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Household Composition and Savings:

An Empirical Analysis based on the German SOEP Data

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Abstract

New developments in the literature on household saving behavior have focused on the question how household savings depend on the composition of a household. This question is of particular interest with respect to aggregate savings when we consider the ongoing changes of the forms of living in recent years (e.g. the tendency to smaller households). As a starting point this paper states some hypotheses about the linkages between household composition and savings that stem from the recent literature. Variables that are claimed to be relevant for household savings include the age sex composition of a household, the intra household distribution of income and the number and age of children within a household. In order to check how relevant these variables are for German households (i.e. do German households differ with respect to these variables) we first describe the composition of German households and how this composition has changed over the last two decades based on the GSOEP data. The variables of interest like age difference between spouses, intra-household distribution of income, labor market participation of spouses are found to be highly relevant among German households. In addition, a tendency to smaller households and later household formation is found to name only a few facts. The last section then tries to test the respective hypotheses about the household composition savings relation. The most important results found are the following: Children positively effect savings in younger households but have a negative influence on savings in elder households. Double earners were found to save a significantly higher share of household income. We also found some weak evidence that a longer remaining life expectancy of the wife together with a higher wife's income share positively effects a household's savings rate.

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1. Introduction

The analysis of households saving behavior is still subject to many open questions. A lot has been done on this field, starting from the basic life-cycle model which has been refined in many ways to the latest attempts to apply behavioral economic approaches for a better understanding of peoples' (households') saving behavior.[1]

This paper deals with some new developments in the saving literature. These new developments try to shed light on the linkage between a household's saving behavior and the composition of the household and its members' characteristics. Whereas the classical approach boils down the household to one representative individual it is likely that various dimensions of household composition have an impact on the household's saving decisions. To give a few examples: how does the number and age of children in a household effect savings, how are savings related to the age sex composition of household members (different life expectancies of household members) and do savings depend only on total household income or is the intra-household distribution of income relevant? These questions are particularly important since it is often claimed that household structures (i.e. forms of living) have dramatically changed and will further change in the future.

Freyland [2004] provides an overview of theoretical developments and some empirical results in the field of savings and household composition. Based on the literature some hypotheses are developed about how household saving behavior is linked to the household's composition and its change over the household's life cycle. These hypotheses will be repeated here as a starting point for the following empirical analysis.

1) The first hypothesis concerns the comparison of dissaving behavior of retired couples. The rate of saving should increase with the age difference between husband and wife other things equal. Comparing two couples at retirement with the same age of the husband and the same wealth and income levels, the wealth of the couple with the younger wife should decline at a lower rate.

2) When comparing male to female singles in retirement theory would predict that a female single saves more or dissaves at a lower rate than a male single with identical resources due to her longer remaining lifetime.

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[1] Good surveys are provided by Browning Lusardi (1995) and Attanasio (1999).

3) Saving of a couple with children, in general should be lower than that of an otherwise identical couple due to increasing costs during the time when children are present.

4) A bequest motive should on the other side increase savings of couples with children as compared to childless couples.

5) From the collective choice models a positive correlation between saving and variables which could possibly reflect the wife's influence on the saving decision are expected. Such variables include the income share of the wife, education differences as proxy for differences in potential lifetime income and possibly marital status.

6) A more even distribution of income within the household reduces low-income risk and should thus reduce precautionary saving by couple consisting of two earners as compared to a single earner couple with the same household income.

7) On the other side saving should increase in phases where both spouses are working to provide resources for phases when there is only one earner.

The remainder of the paper is organized as follows. Section 2 will describe the variables of household composition that were hypothesized to effect savings including the number and age of children in the household, the distribution of income within the household and the difference in remaining life expectancies of household members. That is, in order to evaluate the empirical relevance of different aspects of household composition, the composition of German households over their life cycles will be described. In particular, the focus will be on how German households have changed during the last two decades. Ideally, one would like to have some testable hypotheses about the effect of household composition on household saving, which would then provide the ground for calculating the effect of changing household structures (forms of living) on aggregate savings. To give an example, an increasing share of couples without children in the overall population of households might reduce aggregate savings due to a reduction in savings for bequest. On the other side a tendency to smaller households reduces the possibility to share risks[2] between household members which increases the incentives to save for precautionary reasons. How important these changes of household living arrangements are and if there is considerable diversity among households with respect to variables describing household composition, is the topic of section 2.

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[2] E.g. older couples with children can to some extent rely on their children, in case of bad health status.

On the basis of a German household panel ranging from 1992 to 2002 section 3 will then empirically test the hypotheses concerning household structure and household savings. The focus will be on the variables children, intra household distribution of income and difference in remaining life expectancies of husband and wife. Section 4 concludes.

2. Household Composition and Development

The descriptive analysis of the development of household structures in Germany is based on the German Socio-Economic Panel (GSOEP). The GSOEP is a panel study of German households and individuals.[3] It was first conducted in 1984 in the region of the former FRG[4] and contains data on 5921 German[5] households that consist of 16205 persons.

The GSOEP contains numerous variables that cover information on the main fields of interest which range from population and demography over education and labor market participation, earnings and social security to political orientation. The strength of the GSOEP is that the units of observation are in principal followed up from year to year , i.e. individuals older than sixteen and households are asked the same questions each year.[6] Thus it is an ideal basis for the analysis of the change of household structure over time. To keep the analysis feasible it was chosen to describe the basic changes in household compositions over the last two decades on the basis of the three cross-sections of 1984, 1992 and 2001 of West German households excluding those headed by a foreigner.[7] For more detailed analysis it will be referred to other sources including reports of the Bureau of National Statistics (STABU) and sociological literature on family composition. The three cross-sections used contain information on households like the type of household, household income, household size etc., as well as on individual characteristics of household members like age, sex and personal income. To make the analysis representative of the overall population, in the following analysis households are weighted with the cross-sectional weights included in the data. The weights are constructed on the basis of the population in the Micro-Census, a representative survey of German households.[8]

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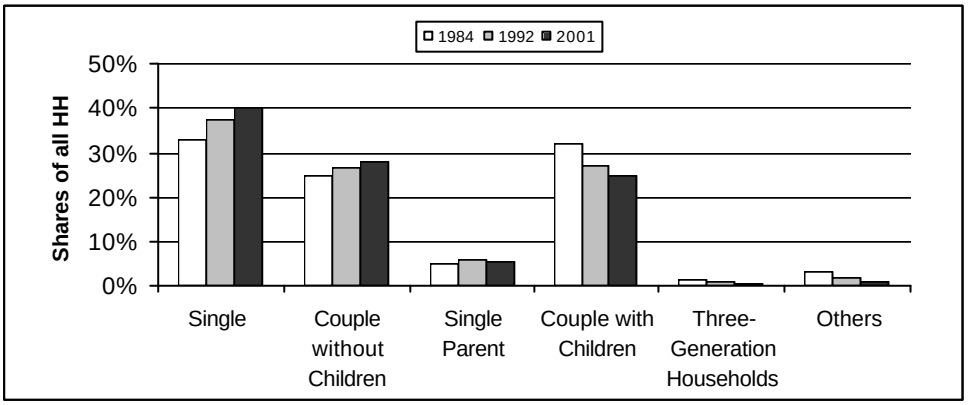
[3] Compare Frisch and Haisken-DeNew (2000).
[4] In 1990 the study was extended to include former GDR citizens.
[5] Foreigners living in Germany are included.
[6] For the problem of attrition see Pannenberg (2000).
[7] Sample sizes are 4524 households in 1984 and 3528 in 1992 out of sample A and 3959 in 2001 belonging to sample A and E of SOEP.
[8] For weighting procedures see Frisch and Haisken-DeNew (2000).

Changes in the forms of living in modern society are at the center of numerous sociological studies at least since the seventies. It has been written about a growing tendency towards individualism and an increasing diversity of life styles. Some simple and well-known facts are a shrinking number of marriages, an increasing age at first marriage, a higher average age of young people when leaving their parents' household, a decreasing rate of reproduction and increasing numbers of divorce. As main reason the sociological literature names a change of values reinforced by an increasing prosperity. However, the driving forces behind this social change are not of primary interest for our purpose and will not be discussed here.[9]

To start with, Figure 2.1 gives a survey of the changed distribution of household types. Whereas the share of single households increased from 33% to 40% and the share of couples without children from 25% to 28% there is a decrease in the share of couples with children from 32% to 25% of all households between 1984 and 2001. In 2001 there are more childless couples than couples with children. This picture gives a first indication of several facts. The trend towards couples without children is to some extent certainly due to a reduction in childbirths. In addition an increasing share of singles hints on a shift towards more individualistic life styles

Figure 2.1: Distribution of household types in 1984, 1992, 2001.



Source: Waves 1984, 1992, 2001 of SOEP, own calculations.

Another important fact concerning the generation structure of households is that the share of one-generation households (singles and couples without children) increased from 58% to 68% whereas the shares of two-generation households (single parents and couples with children) and of three-generation households declined. A fact which is probably relevant

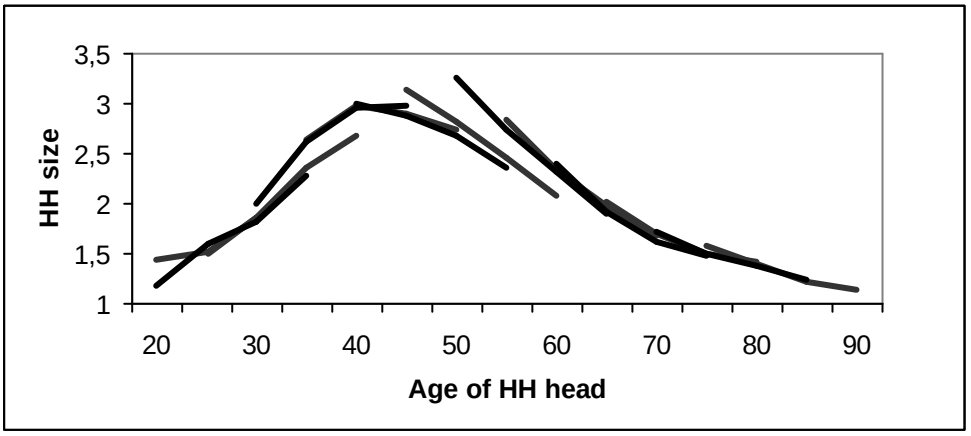
[9] For an introduction into the sociological literature on changing forms of living see Schulze-Buschoff (2000).

for household savings since a reduced linkage between generations on the family level possibly increases the need for saving for old age.

Of course this is only a very crude picture of changes in household compositions. Changing household compositions are not the only reason for a changed distribution of household types. As for the interpretation of these changes other effects like the changing age structure in Germany have to be considered. For example, an increasing share of old people will lead to greater share of singles if the share of singles among old people is greater than average.[10]

For a comparison of household size over the life cycle, Figure 2.2 plots average household size over the age of the household head for different birth cohorts. For this graphic cross sections in a distance of five years (1984, 1989, 1994, 1999) of West German households were used. Households were divided into birth cohorts summarizing households with the household head born in one of five consecutive years into one cohort. Cohorts range from the youngest (born 1970 -1974) to the oldest (1910 – 1914). For each cohort mean household size is then plotted for the four years of observation. The picture shows that average household size decreased in the middle age range. Average household size for households with the head between 30 and 60 years old is smaller for the younger birth cohorts. Overall average household size has declined from 2.31 in 1984 to 2.06 persons per HH in 2001.[11]

Figure 2.2: Average household size by age and birth cohorts.



Source: SOEP, Waves 1984, 1989, 1994, 1999 of West German HH, own calculations.

[10] For further analysis see section 3.2 below.
[11] Own Calculations on the basis of SOEP Waves 1984, 1992, 2001.

Reasons for the reduction in household size especially in the middle age groups could be the tendency to live in single households, lower birth rates and a constantly increasing rate of divorce which particularly should effect the middle age groups between 40 and 55.

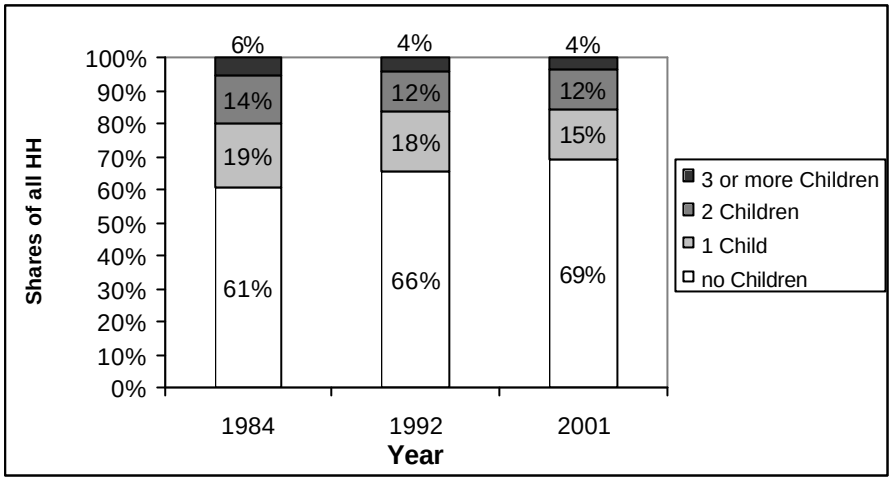
Figure 2.3: Distribution of household size.

Source: SOEP, Waves 1984, 1992, 2001, own calculations.

Figure 2.3 shows the shares of households of different sizes of all households for 1984, 1992 and 2001. The overall development of household size is marked by an increasing share of single and two person households and decreasing shares of households with at least three household members. In 2001 72 % of all households consisted of less than or equal to two persons. This share was only 63 % in 1984. To some extent this is probably caused by the changing age structure of the population. That is, the increasing share of old people particularly of old women whose dominant form of living is a single household leads to an increasing number of this household type. However, other reasons are a tendency among younger individuals to live independently and the decreasing number of children. Figure 2.4 shows the increasing share of childless households and a corresponding decrease in households with children. Again, when interpreting the graph the effect of the increasing share of older people in overall population has to be considered. The average number of children per household reduced from 0.69 in 1984 to 0.55 in 1992 and 0.51 in 2001, whereas it has not much changed if only households with children are considered. For all households with children the average number of children per household was 1.69 in 1984, 1.63 in 1992 and 1.66 in 2001.[12]

[12] Source: SOEP Waves 1984, 1992, 2001 of West German households, own calculations.

Figure 2.4: Shares of households by number of children in household

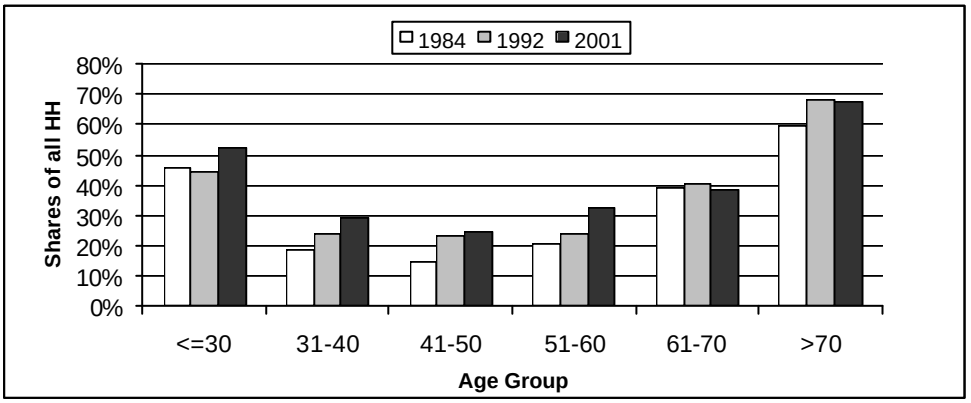


Source: SOEP Waves 1984, 1992, 2001, own calculations.

