Savings Behavior and Asset Choice of Households in Germany:

Evidence from SAVE 2003 and 2005

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To my parents Ulla and George,

and my brother Stephen.

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1 Introduction

Understanding household saving behavior remains a central topic in economic research. This arises from the fact that saving is one of the most fundamental household decisions, affecting both goods and capital markets in aggregate terms. One of the major theoretical models of saving is the life-cycle approach. In this setting, individuals save solely for old age. Extensions include bequests as an additional savings motive and as a possible explanation for positive savings at old age (cf. Hurd (1987)). Kimball (1990) or Lusardi (1997) include a precautionary savings motive. With regard to how households save, there are two major schools of thought. One group, including Milton Friedman, maintains that households save according to dynamic optimization models implicitly. The other group suggests that individuals save according to rules of thumbs and other concepts from behavioral economics (cf. Laibson (1997) or Thaler and Shefrin (1981)).

Studying the savings and financial investment behavior of households in Germany is especially interesting. For one, German households appear to contradict the main predictions of

the basic life-cycle hypothesis of saving as substantial savings are observable for households at old age.[1] For another, German households have shown high savings in all age classes in the past and at the present, although the country offers a most generous public pension and health care system.[2] With regard to their investment behavior, German households traditionally invest their savings in a very conservative manner by international standards. Financial instruments such as corporate stocks play only a minor role in the asset choice behavior. In light of the demographic shift and the public pension system undergoing reform, understanding households' saving and investment decisions become all the more important.

Linking quantitative information on savings, wealth and income to economic, sociological and psychological household characteristics is essential in understanding the savings and investment behavior of households. The lack of reliable survey data combining these characteristics in Germany was the major reason for initiating SAVE in 2001, a survey on savings and financial investment behavior of households in Germany. Re-

[1] Cf. Börsch-Supan, Reil-Held, and Schnabel (2003).
[2] This is referred to as the "German savings puzzle", cf. Börsch-Supan, Reil-Held, and Schnabel (2003).

sults of the first SAVE study are analyzed in detail by Börsch-Supan and Essig (2002 and 2005).

The following study builds upon the findings of the first SAVE survey and analyzes the savings and asset choice behavior of German households using the SAVE surveys from 2003 and 2005. In addition, it reports and analyzes changes in the results between both samples. In the first part, we study the savings behavior of households by means of descriptive statistics. We focus on qualitative and quantitative information about the savings behavior of households. Then we investigate different savings motives and the importance attributed to them by the households and look for possible savings rules. The second part of the study is devoted to households' asset choice behavior. Descriptive analyses of all financial asset classes in SAVE are followed by an in-depth study of the households' decision of whether or not to invest in stocks. For this purpose, we estimate a multivariate logit model drawing from the results of previous work in this field.

The aim of this study is to answer the following questions: "What are the key qualitative and quantitative facts about household savings in Germany?", "Why do Germans save?",

and “How do Germans save?” We want to discover what assets households choose when investing their savings. Finally we investigate the factors influencing the households’ decision of whether to invest in stocks.

This study unfolds as follows. Section 2 gives a general overview of the SAVE survey by summarizing the existing waves of SAVE and reviewing the questionnaire with a particular focus on the SAVE 2005 survey. In addition, the section checks the data quality with respect to nonresponse problems, the quality of responses, and the representativeness of the survey. Sections 3 and 4 are devoted to the analysis of the SAVE 2003 and 2005 data. The savings behavior of the households interviewed is at the core of Section 3. Section 4 investigates the asset choice behavior with a particular focus on the stockholding decision of households. Section 5 summarizes and concludes.

2 The SAVE Survey

SAVE is a repeated survey of the savings and financial investment behavior of private households in Germany and was initiated in 2001. This section gives an overview of the SAVE survey as well as existing SAVE samples and describes the types of questions asked in the SAVE questionnaire. Moreover, it deals with the problems of data quality regarding item nonresponse, the quality of answers and the representativeness of the data.

2.1 Overview of SAVE

Existing surveys in Germany lack detailed qualitative and quantitative information about household savings behavior in connection with economic, sociological and psychological household characteristics. The German Socio-Economic Panel (SOEP), a yearly panel maintained by the German Institute for Economic Research (DIW), collects only very general information on savings behavior. The questions posed are qualitative in nature and do not collect any quantitative details on households' wealth composition and its changes. The Sample of Income and Expenditure (EVS), conducted by the German

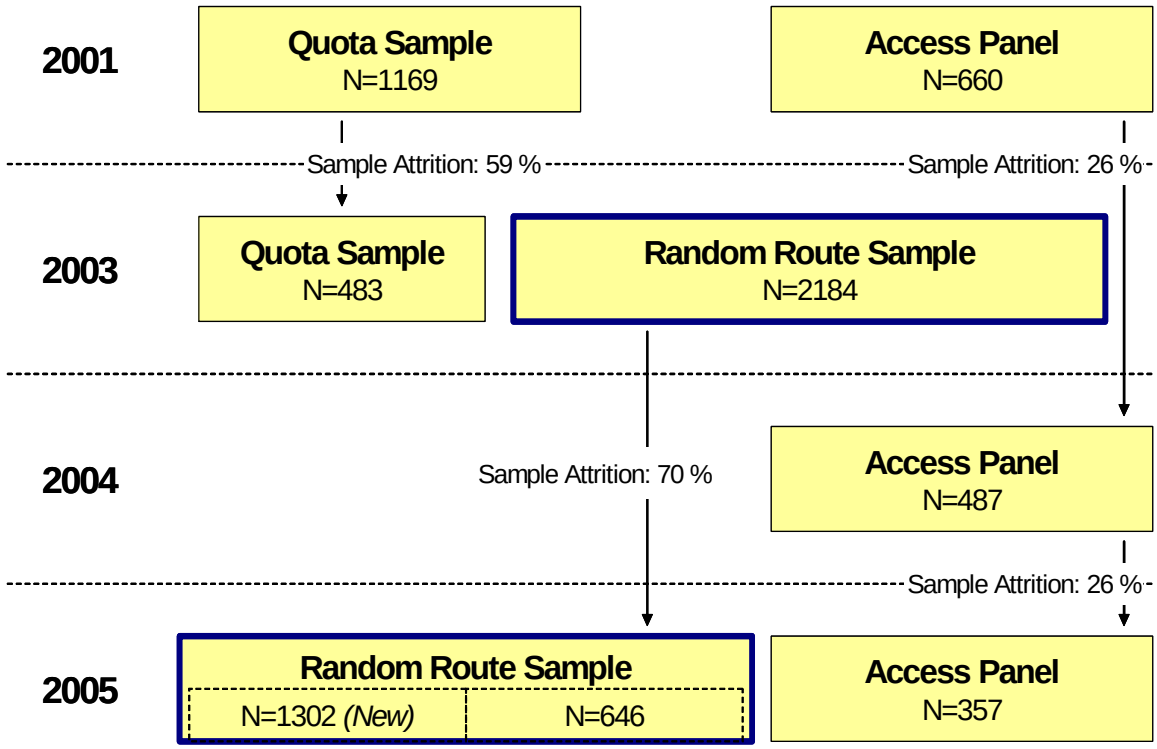
Federal Statistical Office every five years, is the main survey for information on households' savings behavior. It contains detailed quantitative questions on income, expenditures and wealth as well as on basic sociodemographic household characteristics. Unfortunately, however, cuts in public funds have forced the EVS to be downsized significantly. Many economic, sociological and psychological details important for analyzing savings behavior are now missing (see Börsch-Supan and Essig (2005) as well as Essig (2005)).

Due to the lack of data, the Mannheim Research Institute for the Economics of Aging (MEA) initiated SAVE in 2001 as an extensive survey on the savings and financial investment behavior of private households in Germany. The Dutch CentER Panel and the U.S. Health and Retirement Study (HRS) served as examples. In cooperation with the Mannheim Center for Surveys, Methods and Analyses (ZUMA) and TNS Infratest in Munich, MEA produced a questionnaire intended to reveal qualitative and quantitative information on savings behavior, income, wealth and financial investment decisions of German households. This information is combined with questions about economic, sociological and psychological household character-

istics, which are a critical element for understanding the savings behavior of private households (see Börsch-Supan and Essig (2005) as well as Essig (2005)).

So far, there have been three waves of SAVE, namely SAVE 2001, SAVE 2003 and SAVE 2005. Figure 1 displays the different waves and the corresponding samples. SAVE 2001 consists of a quota sample of 1169 households and an access panel with 660 households. The quota sample was drawn by means of an "address-random" procedure. Eligible for participation in the quota sample are households with household heads at least 18 years old. For participation in the access panel, there is a lower and an upper bound for age; household heads have to be between 18 and 69 (see Heien and Kortmann (2005)).

Figure 1: Overview of SAVE Waves



Note: SAVE 2003 includes the Quota and Random Route Samples 2003 as well as the Access Panel 2004.

For the SAVE 2003 survey, respondents of the quota sample and the access panel in 2001 who agreed to continue their participation in the survey were contacted again in 2003. Thus, 483 households of the quota sample and 487 households of the access panel were interviewed again in 2003 whereas the access panel interviews of SAVE 2003 were not carried out until 2004. To ensure a sufficiently large number of observations for

the 2003 wave, 2184 additional households were interviewed for the first time in a random route sample. These households were selected by a "standard random route" procedure. The same age requirement applied as in the quota sample. A detailed description of the sampling methods can be found in Heien and Kortmann (2005).

In the SAVE 2005 wave, 357 of the 487 respondents interviewed in the 2004 access panel were interviewed again. This sample attrition corresponds to the number of observations lost between 2001 and 2004. In the random route sample, however, roughly 70% of the households interviewed in 2003 refused to participate in 2005. To compensate for this unusually high sample attrition, 1303 new households were contacted, expanding the 2005 random sample to 1948 observations.

The focus in this paper will be on the random samples of SAVE 2003 and SAVE 2005, i.e., 2184 observations for 2003 and 1948 observations for 2005.[3]

[3] For reasons of comparison between 2003 and 2005, the quota sample 2003 and the access panel 2004 are not included in the empirical analysis of this paper.

Table 1 on the next page provides a brief overview of the data analyzed, summarizing basic household characteristics of both samples. Each characteristic is represented by different mutually exclusive categories; the percentages indicate the share of households belonging to each category.

In 2003 and 2005, close to 60% of the household representatives interviewed are married, about 20% are single. The remaining category "previously married" refers to divorced or widowed respondents. The large majority, almost 70% of the households interviewed, consist of 2 to 4 household members. About 25% of the households are single households. There are no statistically significant differences with regard to marital status or household size between the two samples according to a chi-squared test of homogeneity (see Yamane (1967), p. 639).

The samples do display statistically significant differences with respect to age, education, employment status and net monthly income at the 5% significance level, but the differences are nevertheless small.

As the table shows, the household representatives in the 2005 sample are older overall. The percentage of respondents older

than 54 increases from 40.0% in the first sample to 43.4% in the second one. The mean age is 50.2 years in 2003 and 51.4 in 2005; the median age is 49 and 51 respectively.

With respect to the household's level of education,[4] about 30% of the respondents have a higher secondary education only or a university degree. About 70% have basic secondary education with or without vocational training. These figures remain roughly constant over the two samples. Major differences in the percentages become evident within the lower two and the upper two educational categories.

With regard to a household's employment status,[5] 35.3% and 36.2% of the households are retired in the 2003 and 2005 samples, respectively. With the exception of the self-employed category, the percentage of employed households in each category is lower in 2005. The share of non-employed households, i.e., retired households, unemployed households and households in education, vocational training, military service or pa-

[4] See Appendix for detailed information on how the household's education variable is derived.
[5] See Appendix for detailed information on how the household's employment status is derived.

rental leave, sums up to 56.8% in the 2005 samples which is up 5.4 percentage points from 2003.

Table 1: Household characteristics of 2003 and 2005 Random Route Samples

Characteristic	2003	2005
Age		
18 - 34	21.4%	18.9%
35 - 54	38.6%	37.7%
55+	40.0%	43.4%
Mean	*50.2*	*51.4*
Median	*49*	*51*
Marital Status		
Currently married	59.7%	57.3%
Previously married	20.9%	22.6%
Not married	19.5%	20.1%
Education		
Basic secondary education	15.8%	12.5%
Basic secondary education with vocational training	55.4%	57.0%
Higher secondary education	14.7%	20.4%
University degree	14.2%	10.0%
Employment Status		
Retired	35.3%	36.2%
Blue collar	16.0%	13.9%
White collar	22.6%	20.1%
Public officials	4.2%	3.1%
Self-employed	6.0%	6.2%
Unemployed	7.0%	9.0%
Education / vocational training / military service / parental leave	9.1%	11.6%
Net Monthly Income (EUR)		
Below 1300	26.9%	30.1%
1300 - 2600	47.8%	43.8%
2600 and above	25.3%	26.0%
Mean	*2,473*	*2,264*
Median	*1,866*	*1,800*
Household Size		
Single	24.9%	25.4%
2 - 4 members	69.0%	68.6%
5 members and above	6.1%	6.0%
Mean	*2.4*	*2.4*
Median	*2*	*2*
Number of observations	*2,184*	*1,948*

Note: Percentages not adding up to 100.0% are due to rounding effects. Values not weighted.

The net monthly income structure in 2005 differs from 2003 with fewer households in the mid-income category and more households in the lowest and the highest income categories. The mean income is 2,473 Euros in 2003 and 2,264 Euros in 2005; the decrease is statistically significant at the 5% level.[6] The median income figures are 1,866 and 1,800 Euros respectively.

2.2 Structure of the Questionnaire

We now turn to the exact structure of the SAVE questionnaire and the type of questions asked in the survey. Although the questionnaire has been modified over the course of the different waves of SAVE, its basic structure has remained the same. The following pertains to the SAVE 2005 questionnaire. It has a total of 131 questions which can be classified into eight parts as summarized in Table 2.[7] The questionnaire starts off with a basic explanation of the SAVE survey and its purpose. It describes the precautions that have been taken to ensure data pro-

[6] This was checked using a two sample t-test of the differences in means.
[7] For a more detailed description see Heien and Kortmann (2005), who include the entire version of the questionnaire.

tection, especially with respect to sensitive questions regarding income and wealth figures. It also explains how the household representative to be interviewed is determined. In this context, great care was taken that the respondent answering the questions was informed about income, assets and the financial decisions of the household.

Table 2: Structure of the SAVE questionnaire

Part 1:	Introduction, determining which person will be surveyed in the respective household
Part 2:	Household's basic socioeconomic data
Part 3:	Household's social environment
Part 4:	Household's health situation
Part 5:	Qualitative questions on current and past savings behavior, income and wealth
Part 6:	Quantitative questions on income, savings and wealth
Part 7:	Psychological and social determinants of savings behavior
Part 8:	Conclusion: Interview situation

Source: Börsch-Supan and Essig (2005), p. 321, modified. Some changes have been made in the questionnaire after SAVE 2001. Parts 3 and 4 were added to the questionnaire in 2005, part 7 was extended significantly in 2005. See Heien and Kortmann (2003 and 2005).

Part 2 of the questionnaire contains questions on the composition and basic socioeconomic characteristics of each household. It includes questions on sex, age, marital and family status as well as on education and occupational information.

Parts 3 and 4 are new sections and were included in the questionnaire in 2005 for the first time. Part 3 poses questions on the household's social environment, i.e., whether household members receive practical help from friends, family or neighbors or if household members participate in any volunteer services. Part 4 contains questions on the household's health situation and the respondent's behavior affecting health; this includes the existence of illnesses or diseases, the frequency of doctoral advice or hospital stay and whether household members smoke regularly or drink alcohol frequently.

Part 5 deals with qualitative questions on current and past savings behavior as well as on the household's income and wealth situation. It starts off with questions on how households make financial decisions and whether respondents seek external advice. It goes on by asking whether households make ends meet, whether they follow any particular savings rules, and whether they have certain savings motives and savings targets. This is extended by some basic quantitative questions. In addition, respondents are asked to give information on past savings patterns and parents' attitude towards money.

Part 6 is in a sense the most crucial part of the questionnaire. It asks specific quantitative questions on household income, savings and wealth. An in-depth survey is made on income and sources of income, old-age provision, real assets and financial assets. It enquires as to the specific value of real estate assets, financial assets, company pension plans and other old-age provisions, outstanding debt, business assets and other assets. For financial assets and old-age provision, respondents are asked to give detailed information on whether they hold a specific asset type, on the amount invested in each type and on the change in value of the invested amount over the past year. Questions on debt enquire about specific types of debt, the amount amortized over the past year and the amount of new debt taken on. As the questions in part 6 of the questionnaire concern very sensitive issues and in order to receive most honest and reliable answers, respondents are able to complete this section anonymously without the presence of the interviewer; it is kept separate from the other parts of the questionnaire.

Part 7 contains questions on psychological and social determinants of savings behavior. In 2005, a complete new set of questions was asked on financial decisions. By means of hypotheti-

cal lotteries, these questions aim at revealing preferences on risk, loss and impatience. In addition, this part deals with the respondents' expectations about the future economic situation, health, future income, occupational risk and life expectancy. Part 7 concludes with questions on self-assessment and general attitudes.

Part 8 ends the interview with general questions on the interview situation and asks whether respondents have internet access. Respondents as well as the interviewers are given the opportunity to add any comments on the survey and the interview. Finally, respondents are asked whether they are willing to participate in the SAVE survey in the future.

2.3 Data Quality

In evaluating data from SAVE, the question arises whether SAVE can produce reliable results. Potential problems of the survey can be classified into three groups. First, many respondents refuse to answer certain types of questions, mostly quantitative questions concerning income and wealth. This phenomenon is known as item nonresponse. Second, respondents' answers given to such questions might be of poor quality (i.e.

intentionally or unintentionally wrong), which can have a negative effect on the reliability of the results. Third, the explanatory power of the data is limited if the data are not sufficiently representative, e.g. due to nonrandom unit nonresponse.

