections are parallel with income. Correcting for equivalent adults breaks the parallelism between income and expenditure. So

we may conclude that the parallelism is partly a consequence of the demographic cycle within the household and not a proof against the life cycle hypothesis. Nevertheless, if children are considered consumption we are not able to rule out the parallelism.

Correcting for demographic variables, though, does not produce a flat consumption profile but one with positive slope. Although this is not contradictory with an intertemporal optimization model and might be simply reflecting a set of preferences in which consumption at later ages is more highly valued (The Keynes (1936)'s "improvement motive" or in modern literature "habit formation"), other explanations also fit this fact. For example, an interest rate above the subjective rate of time preference[24], liquidity constraints or a buffer stock motive which lead people to save in early ages as to build a stock of savings to protect themselves from income fluctuations. As a concrete example, one form of liquidity constraint is the impossibility to borrow against future pensions.




1996-7
13,0
12,5
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Log
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11
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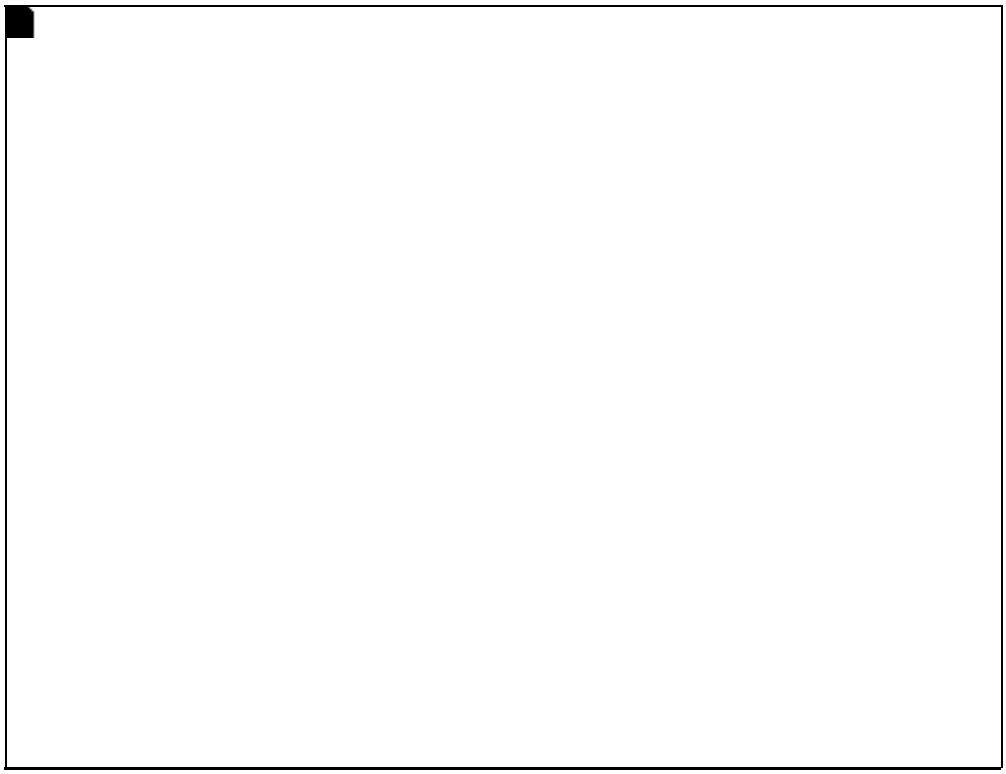
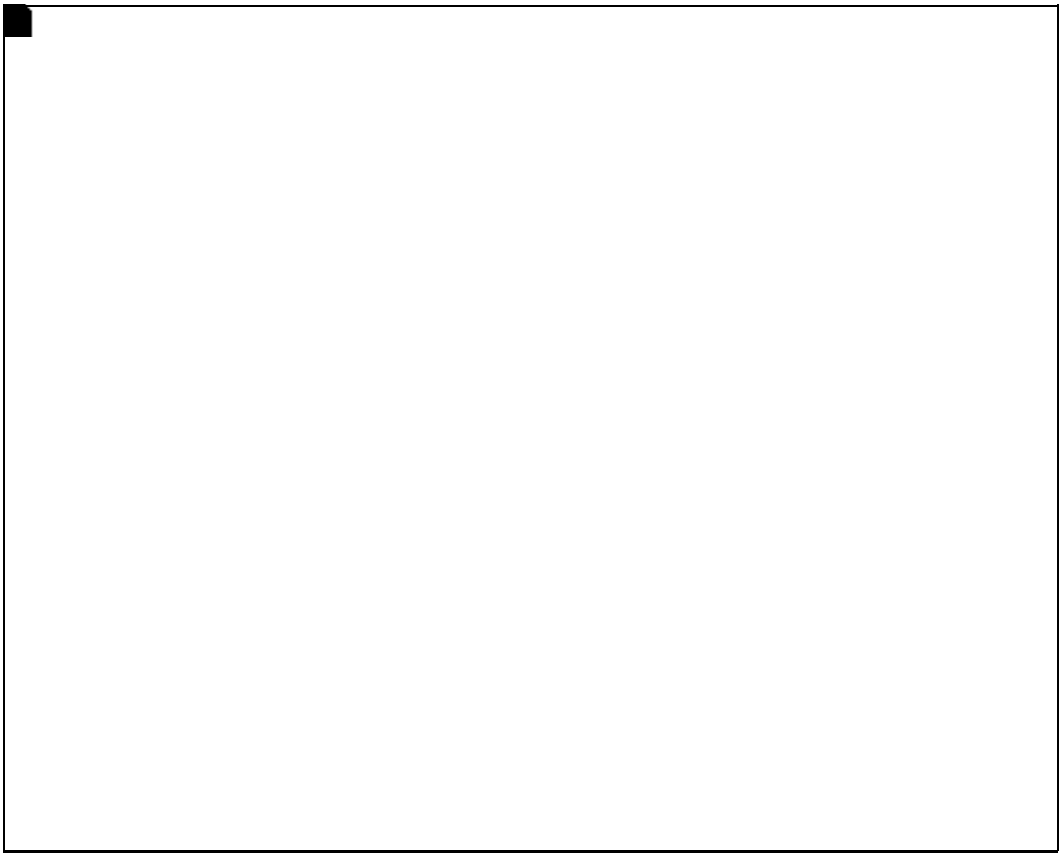
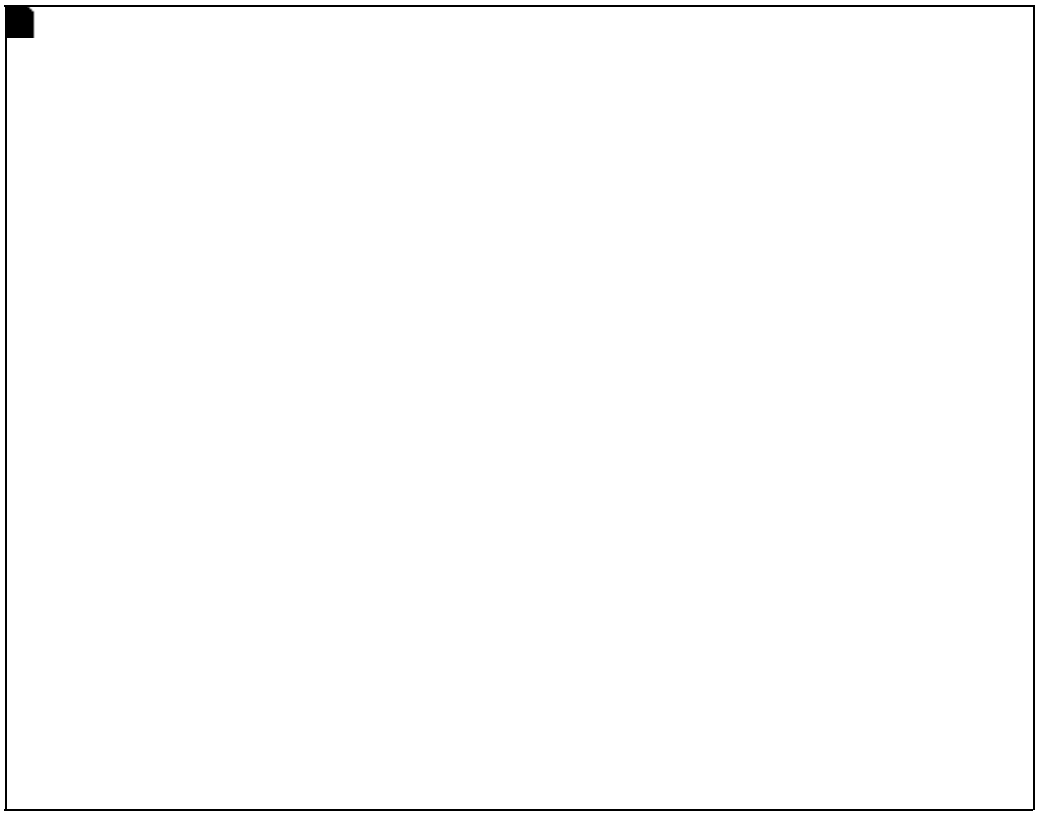
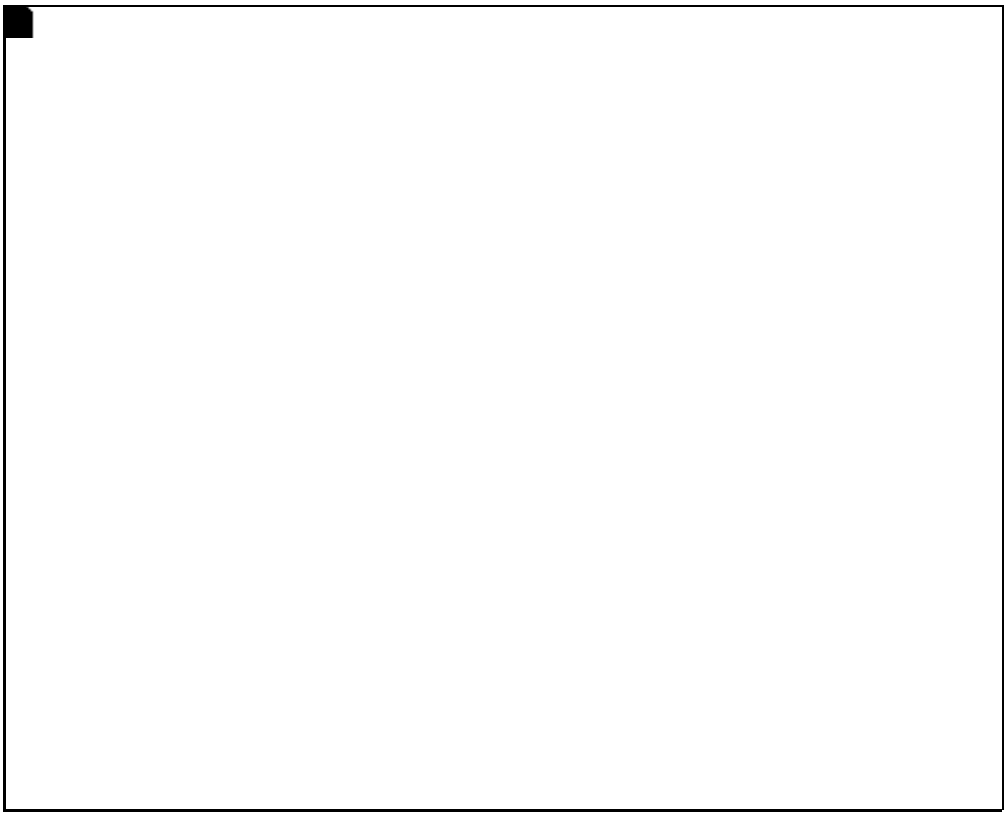
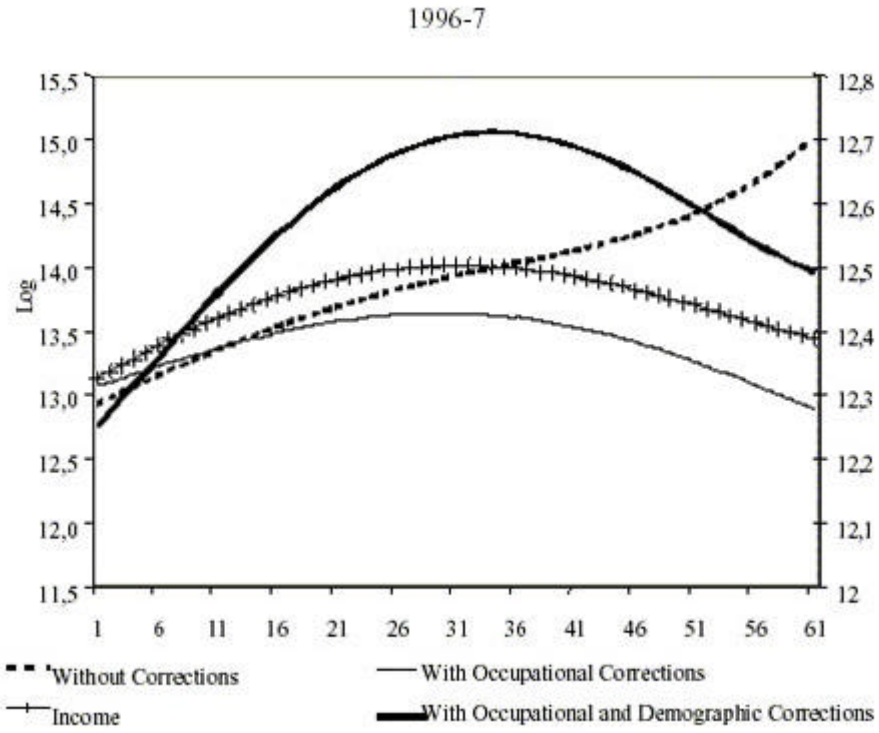
20 25 30 35 40 45 50 55 60 65 70 75 80
Without Corrections
With Occupational
Income
With Occupational and Demographic Corrections