This tendency to smaller households probably has effects on consumption and saving. The overall benefits from economies of scale in consumption reduce with a shrinking average household size. How this effects saving is not clear but it is likely that aggregate savings are effected. In addition the decline in household size reduces the benefits from risk sharing on the household level which increases the need to save for cases like bad health status in old age as long as a public insurance system does not provide full coverage.

As indicated above the increase of the share of single households alone does not necessarily hint to a tendency towards more individualistic life styles. To get a clearer picture of single households Figure 2.5 shows the shares of single households of all households versus age groups.

Figure 2.5: Shares of single HH by age group.

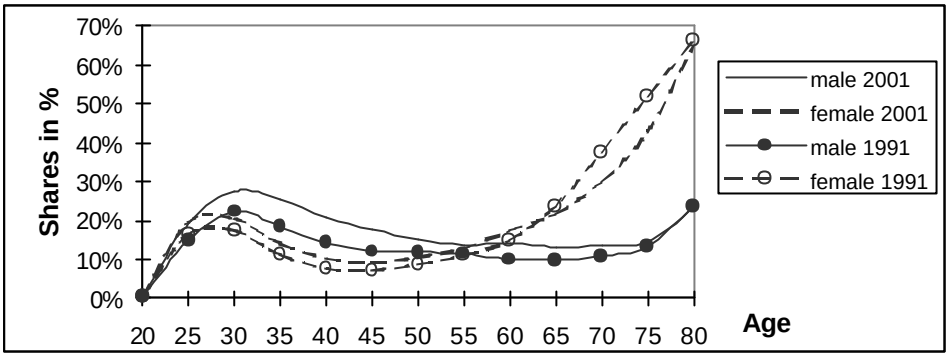


Source: SOEP, Waves 1984, 1992, 2001, own calculations.

The share of single households has increased in almost every age group over the last 20 years. Particularly in the life phase between the age of thirty and sixty–a major share of an individuals working life–the increase in the share of single households is huge. A fact that to a large extent is due to increasing divorce rates as well as the reduced number of

marriages. To get a more detailed picture Figure 2.6 shows the shares of male and female singles of all males and females in different age groups for the years 1991 and 2001.

Figure 2.6:Shares of male and female singles over age groups.



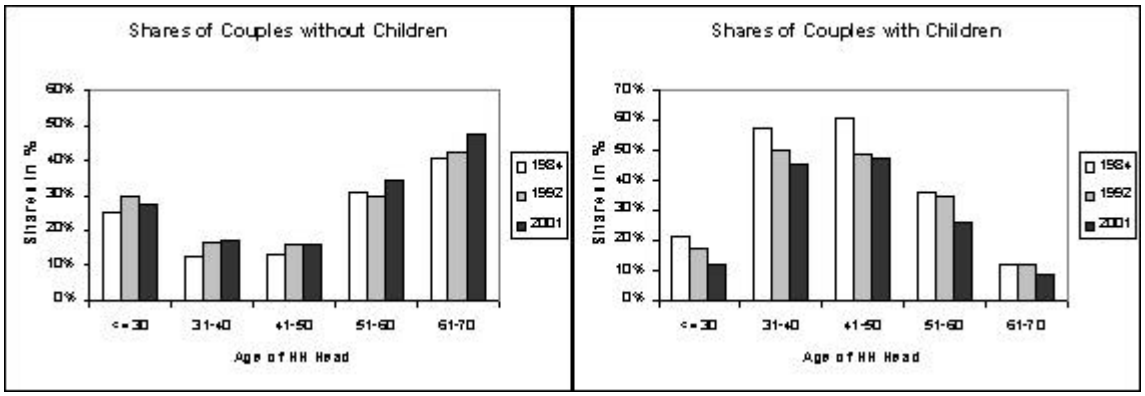
Source: Statistisches Bundesamt 2002, Mikrozensus.

The share of singles has increased for both males and females between 1991 and 2001. An increasing share of males of all ages lives alone whereas for females the share of singles has decreased for women older than 65. In both years the share of single males is substantially higher than that of single females which is probably due to a higher age of males at first marriage and a higher share of males in the total population younger than forty. For women a single household is the dominant form of living in old age due to their higher life expectancy whereas a large fraction of old men is living in more person households. This fact stresses the greater importance for women to provide resources for the last phase of their life where the probability of living alone is much higher than that for males.

We now turn to a description of the composition of couple households either with or without children and of the distribution of variables which are possibly relevant for couples' saving behavior. It has already been stated that the share of childless couples has increased whereas the share of couples with children has been decreasing. This alone does not mean that a growing number of couples decides not to have children since the overall picture includes both, couples that will never have children and those whose children already have left the household. A look at the shares of couples of all households by the age of the household head (Figure 2.7) gives a clearer picture and supports the hypotheses that indeed a growing number of couples decides not to have children at all. For those households with the household head between 31 and 40 and between 41 and 50 the shares of couples without children has increased from 12 % to 17 % and 13 % to 16 %, respectively. That is, the share of couples without children increased in those age groups where most children are born. The share of couples with children has been decreasing over the last two decades. In 2001 only 10 % of households with the household head younger than thirty are couples with children. This indicates the tendency to growing age at

household formation, i.e. at marriage and at first childbirth. In the middle age groups couples with children are still the dominant form of living.

Figure 2.7:Shares of couples of all HH by age group.



Source: SOEP, Waves 1984, 1992, 2001, own calculations.

However, the share of couples with children has reduced from 61% to 47% for households with the household head aged between 41 and 50, probably due to decreasing child births and increasing divorce rates (compare Table 2.1).

Table 2.1: Divorces per 10000 existing marriages in former FRG.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Divorces per 10000 existing marriages	81	82,8	80,2	88,2	91	92,3	95,2	103,7	105,7

Source: Grünheid and Roloff (2000), p.25. Data: STABU.

The increasing share of single households in the group below the age of thirty together with a decreasing share of couples with children indicates that the age at formation of traditional[13] households has increased. However, a definition of household formation is not obvious though probably everybody has a vague idea of what is meant with household formation. In this vague sense a household is formed when at least two people – usually of opposite sex – decide to live together for a longer time (often their whole lifetime), to share economic resources and to make common decisions and plans including those concerning the use of resources. Although the formation of a household is not necessarily linked to marriage, for a majority of people marriage is still the starting point for an independent household. Thus it is the average age at marriage which will be identified with the age at household formation. The increase in average age at marriage is documented in Table 2.2.

[13] With traditional households it is referred to couples with and without children.

Table 2.2: Average age at marriage in former FRG.

Year	1950	1960	1970	1980	1990	1999	2000
Male	28,1	25,9	25,6	26,1	28,4	31,1	31,3
Female	25,4	23,7	23	23,4	25,9	28,4	28,5

Source: Engstler and Menning (2003), p.65.

The high average ages in 1950 are presumably a consequence of World War II. But since then the average age at marriage has constantly increased. Corresponding to later marriages the age of women at birth of the first child has increased (Table 2.3).

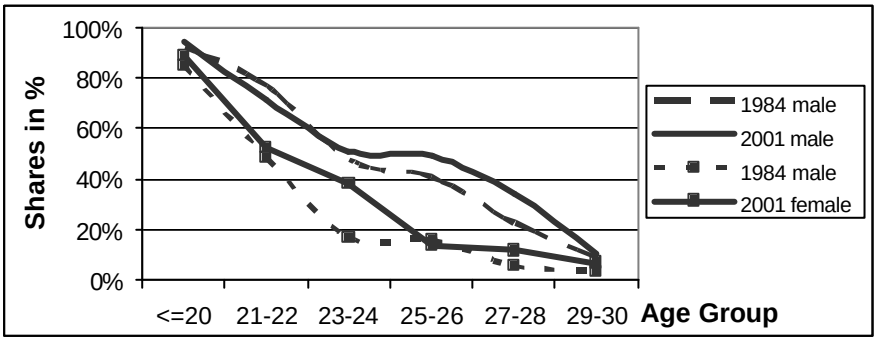
Table 2.3: Age of women at birth of first child.

Year	1960	1970	1980	1989	1991	1996	2000
Married	25	24,3	25,2	26,8	27,1	28,4	29
Unmarried	23,9	23,4	23,5	25,1	26,4	27,5	28

Source: Engstler and Menning (2003), p. 77.

From 1980 to 2000 the age of a married women at birth of the first child has shifted by four years. At time of birth of the first child of a married couple in 2001 husbands are on average about 32 years old. Thus the phase in the life cycle of a married couple where children are present is shifted towards older age. Together with an often cited increasing age of children when leaving their parents' household, this leads to a shift in lifecycle expenditure allocation of couples with children. The average age of male and female children when leaving their parents household has increased by several years.[14] Another way to demonstrate this fact is to plot the shares of people younger than thirty years living with their parents over age groups (Figure 2.8).

Figure 2.8: Shares of males and females living in parental household.



Source: SOEP Waves 1984, 2001 of individual data, own calculations.

For both sexes the shares increased in almost every age group. Whereas in 1984 only 17 % of females between 23 and 24 lived with their parents this share increased to 38 % in 2001. For males there is a marked increase for people aged 27 to 28 from 23 % in 1984 to 34 % in 2001. These two facts together – the increasing age of parents at birth of first child and

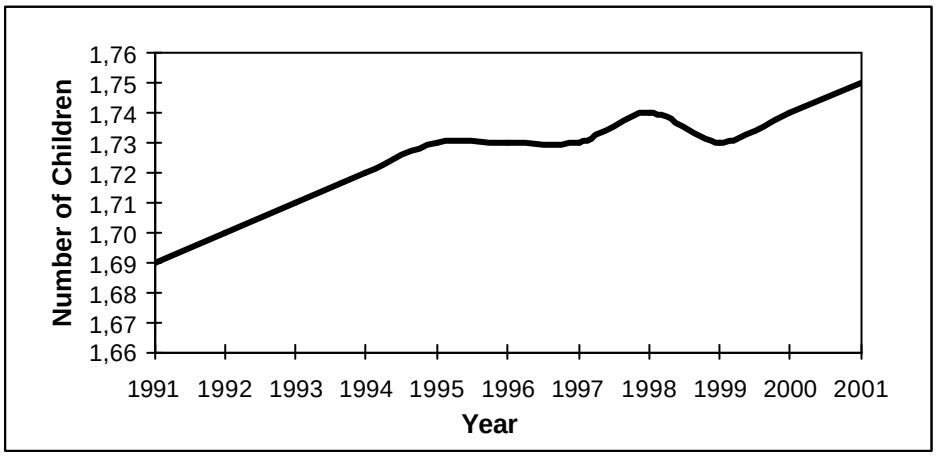
[14] See Lauterbach and Lüscher (1999) for an analysis of this phenomenon.

the increased time span that children stay in the parental households – increase the child burden of parents per child, i.e. the lifetime expenditures for children, and shift the phase of increased consumption due to children towards older age. For example, if the average age of children when leaving their parents household is 25 and does not change in the future, the first child born today by a couple with the wife aged 29 and her husband aged 32 will leave the household when the average husband is 57 and his wife 54 years old, which is not far from the beginning of the retirement phase. However, this argument does not hold if children that live in their parents' household in advanced age contribute to total household income.

However, whether a couple's lifetime expenditures for children will increase in the future does also depend on the number of children per couple. A measure for the average child burden of couples could be the average number of children born per couple times the average number of years that children stay with their parents. Thus the next question is how the number of children per household has developed over the last two decades.

Birth rates in the former FRG, i.e. children born per women between the age of 15 and 44, decreased from 2.10 in 1950 to 1.38 in 2000. The share of women that stay childless for their whole live has markedly increased from 10.1 % for those born in 1940 to 31.2 % for those born in 1965.[15] However, this does not seem to be valid for married women. Figure 9 shows the development of the average number of children younger than eighteen per married couple over the last ten years. This is probably due to self selection, i.e. those women that decide to have children are more likely to marry.

Figure 2.9: Average number of children younger than 18 per married couple.



Source: Statistisches Bundesamt (2002a), Mikrozensus.

[15] Compare Engstler and Menning (2003) p.71.

The increase in the average number of children corresponds with the observation that those who decide to have children show a growing tendency to more than one child. 32 % of all West German women born in 1950 with children had only one child whereas this share is only 28 % for those born in 1960.[16]

To sum up, there seems to be a tendency to an increasing fraction of couples that decide not to have children, but the average number of children of those who decide to have children slightly increases. This statement is supported by Table 2.4 that shows the shares of couples with one, two and three or more children of all couples with children. If all couples in the various age groups are considered the shares of couples without children increased and the shares of couples with one, two and three or more children decreased in the last twenty years.[17] However, for couples with children there is not much change in the shares of couples with one, two and three or more children.

Table 2.4: Shares of couples with children by number of children and age of HH head.

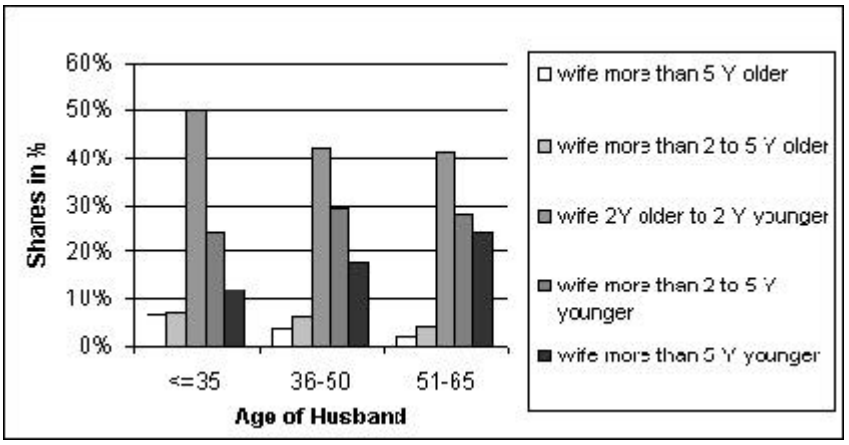
	Age of HH head				
	Year	<=30	31-40	41-50	51-60
1 Child	1984	72%	41%	34%	55%
	1992	71%	36%	37%	64%
	2001	68%	43%	36%	50%
2 Children	1984	23%	44%	47%	28%
	1992	21%	48%	48%	28%
	2001	29%	44%	44%	40%
3 or more Children	1984	5%	15%	19%	17%
	1992	8%	16%	15%	8%
	2001	3%	12%	20%	10%

Source: SOEP Waves 1984, 1992, 2001 of West German households, own calculations.

We now turn to other characteristics of couples that were hypothesized to effect couples' saving behavior. The statistics are based on a panel of waves 1992 to 2002of the SOEP containing both West and East German households. These data are chosen because the analysis of household savings in Section 3 is also based on this panel, since information on saving was included in the SOEP in 1992. To start with, Figure 2.10 shows the distribution of age difference between husband and wife in 2001.[18] There are five types of couples. From those where the wife is more than five years older than her husband up to those couples with the husband more than five years older than his wife.

[16] Compare Engstler and Menning (2003) p. 73.
[17] See the Table in the Appendix to chapter II.
[18] The following statistics always contain both, married and cohabiting couples.

Figure 2.10: Distribution of couples by age difference.

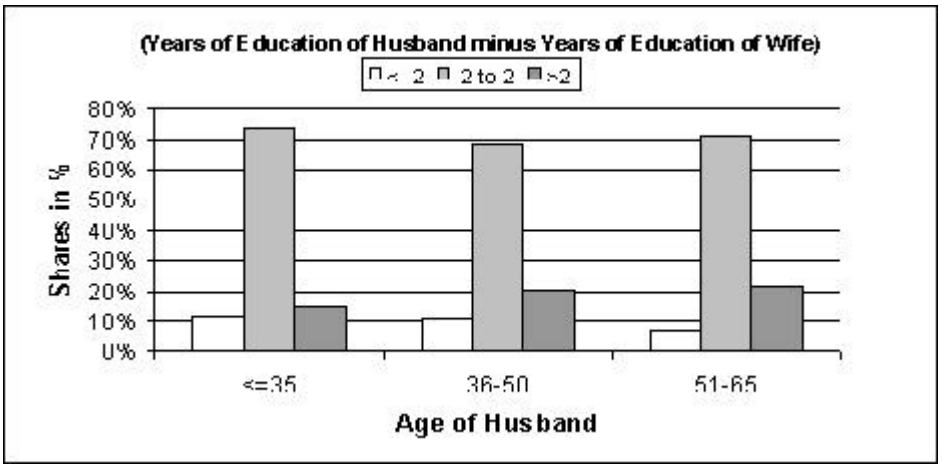


Source: SOEP Wave 2001, West and East German Households, own calculations.