2.3.1 Item Nonresponse

We begin by looking at the item nonresponse problem. Respondents in the SAVE survey are asked to reveal detailed information on very sensitive issues. Due to concerns regarding privacy and data protection or simply due to limited knowledge, some respondents refuse to answer certain types of questions. For the large majority of the questions this does not constitute a problem. For questions concerning socioeconomic and psychological household characteristics, for instance, nonresponse rates are very low. For many questions in Part 6 of the questionnaire, however, item nonresponse is quite high. This concerns questions asking for quantitative details on households' income, wealth and savings.

Essig and Winter (2003) investigate nonresponse rate patterns to questions on income and asset holdings of the SAVE 2001 survey. Nonresponse rates to key quantitative questions for

SAVE 2003 are reviewed by Schunk (2006a). For the SAVE 2005 random sample the nonresponse rates to some of the key quantitative questions show the following features: 10% of the respondents refuse to report a specific value for annual savings. With regard to wealth, nonresponse rates are generally lower for the question of whether a respondent owns a certain type of asset than for the question on the exact amount invested in an asset. 6% of the respondents refuse to indicate whether they own a type of financial asset whereas the nonresponse rate for the exact amount varies between 10% and 20%, depending on the type of financial asset. Naturally, the nonresponse rates of variables increase as soon as one calculates aggregate variables such as total financial wealth as the sum of the amounts invested in each financial asset. Overall, nonresponse rates for the key quantitative questions in 2005 are slightly below the 2003 figures.

There are several ways to deal with item nonresponse. One way is to ignore the missing values and confine estimations to the remaining non-missing observations. The resulting smaller sample size, however, has negative effects on estimation efficiency. Iterative multiple imputation offers a way to reduce the

efficiency problem. This method is applied to the SAVE data. In the multiple imputation approach missing values of a variable are replaced by values derived with the information available from non-missing observations in a data set. Thus, the number of observations is increased to the total number of respondents in the survey. Rubin (1987) explains this widely adopted approach in detail. Schunk (2006a) provides an in-depth description and evaluation of iterative multiple imputation applied in SAVE. The imputation procedure is the same for all the waves of the SAVE surveys. The data analyzed in this paper are the single-imputed versions of the SAVE 2003 and 2005 random samples.[8]

2.3.2 Quality of Responses

In addition to dealing with the response rates of variables, one has to pay attention to the quality of the answers. For this reason, the answers given to key quantitative questions in the SAVE 2003 and 2005 random samples were checked extensively for their quality. Income, savings and wealth figures were carefully examined with respect to the socioeconomic in-

[8] The mean values of the variables in the single-imputed data set hardly differ from the mean values in the multiple-imputed version.

formation available for the households. Moreover, for respondents surveyed in 2003 and 2005, the values stated in one survey were crosschecked with the values indicated in the other survey. Outliers which seemed unexplainable were generally left they way they were. Only in very few cases where it was absolutely certain respondents had made a mistake and where the type of mistake was clearly identifiable were the values adjusted accordingly. For some respondents, for example, it was obvious that they had mistakenly stated their annual income instead of their monthly income. In this case, the income figure was divided by twelve. Finally, one observation in a quantitative savings question was deleted and replaced with an imputed value as this outlier increased the mean savings rate of the sample by more than one percentage point.

2.3.3 Representativeness

We now turn to the representativeness of the SAVE data. For this purpose, the two random route samples used in this paper are compared to the Mikrozensus which is the official representative population and labor market statistic of the German

Federal Statistical Office.[9] Comparison to the Mikrozensus is made with respect to two dimensions, the age of the household head and the household's net monthly income. We construct three age and three income categories, classifying the observations from both surveys, SAVE and the Mikrozensus, into nine categories. The three age classes are under 35, 35 to 54, as well as 55 years of age and above. The three income classes are below 1300 Euros, 1300 to 2600 Euros, as well as 2600 Euros per month and above. We use the Mikrozensus 2002 as a basis of comparison for the SAVE 2003 sample, and the Mikrozensus 2004 for SAVE 2005, since the questions on income and savings in SAVE refer to the year preceding the time of the survey.

Table 3 compares the representativeness of SAVE with regard to the Mikrozensus. The values give the relative frequencies of households in each category in the Mikrozensus divided by the relative frequency of the corresponding category in SAVE. Thus, if a category's value is greater than 1, the category in SAVE is underrepresented in comparison to Mikrozensus,

[9] Mikrozensus involves 1% of the German population each year, corresponding to roughly 370,000 households. See Statistisches Bundesamt Deutschland (2006) for details.

while the category is overrepresented if the figure assumes a value of less than 1. The value of 1.29 for the category “income below 1300 Euros, age 55 and above, Random Route Sample 2003”, for instance, indicates that 29% more households belong to this category in the Mikrozensus 2002 survey than in the SAVE 2003 random sample.

Overall, the values in Table 3 suggest small differences between the SAVE random samples and the Mikrozensus. The largest difference occurs in the oldest households in the lowest income category where the share of households deviates by almost 30% in 2003 and close to 40% in 2005. In all other categories the deviations vary between 0% and 25%. For consistency reasons, the figures in Table 3 were constructed analogously to the procedure used by Börsch-Supan and Essig (2005) for SAVE 2001. In comparison to the quota sample in SAVE 2001 and the access panel, the figures in the above table deviate from 1 by very small amounts (see Börsch-Supan and Essig (2005), p. 325). This could be due to the survey methods applied in the quota sample and the access panel, which are different from the approach of the random route samples. Although the differences here are slight, the SAVE data are made

representative by weighting observations based on the figures in Table 3. All the results in the remainder of this paper are based on these weighted values.

Table 3: Representativeness of SAVE

		All income categories	Net monthly income (EUR)		
			below 1300	1300 - 2600	2600 and above
		Random Route Sample 2003			
Age	under 35	**0.90**	1.05	0.82	0.82
	35 - 54	**0.97**	1.13	0.93	0.95
	55 and above	**1.08**	1.29	0.91	1.24
All age categories			**1.18**	**0.89**	**1.01**
		Random Route Sample 2005			
Age	under 35	**0.97**	0.96	1.04	0.84
	35 - 54	**1.01**	0.85	1.00	1.13
	55 and above	**1.01**	1.37	0.90	0.80
All age categories			**1.09**	**0.96**	**0.97**

Values are based on Mikrozensus 2002 and Mikrozensus 2004 respectively. Values are the relative frequency of households in the Mikrozensus divided by the relative frequency of households in SAVE.

3 Savings Behavior

In this section, we begin the analysis of the SAVE 2003 and 2005 data and investigate the savings behavior of the households interviewed. The qualitative and quantitative information on saving and wealth is evaluated in a first step. We then take a close look at the households' reasons for saving and try to find evidence for possible savings rules.

3.1 Qualitative and Quantitative Information on Savings Behavior

3.1.1 Qualitative Information

The questions on savings behavior in SAVE begin with a very broad question on how households manage to make ends meet. This can be interpreted as an indication of who is actually capable of saving. Respondents are asked how well they got along with their income and expenditures over the past year. They are asked to choose one of five possible answers; the one which best describes their situation. The possible answers and the percentages of households choosing a specific answer are displayed in Table 4.

Table 4: Making Ends Meet – Savings Capability

			At the end of the month, there was always plenty of money left.	*At the end of the month, there was often some money left.*	*There was only some money left if addional income was obtained.*	*At the end of the month, there was often not enough money left.*	*At the end of the month there was never enough money left.*
Total		**2003**	9.2%	49.6%	18.3%	17.2%	5.7%
		2005	7.3%	48.6%	17.4%	20.4%	6.3%
Net Monthly Income (EUR)	**Below 1600**	**2003**	3.6%	40.3%	21.5%	23.3%	11.3%
		2005	1.9%	38.0%	17.8%	31.4%	10.9%
	1600 - 2600	**2003**	8.2%	53.2%	18.0%	17.2%	3.4%
		2005	7.5%	51.5%	18.8%	16.7%	5.5%
	2600 and above	**2003**	18.0%	55.1%	14.8%	9.7%	2.4%
		2005	14.0%	57.4%	14.5%	12.2%	1.9%

The figures represent the relative frequency of households in each category. Values are weighted according to Table 3.

Almost half of the households in 2003 and 2005 reported that "at the end of the month, there was often some money left." If we consider the households capable of saving as those choosing the first two answers, and the households not capable of saving as those selecting the last two answers, the percentage of households capable of saving decreases from 2003 to 2005. 58.8% of the households in 2003 and 55.9% in 2005 are capable of saving, while 22.9% in 2003 and 26.7% in 2005 report that there is "often not" or "never enough" money left. We find

these changes to be statistically significant at the 5% level using a two-sample t-test on the equality of proportions.

Not surprisingly, the share of households capable of saving increases with net monthly income in both years. The share is lower in 2005 for every income class. In the highest income class, close to three-quarters of the households are capable of saving in both samples, while in the lowest income class this share remains below 45% in 2003 and below 40% in 2005. Note also that in the highest income class there is still a relatively high percentage of households not capable of saving: 12.1% of the richest households in 2003 and 14.1% in 2005 indicate that there is “often not” or “never enough money left.”

3.1.2 Quantitative Information

The qualitative answers can be quantified into actual savings figures. For this purpose, it is important to define precisely the notion of savings. In the SAVE questionnaire respondents are asked the question “Can you tell me how much money you and your partner saved in total in the past year?” We refer to the amount stated to this general question as the household’s gross savings over a year. In order to derive the household’s net sav-

ings amount, i.e. savings in an economic sense, the gross savings have to be adjusted by subtracting the household's net borrowing. Net borrowing is the amount households borrowed in the form of consumption loans, family loans and other loans in the year preceding the survey minus the amount of debt paid back in the form of all types of loans. Taking on new debt in the form of mortgages or loans based on building savings contracts is not counted as borrowing, as for these types of loans, households realize an equivalent increase in their capital stock, a new house for example.[10]

There are two potential problems in deriving gross and net savings this way. First, one can criticize that respondents might be aware of the fact that taking on new loans generally reduces savings while paying back loans is a form of positive saving. Thus, adjusting "gross savings" by "net borrowing" to calculate savings in an economic sense would not be necessary. Indeed, this constitutes a potential problem in the savings figures which we cannot rule out entirely. Considering, however, that the great majority of respondents are not economists, the as-

[10] By "borrowing" and "new debt" we refer to the amount of new debt taken on as opposed to "debt" which refers to the outstanding debt of a household.

sumption seems reasonable that respondents do not take into account borrowing and debt repayments when answering the general question on the amount saved.

Second, a household's savings are negative in an economic sense if the household reduces its stock of wealth or capital. Respondents in the survey, however, will most likely not answer negative savings amounts to the general savings question. Thus, in the calculation of gross and net savings described above, the only way for net savings to assume negative values is by net borrowing exceeding gross savings.[11]

We need to bear all this in mind, when viewing the households' gross and net savings figures from the two SAVE samples in Table 5. The upper part of the table shows the absolute figures, the lower part the relative figures, i.e. the savings rates. In order to compute the savings rates, we divide each household's absolute savings by the household's net annual income. Net annual income is derived from a direct question about net monthly income ("How high is the total net income per month

[11] We do not simply calculate savings as changes in net worth because this would involve the aggregation of many variables with relatively high nonresponse rates (cf. Chapter 1.14.2.1)

you and your partner received in the past year after deducting taxes and social insurance contributions?").[12]

Table 5: Gross and Net Savings

	Gross Savings		- Net Borrowing		= Net Savings	
	2003	**2005**	**2003**	**2005**	**2003**	**2005**
			Absolute (EUR)			
Mean	2,749	2,228	-790	-878	3,539	3,106
Median	800	550	0	0	1,200	1,100
Std. Error	139	103	143	109	210	158
Obs.	*2184*	*1948*	*2184*	*1948*	*2184*	*1948*
			Savings Rate			
Mean	10.0%	8.8%	-1.4%	-2.2%	11.4%	11.0%
Median	3.5%	3.1%	0%	0%	5.9%	5.6%
Std. Error	0.4%	0.4%	0.9%	0.5%	1.0%	0.6%
Obs.	*2184*	*1931*	*2184*	*1931*	*2184*	*1931*

Values weighted according to Table 3. Medians are not additive.

According to the general savings question, households saved 2,749 Euros in the year 2002 and 2,228 Euros in 2004 on aver-

[12] Note that the mean savings rates in Table 5 are the mean savings rates over all households as opposed to the macroeconomic savings rate calculated in the national accounts statistics, which is the ratio of total national savings and total national income.

age.[13] They paid back 790 Euros and 878 Euros more in debt than they took up in 2002 and 2004, respectively, which is evident from the negative net borrowing figures. Since most households do not have any outstanding debt, the mean net borrowing figures are quite small and the medians equal to zero. The significantly smaller[14] gross savings in 2004 in comparison to 2002 are offset in part by higher net debt repayments. This results in average net savings of 3,539 Euros per household in 2002 and 3,106 Euros in 2004. Therefore, the mean household savings rates are 11.4% and 11.0% in 2002 and 2004, respectively. The decrease in the savings rate is not statistically significant.[15]

For all savings figures in Table 5, the median values are far below the means, suggesting a skewed distribution. A large share of households has very small savings while a small share of

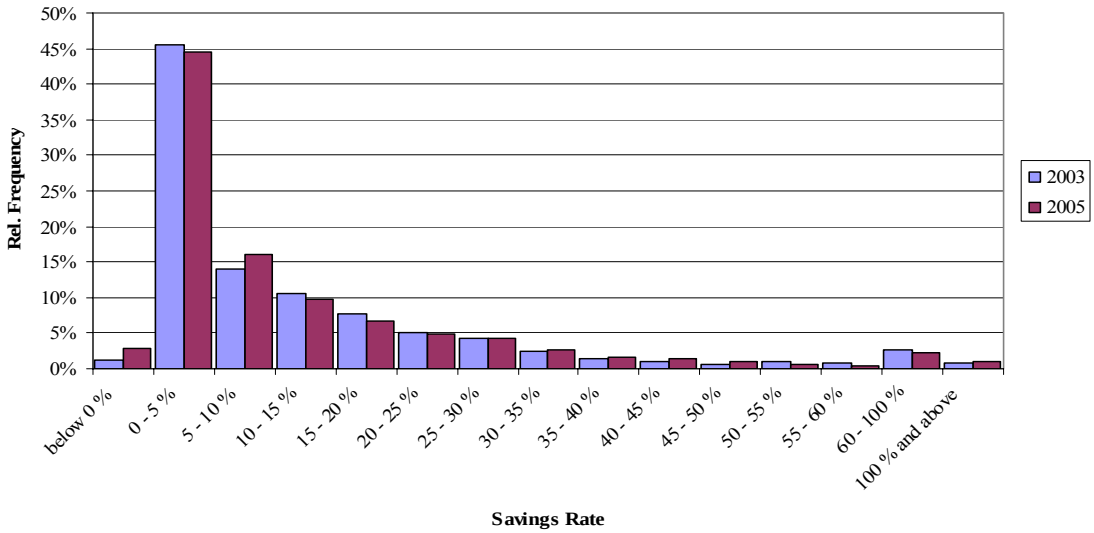
[13] One might be confused by the years 2002 and 2004 instead of 2003 and 2005. As mentioned earlier, respondents in SAVE are asked about their savings and income figures for the year preceding the survey. Thus, savings figures reported in the 2003 sample refer to 2002; figures reported in the 2005 sample refer to 2004.

[14] At the 1% significance level, using a two-sample t-test of differences in means.

[15] At common levels of significance, using a two-sample t-test of differences in means.

households saves a lot. For the net savings rates, the medians of 5.9% in 2002 and 5.6% for 2004 are about half of the mean rates. More details on the distribution of the net savings rates for the 2003 and 2005 SAVE samples are provided in Figure 2.

Figure 2: Distribution of Net Savings Rate



Values weighted according to Table 3.

The basic structure of the savings rate distribution does not change much between the samples. A test of homogeneity of

the two distributions gives no evidence of statistically significant difference at common levels of significance.

In both samples, the majority of the households report savings rates in the range of 0 to 10%. This includes households with zero savings. Only very few households have savings rates below zero; in the 2003 sample merely 1.3% report to have liquidated more than they saved. In the 2005 sample the share is 2.8%.

Even though most households save only a small fraction of their income, almost 11% in both samples stated savings rates of 30% or above. 5.4% in the 2003 sample and 4.2% in 2005 even claim to have saved more than half of their income. While this is explainable for some households, savings rates close to or above 100% are likely to be implausible. From the information available, we cannot find a single clear explanation for those outliers. Some are due to extraordinary income, which does not enter into net monthly income, such as money received through inheritance or gifts. Others, for example, are due to students who might have not included money received from their parents in their income figure. However, since only very few households report such extraordinarily high savings

rates, the basic structure of the distribution remains practically unaffected.

Whether the quantitative savings measures are consistent with the qualitative information of the preceding chapter is checked in Table 6. Mean and median savings rates are displayed dependent on the five answers to the "making ends meet" question. The savings rates seem to be consistent with the answers given regarding the capability to save. They are higher for households defined earlier as capable of saving and lower for households reporting to often not or never have enough money left at the end of the month.

Table 6: Savings Rate and Savings Capability

		Total	*At the end of the month, there was always plenty of money left.*	*At the end of the month, there was often some money left.*	*There was only some money left if additional income was obtained.*	*At the end of the month, there was often not enough money left.*	*At the end of the month there was never enough money left.*
Mean	**2003**	11.4%	27.6%	12.3%	9.0%	5.0%	3.6%
	2005	11.0%	23.0%	13.9%	8.3%	5.2%	-0.6%
Median	**2003**	5.9%	16.8%	8.4%	2.1%	0%	0%
	2005	5.6%	13.9%	8.3%	4%	0%	0%
Std. Error	**2003**	1.0%	3.2%	1.9%	0.8%	1.3%	1.2%
	2005	0.6%	2.3%	0.8%	1.7%	1.1%	4.6%

Values weighted according to Table 3.