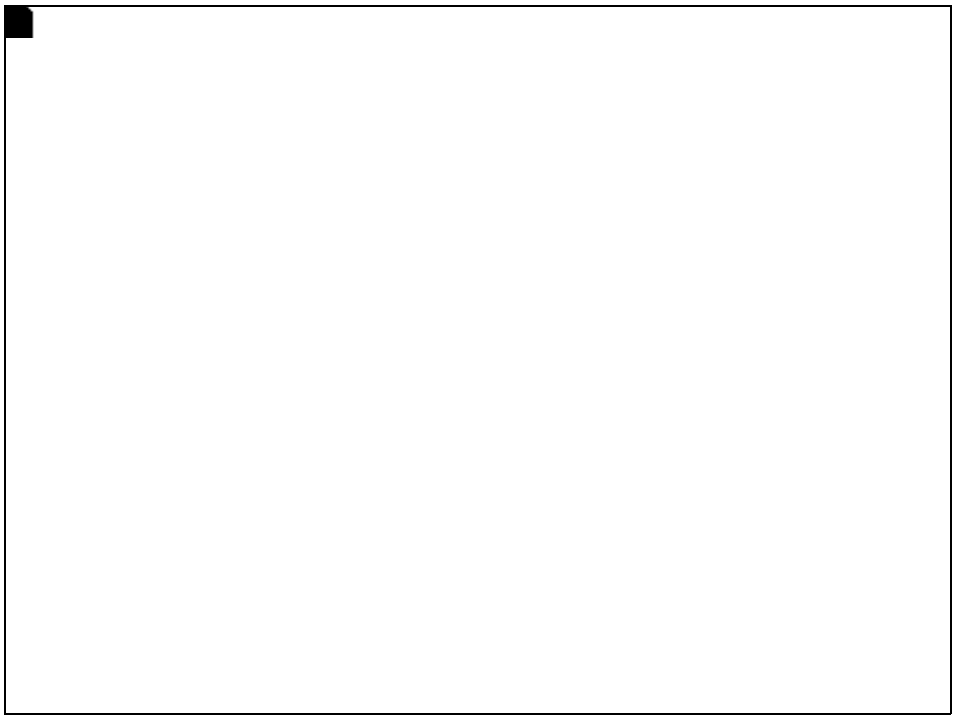




b) Positive saving in the elderly: Are pensions income?

The Chilean microeconomic data - as well as other microeconomic data used to analyze household saving - include as income pensions received by retired individuals (see, for example, papers in Poterba 1994, Carroll and Samwick 1997, Székely 1998, Coronado 1998). If pensions are governmental transfers it is correct to consider them income from the individual point of view. But, if the pensions are a deaccumulation of an implicit or explicit asset (debt) of the pensioners (of the government), then pensions are not income, they are a dissaving. The point is very controversial; on the one hand, there is the literature on the effect of pensions in the whole economy that considers the pensions a deaccumulation of an implicit (explicit) asset in a Pay-As-You-Go (Fully Funded) system of Social Security. And on the other hand, there is the above-mentioned literature of household saving which considers pensions (both public and private) as income. We regard the point controversial, and a more detailed analysis of this point is beyond the objectives of this paper [25]. Thus, in this section we take an eclectic approach and we show the profiles subtracting pensions from income.

In Figure 11 we show the level of savings by age group, and then subtract from it the category of transfers, which in our data includes pensions, as well as other private or public transfers. Unfortunately, we cannot isolate the exact amount for pensions in the data[26]. Figure 11 show a strong increase in savings around the age of retirement, but when we subtract transfers we observe negative savings at those ages.



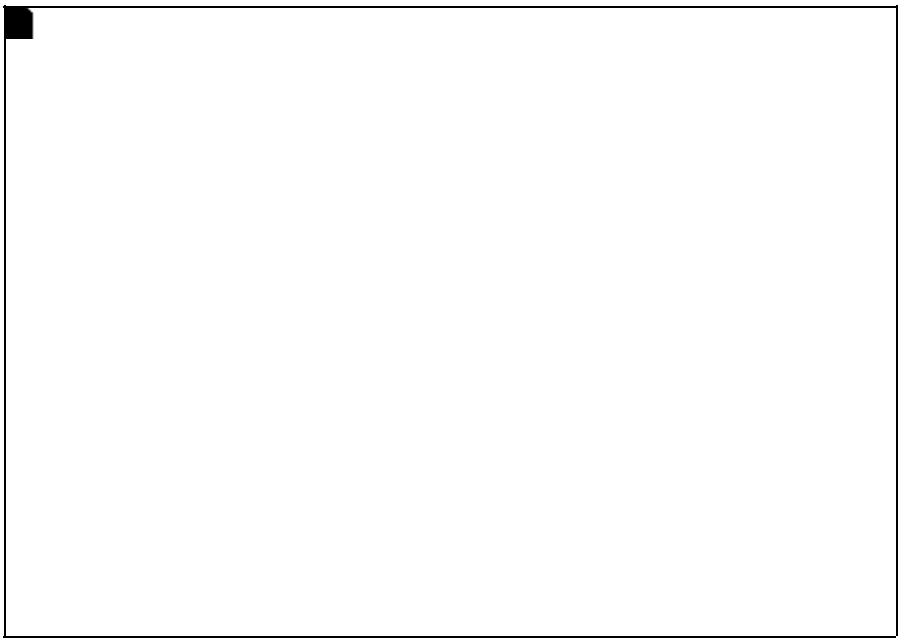


Figure 11 tells us a story in which saving for the elderly is negative and the corresponding dissaving is covered by pensions accumulated in the past. This fact would tell us that when pensions are not considered income the saving behavior is closer to theory predictions[27]. Still, we observe that consumption is lower than "total income" (income plus pensions), i.e., they do not spend all the resources available to them. Börsch-Supan (1994) proposes an explanation for this fact. It would not be possible to borrow against pension income and, due to health and other limitations, the elderly cannot spend their pensions. In this sense, the saving of the elderly would not be an intertemporal optimal decision but a forced one. More traditional explanations are related to precautionary saving due to uncertainty with respect to the age of death and health expenditures and, finally, the heritance motive (Modigliani, 1988).