In almost half of all couples husband and wife are about the same age. Not surprisingly, in a considerably large fraction of couples the husband is at least three years older than his wife, whereas the share of couples with the wife being three or more years older than her husband is small. The dominance of couples with the husband being older is stronger for older couples. Slightly more than 50 % of all couples with the husband older than 51 are couples with an age difference of three or more years, whereas this share is only 36 % for young couples. A reason for this could be that the participation of women in higher education has been increasing more than that of men causing a higher average age of women at entry into the marriage market. The theoretical impact of couples' age difference together with a higher expected lifetime of women seems to be empirically relevant.

Another variable which is claimed to effect household savings is the difference in education between husband and wife (Figure 2.11). We would also expect a different distribution for old and young couples due to the increased number of women with higher education.

Figure 2.11: Education difference of couples.

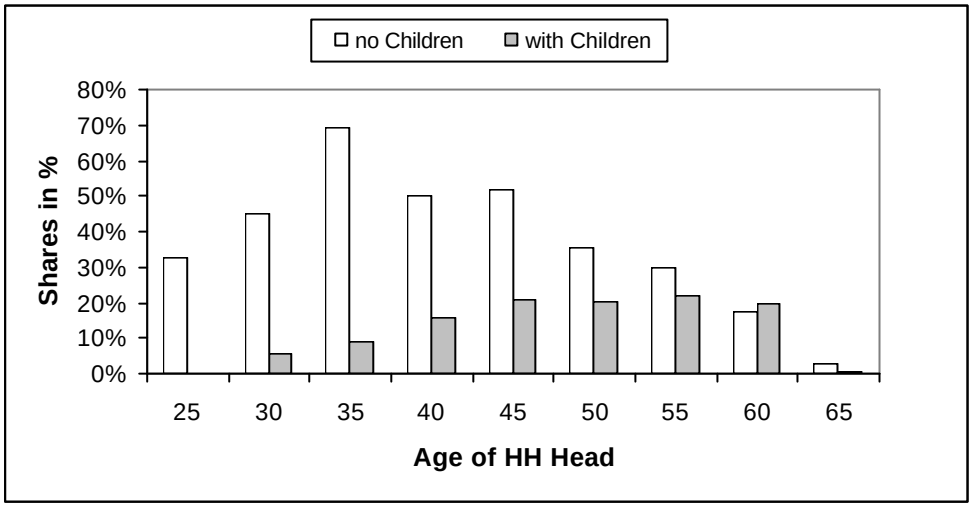


Source: SOEP Wave 2001, West and East German Households, own calculations.

In all age groups the share of couples with more or less the same duration of education is about 70 %. As expected, the share of couples with the husband having at least 3 years more of education is higher among older couples. Although the picture shows some heterogeneity among couples with respect to education difference most people seem to choose partners that have about the same level of education, which makes the variable education difference seem less relevant as a possible source of differences in saving behavior.

We now turn to labor force participation of couples and the wife's share of household income as variables possibly effecting household savings. Figure 2.12 shows the shares of couples with both spouses working fulltime over age groups. A large difference between

Figure 2.12: Fulltime working couples by age of HH head.



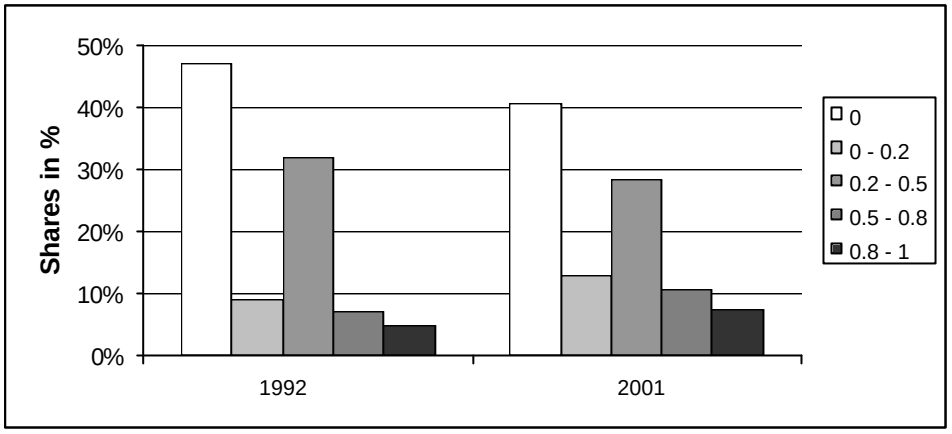
Source: SOEP Wave 2001, West and East German households, own calculations.

couples with and without children is obvious. Among couples without children and the household head between 31 and 35 years old the fraction of fulltime working couples is highest (around 70%). The share decreases with the age of the household head. On the other side there are very few fulltime-working couples among younger households with children and this share increases with the age of the household head. A rough picture of a couple's allocation of time to labor over the life cycle is drawn. In most of the young couples both work as long as they have no children. When children are born, one spouse quits working fulltime and with growing age of children an increasing number of couples does again work fulltime. To get a more detailed insight into the lifetime labor force participation of men and women with and without children reference is given to Engstler and Menning (2003). Some of their basic results will briefly be described. The first

observation is an increase in labor force participation[19] of West German women between the age of 25 and 45 both with and without children over the last three decades. For women without children the share of employed increased from 79 % in 1975 to 85 % in 2000. For women with children the share of women employed increased from 42 % to 63 % in the same time. And even for women with children younger than six years there is a marked increase from 33 to 55 %. However, women with children younger than three years who are temporarily not working to care for their child are contained in these statistics. If these are not considered, in 2000 29 % of women between 15 and 65 with the youngest child under three, 54 % of women with the youngest child between three and five and 67 % of women with the youngest child between six and fourteen are actively employed. The share of actively employed West German women without children in the same age range is 55 %, which is surprisingly less than the share for women with older children. However, if only women between the age of 25 and 45 are considered this share is at 85 %.[20] Thus the employment rate of women without children is considerably higher than that of women with children. For women with children the employment rate increases with the age of the youngest child. Finally the change in the employment rate over the last three decades is much stronger among women with children. Another observation concerns the impact the number of children has on women's employment rates. As one would expect employment rates are higher the less children a women has. For women between the age of 25 and 29, 80 % of childless women, about 50 % of women with one child, 30 % of women with two children and only about 15% of women with at least three children are employed. These shares steadily increase over the age of women and are about the same for women older than fifty years. Whereas the labor market status of women depends on age and number of children, the labor market status of men is almost independent of children. About 80 to 90 % of men with children between 15 and 65 are employed. These observations about labor force participation of men and women should be reflected in the share that wives contribute to total household income (compare Figure 2.13).

[19] This includes full time as well as part time work.
[20] Compare Engstler and Menning (2003) p. 106 and see the Table in the Appendix.

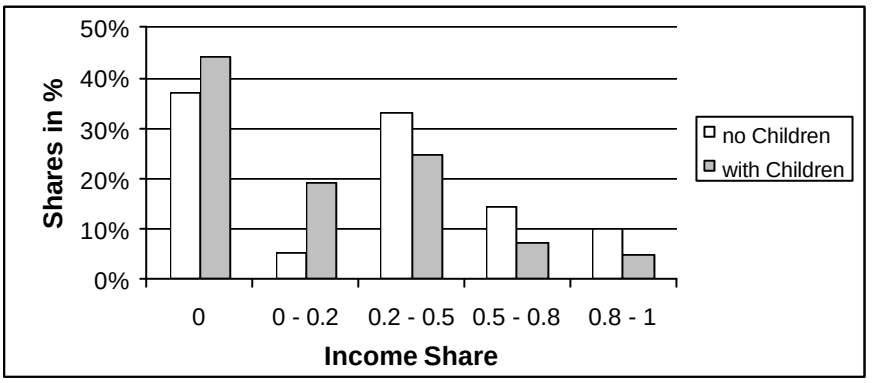
Figure 2.13: Income shares of wife 1992 and 2001.



Source: SOEP Waves 1992 and 2001 East and West German households, own calculations.

The share of couples where the wife does not contribute to household income has slightly reduced in the last ten years, whereas in a growing fraction of couples the wife's contribution to household income is more than half of total income. The share of wives that earned more than half of the household income increased from 12 % to 18 %. Figure 2.14 differentiates childless couples from those with children. The average contribution of the wife to total household income is higher in couples without children. In 25 % of all couples without children the wife's income share is larger than 50 %, whereas this is the case for only 12 % of all couples with children. On the other side in 63% of couples with children the wife earns less then 20% of household income. This share is only 42 % among childless couples.

Figure 2.14: Wife's income share in couples with and without children 2001.



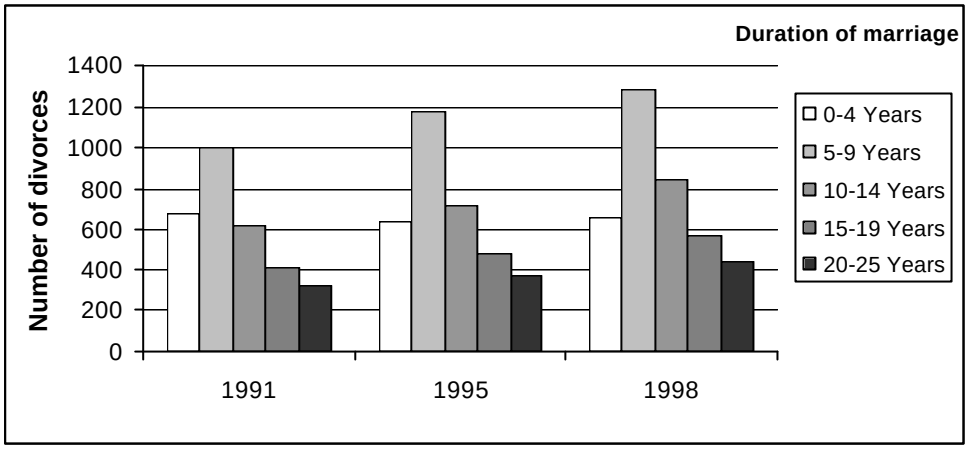
Source: SOEP Wave 2001East and West German households, own calculations.

Thus the hypothesized impact of the wife's income share on household savings is relevant, though more for couples without then for couples with children.

A last point concerns household dissolution, either through divorce or the death of one spouse. That the number of divorces has considerably increased is a well-known fact. The

risk of divorce in the former FRG in 1998 was at 37.9 %. That is, in 1998, 37.9 % of all marriages that took place in the last 25 years have been divorced.[21] This risk was at about 30 % in 1988 and has steadily been increasing since then. The increase in divorce rates is also documented in Figure 2.15 that shows divorced marriages per 10000 marriages in a certain year.

Figure 2.15: Divorced marriages per 10000 marriages of same duration in…



Source: Grünheid and Roloff (2000) p. 27.

The picture shows the increase in divorce rates. Of 10000 marriages that had a duration between 5 to 9 years in 1991 10 % had been divorced in 1991. This share increased to more than 12 % in 1998. Although divorce rates increased, still almost two thirds of dissolutions of marriages are due to death of one spouse.[22] The average age men and women start to earn survivor benefits is 67.7 for women and 68.7 for men in the former FRG in 2001. [23] However women have a longer remaining lifetime, which is reflected in the fact that about 70 % of married people dying in 2001 were male. This figure which has not changed over the last years indicates the far higher risk of widowhood for women which is on the basis of the argument why women should be supposed to save more or why households where women have a greater influence on saving decisions possibly save more.

[21] Compare Grünheid and Roloff (2000) p.25.
[22] Compare Grünheid and Roloff (2000) p.23.
[23] Compare Engstler and Menning (2003) p. 85.

The basic facts about household life cycles and the changes in household composition will be summarized in tabular form.

- The share of households consisting of one or two persons increased from 63 % in 1984 to 72 % of all households in the former FRG in 2001.
- In the same time the share of one-generation households (either singles or couples without children) has increased from 58 % to 68 %.
- An increasing number of households are households without children. The share of childless households increased from 61 % in 1984 to 69 % in 2001. Accordingly the shares of households with one two and three or more children decreased.
- The age of people at formation of a traditional household has considerably increased over the last decades. The age at first marriage has increased from 26.1 to 31.3 years for males and from 23.4 to 28.5 years for females in the last twenty years.
- The age of women at birth of first child has increased from 25.2 years to 29 years for married and from 23.5 to 28 years for unmarried women.
- Although couples that stay childless over their whole life cannot be identified, the increasing share of couples without children over all age groups and the increasing share of women that stay childless over their whole life suggest that a growing fraction of couples lives without children during their whole lifetime.
- Those couples that do have children do not show a tendency to fewer children. Almost half of the couples with children decide to have two children. In the age groups between thirty-one and fifty almost 50 % of all couples with children had two children. The average number of children per married couple even slightly increased in the last ten years.
- Together with an increasing age of children when leaving the parental household this increases the lifetime burden of couples with children
- Female labor force participation has markedly increased both for women with children and childless women. Accordingly the share of a wife's earnings of total household income has increased. This share is greater for couples without children than for childless couples.

- The average age difference between husband and wife is about two and a half years. With a remaining expected lifetime for 60-year-old men in the former FRG of 18.9 years and of 23.2[24] years for 60-year-old women the average husband's remaining expected lifetime after retirement of the husband at the age of 60 is 18.9, whereas his 57-year-old wife has a remaining expected lifetime of about 25.7 years. Thus the expected remaining lifetime of an average wife at her husband's retirement is about 40 % higher than that of her husband.

3. Analysis of Household Savings

This section is primarily concerned with testing the validity of the hypothesis concerning the linkage between household characteristics and savings that were given in the introduction. Among others, the most important are concerned with a couples' difference in remaining life expectancy and its influence on household savings, spouses' relative influence (measured by e.g. income shares or relative level of education) on the saving decision and the influence of children on household savings. The section is organized as follows. We first provide a description of the panel data set which is the basis for the following analyses. The independent and dependent variables are described and shortfalls of the data will be discussed. Thereafter, some descriptive analyses of household savings are provided. Cohort analyses try to depict typical life cycle profiles. Households are separated into birth cohorts and stratified along various dimensions of household composition. Life cycle income and saving profiles of different household types are then plotted to get an idea of the behavior of various household types.

In the main part of this section, the results of some simple regression analyses will be presented in order to describe possible links between household composition and savings. To test the hypotheses developed in chapter I regressions will be done on different sub-samples of a sample of the GSOEP containing information on West and East German households during the years 1992 to 2002.

The following analysis of households' savings is based on a SOEP panel data set containing information on West and East German households (excluding households headed by a foreigner) for the years 1992 to 2002.

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[24] For these figures compare Grünheid and Roloff (2000).

Ideally a good measure of discretionary savings[25] requires either rich information on consumption and disposable income, such that savings can be calculated as the difference or information on a household's per time period (e.g. a year) change in wealth, including financial and real wealth.[26] Unfortunately the GSOEP data does not contain either kind of information in detail. Therefore, the saving measure used in the following analysis of household saving behavior is necessarily a simpler one and can only approximate savings. As a consequence one has to deal with a number of measurement problems that will briefly be discussed

Since 1992 the GSOEP questionnaires contain two questions concerning household savings. People are asked if they put aside some money each month and if so how much. The amount put aside each month will be used to measure monthly savings. To calculate saving rates monthly savings are divided by the monthly household net income which is not calculated on the basis of different income sources and taxes but is directly reported by households. That way of measuring household saving rates raises several problems which can be grouped into two categories. First, the saving and income variable are subject to measurement errors due to their very simple nature. Secondly, savings are measured on a monthly basis which is not the best ground for a life-cycle analysis of saving behavior.

