WHAT DETERMINES THE SAVING BEHAVIOR OF GERMAN HOUSEHOLDS? AN EXAMINATION OF SAVING MOTIVES AND SAVING DECISIONS

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124-2007

What Determines the Saving Behavior of German Households?

An Examination of Saving Motives and Saving Decisions[1]

Daniel Schunk[*]

May 2007

Abstract:

Many motives for saving a portion of one's income co-exist and their relative importance changes over the life-cycle. However, most existing work focuses on only one of those motives and makes simplifying assumptions about the other motives so that they can be relegated to the background. All the more it is important to investigate heterogeneity in saving behavior in the presence of various co-existing saving motives. This paper is concerned with linking heterogeneity in German households' savings decisions to four co-existing saving motives. First, I find that the importance that households attach to the saving motives is related to how much households save at different life stages. Second, I classify the saver type of the households based on whether they engage in regular savings plans, or rather save irregularly and without a savings plan and I find that saving motives are related to the saver type of the household. The results show that heterogeneity in saving behavior along two dimensions – with respect to the saving rate and the saver type – is systematically related to the importance that households attach to different saving motives. This suggests that policy reforms that change the importance of certain saving motives in the eyes of private households might alter household saving behavior in various ways.

JEL-Classification: D12, D91, E21

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1 Introduction

For a typical household, many different considerations influence saving decisions over the life-cycle. For example, households save to finance consumption after retirement. They save in order to insure against various economic, biometric, and political risks that they are exposed to over the life-cycle. Households might also engage in saving for supporting their children or grandchildren, e.g. during their education, or for leaving a bequest to them. Finally, many households are interested in saving for purchasing real estate at some point in their life. Many of these considerations and circumstances imply explicit saving targets and they require specific forms of saving, such as long-term and planned saving for retirement.

Briefly, various saving motives co-exist over the life-cycle, and different motives might be associated with different forms of saving. Understanding what motives drive saving behavior over different stages of the life-cycle and how the relative contribution of these motives changes over the life-cycle will help us to understand differences in saving rates among households as well as past and future trends in saving behavior. As underlined by various authors (e.g., Bartzsch, 2006; Börsch-Supan and Lusardi, 2003), this understanding is of utmost policy relevance, since reforms of the social security systems directly interact with household saving as a private insurance. E.g., the currently ongoing reform of the German pension system is essentially concerned with the trade-off between public and private saving for old age: The reform moves the rather monolithical and very generous system that provides almost all retirement income within a single public pay-as-you-go-framework to a three-pillar system, in which private and occupational pensions will have an increasingly important role. Accordingly, the importance of private saving for old age has increased in recent years. Understanding the motives for private saving is also important from the perspective of taxation: For instance, the taxation of bequests and inheritances is non-distortionary if intergenerational transfers are accidental but may have efficiency costs if bequests are intentional (see, e.g., Bernheim, 2002). In summary, private saving is an important determinant of household economic security as well as social and economic well-being.

The point of departure of this paper – the observation that co-existing motives determine saving behavior – is an idea that goes back to Keynes (1936). While there is an extensive body of empirical literature on saving motives, which I review briefly in a later section, only few empirical studies take into account that different saving motives co-exist over the life-cycle; most studies focus on only one motive and make simplifying assumptions about the other motives such that those can be relegated to the background. A consistent finding in the literature is that there is considerable heterogeneity in household saving behavior, a point that is

emphasized by numerous authors, e.g., Alessie et al. (1997), Browning and Lusardi (1996), and Kurz (1985). In addition, many studies recognize explicitly that the contributions of saving motives to household saving might change over the life-cycle (e.g., Horioka and Wanatabe, 1997; Kennickell and Lusardi, 2005). So far, however, there has been only little interest in the investigation of how co-existing saving motives whose contribution might change over stages of the life-cycle help to explain the observed *heterogeneity in how much households save*. This shortcoming is criticized by, e.g., Alessie and Lusardi (1997), Samwick (2006) and Wärneryd (1999, p. 264). Furthermore, extending the vast literature that seeks to explain how much households save, a recently emerging literature emphasizes *heterogeneity in the extent to which households plan their saving or choose specific forms of saving, such as savings plans* (e.g., Ameriks et al., 2003; Lusardi and Mitchell, 2006; Sourdin, 2005). While Ameriks et al. (2003) relate heterogeneity in the propensity to plan to the general household budgeting behavior as well to a household's general attitudes and skills, Lusardi and Mitchell (2006) and Sourdin (2005) focus on planning and old-age provision. Overall, recent findings, obtained from studies that mostly focus on one specific saving motive, suggest that the heterogeneity in household socio-economic characteristics, in household preferences, and in household saving motives is associated with heterogeneity in saving behavior with respect to two – not necessarily independent – dimensions, namely how much households save and whether they plan their saving.