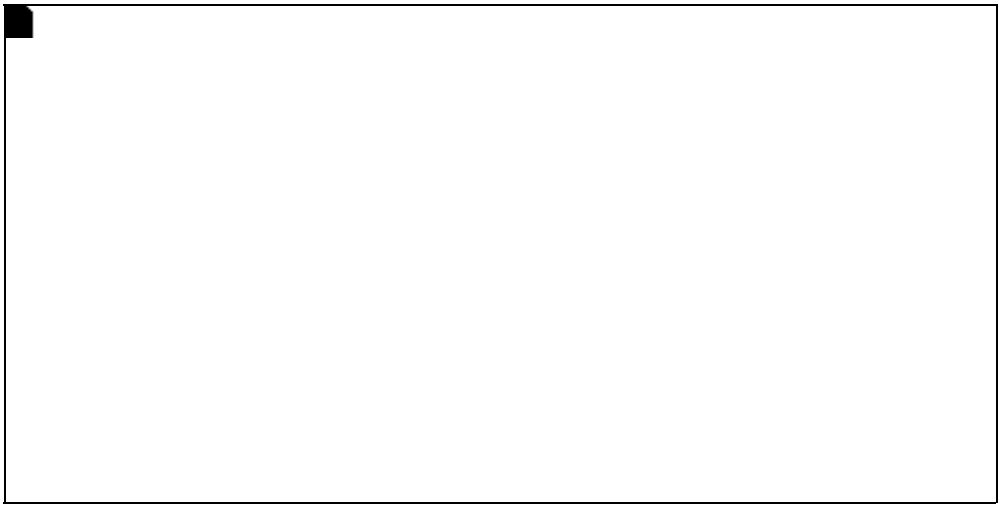
c) Liquidity constrains

It would be interesting to know how credit constraints differ among households and evolve through time. Credit constraints have a strong link to intertemporal allocation of consumption and, hence, to saving behavior[28]. Better access to credit would allow an intertemporal

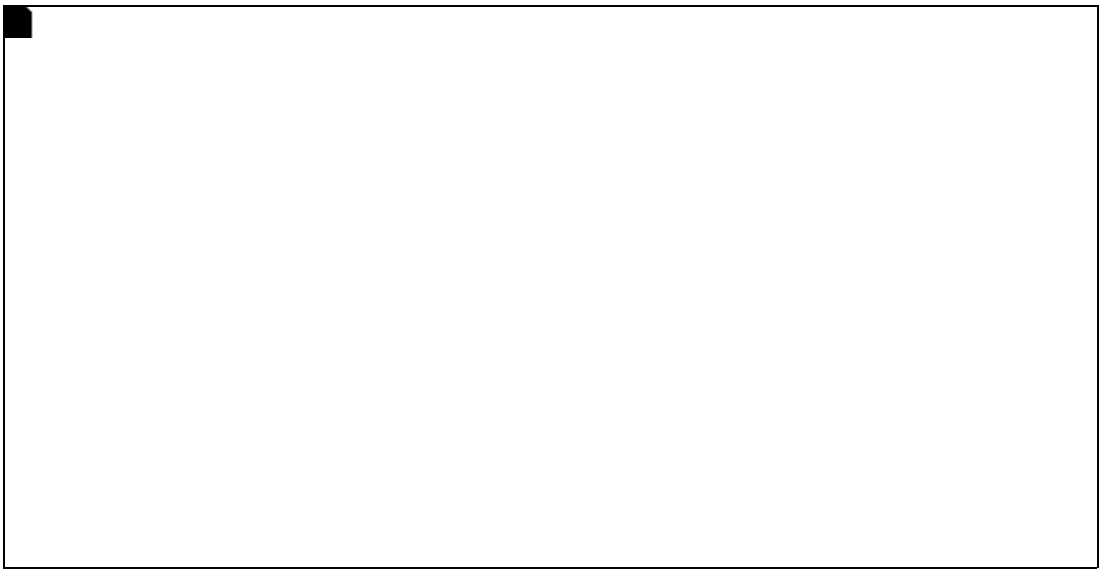
allocation of consumption closer to the optimal and, probably, closer to what theory predicts.

The microeconomic data allow us to do some exploration on the issue. Unfortunately, we usually do not observe access to credit but -with some luck- actual debt levels. Furthermore, the public data bases for Household Budget Surveys do not include the level of debt of each household but only report the financial expenses due to different types of debt: department stores, financial institutions: loans and use of credit cards and mortgage loans. Additionally, there were some changes between surveys in the methodology used to account for financial expenses. To explain those differences it is important to explain how the financial expenses are calculated. Financial expenditures due to department store debt correspond only to expenses made in the "reference period"; on the other hand, financial expenses related to credit cards are based on the actual bill, hence they may correspond to expenses prior to the reference period. In the first survey, the reference period for expenditures was 3 months, while in the second this period was only 1.5-2 months. These differences do not allow us to make comparisons between surveys. Therefore, we center the analysis in comparisons between quintiles.

In order to simplify the analysis we add the financial expenses of all types of debt. Later we will pay some attention to the distribution of financial expenses by type of debt. In Table 8, we show information on the share of each quintile in the volume of financial expenses and in the number of household with financial expenses.



We can see that the richest quintile is overrepresented both as a percentage of the total number of families in debt and in their share in the value of financial expenses considering their share in income shown in Table 1. This overrepresentation has increased in the decade covered by these two surveys. To this evidence we should add the fact that, based on independent information, aggregate financial consumer credit has increased from 1.3% of GDP in 1988 to over 6% of GDP in 1996 (see Butelmann and Landerretche, 1998). These facts help to explain why consumption profiles for the period 1996-7 are closer to the predictions of the LCH than those obtained from the 1988 survey at least for the richest quintile. The increasing access to credit of the richest quintile is confirmed in Table 9.



In this section it is possible to notice that different households present different degrees of access to financial markets, this phenomenon may explain some of the anomalies presented in previous sections. In particular, (i) higher degrees of parallelism observed in the poorest quintiles, (ii) the upward sloping consumption profiles could be a result of household without access to financial markets, so they need to build a stock of assets -in order to smooth income shocks- and as time pass this motive is less important and they increase their consumption (after controlling for demographic factors). In conclusion, this evidence could be able to take account of some of the results previously presented. The importance of this element is measured in a regression analysis (see Butelmann and Gallego, 2001).

V. SAVING OF THE ELDERLY AND COMPATIBILITY BETWEEN LCH AND THE DATA, AND BETWEEN BBMACROAND MICRO STUDIES

The Chilean evidence analyzed in this paper, as well as the international microeconomic evidence, shows that older households do not dissave after retirement. This evidence appears to contradict not only the life cycle hypothesis but the macroeconomic evidence as well. This point is very important for a right understanding of the nature of the relation between saving rates and the proportion of older people in the population. And a right understanding of the relation needs to combine micro and macro evidence.

For example, Loayza *et al.* (2000) obtain a negative and significant parameter for the proportion of older people in the population in their regressions estimating the determinants of both private and national saving. If older people save a higher percentage of their income -as shown in the microeconomic data- a high old dependency ratio should increase the rate of overall saving.