Saving rates as they are calculated here do not correspond to either of the two possible economic definitions of savings. It is unlikely that a households accurately calculates income and consumption per month to calculate monthly savings if it is simply asked to report the amount put aside each month. And even if households would do so, it is not a priori obvious how income and expenditures should be defined. That is, whereas the economist would define what belongs to income and to expenditures for all households alike, it is likely that different households -if they would care about problems of measurement at all- would do their 'calculations' based on different concepts of income and expenditures. As a consequence several measurement errors arise either because all households do not 'adhere' to the economic definition of expenditures and income or households differ with respect to what they consider as income and expenditures. Some examples will illustrate these problems.[27]

Since voluntary regular payments into annuity savings vehicles (e.g. life insurance, private pension plans) are considered as saving, received payments in retirement due to private

[25] Mandatory contributions to public pension schemes are not part of savings here.
[26] For the definition of discretionary savings compare Börsch-Supan et al. (1999).
[27] Compare Börsch-Supan et al. (1999) for several examples.

saving plans should not be considered as part of income but as a decrease of the stock of wealth and thus as dissaving. This causes a problem for the measurement of the income of retired people. Whereas state pension payments are readily regarded as income household net income of many households in retirement probably also contains a considerable share of some form of private pension annuities. As a consequence self reported saving rates of older households that do not regard these annuities as dissaving rather than income will be overestimated.[28]

Another problem concerns the inclusion of repayments for housing loans into household savings since the part of repayments which is not interest increases the household's stock of real wealth. However it is not clear how the respondents understand the question and respondents probably have different perceptions of what exactly is asked. Thus, it is possible that some households include the repayments for a loan while others do not. If a considerable fraction of households does not include these payments savings are systematically underestimated. In particular savings of homeowners who still repay a loan will be underestimated as compared to other households.

Furthermore a decrease in household net wealth which would mean negative saving rates cannot be measured by the method used here. That is, if a household takes up dept to finance consumption its wealth c.p. declines. Thus it might well be the case that households which report not to put some money aside actually have negative saving rates. Consequently savings are systematically overestimated since the saving rate is always zero or positive.[29]

The second principal problem with measuring saving concerns the time span of the observation of income and saving amount. Since the aim is to say something about life-cycle saving profiles of households' the monthly saving amount is not the best ground for calculating saving rates. If households simply report their monthly pay check as net income, the household's income stream is probably rather stable within a year and thus we do not make major mistakes by assuming the reported monthly net income to correspond to the households average monthly net income whereas consumption probably fluctuates more, i.e. is usually higher during e.g. times of holidays. That is, during the summer months a household's monthly reported saving amount is possibly lower than the household's average monthly saving and higher in e.g. spring; or it is temporarily above

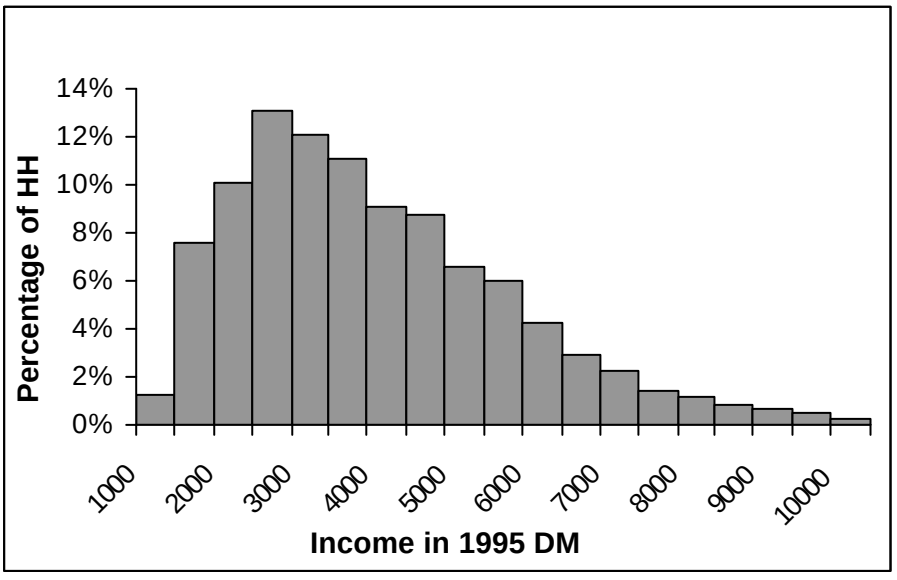
[28] This could be one explanation for the high saving rates of households in old age (Compare section 4).
[29] Savings were set to zero if the question if some money is put aside at all was denied.

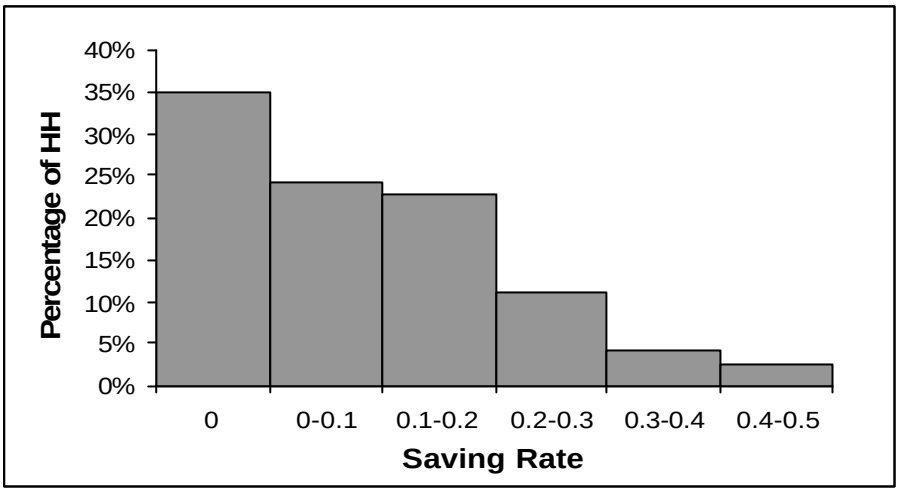
the average amount put aside if a household puts aside some money to purchase an expensive good like a car or furniture in the near future.

Besides systematic errors of measurement the saving rate is of course subject to unsystematic errors. That is, since both monthly net income and saving amount are directly reported by households it is likely that answers are not exact and far from the true measures in some cases. Mistakes in measuring monthly net income for example could be a reason for rather high saving rates of more than 50 %.

To get an idea of how strong the potential errors might be, Figure 3.1 shows the distributions of household monthly net incomes and saving rates in the pooled data. The income distribution is of the usual left skewed shape. About 11% of all households report a monthly net income of less than 1500 DM and almost 4 % one of less than 1000 DM. At the other end of the distribution 1.5 % of all households report a monthly net income of more than 10000 DM. With respect to the saving rates two things should be mentioned. First, 35 % of all households report to save nothing at all. In addition, there is considerable variation in the SOEP saving rates. A relatively large fraction of households report very high saving rates (8 % of all households report saving rates above 30 %). This could be caused by the short run variation in monthly savings due to e.g. high savings for the purchase of expensive goods in the near future. However if households include e.g. mortgage repayments into their saving amounts saving rates of above 30% are not surprising. Yet, another possible source for these high saving rates are measurement errors in the net income variable, i.e. high saving rates could be due to very low reported net incomes.

Figure 3.1: Distribution of real net income and saving rates (pooled data).





Source: SOEP Waves 1992 to 2002, own calculations.

For a rough overview Table 3.1 shows the number of observed households for each year together with simple statistics of households' incomes, savings and saving rates.

Table 3.1: Simple statistics of income, savings and saving rate.[30]

Year	numb. of obs.	**Saving Rate**			
		mean	std.	min	max
1992	5001	0.10	0.11	0.00	0.50
1993	4922	0.10	0.11	0.00	0.50
1994	4943	0.10	0.11	0.00	0.50
1995	4830	0.10	0.11	0.00	0.50
1996	4788	0.10	0.11	0.00	0.50
1997	4833	0.10	0.11	0.00	0.50
1998	5540	0.09	0.11	0.00	0.50
1999	5395	0.09	0.11	0.00	0.50
2000	5285	0.10	0.11	0.00	0.50
2001	5149	0.09	0.10	0.00	0.50
2002	4945	0.09	0.10	0.00	0.50
Year	numb. of obs.	**Income (2000 DM)**			
		mean	std.	min	max
1992	5001	3513	1819	852	10685
1993	4922	3560	1816	868	10790
1994	4943	3540	1798	860	10748
1995	4830	3612	1825	852	10650
1996	4788	3619	1827	855	10808
1997	4833	3612	1784	855	10814
1998	5540	3559	1777	858	10816
1999	5395	3654	1813	862	10751
2000	5285	3719	1860	865	10750
2001	5149	3704	1838	858	10784
2001	4945	3825	1944	870	10832
Year	numb. of obs.	**Savings (2000 DM)**			
		mean	std.	min	max
1992	5001	386	499	0	4065
1993	4922	405	529	0	5006
1994	4943	405	554	0	4334
1995	4830	418	567	0	4792
1996	4788	415	552	0	4197
1997	4833	400	530	0	4119
1998	5540	373	511	0	5102
1999	5395	389	538	0	5071
2000	5285	406	545	0	5000
2001	5149	379	515	0	4902
2002	4945	373	539	0	4836

Source: SOEP Waves 1992 to 2002, own calculations

[30] Households are again weighted with the SOEP internal weighting factors throughout section 4.

Some facts about the saving rates and household net income should be mentioned. Saving rates as calculated here can not be negative. In addition they exhibit a marked variance with maximum saving rates of about 80 % (before outliers were cancelled out). Household net income is very low for some households probably due to measurement errors on behalf of the households.

To get an idea of the quality of the saving measure Table 3.2 compares the mean saving rates in the GSOEP panel to those published by the national bureau of statistics (STABU). Saving rates decreased by about one percentage point over the last ten years. The saving rates reported by the STABU are slightly above those calculated on the basis of the GSOEP household panel.

Table 3.2: Comparison of mean saving rates (SOEP, STABU).

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Saving Rates in SOEP	10,5%	10,8%	10,6%	10,6%	10,5%	10,3%	9,8%	10,0%	10,1%	9,5%
Saving Rates (STABU)	13,0%	12,3%	11,6%	11,2%	10,8%	10,4%	10,3%	9,8%	9,8%	10,1%

Sources: SOEP Wave 1992 to 2002, STABU (2002b).

Thus on average savings are underestimated with the measure used here. In addition, the SOEP saving rates are more or less constant over the 10 years, whereas STABU saving rates declined. When comparing these saving rates differences in the definitions have to be considered. The STABU saving rate is defined as the ratio of savings to disposable income of all households and private non-profit organizations. The denominator (disposable income) contains net labor income, capital and transfer income, real public transfers to private households and the increase of households' entitlements to benefit against companies. Since the 'SOEP saving rates' are subject to various measurement errors in one or the other direction, it is not possible to say how the differences in the STABU definitions should be reflected in differences in the saving rates. However, in average the saving rates are close enough to conduct an analysis. That is, despite various measurement errors it is assumed that the saving rate as defined here is positively correlated with actual savings and can thus be used as a proxy for savings. Furthermore, two properties of the SOEP data make it a good basis for the following analyses. First we can use the panel structure two disentangle between age and cohort effects. Secondly the SOEP data contains detailed information on household composition and characteristics of household members which are important variables for the analyses in the remainder of this section.

We now turn to the descriptive analyses. To describe a household's life-cycle saving behavior one ideally would like to observe households over their entire lifetime. This would permit to depict a household's life-cycle profile of savings and thus to identify the

effect of age (the stage in the life-cycle). Of course such data are not available. What can be done if only cross-section data is available is to use data on different households at different stages of their life to construct a pseudo life cycle. The underlying assumption being, that the major determinants of households saving decisions did not change. That is, a household that is in retirement (say of age 65) today faced the same decision and had to do the same considerations thirty years ago as a household that is of age 35 has to do today. However, if panel data is available and we observe households at different life-cycle stages at a few consecutive points in time it has to be taken care of time and cohort effects. Different birth cohorts did not have the same lifetime resources available which could effect income and saving rates (cohort effects). In the pure life-cycle framework, however, saving rates are independent of the level of lifetime resources as long as the lifetime income path is just parallel shifted. In addition, income and savings vary due to business-cycle fluctuations over time (time effects). This difficulty can be overcome by constructing cohort data to depict household life cycle income and savings.[31] For cohort analysis of household 'life cycle' savings all households in the sample from 1992 to 2002 are divided into twelve birth cohorts. Each cohort contains households with the household head born in one of five consecutive years. Cohorts thus range from cohort 1 containing households with the household head born between 1913 and 1917 up to cohort 12 with the household head born between 1968 and 1972. Table 3.3 gives the number of observations in each cohort averaged over the ten years together with mean saving rates.

Table 3.3: Average number of observations per cohort.

year of birth	avg. numb. of obs.	mean saving rate	std.
1913-1917	220	0.11	0.12
1918-1922	235	0.11	0.12
1923-1927	292	0.12	0.12
1928-1932	351	0.10	0.11
1933-1937	357	0.11	0.11
1938-1942	410	0.12	0.12
1943-1947	464	0.09	0.10
1948-1952	471	0.10	0.11
1953-1957	520	0.08	0.10
1958-1962	559	0.08	0.10
1963-1967	602	0.09	0.11
1968-1972	696	0.09	0.11

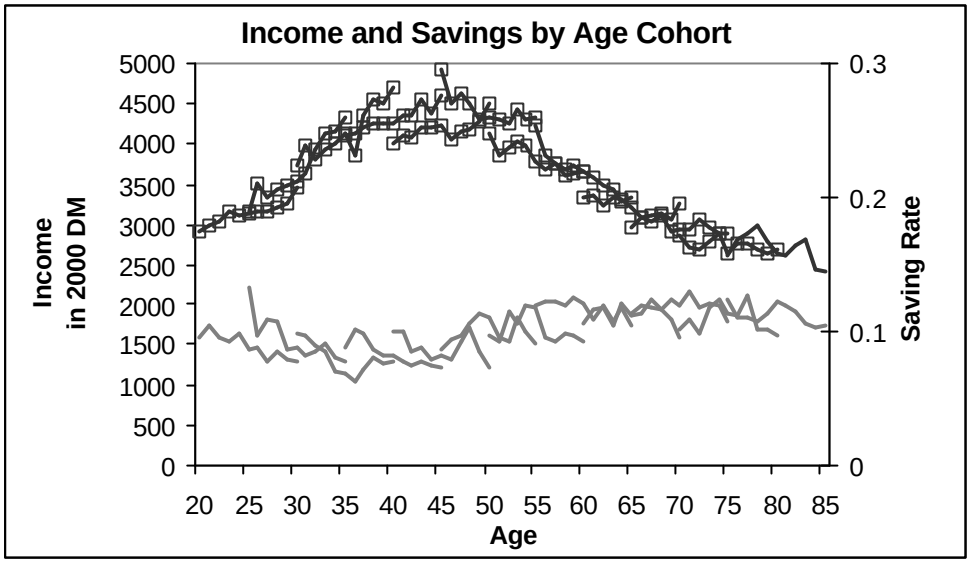
Source: SOEP waves 1992 to 2002, own calculations.

For the analysis of life cycle behavior of the 'average' household, means of the respective variables (i.e. saving rate and income) are calculated for each birth cohort at every time of

[31] For an introduction into cohort analysis compare Deaton 1997 pp. 116-127.

observation (i.e. for 1992 to 2002). Thus in total the original data is summarized in 120 cells with a cell defined by the cohort and the year of observation. Figure 3.2 plots mean income and saving rates of cohorts between 1992 and 2001. The graph depicts the typical life-cycle income stream. However the picture does not confirm the life cycle hypothesis.

Figure 3.2: Cohort analysis of income and saving rates.