For the 2003 sample, the mean savings rate is 27.6% in the highest category and decreases monotonically to 3.6% in the lowest category. In the 2005 sample, the structure is the same with mean savings rates ranging from 23.0% to -0.6%. Thus, the households stating to never have enough money left, liquidate more than they save on average in the 2005 sample. From the median savings rates of 0% in the two lowest categories, it becomes evident that the majority of households we consider as not capable of saving do indeed not save.

Table 7 summarizes the net savings rates dependent on the households' net income quintiles. Households save a higher fraction of income as their income increases. This is supported by the mean and median savings rates in the table below for both samples.

Table 7: Savings Rate and Income

			Net Monthly Income				
		Total	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Mean	2003	11.4%	4.7%	10.6%	9.7%	15.6%	17.8%
	2005	11.0%	7.0%	7.8%	11.7%	13.7%	14.9%
Median	2003	5.9%	0%	3.8%	6.1%	10.2%	10.4%
	2005	5.6%	0%	1.4%	7.4%	7.5%	9.7%
Std. Error	2003	1.0%	4.2%	1.0%	1.2%	1.2%	1.7%
	2005	0.6%	2.1%	1.5%	1.2%	1.0%	1.1%

Values weighted according to Table 3.

While the savings rates for both samples increase with income, the savings rates vary more strongly in the 2003 sample than in the 2005 sample. In 2003 they assume values between 4.7% in the first quintile and 17.8% in the highest quintile, while in 2005 they merely range from 7.0% to 14.9%. Note that the majority of households in the lowest income quintile does not save at all, hence the median savings rates of zero.

3.1.3 Wealth

The households' savings flows accumulate to the households' wealth. We define two main categories of wealth: namely financial wealth and real wealth. Financial wealth contains de-

posits in savings accounts, money held in building savings contracts, the present value of whole life insurances, holdings of fixed income securities, equity and the amount of money invested in real estate funds. As an additional category for financial wealth, “other financial assets” was included in the 2005 questionnaire. Financial assets in the form of convertibles, discount certificates, hedge funds, derivatives or other innovative financial products enter into this category. Real wealth is composed of self-used real estate as well as other real estate wealth, business assets and other assets. Total net worth is the sum of financial wealth and real wealth minus outstanding debt. Outstanding debt contains debt in the form of loans from building savings contracts, mortgages, consumption loans, family loans and other loans.

Table 8 shows mean and median wealth figures. The table displays the end of year values, i.e., the end of 2002 values from the 2003 sample and the end of 2004 values from the 2005 sample.

Households report a mean total net worth of 144,504 Euros in the 2005 sample, close to 11,000 Euros below the mean of 156,108 Euros in the 2003 sample. Most of this wealth seems

to be made up of self-used real estate: on average, self-used real estate wealth adds up to more than 105,000 Euros in both samples. Mean financial wealth accounts for roughly 28,000 and 30,000 Euros of total net worth in 2003 and 2005, respectively. Business assets average out at about 11,000 Euros in both years.

Table 8: Total Net Worth and Types of Wealth

			Wealth (EUR)				
		Total Net Worth	**Outstanding Debt**	**Financial Wealth**	**Real Wealth**	Self-Used Real Estate	Business Assets
Mean	**2003**	156,108	17,639	28,289	145,458	106,038	11,195
	2005	144,504	28,682	30,191	142,994	105,498	11,177
Median	**2003**	29,000	0	9,410	0	0	0
	2005	34,000	0	7,391	12,000	0	0
Std. Error	**2003**	9,057	1,132	1,980	8,215	4,407	4,407
	2005	16,659	3,524	4,531	12,526	6,405	5,115

Values weighted according to Table 3.

The average values for real wealth in the 2005 sample lie slightly below the 2003 figures. Financial wealth, on the other hand, is higher in 2005. Average outstanding debt increases from 2003 to 2005 as well, from 17,639 Euros to 28,682 Euros.

With the exception of debt, however, which exhibits a significant decrease,[16] none of the changes in wealth between the two samples are statistically significant. This is due to the overall high variation in the wealth figures. As can be seen from the standard errors in the last two lines of the table, the variation in the 2003 wealth figures remains well below the variation in the 2005 sample. This is the result of more extreme outliers for all wealth types in the 2005 sample.

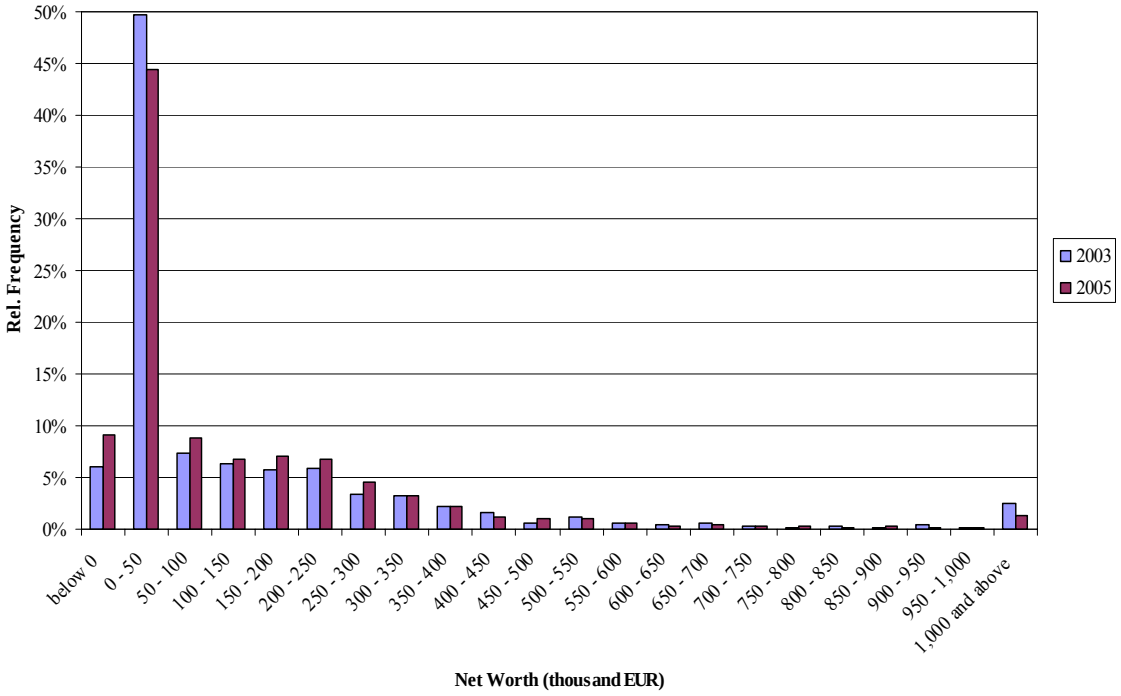
From looking at the median values, it becomes evident that the distribution of the wealth figures is skewed. All median values lie far below their means. More than half of the households interviewed in 2003 and 2005 do not own self-used real estate. Also, the majority of households do not have any outstanding debt.

Figure 3 shows that the distribution of total net worth is highly skewed. Many households have very little wealth while only a few households own very large amounts of wealth. The greatest fraction of households lies in the wealth category from 0 to 50,000 Euros in both samples. The median household has a to-

[16] At the 1% significance level, using a two-sample t-test of differences in means.

tal net worth of 29,000 Euros in the 2003 sample and 34,000 Euros in 2005.

Figure 3: Distribution of Total Net Worth



Values weighted according to Table 3.

While the generally skewed shape of the distribution is the same in both samples, there are some differences worth mentioning. The left column of Table 8 already suggests a difference, as the mean net worth is higher in 2003 than in 2005 while the median is higher in 2005. The figure above shows

that fewer households lie in the 0 to 50,000 Euros range in 2005 than in 2003, while households in the 2005 samples appear more frequently in the category below zero and in the categories between 50,000 and 300,000 Euros. A chi-squared test of homogeneity shows that the 2005 net worth distribution is significantly different from the 2003 distribution at the 1% significance level.

3.1.4 Age Structure

We conclude the chapter on qualitative and quantitative information on savings by looking at the age structure of savings and wealth. It has to be pointed out that there are three time-related effects influencing the savings rates or wealth levels we observe at different ages at different points in time. The first effect is the age effect and represents the savings behavior and wealth accumulation at a certain stage in the life-cycle. The second effect, denoted the cohort effect, reflects life-long differences in the savings behavior of individuals of different birth cohorts. Individuals in Germany, for example, who were born before World War II might have a greater desire to save for precautionary reasons having suffered through the years of

poverty right after the war. The third effect, known as the time effect, takes in the effect of concurrent events. Households surveyed in years following an economic boom, for example, might have higher levels of wealth than households interviewed right after an economic recession (see Poterba (2001), p. 568). The importance of distinguishing between the effects is underlined by Ameriks and Zeldes (2004). They show that a given age-wealth profile over time can be consistent with very different underlying patterns of savings behavior over the life-cycle depending on different combinations of time and cohort effects.

In a single cross section, none of the three effects can be identified. In repeated cross sections or panel data, two of the three effects can be identified. However, regardless of how repeated cross sections or panel data are examined, two of the three effects (age, cohort and time) will always be confronted with another. No solution to the problem exists because the third effect is always a function of the other two. For example, the age and birth cohort of a person determines the current point in time. I.e. time is a perfect function of age and cohort membership,

cohort membership is a perfect function of time and age, and age is a perfect function of cohort membership and time.

Hence, life-cycle savings and wealth accumulation patterns cannot be clearly identified. Nevertheless we can say something about how households saved at different age levels in the years 2002 and 2004.

We first look at the qualitative information on savings behavior. Table 9 analyzes the age structure of the “making ends meet” question on savings capability. The percentages indicate the relative frequencies of households in a certain age / savings capability category. Again, we consider respondents in the first two columns as the ones capable of saving, the ones in the last two columns as not capable.

Table 9: Age Structure and Savings Capability

			At the end of the month, there was always plenty of money left.	*At the end of the month, there was often some money left.*	*There was only some money left if addional income was obtained.*	*At the end of the month, there was often not enough money left.*	*At the end of the month there was never enough money left.*
Age	**Under 30**	**2003**	4.7%	32.9%	25.5%	27.3%	9.7%
		2005	4.5%	36.0%	22.3%	24.4%	12.8%
	30 - 39	**2003**	8.1%	42.7%	19.3%	25.6%	4.3%
		2005	2.2%	43.4%	21.0%	24.8%	8.6%
	40 - 49	**2003**	6.2%	47.8%	18.7%	21.5%	5.7%
		2005	6.3%	44.5%	19.3%	22.6%	7.4%
	50 - 59	**2003**	9.3%	50.2%	16.5%	15.8%	8.2%
		2005	8.6%	44.7%	17.5%	21.2%	8.0%
	60 - 69	**2003**	13.8%	58.5%	15.0%	8.8%	3.9%
		2005	10.2%	53.9%	14.4%	19.2%	2.3%
	70 and above	**2003**	11.7%	59.8%	16.6%	8.2%	3.7%
		2005	10.4%	64.0%	11.9%	12.1%	1.6%

Values weighted according to Table 3.

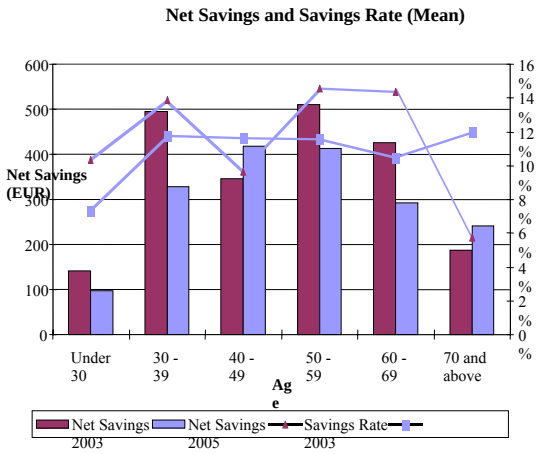
The fraction of households capable of saving is especially high for older respondents in both samples and decreases constantly with decreasing age. More than 70% of the households in the oldest age class claim to always or often have enough money left at the end of the month. This fraction is much lower for younger households. The share of households reporting seldom or never to have enough money left is highest for the youngest

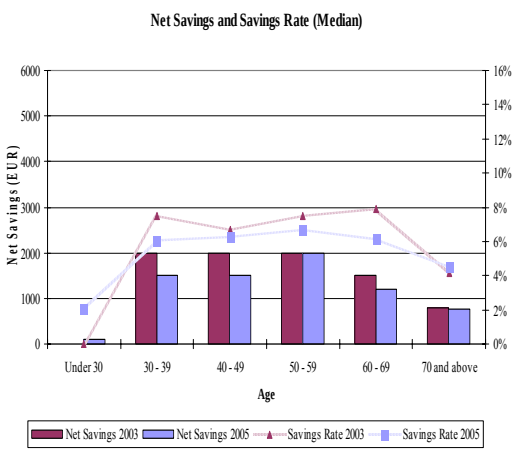
and constantly decreasing with increasing age. Almost three times more households in the youngest age category than in the oldest one are not capable of saving.

The quantitative information on savings at different age levels does not show the same pattern. In both samples, the very young and the very old save less. While the highest savings can be found among the age classes in between, savings among the households older than 60 are still relatively high. No dissaving is observable at the older ages which is possibly due to the problem of respondents not answering negative savings amounts to the general savings question as mentioned earlier.

Figure 4 to Figure 6 depict mean and median net savings, financial wealth and total net worth figures of the 2003 and 2005 samples. The bars show absolute savings or wealth levels, while the lines represent savings rates. Due to the skewness of the distribution the median values give a more representative picture of the age structure of savings and wealth in the samples as they do not respond to outliers.

Figure 4: Age Structure of Savings

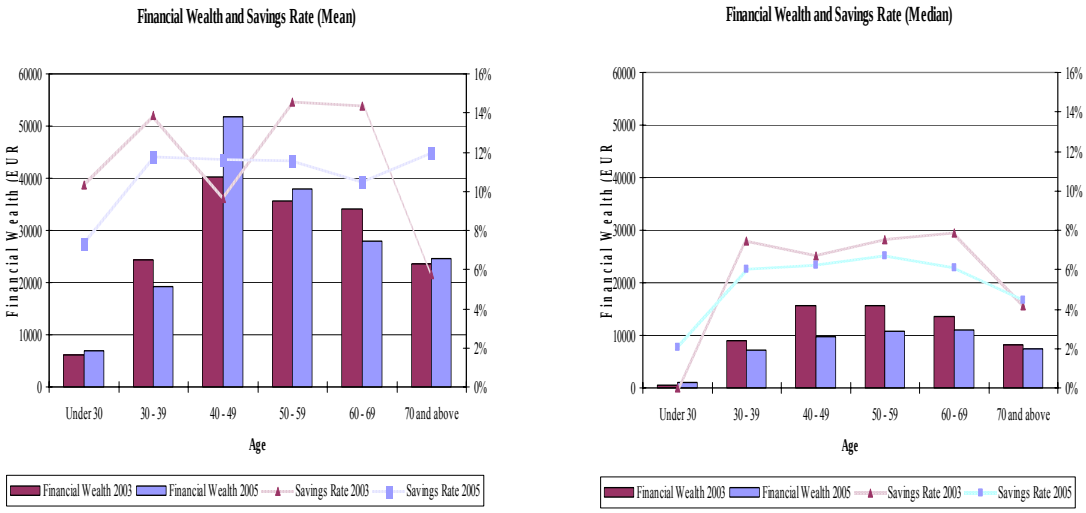




Values weighted according to Table 3.

Financial wealth shows an inverse u-shaped age structure for both samples, assuming the highest values for the middle-aged households. The age structure of total net worth is further skewed to the right, peaking in the age range of 60 to 69. This could be the result of having all debt repaid at this age, especially mortgages taken up in younger years to finance an own home. Paying back debt raises total net worth.

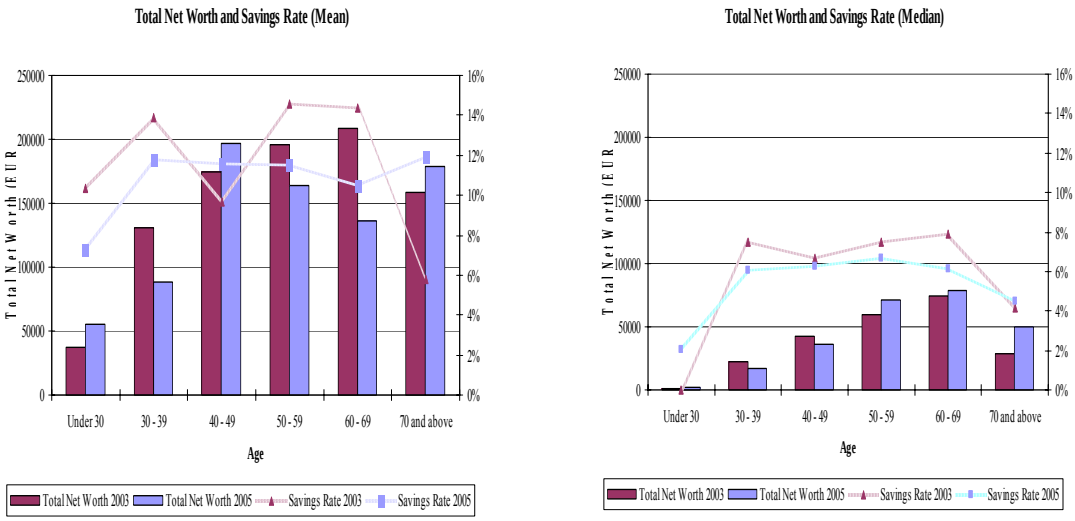
Figure 5: Age Structure of Financial Wealth



Values weighted according to Table 3.

In both samples, the level of wealth is still considerably high for the old households. The bequest motive could be one reason, precautionary saving another. Finding evidence for this savings motive and identifying other reasons for saving is the focus of the next chapter.

Figure 6: Age Structure of Total Net Worth



Values weighted according to Table 3.