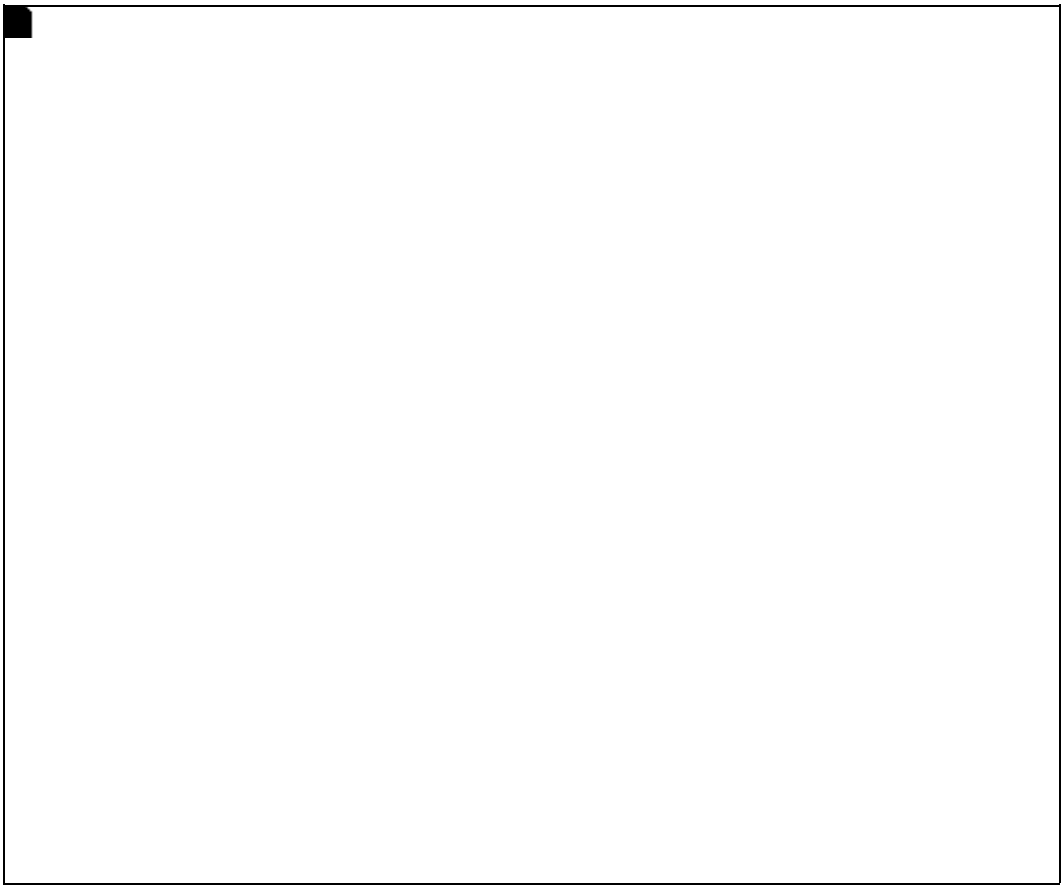
In this section we present a set of explanations for these contradictory findings. The explanations have to do with the definition of income in the microeconomic data as well as with the sample of individuals included in the old population in this type of analysis. Furthermore, Weil (1994) proposes an explanation based on interactions between generations as younger generations will reduce saving if they expect to receive bequests from the saving elderly.

The right explanation for this contradiction will depend on what incompatibility we want to explain, since not all of the macro studies on saving use the same definition of aggregate saving. Some of them use national saving or private saving and few use personal saving, the latter being closer to household saving in the microeconomic data.

a) Income definitions

As was discussed in the last section, it is not clear if pensions are income or dissaving from the household's point of view. As a matter of fact, in the case of private pension plans it is necessary to deduct pensions from income for the retired and to add the contributions to the

pension fund to the income of the working individuals. Bosworth *et al.* (1991) adjusts age specific saving rates by adding employer pension plan contributions and corresponding interest earnings to the income of working groups and by excluding pension benefits (not social security benefits) from the retired group's income. The age profile of saving changes substantially for cross-sections in 1972-73 and 1982-85. Specifically, the saving rate of people over 64 declines from 14,9 to 1,8% in the first sample and from 11,5 to -3,9% in the second. This finding is present in other studies. For example, see Figure 12, if we subtract pensions from income, the profiles in the case of Germany and Japan change substantially, and the positive saving rates observed for the elderly diminish dramatically (in the case of Germany, this rate is significantly negative)



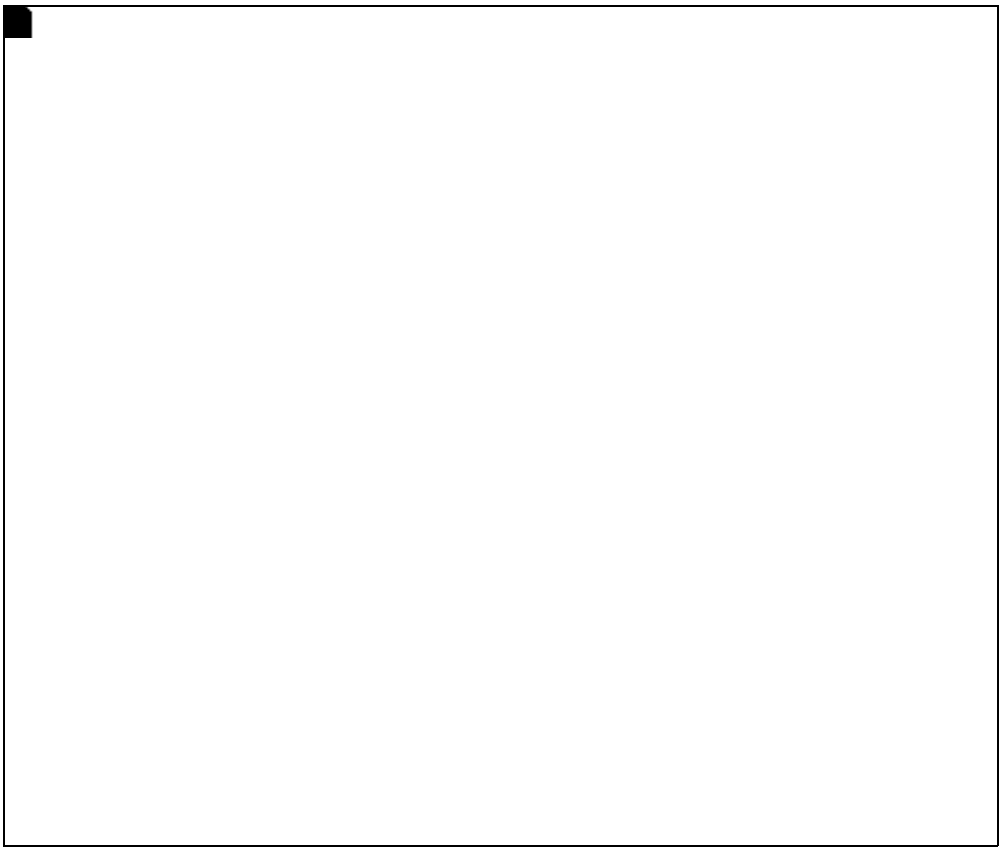
b. Who is old?: the effect of selection bias