Source: SOEP, waves 1992 to 2002, own calculations.

Whereas the life cycle model's prediction would imply a saving rate that increases with age up to some peak and then starts to decrease with age, saving rates are more or less constant if not slightly increasing in old age.[32] Cohort effects can be observed for the saving rates of younger cohorts, i.e. saving rates are lower for the youngest cohort as compared to those of the preceding cohorts. In addition within younger cohorts saving rates declined over the ten years of observations, which suggests a time effect possibly due to decreasing interest rates. In contrast to what the life cycle model says, people do not dissave in old age and the cohort analysis suggests that saving rates do not react to lifetime increases of income with age. However, that does not mean that a household's income is irrelevant for the household's saving rate. It seems likely that in each cohort, those with a higher income display higher saving rates since income simply determines the potential to save.[33]

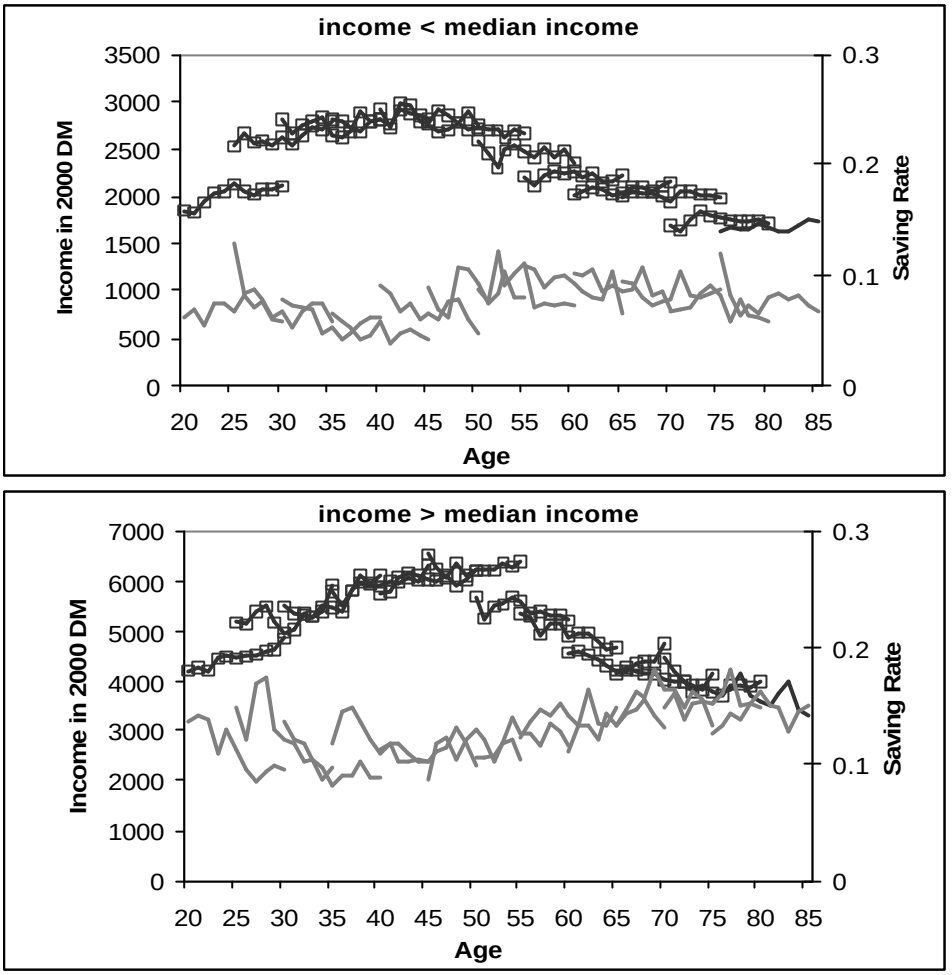
However, before graphs depicting household 'life-cycle' savings are presented one general matter concerning cohort analysis has to be mentioned. When cohorts of households are

[32] The observation that a fixed fraction of income is saved or equivalently that consumption tracks income over the life cycle is in line with the results in the literature. Compare e.g. Attanasio (1999) p. 755.
[33] Compare Figure III.4 below.

stratified by a specific variable this variable should be constant in time, an example being the level of education of the head of the household. If this is not the case one would have different types of households within a birth cohort over time. For example, if it is assumed that high education households behave differently with respect to savings than low education households the sample could be divided into two types of households (high and low education), since households in different birth cohorts are of the same 'type'. However, the interest here is in variables that characterize household composition that typically change over time. Thus, if we are interested in the effect of children on couples' saving behavior and plot 'life-cycle' mean saving rates stratified by children / no children the composition of cohorts would change. For example young cohorts of couples with children, say, with the household head younger than thirty would contain relatively more low income and low education households, whereas the opposite would probably be true for older cohorts (with the household head older than 50). The same problem exists for variables like labor market status of couples and the wife's income share. Despite these problems some cohort analyses stratified by time variant variables will be presented as they provide with careful interpretation some insight into the savings of different household types. However, the analyses start with life-cycle profiles of households stratified by time invariant variables.

In order to get an idea of how income effects the saving rate Figure 3.3 shows 'life-cycle' profiles of high and low income households. In each cohort and each year households where divided into those with a net income above and those with a household net income below the median net income in the respective cohort and year. Mean net income and mean saving rates are than plotted for the respective groups. Again, saving rates are more or less constant over a household's life cycle. In addition, disposable income seems to be an important determinant for saving. High-income households display considerably higher mean saving rates. However, the differences in the saving rates between high and low income households are not significant due to the large variation of household saving rates.

Figure 3.3: Life cycle profiles of low and high income HH.



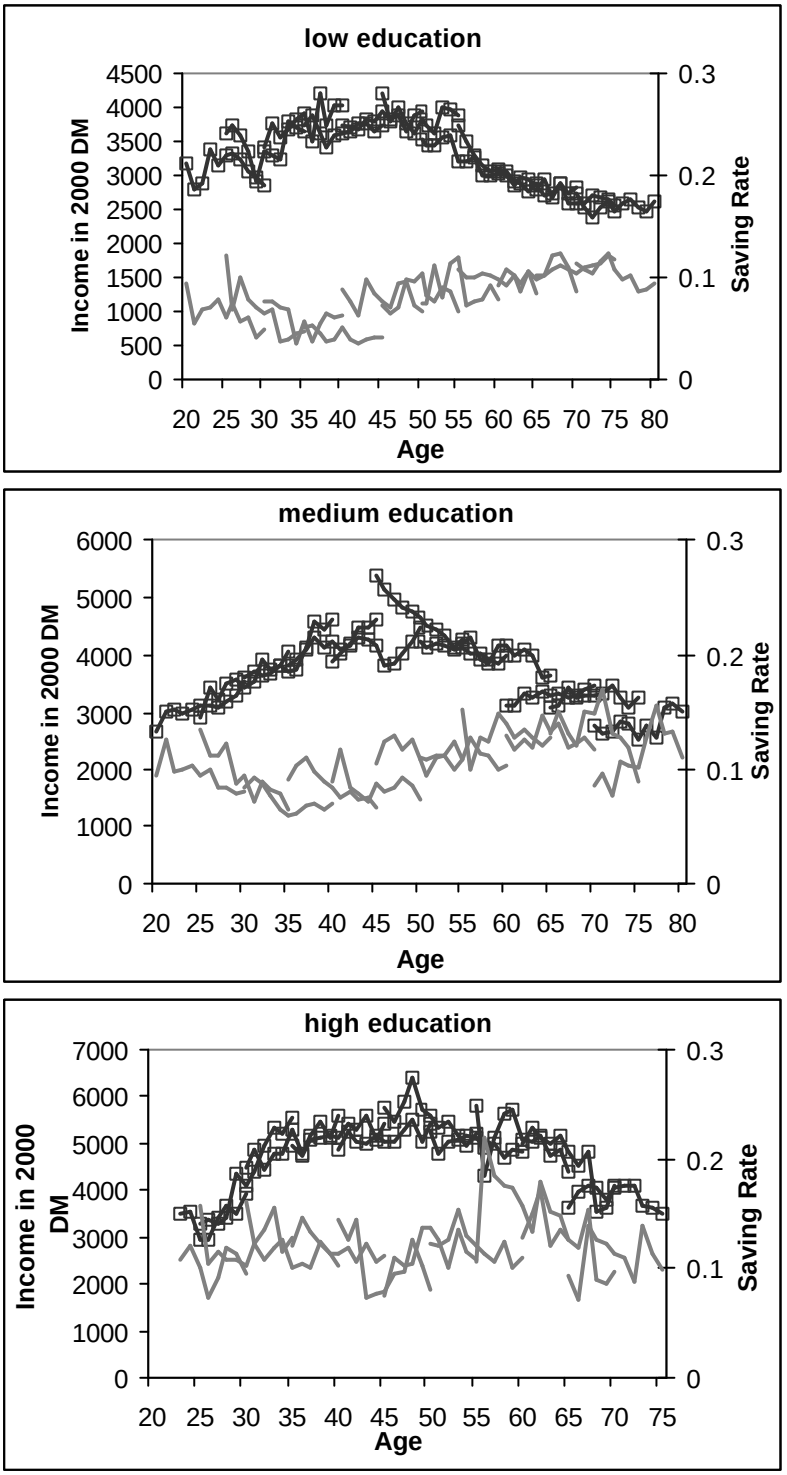
Source: SOEP, waves 1992 to 2002, own calculations.

Table A.1 (see the appendix) shows mean saving rates by income classes over the age of the household head and different cohorts with the cohorts ranging from the youngest cohort 1 (born between 1968 and 1972) to cohort 12 (born between 1913 and 1917). The figures show a clear relation between disposable income and saving rates. High income households display higher saving rates. However, these differences are not significant. In addition, saving rates increase with age and are particularly high for the oldest households. With a closer look at the figures one recognizes a trend of increasing saving rates within each age group, i.e. in many age groups the older cohorts have higher saving rates. However, it is not possible to say whether this is due to cohort effects or time effects. Since this trend is observable in many age and income groups it is likely to be a time effect. That is, overall saving rates declined over the ten years of observation and since older cohorts belong to a specific age group earlier, they have higher saving rates.

The next variable of stratification is the education of the household head. Households are grouped into three different types, those with higher education (university degree), those with a 'medium' school degree and a professional training and those with the lowest school

degree possible or without any education. The number of years of education of the household head are used here to differentiate with respect to education. The high education group is assumed to correspond to those with an education of at least 15 years. The second group consists of those with an education of at least 12 up to 14 years while the rest belongs to the low education group. Figure 3.4 shows income and saving profiles of the respective groups. Low and medium education households have more or less the same life cycle profile of income and saving rates. However, income and saving rates are a bit higher for medium education households especially for the younger age groups. For both types of households saving rates increase with age which seems to be due to cohort effects. Like in the cohort plots for all households, saving rates decrease over time within most cohorts whereas the saving rates are higher for older cohorts. The effect that saving rates increase for older cohorts does not exist for high education households. Saving rates of younger high education households are slightly above those of the other household types which is again not in line with life cycle consumption smoothing. Since the income profile of higher educated is steeper (income is about the same for young household and increases with age more than for lower educated) the life cycle hypothesis would imply a lower saving rate for young high education households since they can expect steeper increase in the life-cycle income profile.

Figure 3.4: Life-cycle profiles by education of HH head.



Source: SOEP, waves 1992 to 2002, own calculations.

The first dimension of household composition which was hypothesized to effect savings is the presence of children. In order to visualize the effect of children on household savings Figures 3.5 and 3.6 depict 'life-cycle' saving and income profiles of couples with and without children. Since the dummy variable for children is not time invariant composition of cohorts would change. Therefore it was chosen to plot means of income and saving rates only for couples with the wife being older than 40 in the last year the household is in the panel to be able to discriminate between couples that have or had children and those that

never had and will not have children.[34] That is, all couples without children in or outside the household where the wife is older than forty in the last year the household is observed are assumed to be childless for their whole life. These couples can than be traced back such that we also can observe couples with the wife being thirty that will most probably never have children. On the other side, the group of couples with children does also contain couples that do not live with their children. However, the aim here is to differentiate between those who decide not to have children and those who want children and not between households with and without children present. For the latter aspect, Table A.2 in the Appendix contains mean saving rates (with standard deviations) of couples with and without children in the household by income classes, age and cohort.

Figure 3.5: Life-cycle profiles of couples with children born.

Source: SOEP, waves 1992 to 2002, own calculations.

[34] With this restriction there are very view couples that change from couple without children to couple with children under the assumption that the probability of a forty year old childless women to bear a child in the future is negligible.

Figure 3.6: Life-cycle profiles of childless couples.

Source: SOEP, waves 1992 to 2002, own calculations.

Saving rates of couples with children increase with age and are considerably higher than those of childless couples in old age. This could be a hint on a bequest motive. However, one has to be careful with interpreting these graphs since differences are not significant. In addition the results could be distorted due to a selection problem. Many elder people that have children join their children's house and poor elder people are more likely to live with their children. Thus in the 'couples with children' group there are probably disproportionately many rich households. Furthermore, it was already mentioned that saving rates of retired households are possibly overestimated since private pension annuities are attached to income. Another problem with these graph is that 'life-cycle' profiles of childless couples show marked variation due to the limited number of observations in each cohort.

In addition to cohort plots Table A.3 in the appendix contains mean saving rates of couples stratified by the number of children and labor market status of spouses. Standard deviations of the mean saving rates are again large such that no significant differences exist between the respective household types. However, it seems that children have a negative influence on a household's saving rate and couples do save more in times when both are employed fulltime. The effect of the number of children is obvious for couples with the head of the household younger than forty years. For these households the saving rate decreases with the number of children. However, among older couples the effect of children on household savings is ambiguous. Concerning the labor market status of couples, it can be stated that couples save more if both spouses are working fulltime. This effect is especially strong for young couples. Since households are not distinguished by income one has to be careful with the interpretation of mean saving rates. For instance, young households with two or

more children are more likely to be low education and low income households which could explain the lower saving rates. Thus the effect attached to children could to some extent be an income effect.

How these and other variables of household composition like age differences among spouses and spouses' income shares effect household savings will be further analyzed in the following sections. At this point it can only be said that the descriptive statistics seem to suggest that some of the household composition variables like the number of children in the household are relevant for savings. However the insight into household saving behavior on the basis of these descriptive statistics is limited and further analysis is thus subject of the remainder of this section.

When 'life-cycle' saving patterns of households are analyzed with a data set containing households of different age at the same point in time observed over several years, it is generally claimed that savings (or consumption) is subject to age, year and cohort effects. The change in a household's saving rate with age of the household head (due to intertemporal preferences) is confounded with changes due to changing economic circumstances with time. First over the time period of observation the macroeconomic situation (e.g. interest rates) changes for all households alike. In addition, it is claimed that two households of the same age at different points in time (belonging to different birth cohorts) have to be treated differently since disposable lifetime resources depend on long run economic growth and thus are smaller for older birth cohorts (if long run growth is positive). Knowing that possibly all three dimensions (time, age, and year of birth) are relevant for household savings, they should be included into the regression model. However, this causes a problem of identification since age, time and year of birth are not linearly independent. A person's age is simply a linear combination of his year of birth and the time of observation. To overcome this problem additional assumptions about the various effects and their interrelation have to be made.[35] That is, in principle the following specification could be used to estimate profiles of household saving rates including variables of household characteristics and composition as independent variables.

$$s_{it} = a + b_1 age_{it} + b\ age_{it}^2 + b_3 age_{it}^3 + b_4 age_{it}^4 + \sum_{i=1}^{12} g_c D_i^c + d_t + f(X_{it}) + e_{it}$$

[35] A way to identify year age and cohort effects was proposed by Deaton and Paxton. For an introduction into the decomposition of cohort, time and age effects, compare Deaton (1997) pp. 123-128.