3.2 Savings Motives

There are many reasons for saving, the most prominent in economic theory being probably the ones related to the life-cycle model. This includes saving for retirement and, in the model's extended version, the bequest motive. Schunk (2006b) investigates the savings motives of households in SAVE in detail using data from SAVE 2003. In the SAVE questionnaire, household respondents are given nine reasons for saving, each of

which they can evaluate with respect to importance on a scale from 0 to 10, 0 indicating that the motive is not important, 10 indicating that the motive is very important. The nine savings motives are saving to buy a new home, precautionary saving for unexpected events, saving to pay back debts, saving for retirement, saving for travel, saving in order to make major purchases, saving to finance the education and support of children and / or grandchildren, saving for bequest reasons and saving to take advantage of government subsidies such as subsidies for a building savings contract.

Figure 7 shows the relative frequencies of values households assigned to each of the nine savings motives. The graphs exhibit strong structural differences in the valuation distributions between the different savings motives. For a given savings motive, the structure of the valuation hardly changes across the two SAVE samples. The households' responses around so-called focal points become apparent for nearly all savings motives.

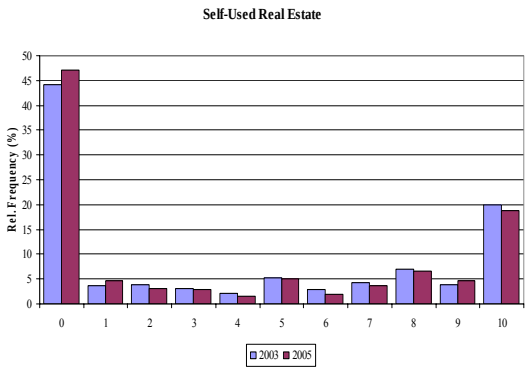
The distributions for self-used real estate and paying back debt resemble a bimodal structure with peaks at 0 and 10. House-

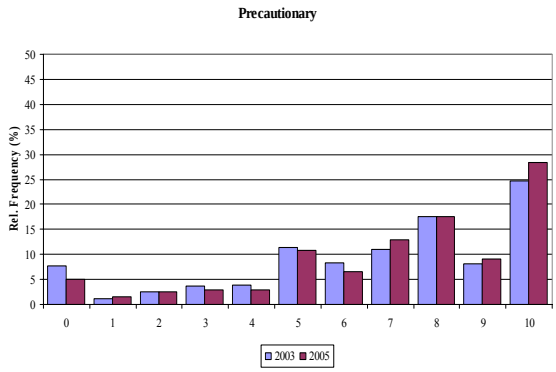
holds value these motives either as not important at all or as very important. This is understandable as these motives clearly depend on the current home and debt situation. As Börsch-Supan and Essig (2005), p. 337, mention, households owning a home or households planning to buy a home consider saving for self-used real estate to be important while households not favoring self-used real estate rate this savings motive as unimportant. The same is true for the repayment of debts. Whether or not a household views saving for debt-repayment as an important savings motive depends on whether the household is indebted.

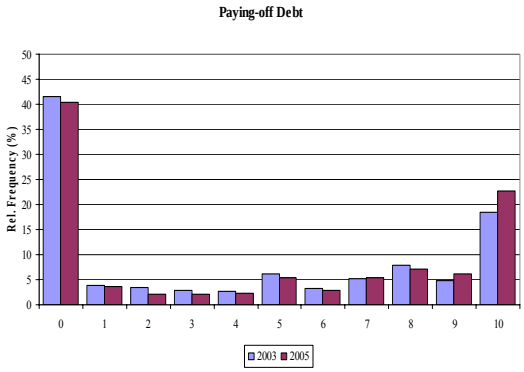
Figure 7: Reasons for Saving

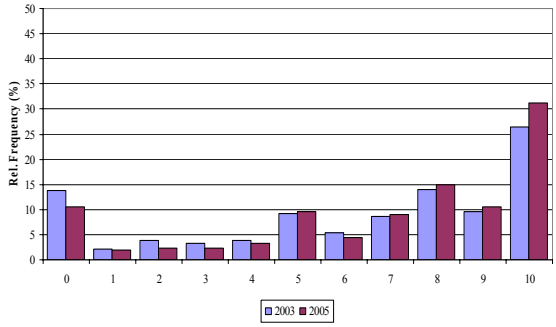
"Below you will find several reasons for saving. How important are these reasons from your point of view?

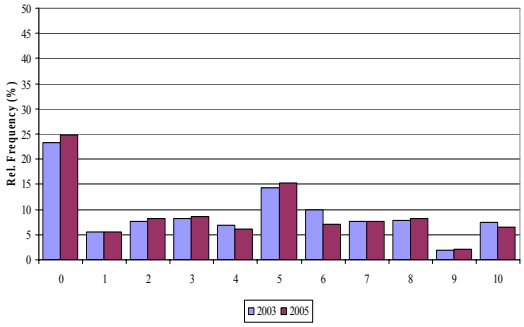
Please value each reason on a scale from 0 (not important) to 10 (very important)."

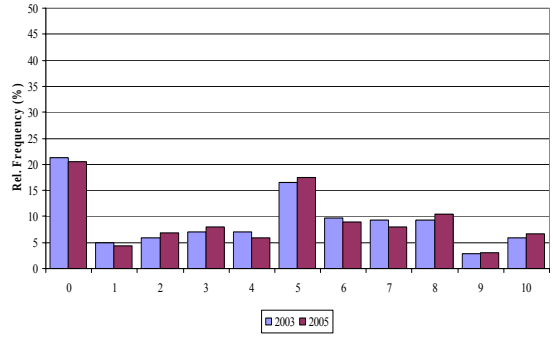


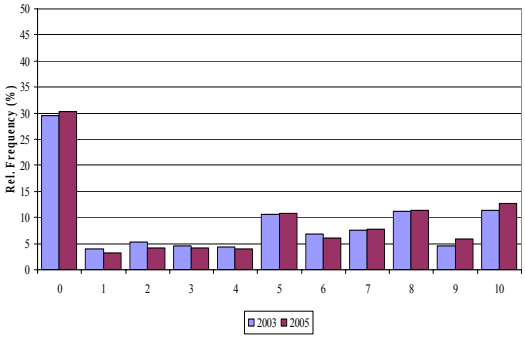

Precautionary
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005

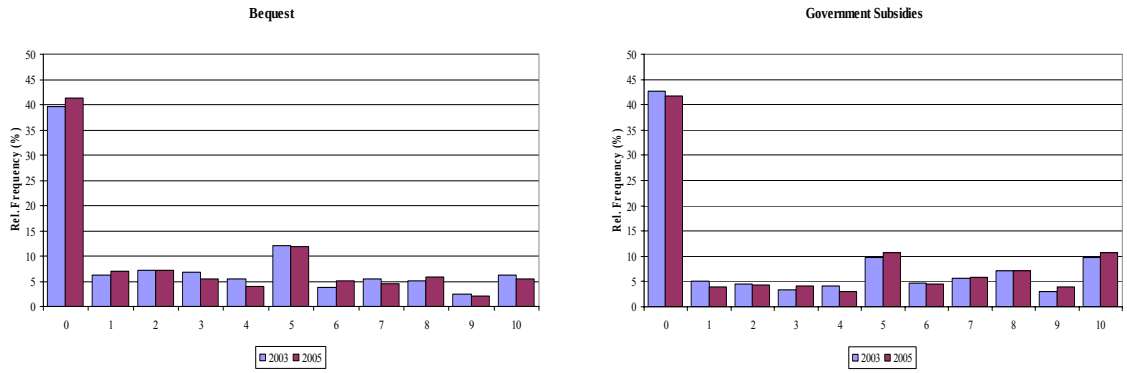

Paying-off Debt
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005


Old-Age Provision
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005


Travel
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005


Major Purchases
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005


Education & Support of Children & Grandchildren
Rel. Frequency (%)
0 5 10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10
2003 2005



Values weighted according to Table 3.

In order to facilitate the interpretation of the remaining results in Figure 7, we transform the scale from 0 to 10 into three groups, namely unimportant, indifferent and important. We denote savings motives rated between 0 and 3 as unimportant, motives between 4 and 6 as indifferent and motives between 7 and 10 as important.

Precautionary savings for unexpected events and old-age provision seem overall to be important savings motives. Moreover, the share of households considering these savings motives to be important increases significantly from 2003 to 2005 while the fraction of households valuing them as unimportant de-

creases significantly.[17] 61.4% of the households surveyed in 2003 rate precautionary savings between 7 and 10 compared to 68.1% in the 2005 sample. Only 15.0% and 11.8% regard precautionary savings as an unimportant savings motive. Old-age provision is considered to be an important savings motive by 58.8% of the respondents in 2003 and 65.9% in 2005. The share of households claiming retirement savings to be unimportant decreases from 22.8% in 2003 to 16.9% in 2005. These changes might be due in part to individuals' increasing awareness of the need for private retirement savings in Germany as suggested by the German government and to the ongoing reform of the public pay-as-you-go pension system.

There does not seem to be a majority opinion on the importance of travel and major purchases as savings motives. Households in both samples answered around the focal points 0 and 5. Overall, the relative frequency of households is distributed quite evenly across the three categories "unimportant", "indifferent" and "very important" with slightly more households considering both savings motives to be unimportant.

[17] At the 1% significance level, using two-sample t-tests of the differences in proportions.

For the education and support of children and grandchildren as well, the distribution of the households' relative frequency is quite even across the three categories of importance in both years. Striking is the high percentage of households reporting that they consider this motive as not at all important (29.5% and 30.2% in 2003 and 2005 respectively). Viewing the education and the support of children as not important can result from households not having any children. The reluctance to save for the education of children might also be due to the fact that so far education in Germany is financed by the public for the most part, making additional private savings less important.

Making use of government subsidies as a savings motive is viewed as not being important by the majority of households in both samples. More than 40% of the households rate this savings motive with 0. As Börsch-Supan and Essig (2005) point out, this low value questions the effectiveness of incentive programs initiated by the government, such as the "Riester-Rente" to encourage private savings for retirement. The high importance of old-age provision and its increase from 2003 to 2005 as mentioned above provides evidence that old-age provision is the primary savings motive and that government subsidies are

only a secondary motive. If this is the case there are likely to be windfall gains.

The distribution for the bequest motive follows a very similar path. The majority claims bequests to be an unimportant motive, around 40% of the households rate this savings motive with 0. This does not support the existence of a bequest motive as suggested by the modified version of the life-cycle hypothesis.

It is interesting to see whether the importance of these savings motives vary with age or income. Table 10 offers an initial insight to this question. The percentages indicate the share of households considering a certain savings motive to be important, i.e., rating it between 7 and 10, as a function of three age and income classes.

Table 10: Savings Motives by Age and Income Classes

		Age			Net Monthly Income (EUR)		
		Under 35	35 - 54	55 and above	Below 1300	1300 - 2600	2600 and above
Self-used real estate	2003	47.0%	39.5%	25.5%	26.2%	33.3%	48.5%
	2005	47.3%	41.7%	21.2%	22.5%	33.8%	48.3%
Precautionary	2003	59.7%	61.9%	61.7%	54.4%	62.8%	67.8%
	2005	63.9%	68.1%	69.8%	61.5%	69.7%	73.8%
Paying-off debt	2003	40.9%	44.0%	27.4%	31.8%	35.1%	43.7%
	2005	48.7%	54.1%	27.3%	33.5%	40.3%	53.3%
Old-age provision	2003	58.1%	66.8%	52.3%	48.2%	58.5%	72.7%
	2005	65.9%	74.6%	58.4%	56.0%	67.2%	76.7%
Travel	2003	32.0%	25.1%	20.9%	20.2%	25.8%	28.0%
	2005	30.9%	23.9%	22.1%	20.7%	24.1%	29.8%
Major purchases	2003	38.5%	28.7%	21.4%	20.8%	28.6%	33.8%
	2005	41.7%	29.8%	21.1%	24.5%	26.8%	35.2%
Education & support of children & grandchildren	2003	34.5%	43.3%	27.2%	26.3%	33.5%	46.9%
	2005	41.3%	47.8%	27.7%	29.1%	37.5%	49.6%
Bequest	2003	15.4%	16.5%	23.0%	18.3%	19.3%	19.8%
	2005	16.3%	14.9%	21.5%	14.6%	21.2%	17.3%
Government subsidies	2003	36.6%	31.6%	15.9%	18.0%	27.5%	32.5%
	2005	35.7%	34.9%	17.8%	18.3%	30.7%	34.3%

Values weighted according to Table 3.

In both samples, the share of households attributing importance to a certain savings motive increases with income for all savings motives except for the bequest motive. The finding is a bit

surprising for precautionary savings, savings for major purchases and savings for travel purposes as one would assume these kinds of expenses to be financed by high income households quite easily without the need to accumulate savings.

The age structure is displayed in the left column. The basic structures are the same for both samples. As one would expect, the importance to save for buying a new home decreases with age. Precautionary savings seem equally important at all age levels. Paying-off debt, old-age provision and the education and support of children and grandchildren are considered important savings motives mostly among the middle-aged households. Saving for travel and major purchases is less important at higher age levels. Not surprisingly, the importance of the bequest motive is higher for the older households. Considerably fewer households consider government subsidies to be an important savings motive. In a sense this is reasonable given that these subsidies favor mostly long-term savings plans, such as building savings contracts or private retirement savings schemes known as “Riester-Rente”.

As of now, we know what households claim to be important savings motives. However, we do not know whether house-

holds act and save according to their statements. A possible way of finding evidence in either direction are the answers to questions in the SAVE survey relating to the use of extraordinary income. Table 11 compares the households' indications on the importance of savings motives to the use of extraordinary income. We have to restrict the comparison to households who received extraordinary income in the year preceding the survey (291 households in the 2003 and 349 households in the 2005 sample). The table is divided into purposes the extraordinary income can be used for. The columns "yes" represent the households using extraordinary income for purpose x while the columns "no" contain the households not using extraordinary income for that purpose. The households in each column are then grouped according to their valuation of the savings motives corresponding to the purpose.

Word and actual behavior seem to be fairly consistent for the savings motives and purposes in the upper part of Table 10. In both samples, the figures show that for the households using their extraordinary income for one of the purposes "purchase of real estate", "paying off debt", "travel", and "durable goods", a higher fraction consider the corresponding savings motive to be

important than for the households not using their extraordinary income for these purposes. 73% of the households in 2003 and 81% of the households in 2005 who use extraordinary income to pay back debt find “paying off debt” to be an important savings motive compared to 41% and 51% of the households who do not use their extraordinary income for the repayment of debt. The reverse is also true: for the households not using their extraordinary income for one of these purposes, a higher fraction consider the corresponding savings motive to be unimportant. Word and behavior seem to be consistent for the use of extraordinary income for whole life insurances or private pension as well. Only for other savings purposes, the figures do not support the consistency.

Table 11: Consistency of Word and Actual Behavior

Use of extraordinary income for:		Purchase of real estate		Paying off debt		Travel		Durable goods (cars, furniture)	
		yes	no	yes	no	yes	no	yes	no
Savings motive:		**Purchase of self-used real estate**		**Paying off debt**		**Travel**		**Major purchases**	
Important (7-10)	**2003**	52.0%	45.1%	72.6%	40.8%	45.7%	25.9%	45.8%	29.8%
	2005	63.8%	48.2%	81.4%	50.6%	46.6%	22.3%	37.7%	31.6%
Indifferent (4-6)	**2003**	7.3%	9.2%	7.8%	12.6%	33.5%	36.3%	44.1%	35.2%
	2005	11.4%	8.0%	14.0%	10.3%	38.5%	32.5%	41.3%	37.6%
Unimportant (0-3)	**2003**	40.7%	45.7%	19.6%	46.6%	20.8%	37.8%	10.2%	35.0%
	2005	24.8%	43.9%	4.6%	39.0%	14.9%	45.2%	21.0%	30.8%
Number of households	**2003**	*13*	*278*	*50*	*241*	*43*	*248*	*47*	*244*
	2005	*8*	*341*	*64*	*285*	*72*	*277*	*88*	*261*

Use of extraordinary income for:		Savings for a certain purpose (whole life insurance, private pension)				Other savings (stocks, securities)			
		yes	no	yes	no	yes	no	yes	no
Savings motive:		**Old-age provision**		**Precautionary**		**Old-age provision**		**Precautionary**	
Important (7-10)	**2003**	73.2%	64.8%	82.5%	64.1%	55.3%	66.9%	58.0%	67.0%
	2005	80.9%	71.6%	73.0%	71.1%	74.9%	72.9%	84.1%	69.7%
Indifferent (4-6)	**2003**	18.1%	19.6%	11.8%	24.9%	21.6%	19.2%	29.0%	22.8%
	2005	10.6%	21.0%	25.1%	22.7%	15.4%	19.8%	13.5%	24.4%
Unimportant (0-3)	**2003**	8.6%	15.6%	5.7%	11.0%	23.2%	13.9%	13.1%	10.2%
	2005	8.4%	7.4%	1.9%	6.2%	9.7%	7.3%	2.4%	5.9%
Number of households	**2003**	*33*	*258*	*33*	*258*	*27*	*264*	*27*	*264*
	2005	*57*	*292*	*57*	*292*	*41*	*308*	*41*	*308*

Values weighted according to Table 3.

3.3 Savings Rules

We now turn to the important question on how German households save. Direct and indirect questions on the savings behavior from the SAVE questionnaire will be evaluated to discover rules German households apply in making their savings decisions. The question on how households invest their savings is treated separately and is the focus of Section 4.

3.3.1 Direct Questions about Savings Behavior

The SAVE questionnaire includes several direct questions about household savings behavior. Table 12 summarizes the results for the question "Which of the following sentences best describes your own and your partner's personal savings behavior?" Respondents were given a choice of five possible answers, all of which appear in the first column of the table. The percentages indicate the relative frequency of households choosing a certain answer. Next to the overall shares of households for each answer, the table lists the shares dependent on three age and income classes.