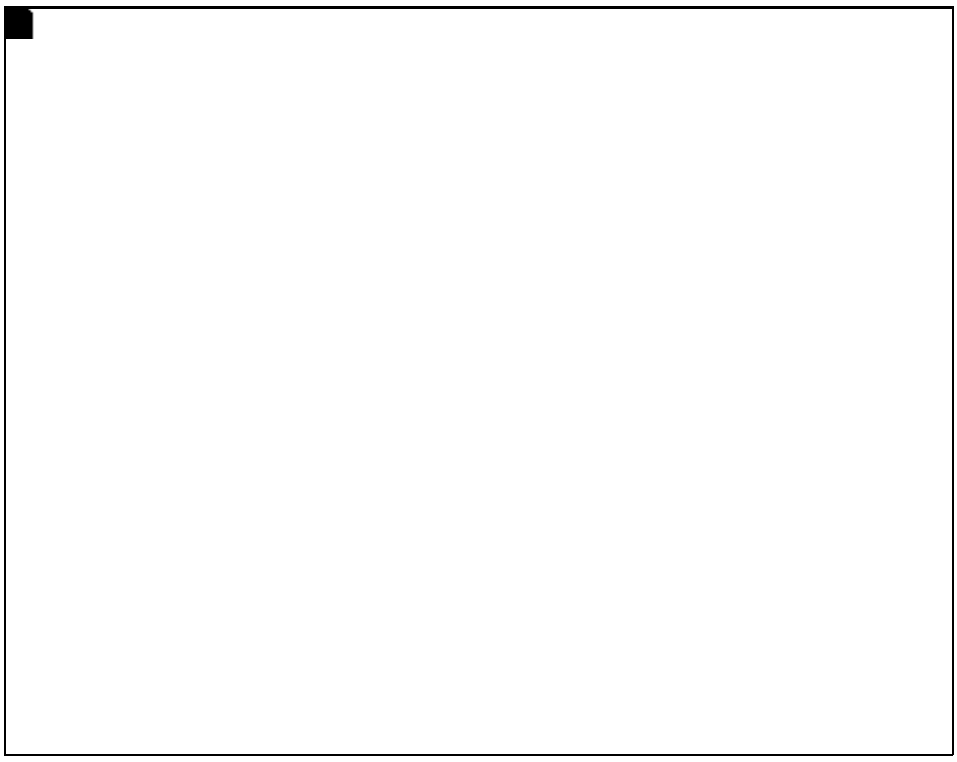
Part of the discrepancy between macro and micro evidence may be explained by a selectivity bias in the sample of elderly people in the micro data.

In the microeconomic data, saving rates for each age group are computed according the age of the head of household. Therefore, the older household saving rate considers only older people who head their households and ignores the behavior of institutionalized individuals or of the elderly living in households headed by younger individuals. Again this selectivity contributes to the discrepancy between microeconomic and macroeconomic data -both when analyzing national as well as private saving-, since in the latter all individuals above a certain age are included in the older group while micro studies include only those who are heads of household.

Figure 13 shows preliminary results on these lines. Higher educational groups have a higher probability of being heads of household and the difference between educational groups increases with age (especially after 62 years). If we add to that evidence the fact that people with lower education are likely to have shorter life expectancy, we can conclude that as we move to older groups the percentage of richer - in terms of permanent income - heads of household increases. As it was shown above, the more educated people have higher rates of saving, so as the group ages its saving rate will increase due to this selectivity.

These results imply that part of the difference of micro and macro studies is due to a selection bias that tend to include only the richest old people in the analysis. However, a more detailed analyses of this point would require an structural analysis.





c) Interactions between generations

Weil (1994) states that an age specific saving rate does not represent the influence of that age group in the overall personal saving rate since there are interactions between age groups. Among the possible interactions he tests empirically the influence of expected bequests on the consumption behavior of younger generations. He finds a positive and significant effect using Panel Study of Income Dynamics (PSID). Furthermore, this effect is close - but not close enough- to the effect needed to solve the divergence between macro and micro data.

Weil concludes that age specific saving rate are not useful to forecast changes in saving due to demographic changes since as demographics changes take place age specific saving rates will be affected. For example, as the population ages there are fewer children to share their parents' bequests and there are fewer incentives for the younger generation to save. On the other hand, it is not possible to test theories on individual behavior using macro data since it captures both the individual saving behavior and its interactions with other individual saving decisions. In this sense, the fact that older people save is not contradictory with them having a negative effect in total saving.

VI. CONCLUDING REMARKS

Household saving behavior at a micro level in Chile has not been analyzed in recent decades. This attempt is important because microeconomic analysis of saving will allow us to get a better understanding of the variables driving saving and to make better predictions of future saving behavior as income, demographic variables, credit market conditions and other social and economic characteristics evolve.

We have learned that current income and permanent characteristics as education are important determinants of household saving rates. Furthermore, there is a clear age pattern for saving and although at a first stage of analysis the predictions of the life cycle hypothesis do not seem to hold, demographic corrections change this preliminary conclusion. Furthermore, when pensions are not considered income the old age saving behavior is similar to the predictions of the LCH. Finally, the finding that household financial expenses have different behavior in different groups, can point to differences in the access to credit. This element may contribute to the fact that households with more educated heads behave closer to the predictions of the LCH.

When other definitions of saving are considered, such as human capital and durable goods, we find that these types of saving are important for all quintiles, that they have a distinct age pattern and - in some groups - they totally compensate for the negative savings of the conventional definition, especially for the latest survey.

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[1] Betancourt (1971) did the most recent microeconomic study on household saving with 1968 data for some Chilean rural areas.

[2] This paper differs from Butelmann and Gallego (2000) since now the complete database for the Household Budget Survey for 1996-7 is available which allow as to graph the age saving profiles and to compare them with those of 1988.

[3] The earlier survey has been used in several expenditure studies, see for example Contreras and Cáceres (1999).

[4] Great Santiago comprises Santiago's County and the cities of Puente Alto and San Bernardo.

[5] In that sense, mortgage payments accounted for in the survey considers only the financial cost of the debt. Hence, the proportion of the principal paid monthly is automatically considered as savings.

[6] The CASEN is an income survey applied every 2 years throughout the country. Of course, this survey is not exempt of underreporting, but corrections are applied before the publication of the data (for methodology, see CEPAL (1996)).