That is, household's i saving rate is a function of the 'household's age' the year of birth of the household head (D_i^c =1 if household i belongs to birth cohort c and 0 otherwise) the time of observation t (the coefficient d_t) and of a vector of variables X_{it} containing household characteristics and variables describing the composition of the household. Together with additional restrictions on time and cohort effects the identification of age, time and cohort effects is possible. However, things will be kept simpler. Considering the quality of the data it is claimed that a separation of these effects will not result in additional valuable insight. Thus a simpler approach will be used. All regressions in the following sections will be done twice, one specification containing a polynomial in age and year dummies and the other containing a polynomial in age together with cohort dummies. It will be found that the results for these two different specifications are in all cases very similar and results will be reported for the specifications containing cohort dummies.

The most important variables for the following regression analyses will be described and some simple statistics of these variables will be provided. Some of the variables which where hypothesized to effect household savings are defined for couples only. Therefore this section is divided into a short description and simple statistics of the variables defined for the full sample and a more detailed discussion of how the variables relevant for couples only are defined. The regression analysis are based on four different data sets. A panel containing households observed at least once between 1992 and 2002, another sample containing only households observed in every single year and two correspondingly constructed data sets for couples.

Tables 3.4 to 3.7 contain descriptions and simple statistics of the variables for the four different data sets. The description of the variables is given in the table and construction of the respective variables is straightforward. The proxy variable for household wealth is used since the SOEP data does only contain information on the amount of wealth for the years 1988 and 2002. Instead, real earnings of interests dividends and rents per year were used and divided by the real interest rate[36] of the respective year. Some variables (saving rate, income and wealthproxy) are subject to heavy outliers. Therefore the following households were deleted from the data: households above/below the 99/1 percentile of the income distribution, households above the 99 percentile of the saving rate distribution (the distribution is left censored at 0 thus the 1 percentile can not be cut of), households above

[36] Nominal interest rates are taken from OECD statistics on the web **http://www.oecd.org/dataoecd.** Private consumption deflators (from the same source) were subtracted to calculate real interest rates.

the 99 percentile of the distribution of the wealthproxy, couples below/above the 1/99 percentile of the distribution of the difference in remaining life expectancy.

Table 3.4: Simple statistics of variables (full sample).

Variable	**Description**	numb. of nonmissing obs.	mean	std.	min	max
continuous Vars.						
income	real income in year 2000 DM	55631	3613	1822	852	10832
savr	saving rate	55631	0.10	0.11	0.00	0.50
age	age of HH head	55628	51.64	17.73	17	99
wealthprox	(Earnings by rent, interest,dividend) divided by real interest (in 1000 DM)	55512	47	108	0	1033
yeduc	years of education of HH head	54588	11.76	2.51	7	18
hhsize	Number of persons in HH	55631	2.13	1.17	1	8
dummy Vars.						
lifeinsd	=1 if HH owns life insurance	55631	0.50	0.50	0	1
homownd	=1 if homeowner	55629	0.37	0.48	0	1
securityd	=1 if securityowner	55631	0.26	0.44	0	1
savplan	=1 if saving plan for homeownwrship	55631	0.34	0.47	0	1
femheadd	=1 if female HH head	55631	0.43	0.49	0	1
chnotinhd	=1 if children outside the household	55631	0.41	0.49	0	1
chy6d	=1 if chidren younger than 6 in HH	55631	0.10	0.30	0	1
chb7a12d	=1 if chidren between 7 and 12 in HH	55631	0.10	0.30	0	1
chold12d	=1 if chidren older than 12 and younger 25 in HH	55631	0.16	0.37	0	1
eastdum	=1 if east german HH	55631	0.21	0.41	0	1

Source: SOEP, waves 1992 to 2002, own calculations.

Table 3.5: Simple statistics of variables (balanced panel).

Variable	**Description**	numb. of nonmissing obs.	mean	std.	min	max
continuous Vars.						
income	real income in year 2000 DM	22858	3712	1678	852	10808
savr	saving rate	22858	0.10	0.10	0.00	0.50
age	age of HH head	22858	53.56	15.51	20	95
wealthprox	(Earnings by rent, interest,dividend) divided by real interest in 1000 DM	22847	42	88	0	1020
yeduc	years of education of HH head	22656	11.74	2.49	7	18
hhsize	Number of persons in HH	22858	2.24	1.19	1	8
dummy Vars.						
lifeinsd	=1 if HH owns life insurance	22858	0.55	0.50	0	1
homownd	=1 if homeowner	22858	0.38	0.48	0	1
securityd	=1 if securityowner	22858	0.28	0.45	0	1
savplan	=1 if saving plan for homeownwrship	22858	0.34	0.48	0	1
femheadd	=1 if female HH head	22858	0.40	0.49	0	1
chnotinhd	=1 if children outside the household	22858	0.45	0.50	0	1
chy6d	=1 if chidren younger than 6 in HH	22858	0.09	0.29	0	1
chb7a12d	=1 if chidren between 7 and 12 in HH	22858	0.12	0.32	0	1
chold12d	=1 if chidren older than 12 and younger 25 in HH	22858	0.20	0.40	0	1
eastdum	=1 if east german HH	22858	0.25	0.43	0	1

Source: SOEP, waves 1992 to 2002, own calculations.

We now turn to the sub-sample of couples. Regression analyses of couples saving behavior contain some additional variables that are not straightforward to construct. Therefore the definition of these variables will be discussed in more detail. Description and simple statistics of variables are given in Table 3.6 and 3.7 for the balanced panel. The most interesting variables with respect to household composition and household saving behavior of couples are the spouses' difference in remaining life expectancies, the wife's income share, dummies for children, spouses' labor market status and dummies for age differences between spouses (as an alternative to the difference in remaining life expectancies).

Table 3.6: Simple statistics of variables (couples only).

Variable	Description	numb. of nonmissing obs.	mean	std.	min	max
continuous Vars.						
income	real income in year 2000 DM	35659	4437	1739	852	10832
savr	saving rate	35659	0.10	0.11	0.00	0.50
wealthprox	(Earnings by rent, interest,dividend) divided by real interest in 1000 DM	35589	57	119	0	1033
agemale	age of husband	35659	50	15	18	95
yeduc	years of education of HH head	35020	11.96	2.50	7	18
dellexp	percentage difference in remaining expected lifetime (0.1 = wife can expect to live 10% longer)	35659	0.29	0.20	-0.11	1.15
agediff	Age husband - age wife	35549	2.71	4.16	-11.00	26.00
femincshare	wife's income share	35658	0.28	0.19	0.00	1.00
educdiff	years of education (husband -wife)	33111	0.63	2.28	-9.50	9.00
dummy Vars.						
lifeinsd	=1 if HH owns life insurance	35659	0.48	0.50	0	1
homownd	=1 if homeowner	35659	0.31	0.46	0	1
securityd	=1 if securityowner	35659	0.45	0.50	0	1
savplan	=1 if saving plan for homeownwrship	35659	0.64	0.48	0	1
femheadd	=1 if female HH head	35659	0.25	0.43	0	1
incshlowd	=1 if wife's income share < 0.3	35658	0.56	0.50	0	1
incshmedd	=1 if wife's income share is >=0.3 and <0.5	35658	0.32	0.47	0	1
incshhighd	=1 if wife's income share >=0.5	35658	0.11	0.32	0	1
bfulltd	=1 if both spouses are working fulltime	35659	0.19	0.39	0	1
chnotinhd	=1 if children outside the household	35659	0.44	0.50	0	1
chy6d	=1 if chidren younger than 6 in HH	35659	0.17	0.37	0	1
chb7a12d	=1 if chidren between 7 and 12 in HH	35659	0.16	0.37	0	1
chold12d	=1 if chidren older than 12 and younger 25 in HH	35659	0.25	0.43	0	1
birth1lag	=1 if first child born last year	35659	0.02	0.12	0	1
birth2lag	=1 if second child born last year	35659	0.01	0.11	0	1
eastdum	=1 if east german HH	35659	0.23	0.42	0	1

Source: SOEP, waves 1992 to 2002, own calculations.

Table 3.7: Simple statistics of variables (couples balanced panel).

Variable	Description	numb. of nonmissing obs.	mean	std.	min	max
continuous Vars.						
income	real income in year 2000 DM	13090	4357	1513	867	10784
savr	saving rate	13090	0.11	0.11	0.00	0.50
wealthprox	(Earnings by rent, interest,dividend) divided by real interest in 1000 DM	13084	49	93	0	987
agemale	age of husband	13090	53	13	21	92
yeduc	years of education of HH head	12966	11.85	2.40	7	18
dellexp	percentage difference in remaining expected lifetime (0.1 = wife can expect to live 10% longer)	13090	0.30	0.19	-0.11	1.14
agediff	Age husband - age wife	13090	2.57	3.66	-10.00	20.00
femincshare	wife's income share	13090	0.27	0.20	0.00	1.00
educdiff	years of education (husband -wife)	12620	0.65	2.18	-7.50	9.00
dummy Vars.						
lifeinsd	=1 if HH owns life insurance	13090	0.65	0.48	0	1
homownd	=1 if homeowner	13090	0.51	0.50	0	1
securityd	=1 if securityowner	13090	0.32	0.47	0	1
savplan	=1 if saving plan for homeownwrship	13090	0.44	0.50	0	1
femheadd	=1 if female HH head	13090	0.21	0.41	0	1
incshlowd	=1 if wife's income share < 0.3	13090	0.56	0.50	0	1
incshmedd	=1 if wife's income share is >=0.3 and <0.5	13090	0.33	0.47	0	1
incshhighd	=1 if wife's income share >=0.5	13090	0.10	0.31	0	1
bfulltd	=1 if both spouses are working fulltime	13090	0.17	0.37	0	1
chnotinhd	=1 if children outside the household	13090	0.49	0.50	0	1
chy6d	=1 if chidren younger than 6 in HH	13090	0.15	0.35	0	1
chb7a12d	=1 if chidren between 7 and 12 in HH	13090	0.20	0.40	0	1
chold12d	=1 if chidren older than 12 and younger 25 in HH	13090	0.30	0.46	0	1
birth1lag	=1 if first child born last year	13090	0.01	0.09	0	1
birth2lag	=1 if second child born last year	13090	0.01	0.10	0	1
eastdum	=1 if east german HH	13090	0.29	0.45	0	1

Source: SOEP, waves 1992 to 2002, own calculations.

To begin with the percentage difference in remaining life expectancy between wife and husband (dellexp) was included as independent variable to test whether saving rates are higher for couples with a longer relative remaining life expectancy of the wife.[37] The variable dellexp is calculated by subtracting the husbands from the wife's remaining life expectancy and dividing by the husbands remaining life expectancy. Thus a value of 1 for

[37] Remaining life expectancies of men and women between the age of 20 and 90 where taken from STABU life tables on the web "www.stabu.de"

dellexp means that the wife can expect to life twice as long as her husband.[38] Another variable which needs some detailed description is the wife's income share. The income share is calculated by simply taking the fraction of the wife's income of the sum of wife's and husband's income, where income contains net labor income and/or pension income for retired persons. Since household income contains other income sources the sum does not add up to household net income in many cases. Thus it is assumed that non labor income is attributed to husband and wife corresponding to their labor income shares. Since labor income is missing for a considerable number of observations some additional calculations were made. If missing, personnel income was calculated by subtracting the partner's income from the household income if the respective person reported to be employed. In addition, if the wife's labor income was missing her income share was set to 0 if the wife did report not to work and it was set to 1 if the wife works fulltime and her husband is not employed. After these calculations the wife's income share was defined for 91 % of the sample containing couples only. For the remaining 9 % the wife's income share was set to the average income share of the respective age group. The definitions of the remaining variables are straightforward and descriptions are given in Table 3.6.

In order to analyze the linkage between household characteristics and household saving behavior, regressions of the household saving rate on various independent variables are done. The independent variables are chosen to describe household characteristics that were hypothesized to effect savings. These variables include dummy variables for children of different age, a measure for spouses' differences in remaining life expectancies the difference of duration of education between spouses and the wife's share of total household income. Since a considerable fraction of households reports zero saving rates which causes a selection problem the estimation method used is tobit regression. To get an idea of what kinds of households are more likely to save nothing the following table provide shares of non-saving households stratified by income and age of household head (see Table 3.8).

[38] Statistical life expectancies are used. A better yet unobservable measure would be the subjective life expectancy.

Table 3.8: Shares of non saving households by income.

age of HH head	Classes of HH Net Income (in 2000 DM)							
	< 1000	1000-2000	2000-3000	3000-4000	4000-5000	5000-6000	6000-8000	>8000
<25	0,68	0,58	0,44	0,39	0,20	0,18	0,24	0,37
25-29	0,90	0,68	0,40	0,36	0,27	0,18	0,14	0,34
30-34	0,96	0,67	0,49	0,33	0,21	0,23	0,17	0,18
35-39	0,94	0,74	0,55	0,45	0,31	0,24	0,17	0,10
40-44	1,00	0,72	0,56	0,41	0,30	0,24	0,18	0,19
45-49	0,87	0,68	0,59	0,35	0,31	0,19	0,16	0,16
50-54	1,00	0,65	0,44	0,35	0,18	0,20	0,15	0,13
55-59	0,76	0,65	0,36	0,26	0,22	0,15	0,11	0,06
60-64	0,79	0,59	0,36	0,22	0,20	0,18	0,08	0,05
65-69	0,77	0,51	0,32	0,17	0,13	0,14	0,08	0,09
70-74	0,84	0,54	0,30	0,19	0,16	0,18	0,08	0,00
75-79	0,68	0,49	0,29	0,15	0,07	0,09	0,21	0,00
>=80	0,72	0,52	0,35	0,24	0,12	0,24	0,09	0,11

Source: SOEP Waves 1992 to 2002, own calculations.

The figures clearly show that the share of non saving households is markedly higher among low income households. Of all households with a monthly net income of less than 1000 DM more than 80 % report not to save at all. With respect to age the shares of non-saving households are higher among younger households in almost all income groups. Thus by neglecting non saving households, low income households and younger households would be systematically underrepresented.

In addition to pooled data tobit regressions panel regressions were conducted to control for individual specific effects, i.e. the random effects of a panel regression capture unobserved heterogeneity among households concerning e.g. intertemporal preferences or their attitude towards saving in general. In other words, there might be households that a priori like saving more than others for unobserved reasons. These differences can be captured in the random effects of a panel data regression.

Repayments of housing loans were included as independent variable since it was claimed that saving rates of homeowners will be systematically underestimated if loan repayments are not included into the monthly saving amount. In addition, wealth dummies and the proxy for the level of wealth were included as control variables since households with a considerable level of wealth should c.p. have less incentive to save. On the other side the inclusion of these variables might cause an endogeneity problem i.e. the wealth variables (particularly the proxy for wealth) are no longer exogenous but depend themselves on the saving rate. A simple example will illustrate this point. Consider two households which are identical except that one of them does ‘like’ saving more for some unobserved reasons. Since the wealth of a household depends on past savings the household with a stronger preference for saving has a higher wealth level today. And since he likes saving more he

also displays a higher saving rate. That is, both a household's wealth level and its saving rate are correlated with the unobserved reasons that make a household like saving more than some other household. We will return to this point later on when the regression results are discussed. We now turn to the presentation of the results. First, results of regressions containing all households in the sample are given. Hereafter a sub-sample containing couples only is used to test the hypotheses concerning differences in life expectancies and the distribution of income within the household. The results for the sample containing all households are presented in Table 3.9.