The basic structure of the relative frequencies of the households is roughly the same for both samples. Altogether about

three quarters of the surveyed households save either regularly or irregularly. The majority of households report saving regularly; 54.6% in 2003 and 52.0% in 2005 claim to save either a fixed or a variable amount regularly. The largest share of households even saves a fixed amount regularly, 34.3% in 2003 and 35.5% in 2005.

Table 12: Self-Assessment of Savings Behavior

		Total	Age			Income (EUR)		
			under 35	35 - 54	55 and above	below 1300	1300 - 2600	2600 and above
I save a fixed amount regularly.	**2003**	34.3%	32.9%	45.2%	25.6%	18.1%	36.0%	52.0%
	2005	35.5%	32.8%	44.4%	28.9%	20.2%	35.6%	55.3%
I save regularly, the amount varies.	**2003**	20.3%	13.8%	16.0%	26.9%	16.5%	20.8%	24.3%
	2005	16.5%	12.3%	13.4%	21.0%	13.3%	17.6%	18.9%
I only save if there is money left.	**2003**	20.9%	18.4%	16.4%	25.9%	23.1%	23.6%	13.6%
	2005	22.4%	23.0%	17.5%	26.3%	23.9%	24.4%	16.9%
I do not have the financial capability to save.	**2003**	22.0%	30.7%	21.6%	18.4%	38.9%	17.3%	8.7%
	2005	22.6%	27.9%	23.6%	19.6%	39.5%	18.7%	7.3%
I do not save, I rather enjoy life.	**2003**	2.5%	4.2%	0.7%	3.2%	3.4%	2.4%	1.5%
	2005	3.0%	4.0%	1.0%	4.3%	3.2%	3.8%	1.6%

Values weighted according to Table 3.

For slightly more than 20% of the households the decision whether or not to save directly depends on consumption and income. They only save if there is money left. Roughly the same share of households claims to not have the financial capability to save. Only about 3% of the households in both samples do not see the necessity to save at all and rather enjoy life.

As expected, income seems to play an important role in the savings decision. In the highest income class, about three quarters of the households put aside money regularly while only a bit more than 30% do so in the lowest income class. Clearly, the percentage of households stating not to have the financial capability to save decreases with increasing income.

With respect to age, there is an astonishing high proportion of the youngest households that saves regularly, more than 45% in 2003 and 2005. Being financially constrained to save decreases in age. This is likely, however, to be driven by an indirect effect of income on savings behavior as the youngest households generally have lower incomes than the older ones.

To check for consistency between self-assessed savings behavior and the self-reported capability to save, we briefly compare

the results to the answers given to the question about making ends meet from Chapter 3.1. Table 13 lists the percentages of households in each answer category as a function of their capability to save.

Table 13: Self-Assessment of Savings Behavior and Savings Capability

		Total	At the end of the month, there was always plenty of money left.	At the end of the month, there was often some money left.	There was only some money left if additional income was obtained.	At the end of the month, there was often not enough money left.	At the end of the month there was never enough money left.
I save a fixed amount regularly.	2003	34.3%	55.9%	38.8%	28.4%	22.4%	15.7%
	2005	35.5%	55.9%	40.6%	35.0%	23.7%	11.8%
I save regularly, the amount varies.	2003	20.3%	27.9%	28.3%	14.0%	6.5%	0.8%
	2005	16.5%	27.1%	23.7%	6.2%	8.6%	3.1%
I only save if there is money left.	2003	20.9%	10.4%	22.4%	28.5%	17.6%	10.9%
	2005	22.4%	10.9%	24.2%	30.4%	18.9%	10.1%
I do not have the financial capability to save.	2003	22.0%	2.2%	8.2%	27.1%	50.9%	70.0%
	2005	22.6%	3.1%	8.2%	25.0%	47.5%	69.8%
I do not save, I rather enjoy life.	2003	2.5%	3.6%	2.3%	2.1%	2.7%	2.6%
	2005	3.0%	3.1%	3.2%	3.5%	1.4%	5.2%

Values weighted according to Table 3.

Overall the answers given to both questions are quite consistent. This becomes particularly evident when looking at the percentages of households claiming not to have the financial capability to save. About 70% of the households in both samples that indicate to never have enough money left at the end of the month also stated not to have the financial capability to save. This is also the case for roughly half of the households claiming to often not have enough money left at the end of the month. The percentage of households saving regularly decreases with lower capability to save, which can be seen in the first two rows of the table above. Nevertheless surprising is the fact that still 15.7% in 2003 and 11.8% in 2005 claim to save a fixed amount regularly even though they never have enough money left at the end of the month. Possibly, some respondents subtract their regular savings amounts as monthly expenditures when answering the "making ends meet" question. In this case, saving regularly can be consistent with never having enough money left at the end of the month.

The second direct question on savings behavior asks households that indicated to save regularly or irregularly whether they save towards specific savings targets. Figures for house-

holds following fixed savings targets are presented in Table 14. 31.1% of the households in 2003 and 28.5% in 2005 claim to have fixed targets. These fractions are highest in both samples for middle-aged and mid-income households.

Table 14: Fixed Savings Targets

	Percentage		Savings target (mean) in EUR		Savings target (median) in EUR		Time (mean) in years		Time (median) in years	
	2003	2005	2003	2005	2003	2005	2003	2005	2003	2005
Total	31.1%	28.5%	32,394	22,375	5,000	3,000	5.9	4.7	2.9	2.0
Standard Error			*3,243*	*2,314*			*0.3*	*0.3*		
				By age:						
Under 35	20.6%	23.2%	35,397	21,901	3,000	3,000	5.3	4.0	2.5	1.8
Standard Error			*9,496*	*3,857*			*0.7*	*0.6*		
35 - 54	45.0%	42.8%	44,857	30,187	10,000	5,000	8.5	6.5	4.7	3.4
Standard Error			*5,113*	*4,544*			*0.5*	*0.5*		
54 and above	34.4%	34.0%	14,264	12,883	3,000	2,500	2.9	3.0	1.5	1.9
Standard Error			*2,263*	*2,490*			*0.3*	*0.3*		
				By income:						
Below 1300	21.6%	26.8%	14,635	5,288	2,000	1,000	3.6	2.3	1.5	1.4
Standard Error			*4,180*	*1,327*			*0.5*	*0.2*		
1300 - 2600	41.8%	39.0%	24,338	23,471	7,000	5,000	6.0	5.4	2.9	2.9
Standard Error			*2,865*	*3,536*			*0.5*	*0.5*		
2600 and above	36.6%	34.3%	52,069	34,477	10,000	10,000	7.2	5.9	3.5	2.7
Standard Error			*7,688*	*4,983*			*0.6*	*0.6*		

Values weighted according to Table 3. All households that save according to the first three rows of Table 12 are included.

Middle-aged households show the highest savings targets in terms of mean and median values. The medians well below the means indicate that few households have very high targets while many households have rather small targets. The high mean targets in connection with the above average time to reach the goal for the middle-aged households could be due to savings to purchase an own home. It seems odd, however, that this observation is not made for the youngest households, since according to Table 10 in Chapter 3.2 the highest proportion of households viewing self-used real estate as an important savings motive is found among the youngest households. The oldest households exhibit the smallest savings targets and the shortest time to reach the goal. Likely, these savings targets are for major purchases or travel rather than for buying an own home.

For both samples we can see that the mean and median savings targets increase with income. Moreover, richer households seem to be planning further ahead than poorer households; this becomes apparent from the longer mean and median times to reach a savings goal for the richer households.

The considerable share of households reporting fixed savings targets could be one explanation for the majority of households saving regularly. We will investigate this further by looking at the indirect questions about savings behavior.

3.3.2 Indirect Questions about Savings Behavior

The indirect questions about savings behavior in SAVE deal with households' practices of keeping record of all expenditures. Table 15 summarizes the responses to the question "Do you or your partner keep record of all household expenditures?" broken down into three age and three income groups. In both samples, quite a large fraction, namely close to one fifth of the respondents keep record of their household budget in total. This is about the same fraction of respondents whose parents keep record of all household expenditures, too.

Table 15: Keeping Record of Household Budget

"Do you or your partner keep record of all household expenditures?"

By age:		Under 35	35 - 54	55 and above	Total	Parents
yes	2003	14.7%	18.8%	17.0%	17.2%	17.7%
	2005	15.3%	19.9%	16.3%	17.5%	18.1%
no	2003	85.3%	81.2%	83.0%	82.8%	82.3%
	2005	84.7%	80.1%	83.7%	82.5%	81.9%

"Do you or your partner keep record of all household expenditures?"

By income:		Below 1300	1300 - 2600	2600 and above	Total	Parents
yes	2003	14.5%	15.8%	23.0%	17.2%	17.7%
	2005	13.6%	17.5%	22.5%	17.5%	18.1%
no	2003	85.5%	84.2%	77.0%	82.8%	82.3%
	2005	86.4%	82.5%	77.5%	82.5%	81.9%

Values weighted according to Table 3.

The share of households keeping account increases with income, amounting to 23.0% and 22.5% for the highest income class in the years 2003 and 2005, respectively. With respect to age, the largest share can be found in the group of households between 35 and 54 years of age. However, variation in the shares between the age groups is rather small in both samples.

Table 16 sheds light on the question of whether keeping record of household expenditures is inheritable. In the 2003 sample,

the percentage of respondents claiming to keep record of the household budget is almost five times higher for respondents whose parents keep account than for those whose parents do not. In the 2005 sample, the percentage is almost four times higher. This is indeed an indication that keeping record of household budget might in part be due to parental behavior.

Table 16: Inheritance of Keeping Record

"Do you or your partner keep record of all household expenditures?"		
2003	Parents	
Respondents	yes	no
yes	49.8%	10.2%
no	50.2%	89.8%

"Do you or your partner keep record of all household expenditures?"		
2005	Parents	
Respondents	yes	no
yes	44.1%	11.6%
no	55.9%	88.4%

Values weighted according to Table 3.

The additional question that arises with respect to savings rules is the question of what types of assets households choose to invest their savings. This part of the savings rules is at the core of the next section of this paper.

4 Asset Choice Behavior

This section studies the asset choice behavior of private households in Germany. An overview of the asset choice among all asset classes recorded by SAVE is followed by an in-depth analysis of the stockholding behavior of households in SAVE.[18] Insights from previous theoretical and empirical studies are combined in estimating a logit model of the households' decision whether or not to hold stocks.

4.1 Overview

We begin by looking at the asset holdings of households in SAVE. Figure 8 shows the relative frequency of households holding a specific type of asset. Again, the answers for the 2003 and 2005 samples refer to the households' asset situation in 2002 and 2004, respectively.

[18] We use the notation of Eymann, Börsch-Supan and Euwals (2002) and refer to "asset choice" as the discrete decision whether or not to hold a certain type of asset. "Portfolio choice" on the other hand describes the decision of how much to invest in a certain type of asset; portfolio choice in SAVE is not treated in this paper.

Figure 8: Shares of Households Holding a Specific Asset

Values weighted according to Table 3.

It becomes immediately apparent that Germans seem to invest their savings in a very conservative manner: close to 60% of the households in both samples own normal savings accounts and about one quarter of the households have whole life insurance contracts. The share of households investing in building savings contracts was 22% in 2002 and 28% in 2004.

Only about 7% of the households hold fixed income securities, which include government as well as corporate bonds. The

share of households holding stocks and real estate funds has increased from 14.5% in 2002 to 17.8% in 2004. Despite the recent increase, this share is relatively low reflecting the reluctance of households to invest in equity. In part, it could also be a result of the stock market downturn following the September 11 attacks in 2001 and with households' loss of confidence in investing in corporate stock.[19] The recent increase in stock ownership might be due to the recovery of the stock market. Financial innovations summarized under "other financial assets" are held by 2.2% of the households in the 2005 sample. This category was included in the SAVE questionnaire in 2005 for the first time, hence the missing value for the 2003 sample.

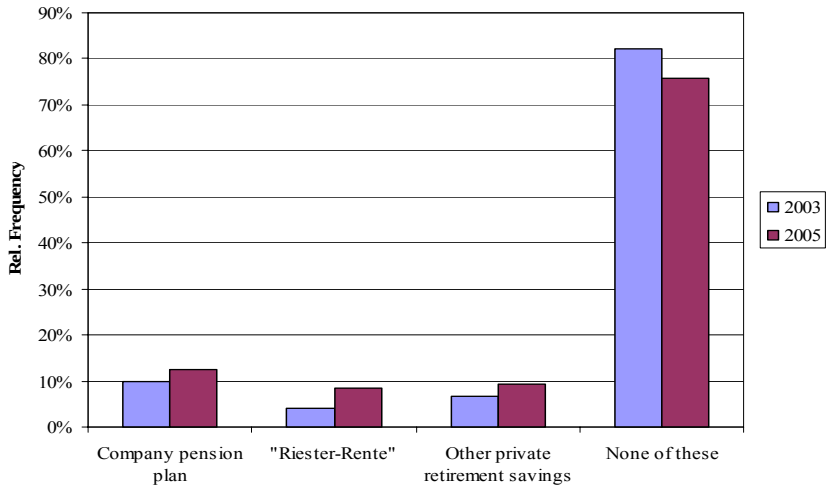
Close to 30% of the households in both samples do not own any of these financial assets. This figure is roughly in line with the fraction of households reporting to not save at all as discussed in the context of Table 12 in Chapter 3.3.

Assets specifically designed for old-age provision are the focus of Figure 9. As can be seen, the relative frequency of house-

[19] This explanation is supported by results from the SAVE 2001 survey in which close to a third of the households reported to have held stocks in the year 2000. At that time stock markets were booming.

holds owning an asset has increased from 2002 to 2004 for all types of assets. The share of households holding investments eligible for government subsidies under “Riester-Rente”, for instance, has more than doubled.

Figure 9: Shares of Households Holding a Specific Retirement Savings Asset



Values weighted according to Table 3.

The vast majority of households do not hold assets for retirement, which is reasonable in light of the large pay-as-you-go pension system in Germany. Moreover, these figures include retired households who by definition do not save for retirement. The proportion of households not holding any type of as-

set for old-age provision has decreased from more than 80% in 2002 to about 75% in 2004. This decrease is possibly due to people's rising awareness of the need to provide own savings for retirement to replace pension reductions in the pay-as-you-go pension system in Germany. This coincides with the increasing fraction of households considering old-age provision to be an important savings motive as suggested by the results in Chapter 3.2.

Whether the asset choice structures vary with respect to age and income is investigated in the next two tables. Relative frequencies of households holding a type of asset as a function of six age classes are summarized in Table 17 whereas Table 18 shows the frequencies by income quintiles. Again, we have to be careful in interpreting the age structures as the effects we observe comprise age and cohort effects. For the sake of completeness, stockholding is included in the tables as well; the interpretation of this type of asset is left to the analysis in the next chapter.

The largest share of households with savings accounts can be found in the oldest age categories. This could be explained by an age or life-cycle effect on the one hand: older individuals

might favor this type of investment as it is very safe and does not exhibit any price volatility. Risk and volatility are undesirable for most retired people as they might have to liquidate parts of their savings for consumption. On the other hand, it might be the result of a cohort effect: older cohorts grew up with savings accounts as the major savings instrument whereas younger generations are also familiar with newer types of financial investments.

The age structure of building savings contracts and whole life insurances are probably explained by a life-cycle effect. Building savings contracts are most popular among 30 to 39 year old respondents. This seems reasonable given that some of the youngest households are still in education, possibly with too little income to save. Many older households already have their own home, making building savings contracts unnecessary. Whole life insurances are most likely to be found among middle-aged households. Again, many of the youngest respondents do not have sufficient income to invest, while for the majority of older households life insurances have already been disbursed.

Fixed income securities exhibit the highest frequencies among 60 to 69 year old households. This could be the result of an age effect. The same argument of low price volatility used for savings accounts also applies to government bonds, for instance, making them a favorable security for individuals entering retirement age. Shares of households holding other financial assets are distributed quite evenly over the different age classes. Not holding any type of asset is most likely to be found among the youngest households which could be the result of overall lower income in this age class.

Table 17: Age Structure of Asset Choice

		Total	Age					
			below 30	30 - 39	40 - 49	50 - 59	60 - 69	70 and above
				Financial Assets				
Savings account	**2003**	59.1%	37.2%	58.2%	56.4%	55.9%	68.7%	71.0%
	2005	58.3%	44.9%	54.4%	54.4%	51.9%	67.7%	71.3%
Building savings contract	**2003**	22.4%	24.2%	31.9%	27.2%	25.9%	20.3%	7.3%
	2005	27.7%	25.1%	37.1%	31.2%	31.5%	27.5%	14.4%
Whole life insurance	**2003**	25.2%	16.3%	34.1%	41.5%	35.9%	19.6%	4.1%
	2005	25.6%	14.9%	29.6%	35.1%	36.9%	26.7%	7.2%
Fixed income securities	**2003**	7.1%	3.4%	5.3%	7.9%	8.5%	9.8%	6.4%
	2005	7.3%	3.7%	3.5%	7.1%	8.8%	10.7%	8.4%
Stock holdings & real estate funds	**2003**	14.5%	8.4%	17.4%	19.2%	14.7%	16.8%	9.0%
	2005	17.8%	10.7%	20.2%	24.5%	18.3%	16.0%	14.2%
Other financial assets	**2003**	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	2005	2.2%	1.3%	2.7%	2.7%	2.2%	2.1%	2.2%
None of these	**2003**	28.6%	48.5%	27.9%	25.8%	28.5%	20.5%	26.4%
	2005	28.4%	38.6%	27.5%	30.7%	30.7%	22.2%	24.0%
				Retirement Savings				
Company pension plan	**2003**	9.9%	5.6%	15.7%	14.4%	11.7%	7.3%	4.7%
	2005	12.4%	6.9%	17.4%	22.0%	16.4%	6.8%	2.6%
"Riester-Rente"	**2003**	4.2%	4.3%	8.2%	7.8%	4.3%	0.6%	0.6%
	2005	8.5%	6.2%	19.5%	16.4%	8.1%	1.1%	0.0%
Other private retirement savings	**2003**	6.8%	6.8%	11.7%	11.4%	8.4%	2.2%	1.1%
	2005	9.4%	8.8%	17.6%	14.9%	13.5%	2.1%	0.5%
None of these	**2003**	82.1%	85.0%	71.4%	71.1%	78.7%	90.4%	94.7%
	2005	75.7%	81.4%	57.3%	58.7%	69.0%	91.2%	96.9%

Values weighted according to Table 3.