[7] In CASEN there is an even higher degree of underreporting before corrections are applied. For 1987 it was 46% with respect to National Accounts. This comparison is important to keep in mind, in order not to undervalue the information obtained in the HBSs.

[8] For the temporal evolution of household saving using Chilean aggregate data, see Agosín (1999) and Bennett *et al*. (1999).

[9] This is a usual extension in the literature analyzing household saving, see Attanasio and Székely (1998) and Gourinchas and Parker (1999), among others.

[10] Those household not reporting income but not unemployed are assigned income according to their characteristics, i.e. education, age, sex, occupation, and economic sector.

[11] Beyond our under-reporting problem, it is impossible to compare this figure with those of National Accounts since the former, on the one hand, only represents total saving of Greater Santiago and, on the other, the National Accounts in Chile do not give information on household saving. Estimates on the base of Bennett *et al*. (1999) indicate that the rate of household saving comparable with our calculations -using disposable income net of social security contributions- for 1988 would be negative at a level of -9.6% in 1988 and at a level of -8.7% in 1996-97. Despite the difference in levels, both sources coincide on an increasing tendency of saving between the two periods. Beyond the limitations mentioned above it is always difficult to compare saving rates from micro data with those given by national accounts since definitions of income and expenditure are different (Bosworth, *et al.* 1991).

[12] See Coronado (1998) for Chile; Székely (1998) and Attanasio and Székely (1998) for Mexico; Denizer and Wolf (1998) for Bulgaria, Hungary and Poland; Browning and Lusardi (1996) for United States; and Bosworth *et al.* (1991) and Poterba (1994) for other developed countries.

[13] This relationship between educational attainment (measured by years of schooling) and income has been profusely documented in the literature since the publication of Mincer (1974). For Chile, see Robbins (1996) for example.

[14] But Gourinchas and Parker (1999) find no relationship between educational level and the subjective rate.

[15] The high between-group variance observed in the 1996-7 survey for the expenditure classification is dramatically reduced when we consider the expenditure in durable good as saving.

[16] See the Annex 1 for the list of goods considered in these categories.

[17] Behind this is the assumption that in the maximizing process the consumer tries to keep the ratio of marginal utility of consumption constant for adjacent periods.

[18] However, this evidence can be explained in the context of the LCH augmented to incorporate other factors, for example precautionary saving due to uncertainty and liquidity constrains (See for example, Gourinchas and Parker, 1999).

[19] See Carroll and Summers (1991) for Canada, Denmark, Japan, Norway, UK and USA; Paxson (1996) for USA, UK, Taiwan and Thailand; and Deaton (1997) for Thailand, Taiwan and Ivory Coast.

[20] We show fifth order polynomials on age income and expenditure profiles because moving averages were noisy and conclusions don't differ between these smoothing techniques.

[21] The number of adult equivalents is given by the following formula:
AE=1.2+0.8*(N1+N2)+0.4*N3+0.3*N4.
where:
-AE : number of equivalent adults
-N1: number of additional adults
-N2: number of children between 11 and 15 years
-N3: number of children of between 5 and 10 years.
-N4: the number of children between 0 and 4 years.
Implicit in that formula are two factors, the fact that the age of each member of the family implies a different scale of necessities in relation to an adult member and that there are important economies of scale as a family grows.

[22] It is important to note that Gourinchas and Parker (1999) argue the true correlation is between demographic variables and precautionary saving, and this last variable is correlated with the age.

[23] Dummies indicate whether the head of the household works, the spouse works, and the sex of the head of household.

[24] This is likely in a growing economy where the real interest rate is high because it equals the rate of growth.

[25] Only recently, Japelli and Modigliani (1998) have studied in detail the effect of social security contributions and pensions on the age saving profiles. These authors explain that the correct treatment is to consider social security contributions as savings and pensions as dissavings. They also discuss if in a PAYG system it is correct to consider payment to social security as savings or rather as a tax; and if pensions should be considered transfers or dissavings. Their response is eclectic as they consider part of the contributions as savings, and part as taxes. Using those corrections they find for Italian data that saving profiles present the U-inverted shape predicted by the theory.

[26] However, in the graphs is possible to infer that no-pension transfers are a relatively constant up to the age of retirement.

[27] The corrected saving profile would be even more hump-shaped if we add the contributions to social security by individuals during their working years. This information though, is not available and would have to be computed based on salaries and assumptions about the type of pension system to which the individual contributes.

[28] Several studies have estimated, using various techniques, the share of constrained consumption in Chile and in other developed and developing countries. Namely in the case of Chile, Corbo and Schmidt-Hebbel (1991) estimated this share in 60% for the period 1968-88; Schmidt-Hebbel and Servén (1996) 45% for the 1963-1991 period; Villagómez (1997) 46% for the 1970-1989 period; and Bandiera *et al.* (2000) 55% for the 1970-1995 period. More recently Schmidt-Hebbel and Servén (2000) found a share of constrained consumption of 25% for the 1986-1997 period. The summary of these results is that although there is evidence of liquidity constraints, these constraints seem to have diminished in the time.

[29] This definition does not consider articles that may be more durable than those included; for example, suitcases can last more than a computer. Also there is a bias to include the most expensive articles as durables, for example, a boat and camping equipment are included but a tennis racket or a soccer ball excluded.