Table 3.9: Tobit estimates of saving rate (full sample)

	Tobit Estimates		random effects tobit	
Variable	coeff.	p-value	coeff.	p-value
constant	-.5023124	0.000	-0.18041	0.083
income in 1000 DM per adult equiv.	.0292436	0.000**	0.02377	0.000**
(income in 1000 DM per adult equiv.)^2	-.0006325	0.000**	-0.00050	0.000**
age	.032302	0.000**	0.01241	0.156
age2	-.0011835	0.000**	-0.00063	0.016*
age3	.0000155	0.000**	0.00001	0.007**
age4	-6.93e-08	0.000**	0.00000	0.008**
hh head female	-.0148469	0.000**	-0.00971	0.003**
repayments for real estate	-.0000659	0.000**	-0.00003	0.009**
repayments for own house	-.0000298	0.000**	-0.00004	0.000**
dummy for life insurance ownership	.0182607	0.000**	0.01398	0.000**
dummy for life security ownership	.043718	0.000**	0.01912	0.000**
proxy for wealth	.0018714	0.000**	0.00107	0.000**
years of education of hh head	.0001073	0.699	0.00054	0.460
dummy for children <= 6y	.0076615	0.000**	0.00234	0.475
dummy for children 7 to 12y	.002969	0.136	0.00402	0.144
dummy for children 13 to 25 y	.0011329	0.530	-0.00153	0.567
dummy for children outside the hh	-.0004777	0.763	0.00261	0.368
dummy for first child born last y	-	-	-0.01736	0.049+
dummy for second child born last y	-	-	0.01667	0.043+
dummy for east german hh	.0646678	0.000	0.04378	0.000**
Numb of Obs.	**53290**	**Numb of Obs. (per year)**	**2077**	
Log Likelihood	**8509.30**		**9187.59**	
Chi^2(28)	**13491.40**			

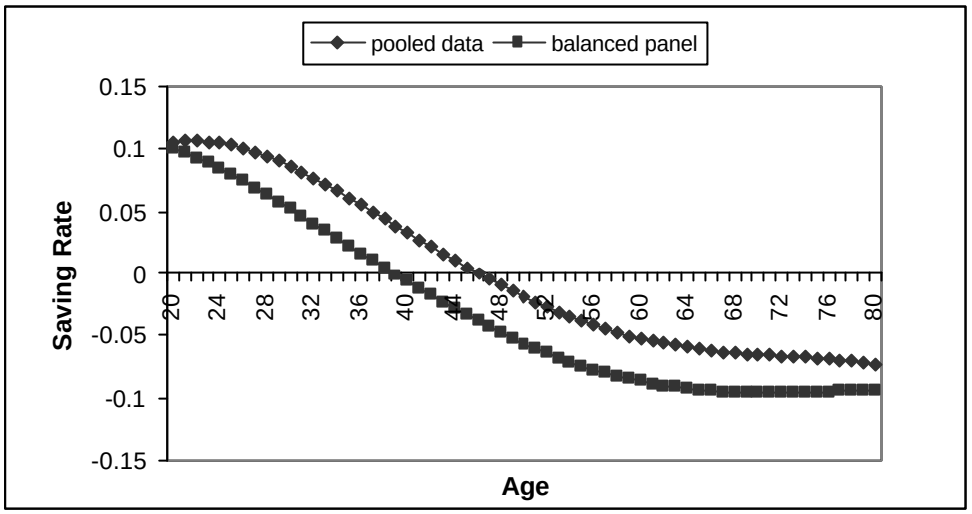
Source: SOEP, waves 1992 to 2002 of East and West German households.
Notes: Dummies for the cohorts 2 to 12 were included and are positively significant for all cohorts.
** Significant at a 1% level; * Significant at a 5% level, +Significant at a 10% level.

The results of two different estimations are presented, a tobit regression on pooled data (columns 1-2) and the results of a random effects estimation on the basis of a balanced

panel (columns 3-4), i.e. the panel was reduced to households that have been observed over the whole time span.[39]

The most interesting results with respect to the hypotheses made are the following. Income has a positive non–linear effect on saving rates. All age terms are significant. To illustrate the age effects on household saving rates Figure 3.7 plots life-cycle profiles of predicted saving rates based on the estimation results of the pooled regression and the panel data regression respectively.

Figure 3.7: Predicted life-cycle profiles of saving rates (pure age effects).[40]



Source: SOEP, waves 1992 to 2002, own calculations.

Some things about the age profiles of saving rates should be mentioned. The negative correlation between repayments for housing loans and the monthly saving rate in both regressions suggests that homeowners do indeed not include repayments for housing loans into savings and since most of the repayment of housing loans takes place in the middle phase of life saving rates of households between 30 and about 50 are underestimated. In addition it has already been mentioned that saving rates of older households could generally be overestimated due to the inclusion of private pension annuities into household income.

The effect of children on savings is positive. All dummy variables for children in the household are have positive coefficients however not significant at a 10 % level in most

[39] The panel used in the estimation is not perfectly balanced since there are a few households that are not observed over the whole time span due to missings in the independent variables in some years. However, the fraction of these households is very small and thus can be neglected. .

[40] The curves are simply polynomials functions in age with the coefficients taken from the regression results. The constant term was chosen such that the starting level equals the predicted saving rate of an average household of age 20.

cases. Thus, it seems that the costs of children are outweighed by other possibly positive effects of children on savings like a bequest motive or savings for the education of children. Reasons why the presence of children could negatively effect household savings are intra family risk sharing and inter generational transfers. That is, there is an agreement (tacit or not) between parents and their children for intergenerational transfers (e.g. older people join their children's house).[41]

To check for a bequest motive a dummy variable was included indicating if there are children outside the household. However this variable does not have a significant effect on household savings. To measure if and how saving behavior changes with the birth of children two dummies for the birth of the first and second child respectively were included in the panel regression. It is found that savings decline after the birth of the first child but increase when the second child was born. Both variables are significant at a 10% level.

All the wealth variables are positively correlated with savings. In addition saving rates are significantly lower for households that repay a loan for housing, which seems to support the assumption that most households do not include these repayments into their reported savings.

We now turn to the results of estimations on the basis of a sub-sample containing couples only. The husband's age instead of that of the head of the household was chosen to define the household's age because differences in spouses' life expectancies are included as independent variables. If the age of the household head would have been chosen, two identical couples e.g. with the husband being 65 and the wife 60 years old would have been treated differently if the husband is the household's head in one of these households and the wife in the other.

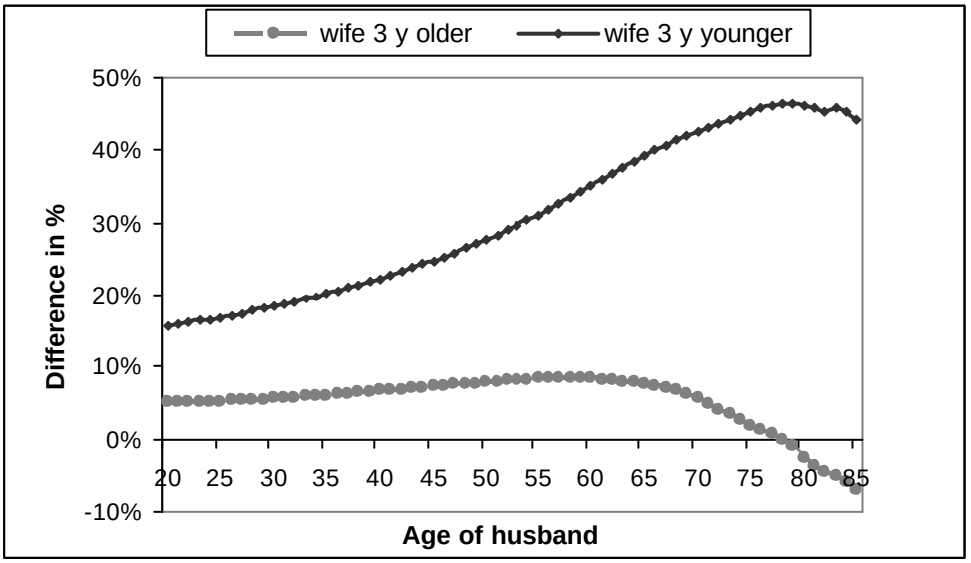
The central hypothesis about a couple's saving behavior concerns the difference of spouses' remaining life expectancies and spouses' influence on the saving decision. Following other empirical studies on this subject[42] two types of variables are used to measure the relative influence of spouses on the household saving decision, i.e. the wife's income share and the difference in education between husband and wife as a measure of potential lifetime income. In addition the difference in expected remaining lifetime is included as independent variable since the preferred saving rates of husband and wife should differ more the larger the gap in remaining life time. Another dimension which was

[41] Compare Ktlikoff and Spivak (1981) for this insurance argument.
[42] Compare Chapter I section 3.4.

hypothesized to effect household savings is the couple's labor market status. Thus a dummy indicating whether both spouses work fulltime is also part of the independent variables. The results of the estimations on the basis of the sample containing all couples are presented in Table 3.10.

In addition, Figure 3.8 plots differences in remaining life expectancies for two hypothetical couples, one with the wife 3 years younger and another with the wife 3 years older than her husband to illustrate how the age difference between spouses is reflected in the percentage difference in remaining life expectancies. A woman being 3 years younger than her husband can expect to life 40 % longer than her husband when the latter is about sixty years old, i.e. has reached retirement age. Whereas the difference in remaining life expectancies is maybe not important for younger couples it should matter for savings of older ones who are in or near retirement. Difference in remaining expected lifetime could matter for savings if different preferences for retirement savings are considered by the decision maker. However, the central argument for the relevance of the difference in remaining lifetime origins from the collective choice literature. Here difference in remaining lifetime matters together with the relative bargaining position of household members. That is, the wife's longer remaining lifetime matters if the wife contributes a considerable share to total household income.

Figure 3.8: Percentage difference in remaining life expectancy of wife and husband.



Source: STABU life tables www.stabu.de.

Table 3.10: Tobit estimates of saving rate (couples).

	Tobit Estimation		Random Effects Tobit	
Variable	coefficient	p-value	coefficient	p-value
constant	-.5482339	0.000**	0.02958	0.857
income in 1000 DM per adult equiv.	.030194	0.000**	0.02724	0.000**
(income in 1000 DM per adult equiv.)^2	-.00069	0.000**	-0.00070	0.000**
agemale	.0353962	0.000**	-0.00763	0.576
agemale2	-.0012195	0.000**	0.00004	0.916
agemale3	.0000155	0.000**	0.00000	0.920
agemale4	-6.72e-08	0.000**	0.00000	0.768
female hh head	-.0091957	0.000**	-0.01638	0.004**
wealth variables				
repayments for real estate	-.0000609	0.000**	-0.00001	0.540
repayments for own house	-.0000331	0.000**	-0.00004	0.000**
dummy for life insurance ownership	.0145368	0.000**	0.01386	0.000**
dummy for life security ownership	.03623	0.000**	0.01701	0.000**
proxy for wealth	.001785	0.000**	0.00078	0.000**
household composition				
years of education of hh head	.0001664	0.635	0.00277	0.001**
education male - education female	.0003069	0.378	0.00003	0.970
dummy for both working fulltime	.0193568	0.000**	0.02538	0.000**
female income share	-.0264889	0.000**	-0.01099	0.221
percentage difference in life expectancie	-.0274006	0.000**	-0.04289	0.004**
fem. Income share*diff. In lifeexp	.0259492	0.086	-0.01241	0.641
bothfulltimedummy*equivinc	-.0051564	0.592	-0.02047	0.163
age of hh head* dummy for children	-.0003639	0.000**	-0.00037	0.000**
dummy for children <= 6y	.0128589	0.000**	-0.00068	0.867
dummy for children 7 to 12y	.003877	0.088	0.00450	0.167
dummy for children 13 to 25 y	.0057561	0.026+	0.00117	0.746
dummy for children outside the hh	-.0087232	0.000	-0.00666	0.071
dummy for first child born last y	.0012214	0.844	-0.01351	0.181
dummy for second child born last y	.0124417	0.065	0.01154	0.198
dummy for east german hh	.0578729	0.000**	0.02860	0.000**
Numb of obs.	**32301**	**Numb of obs. (per year)**	**1176**	
Log Likelihood	**8556.28**		**6429.4**	
Chi^2(38)	**8433.8**			

Source: SOEP, waves 1992 to 2002.
Notes: Dummies for the cohorts 2 to 12 were included and are positively significant for all cohorts.
** Significant at a 1% level; * Significant at a 5% level, +Significant at a 10% level.

The regression results are not very supportive of the hypotheses made. First, the difference in remaining life expectancy has the opposite effect of the claimed one. Saving rates are lower, the higher the wife's remaining life expectancy relative to her husband's one. However, if interacted with the difference in remaining life expectancies we find a positive effect of a wife's income share on household savings which is unfortunately not significant. This result is at least some weak evidence for the 'bargaining' hypothesis, i.e. different preferences (due to different life expectancies) are reflected in actual household's saving rates if the wife 'controls' a considerable share of total household income.

The effect of the wife's income share alone on household savings is negative. The education level of the household head has a positive influence on the saving rate. Education difference between spouses which was claimed to measure differences in potential earnings effects savings in the other direction as hypothesized but is not significant in both regressions.

A further interesting result concerns the couple's labor market status. Couples with both spouses working fulltime save significantly more. Thus it seems that couples increase savings in times where both work and that motives that possibly lower savings when both work fulltime (e.g. sharing the risk of unemployment) are less important. The dummy for both working fulltime interacted with the household's income level is not significant.

All other results are identical to those of the full sample estimations. That is, income has a positive effect on saving rates. Furthermore, children positively effect saving rates, but only weakly significant. To control for the effect of children conditional on the household's age a dummy for children was interacted with the husband's age. This variable is significantly negative, suggesting that children negatively influence savings in older households (compare the regressions for the sub-sample of elder couples p.60).

For a further analysis of couples' saving decisions the remainder of this section presents results of estimations for a sub-samples containing elder couples only. Since it seems reasonable that the difference in remaining life expectancy should be more important for older couples, regressions were done for a sub-sample containing couples near or in retirement (with the husband born 1942 or earlier, i.e. cohorts 1 to 7). The results are given in Table 3.11.

In the regressions for elder couples some independent variables were omitted due to their very limited relevance among elder households. The results for couples near or in retirement are essentially the same as those for the sample containing all couples. The sign of the variable that measures difference in remaining life expectancy does not change however it is again not significant. The results for the wife's income share are still ambiguous and mostly not significant. In contrast to the regressions containing all couples the dummy for children here is significantly negative. Other variables like income age etc. show the same effects as in the previous regressions, however the age terms are not significant, that is saving rates are more or less constant with age for elder couples

Table 3.11: Panel data estimates (husband born before 1942) dependent Var. = saving rate.

	Tobit Estimation		Random Effects Tobit	
Variable	coefficient	p-value	coefficient	p-value
constant	4,05276	0.643	4,01366	0.289
income in 1000 DM per adult equiv.	0.03061	0.000**	0.03034	0.000**
(income in 1000 DM per adult equiv.)^2	-0.00068	0.000**	-0.00075	0.000**
agemale	-0.07673	0.678	-0.25624	0.259
agemale2	0.00138	0.735	0.00604	0.234
agemale3	-0.00001	0.787	-0.00006	0.201
agemale4	0.00000	0.835	0.00000	0.166
female hh head	-0.01945	0.000**	-0.02093	0.011*
wealth variables				
repayments for real estate	-0.00007	0.000**	0.00000	0.889
repayments for own house	-0.00005	0.000**	-0.00006	0.000**
dummy for life insurance ownership	0.00674	0.015*	0.00378	0.357
dummy for life security ownership	0.02746	0.000**	0.01441	0.000**
proxy for wealth	0.00187	0.000**	0.00060	0.009*
household composition				
years of education of hh head	-0.00571	0.000**	-0.00107	0.378
education male - education female	0.00147	0.038	-0.00079	0.507
dummy for both working fulltime	0.00911	0.086	0.01062	0.143
female income share	-0.02226	0.024*	-0.02685	0.074
percentage difference in life expectancies	-0.01798	0.042+	-0.04957	0.016*
fem. Income share*diff. In lifeexp	0.01807	0.406	0.02448	0.521
dummy for children	-0.02110	0.000**	-0.02573	0.000**
dummy for children outside the hh	-0.00526	0.114	-0.01166	0.144
dummy for east german hh	0.07828	0.000**	0.06795	0.000**
Numb of Obs.	**11303**	**Numb of Obs. (per year)**	**472**	
Log Likelihood	**3296.62**		**2697.42**	
Chi^2(25)	**2580.40**			

Source: SOEP, waves 1992 to 2002.