In the group of assets for retirement savings, the age pattern can be explained by both age and cohort effects. Overall the share of households not owning any type of retirement savings asset is lowest for the middle-aged and highest for the oldest age households. This difference could be interpreted as evidence of an age effect: middle-aged households are in their major years of employment whereas the oldest age households are already retired. A cohort effect could be a reason for the difference in the shares between the 30 to 49 year olds and the older households: private old-age provision was less essential in younger years for households that are now 60 or older compared to households that are now in their young employment years.

Table 18: Income Structure of Asset Choice

		Total	Monthly Net Income				
			First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
			Financial Assets				
Savings account	**2003**	59.1%	43.2%	53.5%	62.3%	71.6%	66.6%
	2005	58.3%	42.4%	53.2%	62.5%	62.4%	73.6%
Building savings contract	**2003**	22.4%	7.7%	15.4%	21.7%	37.1%	32.2%
	2005	27.7%	10.8%	16.4%	30.0%	39.1%	44.1%
Whole life insurance	**2003**	25.2%	8.0%	13.3%	23.8%	37.6%	47.2%
	2005	25.6%	11.9%	17.1%	22.1%	34.4%	44.3%
Fixed income securities	**2003**	7.1%	1.2%	3.8%	7.3%	9.4%	15.4%
	2005	7.3%	2.8%	2.9%	5.6%	7.4%	19.0%
Stock holdings & real estate funds	**2003**	14.5%	3.1%	6.6%	10.7%	22.3%	33.6%
	2005	17.8%	4.7%	6.8%	17.6%	20.6%	41.8%
Other financial assets	**2003**	n/a	n/a	n/a	n/a	n/a	n/a
	2005	2.2%	0.8%	2.4%	1.6%	1.6%	5.3%
None of these	**2003**	28.6%	51.5%	37.1%	23.4%	14.0%	13.8%
	2005	28.4%	49.1%	34.6%	24.3%	20.2%	11.2%
			Retirement Savings				
Company pension plan	**2003**	9.9%	2.8%	4.1%	10.2%	15.3%	18.9%
	2005	12.4%	2.5%	5.1%	8.5%	19.6%	27.6%
"Riester-Rente"	**2003**	4.2%	2.0%	2.6%	5.0%	4.2%	7.9%
	2005	8.5%	3.2%	5.3%	8.5%	11.5%	15.0%
Other private retirement savings	**2003**	6.8%	2.6%	3.5%	6.7%	10.0%	12.0%
	2005	9.4%	3.7%	5.4%	7.6%	12.8%	18.5%
None of these	**2003**	82.1%	93.2%	90.3%	81.9%	74.4%	68.0%
	2005	75.7%	91.1%	85.6%	79.9%	64.6%	55.1%

Values weighted according to Table 3.

Interesting observations can be made with respect to the change of the retirement savings figures as a function of age between the 2003 and the 2005 survey. As mentioned above, the percentage of households holding some type of asset for old-age provision increased from 2002 to 2004. Most notable differences can be seen for the rather new “Riester-Rente”. These types of subsidized assets are most popular among 30 to 39 year old households where almost every fifth respondent reported to have held “Riester-Rente” assets in 2004, an increase of more than 130% over 2002. Overall, the strongest increases in any retirement savings assets can be found among the 30 to 59 year old households, which is reasonable given these households are in their major years of employment.

The choice of assets broken down by income shows a much more uniform pattern than the asset choice by age. Generally, wealthier households are more likely to hold any type of financial or retirement savings asset. Discrepancies between the first and the fifth income quintile are especially high for whole life insurances as well as for stocks and real estate funds. For example, only 8% of the households in 2002 and 12% in 2004 held whole life insurances in the lowest quintile compared to

47% and 44% in the highest quintile in 2002 and 2004, respectively.

The share of households not owning any type of financial or retirement savings asset decreases constantly with increasing income. Nearly half of the households in the lowest income quintile in both samples do not hold any type of financial assets compared to only 14% and 11% in the highest income quintile in the 2003 and 2005 samples, respectively. For the retirement savings assets, around 90% of the poorest households in both samples do not own any type of asset, compared to 68% of the richest households in the 2003 and 55% in the 2005 sample.

4.2 Stockholding Behavior

We now turn to the stockholding behavior in SAVE. Basic models of portfolio theory suggest positive holdings of risky assets, i.e. stocks, for every individual. Prominent examples include static portfolio selection theory by Markowitz (1952).[20] More recent studies are dynamic expected utility models as analyzed by Brennan, Schwartz and Lagnado (1997) or Bertaut and Haliassos (1997). The actual asset choice we

[20] Static portfolio theory is explained in detail in Sharpe (1998).

observe, however, is quite different from the theoretical predictions. The great majority of households do not invest in equity. This discrepancy between theoretical predictions and empirical evidence is referred to as the "stockholding puzzle". In the following, we review existing literature on the stockholding puzzle and analyze the stockholding decision of households in SAVE in order to find evidence for the unwillingness of most investors to hold stocks.

4.2.1 The Stockholding Puzzle

The stockholding puzzle can be illustrated by means of expected utility maximization in a simple two-period version of the Consumption Capital Asset Pricing Model (CCAPM) as employed by Haliassos and Bertaut (1995).[21] According to this approach, an agent receives exogenous labor income in both periods, which is uncorrelated with asset returns. Without loss of generality, initial wealth is assumed to be zero. In the first period the agent consumes and invests his savings in two as-

[21] The CCAPM in its general multiple-period multiple-asset form is treated extensively by Danthine and Donaldson (2001) or Romer (1995). It is outside the scope of this paper, as we use the CCAPM for illustration purposes only.

sets, stocks and a riskfree asset. In the second period he consumes his second period labor income and his savings from the first period including the returns. Formally, the agent maximizes his expected utility

$$\begin{aligned} &\max_{s_{st},s_{rf}} \; U(c_0) + \beta \, \mathrm{E}_0\left[U(c_1)\right] \\ &\text{s.t. } \; y_0 = c_0 + s_{st} + s_{rf} \\ &\qquad c_1 = s_{st} R_{st} + s_{rf} R_{rf} + y_1 \end{aligned} \tag{1}$$

where β is the subjective discount factor, c_t real consumption in period t, y_t real income in period t, s_{st} real holdings of stocks and s_{rf} real holdings of the risk-free asset. Stocks yield the stochastic gross return R_{st}, whereas the risk-free asset earns the safe return R_{rf}. The first-order conditions, referred to as the Euler equations, are

$$\begin{aligned} U'(c_0) &= \beta R_{rf} \, \mathrm{E}_0\left[U'(c_1)\right] \\ U'(c_0) &= \beta \, \mathrm{E}_0\left[R_{st} U'(c_1)\right]. \end{aligned} \tag{2}$$

By combining the two conditions and substituting the budget constraints from (1), we get

$$\left(\mathrm{E}_0\left[R_{st}\right]-R_{rf}\right)\mathrm{E}_0\left[U'\left(s_{st}R_{st}+s_{rf}R_{rf}+y_1\right)\right]+\mathrm{Cov}_0\left[R_{st},U'\left(s_{st}R_{st}+s_{rf}R_{rf}+y_1\right)\right]=0. \quad (3)$$

If holding no stocks is an interior solution, s_{st} will be equal to zero. Moreover, since labor income is assumed to be uncorrelated with the return on stocks, the covariance term will be zero. Thus, equation (3) will simplify to

$$\left(\mathrm{E}_0\left[R_{st}\right]-R_{rf}\right)\mathrm{E}_0\left[U'\left(s_{rf}R_{rf}+y_1\right)\right]=0. \quad (4)$$

If there exists an equity premium, i.e., if stocks pay a higher expected return than the safe asset and assuming that $\mathrm{E}_0\left[U'\left(c_1\right)\right]\neq 0$, this equation is a contradiction. No matter how risk averse, agents maximizing expected utility should always be willing to trade-off risk against return and invest a positive amount in stocks.

In reality, however, we observe that the majority of households do not participate in the stock market at all. According to the SAVE survey, only 15% of the German households in 2002 and 18% in 2004 owned stocks or real estate funds. Börsch-Supan and Essig (2005) report a higher ownership rate of

around 30% for SAVE 2001, which nevertheless constitutes a minority.[22]

The stockholding puzzle can be referred to as the micro analogue of the equity premium puzzle (see Miniaci and Weber (2002), p. 145). The equity premium puzzle refers to the observation made by Mehra and Prescott (1985) that the high historical excess returns of stocks over government bonds cannot be explained by asset pricing based on households' standard expected utility maximization, i.e. the CCAPM, and reasonable rates of risk aversion.[23] Mankiw and Zeldes (1991) draw the connection to the stockholding puzzle by showing that part of

[22] It is hard to compare these figures directly to other German or international surveys. The reason is that holding stocks is defined differently in each survey. Some surveys regard holding mutual funds as holding stocks, others include real estate funds and some differentiate between direct and indirect stockholding. Nevertheless, it can be said that overall, the majority of people do not invest in stocks. Cf. Bertaut and Star-McCluer (2002) who analyze data from the U.S. Survey of Consumer Finances, Banks and Tanner (2002) who evaluate the U.K. Financial Research Survey or Alessie, Hochguertel and van Soest (2002) who examine the Dutch CentER Savings Survey. For Germany, Börsch-Supan and Essig (2003) evaluate German stockholding behavior based on the Sample of Income and Expenditure (EVS).

[23] Mankiw and Zeldes (1991) calculate an implicit coefficient of relative risk aversion of close to 30 to explain the historical equity premium. This would correspond to a person who has a certainty equivalent of $51 in a lottery with a 50% chance to consume $50 and a 50% chance to consume $100. Cf. Benartzi and Thaler (1995), p. 77.

the premium can be explained by the unwillingness of households to hold risky assets.

4.2.2 Previous Literature

There is a vast amount of literature trying to explain investors' reluctance to participate in the stock market. Large parts of the theoretical literature aim at offering solutions to the equity premium puzzle. Since these models have a micro foundation and since some of them allow for individual heterogeneity of preferences, their suggested solutions to the equity premium puzzle can help to explain the stockholding puzzle implicitly.

Many studies try to rationalize the unwillingness to hold risky assets theoretically by introducing frictions into standard expected utility maximization models. Frictions include substantial information and transaction costs or borrowing constraints. Haliassos and Bertaut (1995) as well as Bertaut (1998), for example, modify the basic CCAPM by introducing information costs of participating in the stock market. Guiso, Jappelli and Terlizzese (1996) analyze portfolio and asset choice under borrowing constraints. The effects of borrowing constraints are also investigated by Constantinides, Donaldson and Mehra

(2002) in connection with life-cycle considerations in a 3-period overlapping generations (OLG) model. In their model, the majority of the young generation's future income is determined by its future wages while the middle-aged have to rely on their savings as the major source of future income. The young would like to borrow and invest in the stock market to profit from higher returns, but the borrowing constraint prevents them from doing so. The middle-aged and retired prefer a large share of fixed income securities in their portfolio because of the lower volatility. Thus, the authors argue, the equity premium is driven by the relatively low demand for equity of the young and the relatively high demand for fixed-income securities by the older generations.

Other studies depart from traditional expected utility maximization and make alternative assumptions on individuals' preferences. Constantinides (1990), for instance, relaxes the assumption of time separable von Neumann-Morgenstern preferences. He invokes habit persistence, in which utility does not only depend on current but also on past levels of consumption. He shows that his habit persistence model can explain the equity premium. Epstein and Zin (1990), on the other hand, apply

the dual theory of choice introduced by Yaari (1987) to model individuals exhibiting "first-order risk aversion." Their model can account for about one third of the observed historical equity premium. Instead of probability weights, as in regular expected utility maximization, they choose a rank-dependent probability approach which assigns weights to the utility of outcomes dependent on a ranking. Under this approach, indifference curves are non-differentiable at certainty, which implies that there does not exist a smooth tradeoff between risk and return for individuals holding zero stocks (Haliassos and Bertaut (1995), p. 1120). Benartzi and Thaler (1995) offer an explanation for the equity premium puzzle based on two behavioral concepts, namely loss aversion and mental accounting. Instead of an expected utility function, they choose a prospective utility function in which changes of wealth determine utility rather than the level of wealth.[24] This allows for investors being more sensitive to losses than to gains, i.e. loss averse. Mental accounting comes into play in the dynamic aggregation rules that loss averse investors follow. For loss averse inves-

[24] See Kahneman and Tversky (1979) for a detailed explanation of prospect theory and loss aversion. Thaler (1999) offers an excellent overview of mental accounting concepts.

tors, risky assets are only attractive as long as the investment is not evaluated frequently. The authors combine these behavioral concepts to "myopic loss aversion." Using simulations with monthly returns on stocks, bonds and treasury bills, they find that the size of the historical equity premium is consistent with reasonable parameters of loss aversion and investors evaluating their portfolios annually.

Many studies investigate the reluctance to hold risky assets empirically.[25] The three studies our estimation will primarily be based on are Haliassos and Bertaut (1995), Bertaut (1998) as well as Börsch-Supan and Essig (2003).

Haliassos and Bertaut (1995) analyze the stockholding puzzle in a logit estimation for the United States using the 1983 Survey of Consumer Finances. They report significant positive effects of the level of education, labor income and financial wealth on the probability to hold stocks. They also find evidence that occupational information of households is related to stockholding. Having a managerial occupation tends to increase the probability of holding stocks whereas a high risk oc-

[25] Cf. for example King and Leape (1987 and 1998), Vissing-Jorgensen (2002) or Guiso, Jappelli and Terlizze (1996).

cupation seems to decrease the probability. In addition, the authors find significant evidence for households deviating from standard expected utility maximization in making financial investment decisions. Bertaut (1998) reports positive effects of education and wealth on the stockholding decision by applying probit estimations to the 1983 and 1989 Surveys of Consumer Finances. Moreover, she includes self-reported risk aversion as an explanatory variable and finds that lower risk aversion seems to positively affect the stockholding probability.

Börsch-Supan and Essig (2003) investigate the stockholding behavior of households in Germany by means of probit estimations based on the 1993 and 1998 Samples of the Income and Expenditure Survey (EVS). They confirm the evidence from the other two studies by reporting that income, wealth and education have a significant positive effect on the stockholding probability. In addition, they find a significantly negative effect for households who are self-employed and a positive effect for households whose representative is male.

4.2.3 Stockholding in SAVE: Bivariate Analysis

To see whether previous empirical results match our data, we now turn to the analysis of stockholding behavior in SAVE. We start with an investigation of the influence of some prominent factors affecting stock market participation individually and follow that with a multivariate logit model of the stockholding decision.

Stockholding and Age

We begin the simple bivariate analysis by looking at stockholding and age. Table 19 shows the share of households investing in stocks and real estate funds broken down into six age classes. The row “sample proportion” refers to the percentage of respondents in each age class.

Table 19: Shares of Households Investing in Stocks by Age

		Total	Age					
			under 30	30 - 39	40 - 49	50 - 59	60 - 69	70 and above
Stockholdings and real estate funds	2003	14.5%	8.4%	17.4%	19.2%	14.7%	16.8%	9.0%
	2005	17.8%	10.7%	20.2%	24.5%	18.3%	16.0%	14.2%
Sample proportion	*2003*	*100.0%*	*14.2%*	*17.7%*	*19.2%*	*14.5%*	*18.0%*	*16.4%*
	2005	*100.0%*	*12.4%*	*14.7%*	*20.8%*	*16.3%*	*18.5%*	*17.3%*

Values weighted according to Table 3.

Stockholding is higher in 2005 in almost every age class. In both years, the age profile of stockholding seems to be roughly hump-shaped, peaking in the 40 – 49 years category with 19.2% stockholders in 2003 and nearly 25% in 2005. The lowest participation rate can be found among the households under 30 years of age. The hump shape is roughly in line with the results of Börsch-Supan and Essig (2003) in the EVS and the lower participation rates at the younger age coincides with other studies such as Bertaut (1998). Given these results it is tempting to conclude that more households invest in stocks during their major years of employment and that fewer households hold stocks as they approach retirement age, possibly due to the relatively high volatility of stock prices. Again, this life-

cycle interpretation is likely to be biased though as it neglects possible cohort effects. Older individuals may have started with lower initial stock market participation at a young age given they are members of a cohort which grew up with mostly traditional savings instruments. The stock market participation of the younger households today may rise well above the current participation figures of the older households over the course of their life-cycle.

Stockholding and Income

Stock ownership rates of households as a function of income quintiles are displayed in Table 20. Only 3.1% in the 2003 and 5.1% in the 2005 sample hold stocks or real estate funds in the lowest income quintile. These percentages increase as we move to the upper quintiles; nonetheless, stock ownership stays well below 50% of the households in the highest income quintile. In this quintile, one third of the 2003 respondents and slightly more than 40% of the 2005 respondents report to hold stocks. While in Chapter 4.1, we observed that ownership rates of all assets increase with income, ownership rates of stocks appear to be especially responsive to shifts in income.

Table 20: Shares of Households Investing in Stocks by Net Income

		Total	Net Monthly Income				
			First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Stockholdings and real estate funds	2003	14.5%	3.1%	6.6%	10.7%	22.3%	33.6%
	2005	17.8%	4.7%	6.8%	17.6%	20.6%	41.8%
Sample proportion	*2003*	*100.0%*	*19.1%*	*17.9%*	*23.7%*	*22.9%*	*16.4%*
	2005	*100.0%*	*20.4%*	*18.4%*	*20.4%*	*21.9%*	*18.9%*

Values weighted according to Table 3.