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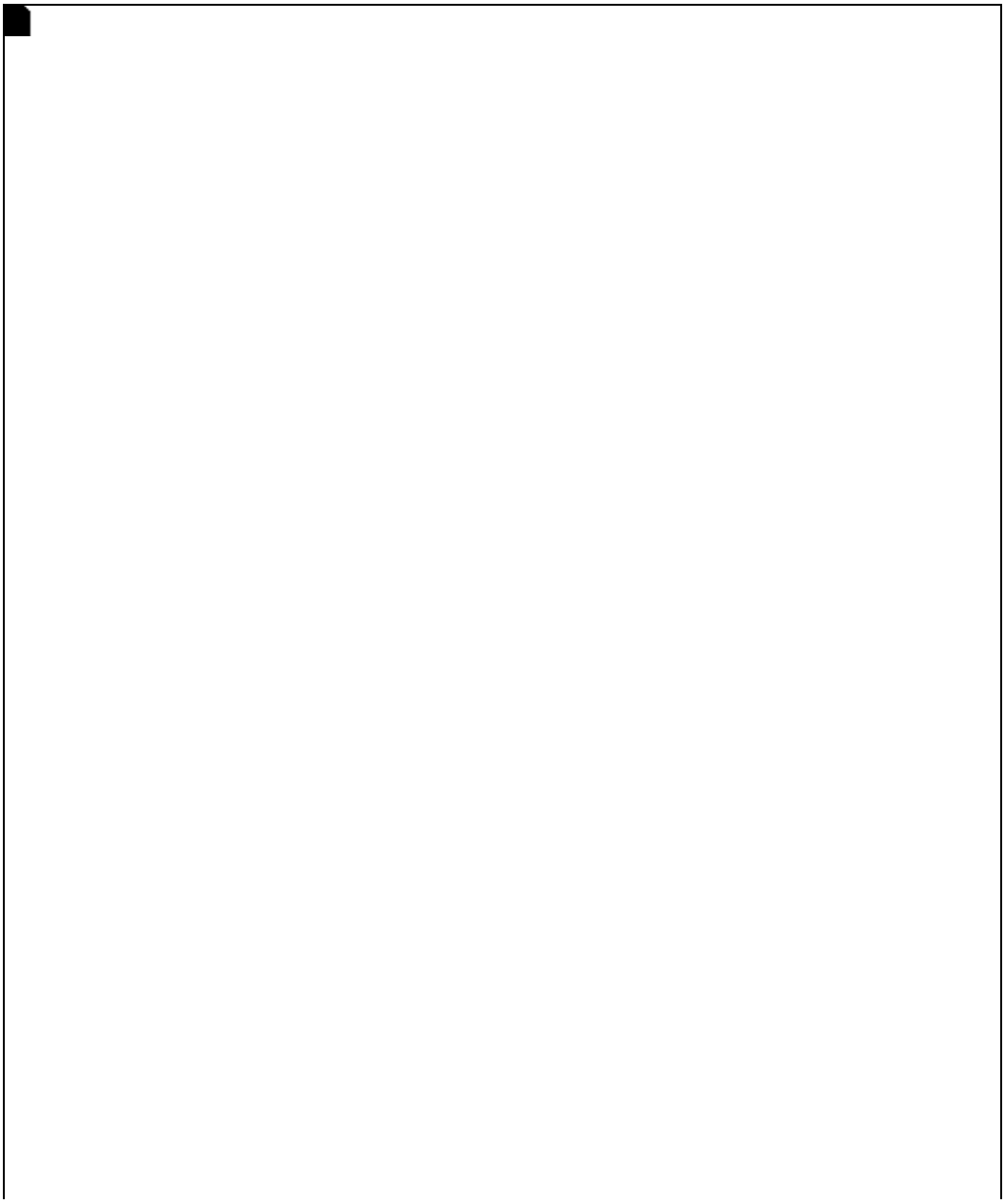
ANNEX 1
DESCRIPTION OF GOODS CONSIDERED IN CATEGORIES OF DURABLE CONSUPTION AND INVESTMENT IN HUMAN CAPITAL:

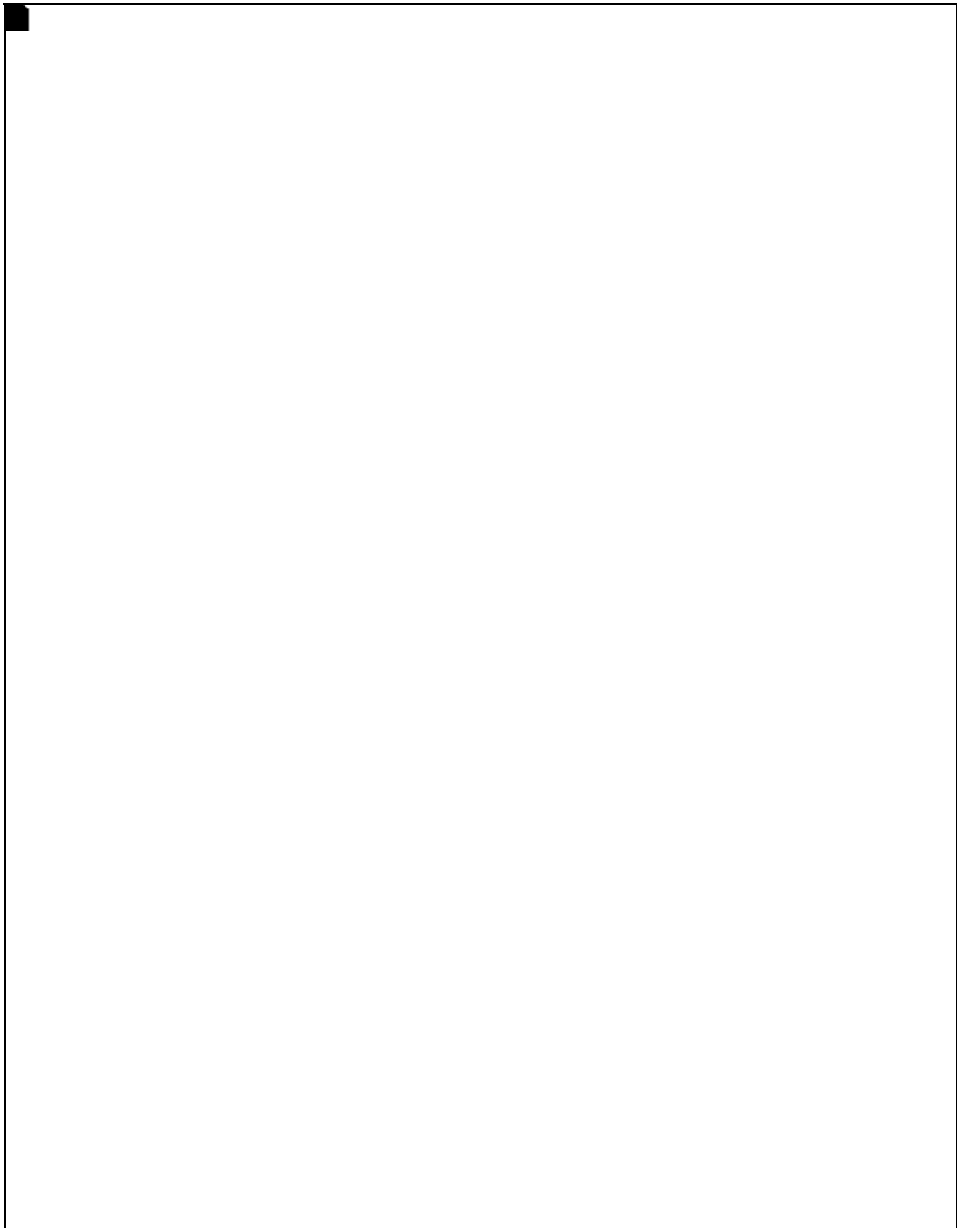
Durable goods[29]

* Furniture

* Decoration
* Textile and home accessories
* Appliances
* China
* Computer
* Equipment and accessories
* Musical instruments
* Motor boats, boats and outboard motors
* Camping, hunting and fishing equipment,
* Photographic cameras and accessories
* Typewriter, microscope, power tools.
* Vehicles

Investment in Human Capital:
* Medical products
* Apparatus and equipment
* Professional health services
* Hospital care
* Health insurance
* Encyclopedias and dictionaries
* School enrollment.





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