Notes: Dummies for the cohorts 9 to 12 were included and are positively significant for all cohorts.

** Significant at a 1% level; * Significant at a 5% level, +Significant at a 10% level.

The main results are summarized in tabular form.

- Cohort analyses have shown that saving rates are rather constant over a household's life cycle if not increasing in old age.
- Saving rates significantly increase with household income.
- Households with children have significantly higher saving rates when children are young. This result is quite robust since it is found in all regressions. However, elder households with children save significantly less.
- Couples where both work fulltime have significantly higher saving rates.
- The effect of the difference in remaining lifetime of spouses is significantly negative and the hypothesis can thus not be supported. That is, saving rates are lower the longer the remaining lifetime of a women relative to that of her husband.
- There is weak evidence that the difference in remaining lifetime together with the wife's income share has a positive effect on saving rates. In the pooled data regressions it was found that saving rates are higher (only at a 17% significance level) the longer the wife's relative remaining life expectancy and the higher the wife's contribution to total household income.
- The findings on the effect of the wife's income share can not support the hypothesis made. It was found in all regressions that couples with a higher income share of the wife save significantly less.

4. Summary and Conclusion

The aims of this paper were to describe empirical household composition and its change in time of German Households and to identify linkages between the composition of a household and its saving behavior. Starting from some insights of the latest literature on household saving behavior particularly with respect to household composition some hypotheses about the relation between household savings and composition were stated. Factors, which are claimed to be relevant, include the numbers of children and the age sex composition of a household that should effect savings through the relative expected remaining lifetime of household members. In addition, a central argument why savings should depend on differences in remaining lifetime of spouses and their relative income shares stems from the collective choice literature. The influence household members have on the decision how much to save is linked to observable characteristics like income shares of household members or differences in education. It is then claimed that these observable characteristics effect household savings via a bargain on the household level. A problem with this approach is that there are probably a lot of unobserved factors that are relevant in the decision process, i.e. for the influence each has on the decision.

To check to what extent German households differ with respect to the variables, which were hypothesized to effect saving, section 2 describes composition and characteristics of households. It can be stated that there is relevant variation among households with respect to these different variables and significant change over the last decades. The main results were summarized at the end of section 2.

In section3 the attempt was made to test the hypotheses made on the basis of a SOEP data set. Some supportive evidence has been found. The effect of children on savings is positive for couples with younger children but negative for elder couples. However, it was not possible to differentiate between the various effects children theoretically could have on household savings. That is, positive effects on savings that were claimed to exist either because of a bequest motive or because parents save to finance their children's education could not be identified. It was found that the variable for children outside the household has no significant impact on the saving rate. However, this is a rather poor measure to identify bequest motives. In addition, some weak evidence for the impact of age difference between spouses was found. Couples with a higher relative expected lifetime and a high income share of the wife were found to have higher saving rates near retirement, however these results are barely significant and provide only, if at all, weak support of the bargaining hypothesis. Another interesting result concerns the labor market participation of

couples. Double earners have significantly higher saving rates. Thus it seems that household savings increase during periods where both work to provide resources for phases when there is only a single earner. Other effects that a couple's labor market status could have on savings could not be identified. In particular, it is not possible to say if the effect of the wife's income share works through the mechanism described in the collective choice framework. This is a general problem. Although some effects of different variables describing a household's composition could be found it is hard to identify the underlying reasons and the strength of the different effects of the same variable. However, the positive results found and the fact that households differ with respect to composition and even seem to diverge further suggest that the topic is worth to be pursued.

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Appendix

Section 2:

Number of children by age of HH head (all couples)

	year	Age of HH head			
		<=30	31-40	41-50	51-60
No Children	1984	54%	17%	17%	46%
	1992	63%	25%	25%	46%
	2001	69%	28%	25%	57%
1 Child	1984	33%	34%	28%	30%
	1992	26%	27%	28%	34%
	2001	21%	31%	27%	22%
2 Children	1984	11%	36%	39%	15%
	1992	8%	36%	36%	15%
	2001	9%	32%	33%	18%
3 or more Children	1984	2%	12%	16%	9%
	1992	3%	12%	12%	5%
	2001	1%	9%	15%	4%

Source: SOEP Waves 1984, 1992, 2001 of West German Households, own calculation.

Employment rates of women by children

Employment Rates and Actively Employed West German Women Between the Age of 15 and 65 Years With and Without Children				
	Employment Rate*	Actively Employed**	Employment Rate*	Actively Employed**
	Share in %		Change from 1996 to 2000 in	
Women without Children	55,6	55,2	0,3	0,3
Women without Children (25 to 44 Y.)	84,8	84	2,1	2
Women with Children	60,8	56,8	6,3	5,8
Youngest Child < 3 Y.	47,7	29	5,3	3,4
Youngest Child 3-5 Y.	55,7	54,3	7,7	7,5
Youngest Child 6-14 Y.	67,6	67,1	5,3	5,2

Source: Engstler and Menning (2003) p. 107. *) Including those who are temporarily not working (e.g. Motherhood) **) Without those who are temporarily not working

Section 3:

Table A.1: Mean saving rates by age, cohort and income.

		HH real net income (in 2000 DM)							
age	cohort	<2000		2000-4000		4000-6000		6000-10000	
		mean sav.rate	std.	mean sav.rate	std.	mean sav.rate	std.	mean sav.rate	std.
<25	1	**0.06**	0.10	**0.08**	0.11	**0.13**	0.12	**0.10**	0.13
25-29	1	**0.04**	0.08	**0.09**	0.11	**0.11**	0.11	**0.09**	0.10
	2	**0.05**	0.09	**0.11**	0.11	**0.12**	0.11	**0.18**	0.14
30-34	1	**0.03**	0.06	**0.08**	0.10	**0.10**	0.10	**0.14**	0.12
	2	**0.05**	0.10	**0.08**	0.10	**0.12**	0.12	**0.14**	0.12
	3	**0.05**	0.09	**0.08**	0.09	**0.12**	0.11	**0.16**	0.13
35-39	2	**0.03**	0.06	**0.08**	0.10	**0.09**	0.09	**0.13**	0.11
	3	**0.03**	0.08	**0.06**	0.08	**0.09**	0.10	**0.13**	0.12
	4	**0.03**	0.07	**0.06**	0.08	**0.13**	0.12	**0.16**	0.12
40-44	3	**0.04**	0.08	**0.06**	0.09	**0.07**	0.09	**0.12**	0.11
	4	**0.02**	0.04	**0.05**	0.07	**0.09**	0.09	**0.13**	0.11
	5	**0.05**	0.08	**0.08**	0.09	**0.10**	0.10	**0.11**	0.12
45-49	4	**0.01**	0.03	**0.05**	0.07	**0.08**	0.08	**0.12**	0.11
	5	**0.07**	0.12	**0.06**	0.10	**0.10**	0.11	**0.12**	0.10
	6	**0.06**	0.10	**0.09**	0.11	**0.10**	0.10	**0.09**	0.09
50-54	5	**0.03**	0.06	**0.05**	0.09	**0.11**	0.10	**0.12**	0.11
	6	**0.06**	0.11	**0.08**	0.09	**0.11**	0.11	**0.13**	0.12
	7	**0.06**	0.10	**0.10**	0.10	**0.11**	0.10	**0.13**	0.11
55-59	6	**0.05**	0.09	**0.10**	0.11	**0.11**	0.10	**0.12**	0.10
	7	**0.05**	0.10	**0.10**	0.11	**0.12**	0.11	**0.13**	0.10
	8	**0.07**	0.10	**0.11**	0.11	**0.13**	0.11	**0.14**	0.13
60-64	7	**0.03**	0.08	**0.09**	0.10	**0.12**	0.10	**0.13**	0.11
	8	**0.05**	0.08	**0.11**	0.11	**0.15**	0.12	**0.18**	0.13
	9	**0.08**	0.10	**0.11**	0.10	**0.12**	0.12	**0.14**	0.11
65-69	8	**0.05**	0.08	**0.12**	0.12	**0.13**	0.12	**0.17**	0.10
	9	**0.08**	0.11	**0.12**	0.11	**0.16**	0.12	**0.15**	0.11
	10	**0.08**	0.11	**0.12**	0.11	**0.15**	0.11	**0.18**	0.13
70-74	9	**0.05**	0.09	**0.12**	0.11	**0.17**	0.14	**0.19**	0.14
	10	**0.06**	0.09	**0.12**	0.12	**0.18**	0.12	**0.19**	0.14
	11	**0.07**	0.09	**0.13**	0.11	**0.14**	0.13	**0.19**	0.11
>=75	10	**0.07**	0.10	**0.12**	0.11	**0.17**	0.13	**0.20**	0.12
	11	**0.06**	0.09	**0.13**	0.12	**0.15**	0.13	**0.21**	0.15
	12	**0.08**	0.10	**0.13**	0.13	**0.18**	0.13	**0.22**	0.15

Source: SOEP, Waves 1992 to 2002, own calculations.

Table A.2: Mean saving rates of HH with and without children.

		HH real net income (in 2000 DM)							
		<2000				**2000-4000**			
age of husband	cohort	with children		without children		with children		without children	
		mean	std.	mean	std.	mean	std.	mean	std.
25-29	1	**0.02**	0.05	**0.04**	0.08	**0.05**	0.08	**0.07**	0.09
	2	**0.02**	0.05	**0.07**	0.11	**0.08**	0.10	**0.11**	0.12
30-34	2	**0.03**	0.05	**0.03**	0.09	**0.06**	0.08	**0.07**	0.11
	3	**0.04**	0.07	**0.01**	0.03	**0.08**	0.10	**0.10**	0.11
35-39	3	**0.03**	0.08	**0.00**	0.00	**0.06**	0.08	**0.05**	0.09
	4	**0.03**	0.08	**-**	-	**0.06**	0.08	**0.08**	0.07
40-44	4	**0.04**	0.10	**-**	-	**0.05**	0.06	**0.08**	0.10
	5	**0.02**	0.04	**-**	-	**0.07**	0.09	**0.07**	0.06
45-49	5	**0.01**	0.05	**0.02**	0.05	**0.04**	0.07	**0.04**	0.06
	6	**0.04**	0.06	**0.16**	0.18	**0.06**	0.09	**0.13**	0.12
50-54	6	**0.01**	0.04	**0.01**	0.03	**0.05**	0.07	**0.09**	0.10
	7	**0.01**	0.03	**0.05**	0.07	**0.08**	0.10	**0.10**	0.11
55-59	7	**0.02**	0.04	**0.03**	0.06	**0.09**	0.11	**0.11**	0.11
	8	**0.16**	0.17	**0.03**	0.07	**0.09**	0.11	**0.12**	0.12
60-64	8	**0.00**	0.00	**0.06**	0.09	**0.10**	0.11	**0.11**	0.10
	9	**0.09**	0.10	**0.06**	0.09	**0.06**	0.07	**0.11**	0.10

		HH real net income (in 2000 DM)							
		4000-6000				**6000-10000**			
age of husband	cohort	with children		without children		with children		without children	
		mean	std.	mean	std.	mean	std.	mean	std.
25-29	1	**0.08**	0.09	**0.13**	0.11	**-**	-	**-**	-
	2	**0.09**	0.11	**0.15**	0.14	**0.12**	0.12	**-**	-
30-34	2	**0.09**	0.09	**0.14**	0.11	**0.09**	0.09	**0.18**	0.11
	3	**0.11**	0.10	**0.13**	0.11	**0.15**	0.13	**0.14**	0.12
35-39	3	**0.09**	0.09	**0.09**	0.11	**0.11**	0.11	**0.16**	0.12
	4	**0.12**	0.11	**0.16**	0.12	**0.16**	0.12	**0.16**	0.12
40-44	4	**0.08**	0.09	**0.12**	0.11	**0.11**	0.10	**0.16**	0.11
	5	**0.10**	0.10	**0.09**	0.12	**0.13**	0.12	**0.18**	0.12
45-49	5	**0.09**	0.10	**0.13**	0.13	**0.12**	0.11	**0.14**	0.13
	6	**0.10**	0.10	**0.09**	0.09	**0.09**	0.10	**0.14**	0.11
50-54	6	**0.09**	0.10	**0.14**	0.10	**0.12**	0.12	**0.16**	0.13
	7	**0.11**	0.09	**0.13**	0.10	**0.11**	0.09	**0.15**	0.13
55-59	7	**0.10**	0.10	**0.15**	0.12	**0.14**	0.10	**0.13**	0.13
	8	**0.12**	0.11	**0.14**	0.11	**0.11**	0.09	**0.21**	0.14
60-64	8	**0.11**	0.10	**0.17**	0.13	**0.12**	0.10	**0.18**	0.12
	9	**0.07**	0.09	**0.17**	0.11	**0.11**	0.11	**0.17**	0.11

Source: SOEP, Waves 1992 to 2002, own calculations.

Table A.3: Mean saving rates by no. of ch. and labor market status of couples.

		no Children				**one Child**			
age of husband	cohort	not both fulltime		both fulltime		not both fulltime		both fulltime	
		mean	std.	mean	std.	mean	std.	mean	std.
25-29	1	**0.07**	0.10	**0.13**	0.11	**0.06**	0.09	**0.09**	0.09
	2	**0.13**	0.15	**0.18**	0.14	**0.08**	0.10	**0.10**	0.12
30-34	2	**0.10**	0.11	**0.14**	0.11	**0.08**	0.09	**0.11**	0.10
	3	**0.10**	0.12	**0.12**	0.11	**0.10**	0.11	**0.15**	0.13
35-39	3	**0.08**	0.10	**0.09**	0.11	**0.08**	0.09	**0.13**	0.11
	4	**0.14**	0.11	**0.15**	0.12	**0.07**	0.09	**0.14**	0.14
40-44	4	**0.13**	0.12	**0.11**	0.11	**0.06**	0.08	**0.11**	0.10
	5	**0.12**	0.11	**0.10**	0.12	**0.08**	0.09	**0.11**	0.11
45-49	5	**0.09**	0.12	**0.11**	0.12	**0.09**	0.10	**0.12**	0.12
	6	**0.09**	0.11	**0.14**	0.10	**0.09**	0.10	**0.16**	0.12
50-54	6	**0.12**	0.12	**0.14**	0.11	**0.08**	0.10	**0.15**	0.14
	7	**0.11**	0.11	**0.14**	0.12	**0.10**	0.10	**0.12**	0.10
55-59	7	**0.12**	0.11	**0.16**	0.12	**0.10**	0.10	**0.12**	0.09
	8	**0.12**	0.11	**0.14**	0.16	**0.10**	0.11	**0.12**	0.10
60-64	8	**0.13**	0.11	**0.15**	0.10	**0.10**	0.11	**-**	-
	9	**0.12**	0.11	**0.05**	0.09	**0.08**	0.09	**-**	-

		2 or more children							
age of husband	cohort	not both fulltime		both fulltime					
		mean	std.	mean	std.				
25-29	1	**0.05**	0.09	**0.02**	0.04				
	2	**0.06**	0.08	**0.16**	0.13				
30-34	2	**0.07**	0.08	**0.10**	0.10				
	3	**0.08**	0.10	**0.13**	0.11				
35-39	3	**0.07**	0.09	**0.09**	0.10				
	4	**0.10**	0.11	**0.14**	0.12				
40-44	4	**0.07**	0.08	**0.11**	0.11				
	5	**0.09**	0.10	**0.13**	0.12				
45-49	5	**0.08**	0.10	**0.11**	0.10				
	6	**0.05**	0.07	**0.08**	0.10				
50-54	6	**0.07**	0.08	**0.06**	0.09				
	7	**0.09**	0.09	**0.08**	0.08				
55-59	7	**0.11**	0.11	**0.11**	0.09				
	8	**0.10**	0.09	**0.24**	0.21				
60-64	8	**0.12**	0.10	**-**	-				
	9	**0.09**	0.08	**-**	-				

Source: SOEP, Waves 1992 to 2002, own calculations.

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