Information costs may well be one of the reasons for stock ownership rates to increase with income. Information costs denote expenses to acquire the investment information necessary for participating in the stock market such as purchasing investment guides, subscribing to investment magazines or hiring financial advisers (see Bertaut (1998), p. 264). Households with higher income are more likely to be able to pay these expenses.

Stockholding and Wealth

Similar reasoning can be applied to the effect of wealth on stock market participation. Table 21 summarizes the percentage of households holding equity as a function of total net

worth quintiles. The stock ownership rates increase with total net worth in both samples. About 2% of the households in the lowest quintile report to hold stocks whereas roughly one third of the households are stockholders in the highest quintile.

Table 21: Shares of Households Investing in Stocks by Total Net Worth

		Total	Total Net Worth				
			First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Stockholdings and real estate funds	2003	14.5%	2.1%	5.6%	14.8%	17.6%	32.9%
	2005	17.8%	2.4%	7.1%	22.6%	23.3%	34.6%
Sample proportion	*2003*	*100.0%*	*22.2%*	*17.3%*	*20.2%*	*20.3%*	*19.9%*
	2005	*100.0%*	*23.0%*	*16.1%*	*19.7%*	*20.5%*	*20.6%*

Values weighted according to Table 3.

Again, information costs are one of the likely reasons for more stockholders to be found among the wealthier households. In addition, as Börsch-Supan and Essig (2003) point out, minimum stock volumes which have to be purchased when investing in equity can act as a barrier to entry. Poorer households might not have enough financial power to fulfill these minimum requirements for any stock or to invest the minimum

amount in every stock needed to make their portfolio sufficiently diversified.

Stockholding and Education

Stock market participation as a function of education is summarized in Table 22. We construct four education categories from two questions in the SAVE questionnaire. The lowest education level possible is basic secondary education only followed by basic secondary education and vocational training. The third category is higher secondary education followed by the highest education level, a university degree.[26]

Table 22: Shares of Households Investing in Stocks by Education

			Education			
		Total	Basic secondary education only	Vocational training	Higher secondary education only	University degree
Stockholdings and real estate funds	2003	14.5%	3.4%	12.4%	18.6%	31.5%
	2005	17.8%	4.2%	14.5%	27.6%	35.6%
Sample proportion	*2003*	*100.0%*	*15.8%*	*55.4%*	*14.7%*	*14.2%*
	2005	*100.0%*	*12.5%*	*57.0%*	*20.4%*	*10.0%*

Values weighted according to Table 3.

[26] See Appendix for more information on how the education variable was derived.

As can be seen, stock market participation increases with the level of education in both the 2003 and 2005 samples. While only about 4% of households with nothing but basic secondary education hold stocks, the number increases to 31.5% and 35.6% in 2003 and 2005 for households with a university degree.

The effect of education on stockholding is likely to be both direct and indirect. The household's education affects stockholding indirectly via its income and its wealth since education generally correlates positively with income and wealth. The direct effect can be due to the information costs of participating in the stock market. In general, individuals with higher education have a higher ability to acquire and process information. In addition, they are more likely to possess knowledge of financial markets. Thus, the information costs for less educated people are higher compared to individuals with higher education.

4.2.4 Stockholding in SAVE: Econometric Analysis

The bivariate analyses have given an overview of different factors influencing the stockholding decision. In order to isolate the individual factors influencing the stockholding decision, it

is necessary to conduct a multivariate analysis. Controlling for numerous explanatory variables simultaneously helps in disentangling the direct and indirect effects of the explanatory variables. In the following we estimate a multivariate logit model of stockholding.

The Econometric Model

The decision to hold stocks can be described by a latent variable model of the following form (Wooldridge (2001), ch.13 and ch.15):

$$U^* = \mathbf{x}\boldsymbol{\beta} + e \qquad (5)$$

where U^* is the difference in individual utility from holding stocks rather than not holding stocks, $\boldsymbol{\beta}$ is a $K \times 1$ vector of parameters and $\mathbf{x}$ a $1 \times K$ vector of explanatory variables with the first element equal to unity; the random error term e is assumed to be independent of $\mathbf{x}$ with a continuous probability density function (pdf) symmetric around zero. We cannot observe or measure an individual's utility from investing in stocks, hence it is marked with a (*); since it is not observable, we refer to utility as the underlying latent variable. We do, however, observe each individual's decision of whether or not to hold

stocks. We can infer that whenever an individual holds stocks, an individual's additional utility from holding stocks is greater than zero. This is summarized by

$$y = \begin{cases} 1 & \text{if } U^* > 0 \\ 0 & \text{otherwise} \end{cases} \qquad (6)$$

where y is an indicator variable equal to one if an individual holds stocks. We can now obtain the distribution of y given $\mathbf{x}$. We know that

$$\Pr(y=1|\mathbf{x}) = \Pr(U^* > 0|\mathbf{x}) \qquad (7)$$

which is equal to

$$\Pr(e > -\mathbf{x}\boldsymbol{\beta}|\mathbf{x}) = 1 - \mathrm{G}(-\mathbf{x}\boldsymbol{\beta}) \qquad (8)$$

where $\mathrm{G}(\cdot)$ is the cumulative distribution function (cdf) of e. Since the pdf of e is symmetric about zero, $1-\mathrm{G}(-\mathbf{x}\boldsymbol{\beta})$ is equal to $\mathrm{G}(\mathbf{x}\boldsymbol{\beta})$; thus,

$$\Pr(y=1|\mathbf{x}) = G(\mathbf{x}\boldsymbol{\beta}). \qquad (9)$$

We assume that e follows a standard logistic distribution. Then (9) becomes a logit model and the cdf has the closed form solution

$$\mathrm{G}\left(\mathbf{x}\beta\right)=\frac{\exp\left(\mathbf{x}\beta\right)}{1+\exp\left(\mathbf{x}\beta\right)}, \qquad (10)$$

and the parameters β can be consistently estimated by maximum-likelihood estimation (MLE). With *N* independent, identically distributed observations $\left(y_i,\mathbf{x}_i\right)$, we determine the estimates $\hat{\beta}$ of β by maximizing $N^{-1}\sum_{i=1}^{N}\ell_i\left(\beta\right)$ with respect to β. The term $\ell_i\left(\beta\right)$ is the log-likelihood function of observation *i*; it is the log of the density of y_i given $\mathbf{x}_i$ and has the following form:

$$\ell_i\left(\beta\right)=y_i\log\left[\mathrm{G}\left(\mathbf{x}_i\beta\right)\right]+\left(1-y_i\right)\log\left[1-\mathrm{G}\left(\mathbf{x}_i\beta\right)\right] \qquad \text{for } y_i=0,1. \qquad (11)$$

If we specify the model correctly, maximizing the log-likelihood function will yield consistent and asymptotically normal distributed estimates of β .

In estimating the logit model of the stockholding decision we first include the variables analyzed in the bivariate analyses as explanatory variables, namely age, net income, wealth and education. Given the results of Table 19 we expect age to have a positive effect on the probability to hold stocks for younger households and a negative effect for older households. Net income and net worth seem to increase the probability of holding stocks monotonically (cf. Table 20 and Table 21). Hence, we expect the estimated coefficients of net worth and income to be positive. For education, we include dummy variables for three of the four educational categories in the regression model. The lowest category ("basic secondary education only") serves as the reference category. Given the figures in Table 22, we expect the estimated coefficients of the education dummies to be positive. Moreover, since the ownership rates of stocks increase with higher levels of education, the coefficient of "university degree" should be the largest, followed by the coefficient of "higher secondary education only", which in turn should be greater than the coefficient of "vocational training".

We also take into account specific household characteristics, namely the number of children, a dummy equal to one if the re-

spondent is male, and a dummy equal to one if the respondent is married.

The household's employment status and occupation can influence the stockholding decision.[27] For this reason, we include dummy variables for each of the following employment and occupation categories: unemployed, retired, civil servant, white collar and self-employed.[28] Thus, the reference categories left out refer to blue collar workers as well as households in education, vocational training, military service or parental leave. In the bivariate analysis of stockholding as a function age we found retired households to be less likely to hold stocks. As mentioned above, this could be due to their stage in the life cycle as well as to their unfamiliarity with newer types of investments such as stocks. For these reasons, we expect the sign of the coefficient of "retired" to be negative. Since civil servant have tenure and their income risk is generally very low, they might have a higher willingness to participate in the stock market and accept higher risk for higher returns; this would result

[27] Cf. discussions in King and Leape (1987) and (1998), Haliassos and Bertaut (1995) as well as Bertaut (1998).
[28] See Appendix for detailed information on how the employment status variables are derived.

in a positive coefficient of the civil servant dummy. Self-employed households may have a higher or lower probability of investing in stocks. On the one hand, due to their profession they probably have more knowledge of the stock market making it easier for them to cross the information cost barrier. This would result in a positive estimated coefficient. On the other hand, they are likely to own business assets which can be regarded as a substitute for investing in other equity via the stock market (cf. Börsch-Supan and Essig (2003)).

The decision whether or not to hold stocks might also depend on the purpose of the investment. This is where the savings motives discussed in Chapter 3.2 come into play. For each savings motive, we use a dummy as explanatory variable which is equal to one if a respondent considers the savings motive to be important.

Psychological features play an important role in the individual investment decision process. The psychological characteristics we take into account in the logit estimation relate to households' expectations, their self-reported financial risk taking behavior and their self-reported risk aversion. With respect to

households' expectations, we include three dummy variables.[29] The first dummy is equal to one for households who have negative expectations regarding their future financial situation. The second dummy is equal to one for households who have negative expectations regarding their future health situation. The third dummy identifies households who consider their unemployment risk in the year of the survey to be high. Since all of these expectations are likely to reduce households' willingness to take risk, we expect the coefficients of the three dummies to be negative.

Financial risk taking behavior is represented by two dummy variables. The first variable refers to households who report that they are willing to take some risk in financial investments; the second captures households who report that they are willing to take considerable risk. The category left out denotes households who are not willing to take any risk in financial investments.[30] We use these variables to find evidence for the hypothesis of Haliassos and Bertaut (1995) that individuals seem

[29] See Appendix for detailed information on how the expectations variables are derived.
[30] See Appendix for detailed information on how the variable about financial risk taking behavior is derived.

to depart from expected utility maximization. In standard expected utility maximization, risk averse agents are willing to take risk for the benefit of higher expected returns; the more the agent is risk averse, the higher the expected return has to be in order to compensate for risk. Respondents stating that they are not willing to take any risk in financial investments can be interpreted as deviating from expected utility maximization. Thus, if the coefficients on the two dummy variables in the regression are jointly significantly greater than zero, we can interpret this as evidence that departure from expected utility maximization might be one the of the reasons for respondents not to invest in stocks.

As a proxy for the respondent's level of risk aversion we make use of the answers to questions on self-assessed risk aversion.[31] We include a dummy for respondents with medium risk aversion and a dummy equal to one for respondents reporting high risk aversion. The excluded dummy variable refers to the households that have a low level of risk aversion. We assume that the higher the household's risk aversion, the lower its will-

[31] See Appendix for detailed information on how the variable about self-reported risk aversion is derived.

ingness to invest in stocks. Therefore, the coefficients on the two variables included in the estimation are expected to be negative, the coefficient on medium risk aversion above the coefficient on high risk aversion.

In addition to self-reported risk preferences and expectations, we include information on actual risk taking behavior in the estimation. A dummy indicating whether a respondent smokes regularly will serve as a proxy, smokers showing more risky behavior than non-smokers. The sign of the smoking dummy is expected to be positive as a higher willingness to take risk should increase the probability of investing in stocks.

Finally, we include explanatory variables derived from questions which are included in the SAVE 2005 questionnaire for the first time. As mentioned in Chapter 2.2, Part 7 of the questionnaire now contains questions on hypothetical lotteries. Using these questions we generate two variables, one serving as a proxy for the household's risk aversion and the other as a proxy for the household's loss aversion.[32] The risk aversion

[32] See Appendix for detailed information on how the risk and loss aversion variables are generated using the hypothetical lottery questions. The use of hypothetical lotteries to reveal individuals' risk tolerance is investigated ex-

variable is a dummy equal to one if the respondent exhibits low risk aversion, is risk neutral or risk loving. The reference category refers to respondents with high risk aversion. If we assume that people with lower risk aversion are more likely to hold stocks, the coefficient of the risk aversion dummy should be positive. The loss aversion variable is a dummy equal to one if respondents are willing encounter loss in a lottery if they have a certain chance to win, and equal to zero if respondents are not willing to encounter any loss. We use this variable to try to find evidence for loss aversion in an individual's decision whether or not to invest in stocks as investigated by Benartzi and Thaler (1995). If decreasing loss aversion has a positive effect on the probability to hold stocks, we expect the coefficient of the loss aversion dummy to be positive.

It has to be mentioned that the proxy approach for households' risk preferences and expectations contains potential problems. As Eymann, Börsch-Supan and Euwals (2002), p. 6, point out, "Though common, the approach of using proxy variables – whether based on both hypothetical lotteries or self-

tensively in an experimental study by Barsky, Juster, Kimball and Shapiro (1997).

assessments – is problematic […].” Inconsistent estimates can result from possible endogeneity of the proxy variables, measurement error, strategic responses or respondents’ tendencies to concentrate their answers around focal points. A possible solution to reduce the bias is the estimation of a reduced form model. The major drawback of this approach, however, is the fact that interpreting the results is difficult as direct and indirect effects of regressors are hard to distinguish. Eymann, Börsch-Supan and Euwals suggest a different approach. They use a multiple indicator multiple causes (MIMIC) model which accounts for measurement error and potential endogeneity. Due to its complexity, estimating a MIMIC model is beyond the scope of this paper.

In addition to the hypothetical lottery questions, the SAVE 2005 survey contains information on possible credit constraints of households and whether households receive professional external advice in making their financial investment decisions. We include a dummy variable in the logit estimation which is equal to one for households reporting to have ever been denied a request for a loan. The dummy aims at identifying the households that are credit constrained. If credit constraints deter in-

dividuals from investing in stocks (cf. Constantinides, Donaldson and Mehra (2002)), the coefficient of this dummy should be negative. In addition, we include a dummy variable equal to one for households who report to seek financial advice in making their investment decisions. A positive coefficient for this variable would imply that households receiving professional assistance in financial decisions are more likely to invest in stocks. This could be interpreted as evidence for the existence of information costs necessary to participate in the stock market.

Whether the estimation results meet our expectations is investigated in the following chapter.

Estimation Results

We estimate the logit models separately for the 2003 and 2005 random samples. We run separate regressions as there is evidence of heterogeneity between the two samples.[33] The regression results for the 2003 and the 2005 estimations are presented

[33] This was tested by running a logit estimation with the pooled data, a time dummy and interactions of the time dummy with each of the explanatory variables. The time dummies and the interactions were found to be jointly significant different from zero in a Wald test at the 5% significance level.

in Table 23. In order to check the robustness of the regression results, we also estimate a conditional fixed effects logit model. This model, suggested by Chamberlain (see Greene (2000), pp. 839-841), allows controlling for possible unobserved fixed effects heterogeneity among the households by means of panel data. Thus, we estimate the fixed effects model by confining the 2003 and 2005 random sample to the 646 households interviewed in both years. Results of this estimation, however, have to be viewed with caution: the fixed effects model can only be estimated for households that changed their stockholding behavior between the 2003 and 2005 surveys. This reduces the original sample size to only 122 observations.

We begin our presentation by turning to the results of the separate regressions for 2003 and 2005. Insignificant coefficients are left in the regression models as taking them out hardly changes the other results.

Household characteristics summarized under “personal information” do not have a significant effect on the decision of whether or not to hold stocks. The same is true for age in the 2003 sample, for which we can find neither individual nor joint significance even for different specifications of the age vari-

able.[34] In the 2005 sample, we find a highly significant influence of age on the stockholding decision in the form of a third degree polynomial. Age increases the probability to hold stocks up until the age of about 40 after which it decreases the probability. This is in line with the predictions from the bivariate analysis. The predicted probability reaches a local minimum around the age of 75 after which it increases again. The probable reason for this increase not visible in the bivariate analysis, is that the highest age class comprises the stock ownership rate for all households of 70 or older. The increase at a very high age could be explainable with a bequest motive, although we saw in Chapter 3.2 that bequests are overall not an important savings motive.

[34] It was checked for the following age specifications: age entering as a linear term, as a two degree polynomial or in the form of age class dummies.

Table 23: Logit Estimates for Stockholding Decision

Logit Estimates	2003	2005	Conditional Fixed Effects Logit
Personal information			
Male	-0.145	0.217	
	0.334	*0.146*	
Married	-0.116	0.118	-2.628
	0.517	*0.522*	*0.055*
Children	-0.134	0.122	2.041
	0.514	*0.571*	*0.116*
Age			
Age $x10^{-1}$	2.068	3.875	-7.406
	0.090	*0.002*	*0.570*
Age $x10^{-1}$ squared	-0.373	-0.757	1.720
	0.118	*0.002*	*0.517*
Age $x10^{-1}$ cubed	0.020	0.044	-0.115
	0.164	*0.003*	*0.499*
Education			
Vocational training	1.060	0.850	-1.108
	0.002	*0.022*	*0.419*
Higher secondary education only	1.284	1.479	0.375
	0.000	*0.000*	*0.800*
University degree	1.592	1.572	0.057
	0.000	*0.000*	*0.971*
Wealth			
Net worth $x10^{-6}$	3.476	3.479	2.268
	0.000	*0.000*	*0.224*
Net worth $x10^{-6}$ squared	-1.609	-1.793	-1.203
	0.000	*0.004*	*0.295*
Net worth $x10^{-6}$ cubed	0.211	0.200	0.121
	0.007	*0.079*	*0.317*
Net income (monthly)			
Ln (income $x10^{-3}$)	0.471	0.384	-0.001
	0.000	*0.002*	*0.997*
Employment Status			
Unemployed	-0.450	0.157	1.857
	0.384	*0.681*	*0.308*
Retired	0.311	0.569	1.507
	0.318	*0.074*	*0.142*
Public employee	-0.184	0.443	
	0.575	*0.220*	
White collar	-0.099	0.307	-0.058
	0.638	*0.148*	*0.941*
Self-employed	0.002	0.014	1.828
	0.995	*0.960*	*0.142*
Expectations			
Financial situation (negative)	-0.639	-0.616	-0.387
	0.007	*0.004*	*0.527*
Unemployment risk (high)	-1.736	0.217	0.350
	0.020	*0.485*	*0.650*
Health (negative)	-0.607	0.225	1.087
	0.041	*0.358*	*0.156*

Note: Values weighted for 2003 and 2005 logit estimates according to Table 3. Values in italic are p-values. Dummy variables for male and public employee are dropped in the fixed effects logit model due to their deterministic nature.

Logit Estimates (continued)	2003	2005	Conditional Fixed Effects Logit
Savings motive			
Home	0.410	0.118	0.456
	0.012	*0.470*	*0.332*
Precautionary	0.166	0.512	1.129
	0.326	*0.003*	*0.026*
Debt repayment	-0.274	-0.269	-0.675
	0.098	*0.095*	*0.105*
Old-age provision	-0.037	0.037	0.015
	0.823	*0.834*	*0.973*
Travel	-0.032	0.309	-1.073
	0.848	*0.057*	*0.042*
Major purchases	0.073	0.242	0.009
	0.656	*0.130*	*0.980*
Education of children / grandchildren	0.369	-0.140	0.233
	0.031	*0.395*	*0.584*
Bequest	-0.206	-0.048	0.003
	0.294	*0.808*	*0.995*
Government subsidies	0.126	0.304	-0.009
	0.459	*0.058*	*0.985*
Risk behavior			
Smoker	-0.362	-0.572	-0.201
	0.027	*0.001*	*0.797*
Financial risk taking behavior			
Willing to take some risk	1.051	1.044	0.577
	0.000	*0.000*	*0.130*
Willing to take considerable risk	1.879	1.397	0.783
	0.000	*0.000*	*0.248*
Risk aversion (self reported)			
Medium	-0.083	0.319	-0.453
	0.651	*0.071*	*0.331*
High	-0.299	-2.150	-0.840
	0.601	*0.011*	*0.544*
Risk aversion (hypothetical lottery questions)			
Risk loving / risk neutral / low risk aversion		0.076	
		0.656	
Loss aversion (hypothetical lottery questions)			
Willing to encounter some loss		-0.077	
		0.614	
Market frictions			
Credit constraint		-0.189	
		0.547	
Financial Advice			
Professional advice		0.491	
		0.001	
Constant	-7.681	-10.825	
	0.000	*0.000*	
Log likelihood	*-685.698*	*-679.755*	*-65.859*
Pseudo R-squared	*0.241*	*0.255*	
Number of observations (per year)	*2184*	*1948*	*122*

Note: Values weighted for 2003 and 2005 logit estimates according to Table 3. Values in italic are p-values. Dummy variables for male and public employee are dropped in the fixed effects logit model due to their deterministic nature.

For both samples, it is evident that education has a highly significant positive effect on the stockholding decision. As expected, the size of the coefficients increases with higher levels of education. For both years, the strongest effect of education on stockholding seems to be between the reference group of households with basic secondary education only and households with vocational training.

Net worth has a significant effect on the stockholding decision. The results in Table 23, however, suggest a third degree polynomial relationship increasing to a local maximum at around 1 million Euros of net worth, then decreasing to a local minimum at around 4.5 million Euros and increasing thereafter. While the first increase of the polynomial is in line with information cost hypothesis, the decrease to the local minimum is hard to explain. Including net worth as a two degree polynomial has a strongly significant effect as well. The second degree polynomial shows a local maximum at around 6.5 million Euros of net worth after which the stockholding probability decreases to zero. Using a linear specification we are able to establish a monotonic relationship between net worth and stockholding. But a number of caveats are due. Net worth can be affected by

measurement error. Moreover we cannot rule out endogeneity of net worth. Reverse causality is possible because the decision to hold stocks naturally affects a household's net worth.

Net income shows a highly significant positive effect on the stockholding probability.[35] This is in line with the bivariate analysis and previous studies. The same potential problems as mentioned for total net worth might bias the coefficients on income. However, reverse causality is not as likely as net income for most households represents the households' labor income. Measurement error is likely to be a smaller problem as income is calculated using only one variable from SAVE whereas numerous variables are aggregated in computing total net worth.

Our expectations with respect to the effects of occupation and the employment status of households cannot be confirmed by the regression results. All coefficients are statistically insignificant except for being retired in the 2005 sample. This is also the case for most of the savings motives. There is weak evidence though that debt repayment as a savings motive has a

[35] For calculation purposes, 1€ of income was added to each household's net monthly income in the 2005 sample since 17 of the 1948 respondents reported zero income for which the logarithm is not defined. The results hardly change when doing this operation.

negative effect on stockholding. This could be due to the risky nature of holding stocks which is unfavorable for indebted households. Saving to finance self-used real estate has a significantly positive effect in 2003, saving for travel and government subsidies as savings motive a significantly positive effect in 2005.[36] The precautionary savings motive has a highly significant positive coefficient in the 2005 sample. This is strange given that stock prices are volatile and that precautionary savings are supposed to serve as a buffer for unexpected events.

Surprisingly, the effect of smoking on the stockholding decision is negative and significant at the 5% levels in both regressions. If we believe risky behavior to positively affect the probability to hold stocks, a dummy for smokers may not serve as a good proxy.[37]

We find significant results for the expectation variables in the 2003 sample that meet our earlier predictions. Households hav-

[36] At the 5% significance level.

[37] This is somewhat supported by recent study of Cutler and Glaeser (2006) who find that ignorance is the major determinant in the decision of individuals to smoke. In this case, a dummy for smokers would not necessarily represent a group who knowingly shows riskier behavior.

ing negative expectations with respect to their financial situation, their unemployment risk and their health show a higher unwillingness to invest in stocks. Highly significant results can also be found with respect to the financial risk taking behavior of individuals. The two coefficients in both years are jointly highly significant, which supports the hypothesis of departures from expected utility maximization. Self-reported risk aversion shows mixed results. While the 2005 estimates suggest that high risk aversion seems to prevent people from holding stocks, medium risk aversion positively affects the stockholding decision in comparison to people with low risk aversion.

Our results are generally in line with previous theoretical and empirical studies with regard to the main factors expected to influence the stockholding decision. Higher levels of education, higher wealth and higher income increase the probability to hold stocks and support the hypothesis that information costs deter stock market participation. This is underlined by the positive effect of professional financial advice on stockholding probability. There is also evidence that the departure from expected utility maximization is one of the reasons stocks, as suggested by Haliassos and Bertaut (1995), for respondents not

to hold. We find no evidence that loss aversion deters households from investing in equity nor that credit constraints keeps them from buying stocks.

Unfortunately, too few of the estimates of the conditional fixed effects model are sufficiently significant to check the robustness of our other regression coefficients. Nevertheless, three of the estimated coefficients are statistically significant at reasonable levels of significance. Being married seems to have a negative effect on the stockholding decision.[38] [39] It is hard to interpret this result as there seems to be no reason for marriage to reduce the possibility of holding stocks, all else equal. The positive effect of the precautionary savings motive is confirmed by the fixed effects model at the 5% significance level. The significantly positive effect of saving for travel found in the 2005 estimation is however reversed by the negative coefficient in the fixed effects model, perhaps indicating the presence of unobserved heterogeneity.

[38] At the 5% significance level.
[39] This result matches the findings of Börsch-Supan and Essig (2003).

5 Conclusions

The aim of this paper was to investigate the savings and asset choice behavior of households in Germany with a special focus on the stockholding decision using data from SAVE 2003 and 2005. Our major findings can be summarized as follows.

The basic results pertaining to savings behavior are generally in line with the results of the first SAVE study by Börsch-Supan and Essig (2003 and 2005). In both years, the data suggest that German households have a very high willingness to save. About three quarters of the households save and roughly half of the households even save regularly. About 30% save towards a fixed saving target. Roughly 20% of the households cannot save due to income restrictions. The high willingness to save is supported by a mean net savings rate of 11% in both years. Precautionary saving and old-age provision appear to be the most important savings motives among households. While precautionary saving is equally important at all age classes, old-age provision is considered to be an important savings motive mainly among young and middle-aged households. The overall importance of both motives increased from 2003 to

2005, which is in part likely to be due to the rising awareness of the need to provide private retirement savings. Even though relatively more households consider the bequest motive to be important among the older households, the majority of all households consider bequest to be unimportant. This stands in contrast to the relatively high level of wealth we observe at old age. Some of this wealth might be used as a buffer for precautionary reasons, however, which in turn appears to be a very important reason for saving.

The asset choice behavior of German households continues to be rather conservative. Younger households, however, seem to be more willing to invest in a broader range of financial instruments next to traditional savings accounts. This is also the case for richer households, who appear to own a greater variety of financial securities. Stockmarket participation remains low, although we observe an increase in the participation rates from 15% of the households in the 2003 survey to 18% in the 2005 survey. This could in part be due to a business cycle effect. Assets designed for old-age provision are mainly held by young and middle-aged households. A large increase in the ownership rates is observable for all retirement savings, most notably for

"Riester-Rente" assets. The ownership rate of "Riester" has more than doubled, the highest increases can be found among the young and middle-aged households. These findings are in line with the old-age provision to be an important savings motive.

The results of the logit analysis suggest that households' reluctance to hold stocks stems from the information costs necessary to participate in the stock market as the level of education and income have a positive effect on the probability to hold stocks in both samples. This is supported by the positive effect of seeking professional financial advice. The proxies used for risk or loss aversion do not show any significant influence. Evidence is also found for departure from expected utility maximization.

This was the first study to analyze the wide range of data in the SAVE 2005 survey. As such the aim of the study was to provide an overall picture on savings behavior and asset choice in Germany. Further studies will need to analyze the data in more detail. With respect to the households' investment behavior, further work will need to study the asset choice with regard to all asset classes in SAVE. Moreover, future studies should fo-

cus on households' portfolio decisions, i.e, the decision of how much to invest in a certain asset. Analyses in this field can be carried out by means of tobit estimations and selection models.

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Appendix

Explanation of Generated Variables

Education

There are two questions in the SAVE questionnaire relating to education which we have use to generate one variable for education. The first one refers to primary and secondary education while the second one refers to vocational training and tertiary education, such as university education. Respondents are asked to indicate their own level of education as well as their partner's level of education (if applicable). We combine the possible answers to both questions to construct a single ranking for the level of education. The ranking is as follows, sorted from highest to lowest level of education:

1. *Hochschulabschluss, Lehrerausbildung, Ingenieurschule, Fachhochschule*
2. *Allgemeine oder fachgebundene Hochschulreife / Abitur, Fachhochschulreife, Berufsfachschule, höhere Handelsschule*
3. *Meister- / Technikerschule*

4. *Beamtenausbildung, sonstiger Abschluss*
5. *Lehre / Gesellenprüfung*
6. *Polytechnische Oberschule, 10. Klasse, mittlere Reife / Realschulabschluss*
7. *Hauptschul- / Volksschulabschluss.*

We use each household's highest level of education according to this ranking to generate one variable for household education. For household education we use the respondent's level of education as opposed to the partner's education or the higher one of the two. This is due to the fact that in the SAVE interviews special care is taken that the interviewer speaks to the person most responsible for the household's savings and financial investment decisions. The eight levels from the ranking above are merged into four mutually exclusive education categories. Beginning with the highest education level, these categories are as follows.

1. *University degree (includes 1. from above)*
2. *Higher secondary education only (includes 2. from above)*

3. *Vocational training (includes 3., 4. and 5. from above)*
4. *Basic secondary education without vocational training (includes 6. and 7. from above).*

Employment Status / Occupational Information

There are three questions in the SAVE questionnaire in which respondents are asked about their own employment status and occupation as well as their partner's status. People indicating to be employed full time have the choice of seven types of occupation: *Arbeiter, Angestellter, Beamter, Landwirt, Freiberufler, Gewerbetreibender oder sonstiger Selbstständiger, mithelfender Familienangehöriger*. We summarize these types of occupation to construct the following four occupational categories:

Blue collar (includes Arbeiter, Landwirt and mithelfender Familienangehöriger)

White collar (includes Angestellter)

Public officials (includes Beamter)

Self-employed (includes Freiberufler, Gewerbetreibender oder sonstiger Selbstständiger).

People reporting to work part time or to be not employed indicate to be one of the following:

Retired

Unemployed

In education / vocational training / military service / parental leave.

Generally, we use the respondent's rather than the partner's employment status and occupation to determine the household's employment status. We make an exception if the respondent is unemployed or in education / vocational training / military service / parental leave and the respondent's partner is employed full time. In this case, the partner's occupation is used in determining the household's employment status.

Financial Risk Taking Behavior

There is one question in SAVE in which respondents are asked about their financial risk taking behavior. Respondents are asked to rank their willingness to take risk in financial invest-

ment decisions on a scale from 0 to 10; 0 indicates not willing to take any risk. Using this scale we construct the following four categories of financial risk taking behavior:

Not willing to take any risk (includes respondents with value 0)

Willing to take some risk (includes respondents with values from 1 to 5)

Willing to take considerable risk (includes respondents with values from 6 to 10).

We generate a separate category for respondents with value 0 as there is a clear break between the relative frequency of households indicating a value of 0 and the frequency of households indicating a value between 1 and 10.

Self Reported Risk Aversion

The SAVE questionnaire contains five questions on the respondents' self reported willingness to take risk. In each question, respondents are asked to rank their willingness to take risk in a specific field on a scale from 0 to 10; 0 indicates not willing to take any risk. The five fields are health, career, financial investments, leisure and sports as well as driving. We apply the

approach of Börsch-Supan and Essig (2002) in SAVE 2001 and use the answers to these questions to construct one variable of self-reported risk aversion. For this purpose, the answers to the five questions are aggregated for each household to construct one value for each household's overall risk aversion. We then split the households into the following three categories dependent on their values from 0 to 10:

Low risk aversion (includes respondents with values from 0 to 3)

Medium risk aversion (includes respondents with values from 4 to 7)

High risk aversion (includes respondents with values from 8 to 10).

Risk and Loss Aversion from Hypothetical Lottery Questions

The SAVE 2005 questionnaire contains six hypothetical lottery questions, three of which are designed to reveal information on households' levels of risk aversion, the other three focusing on households' level of loss aversion.

The questions referring to risk aversion are the following:

"Please choose one of the two alternatives: when choosing Alternative A, you will receive a fixed amount of money in cash. When choosing Alternative B, a coin will be tossed; the outcome of the toss will determine the amount of money you receive. What do you prefer, A or B?"

1. *A: You receive 1,000 € in cash.*

   B: Heads: You receive 2,000 €. Tails: You receive nothing.

2. *A: You receive 1,000 € in cash.*

   B: Heads: You receive 2,500 €. Tails: You receive nothing.

3. *A: You receive 1,000 € in cash.*

   B: Heads: You receive 3,000 €. Tails: You receive nothing.

Using the answers to these questions we can separate respondents into four groups of risk aversion. The first group includes respondents choosing Alternative B in every question and can be referred to as risk neutral or risk loving. The second group includes respondents choosing Alternative A in the first question and Alternative B in the second and third question. The

third group includes respondents choosing Alternative A in the first and second question and Alternative B in the third question. The fourth group includes respondents choosing Alternative A in every question and can be referred to as very risk averse. Dependent on their group, we split the households into two categories:

Risk loving, risk neutral or low risk aversion (includes respondents in the first, second and third group)

High risk aversion (includes respondents in the fourth group).

We choose to split the households into these two categories as there is a clear break between the relative frequency of households choosing Alternative A in every question and the frequency of households choosing the coin toss in at least one of the questions.

The questions referring to loss aversion are the following:

“Please choose one of the two alternatives: when choosing Alternative A, you will receive a fixed amount of money in cash. When choosing Alternative B, a coin will be tossed; the outcome of the toss will determine the amount of money you re-

ceive or the amount of money you lose. What do you prefer, A or B?"

1. *A: You receive 1,000 € in cash.*

   B: Heads: You lose 100 €. Tails: You receive 200 €.

2. *A: You receive 1,000 € in cash.*

   B: Heads: You lose 100 €. Tails: You receive 300 €.

3. *A: You receive 1,000 € in cash.*

   B: Heads: You lose 100 €. Tails: You receive 400 €.

In a corresponding manner to the questions on risk aversion, respondents can be separated into four groups of loss aversion. We split the households into two categories dependent on their answer:

Willing to encounter some loss (includes respondents in the first, second and third group)

Not willing to encounter any loss (includes respondents in the fourth group).

Again, we choose to split the households into these two categories as there is a clear break between the relative frequency of households choosing Alternative A in every question and the

frequency of households choosing the coin toss in at least one of the questions.

Expectations

There are four questions in the SAVE questionnaire about households' expectations which we include in the estimation. Respondents are asked to indicate their expectations with respect to their future financial situation, their health situation and their unemployment risk in the year the survey takes place.

Respondents are asked to rank their expectations with respect to their future financial situation and their future income situation on a scale from 0 to 10, 0 indicating very negative expectations, 10 indicating very positive expectations. We create a dummy variable for respondents with negative financial expectations and a dummy variable for respondents with negative health expectations. Respondents are assumed to have negative expectations if they state a value of less than or equal to 3.

With respect to their expectations with regard to unemployment risk, respondents are asked to indicate their subjective probability of becoming unemployed in the year the survey takes place. Rather than respondents having to come up with

their own probability figure, the questionnaire offers them the choice of 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% and 100% probabilities. We create a dummy variable for respondents who consider their unemployment risk to be high in the year of the survey. Respondents are assumed to have high subjective unemployment risk if they state a probability of greater than or equal to 70%.