This paper focuses on the question to what extent heterogeneity in saving behavior can be explained by the importance that households attach to four potentially co-existing saving motives: The old-age provision motive, the precautionary motive, the bequest motive, and the motive to purchase a house (henceforth: housing motive). The paper finds that the importance attached to certain saving motives is related to heterogeneity in each of the two dimensions of saving behavior. More specifically, the paper first estimates the relationship between the saving motives and the saving rate. I find that information on saving motives is related to the household saving rate, and that the relative contribution of the saving motives to household saving changes over age classes. Second, the paper investigates whether saving motives help to explain what type of savers households are, e.g., whether they engage in regular savings plans, or rather save irregularly and without a savings plan. I find evidence for a relationship between the information on certain saving motives and the saver type of the households, i.e. the households' propensity to plan their saving.

To identify which of the saving motives are operative I use explicit data, i.e. answers to survey questions about the importance that households attach to the considered saving motives,

henceforth referred to as "subjective" measures.[2] On the one hand, subjective measures can generally be criticized for being more prone to misreporting than other measures, for instance in the case when certain answers are socially desired. Furthermore, in the specific context of this paper the reported saving motives themselves can cause estimation bias since they are endogenous to the saving behavior of households. On the other hand, the subjective measures used in this study have considerable advantages: First, their cognitive burden is very low and the item nonresponse rate is negligible. Second, they provide an alternative way to measure the strength of the precautionary motive, which does not restrict attention to income risk only – a limitation in existing studies of precautionary saving that is criticized in the literature (e.g., Hurst et al., 2005).[3] The subjective measure for the strength of the precautionary motive that is considered in this study includes other risks, such as health risks, longevity risk, and interest rate risk.[4] Overall, the paper presents empirical evidence that the importance that households attach to various saving motives is associated with observed saving behavior. The findings suggest that policy reforms that change the importance of certain saving motives in the eyes of private households might indeed alter household saving behavior in various ways and with differential effects over households' life stages.

The remainder of this paper is structured as follows: Section 2 provides information on the data, describes how the principal variables used in this study are measured, and presents basic descriptive statistics. Section 3 provides an overview of studies on saving motives and saving behavior and relates the current paper and its empirical framework to the existing literature. In section 4, the empirical analysis of the relationship between information on saving motives, the saving rate, and household saver types is presented, and the findings are discussed. Section 5 concludes.

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[2] Subjective data on saving motives have been used in existing studies. For example, information about bequest intentions has been used to learn about the existence of a bequest motive in studies by Alessie et al. (1999), Jürges (2001), and by Mirer (1979). Alessie and Kapteyn (2001) provide a detailed discussion about the usefulness of subjective data in research on saving behavior.

[3] The theory of precautionary saving predicts that households with higher income risk have higher accumulation, and most studies investigate the relationship between a measure for income risk and a stock or flow measure of saving without considering or controlling for other sources of risk. Palumbo (1999), and Kennickell and Lusardi (2005) are exceptions, they consider further sources of risk.

[4] Theoretical studies have shown the relevance of these risks for savings behavior, see, e.g., Yaari (1965) and Leung (1994) for uncertainty about lifetime. Palumbo (1999) presents a theoretical model that includes uncertainty about medical expenses – i.e., health risks – estimates its parameters based on data from the U.S. Panel Study of Income Dynamics (PSID), and finds that uncertain medical expenses represent an important motive for precautionary saving.

2 Data and Descriptive Statistics

2.1 The SAVE Survey

2.1.1 Overview

Departing from the Dutch CentER Panel and the U.S. Health and Retirement Study (HRS) as an example, researchers of the University of Mannheim have cooperated with the Mannheim Center for Surveys, Methods and Analyses (ZUMA), TNS Infratest (Munich), Psychonomics (Cologne) and Sinus (Heidelberg) to produce a questionnaire on households' saving and asset choice. The SAVE dataset records detailed information on both, financial variables such as income, saving, and asset holdings as well as on sociological and psychological characteristics of households. Great care was taken that the interviewer talks to the member of the household who knows about income, wealth and saving behavior whom we henceforth refer to as the household head.

2.1.2 The Random Sample

A first wave of the SAVE study, which was based on quota sampling, was fielded in the summer of 2001. The findings from this study were used to investigate the impact of different survey modes on response behavior (see Essig and Winter, 2003). The next wave benefited from the methodological findings of the 2001 wave and was conducted in summer 2003. The 2003 wave, which is used for the analysis presented in this paper, is a random sample of 2184 households.

The data universe for the SAVE 2003 random sample were all German speaking households in Germany with the households' head being eighteen years and older. Interviewees were selected from a multiply stratified multistage random sample. Further sampling details are presented in Heien and Kortmann (2003).

2.1.3 Data-Quality, Item Nonresponse, and Multiple Imputation

Essig (2005) discusses various methodological aspects of the SAVE dataset, in particular the questionnaire, interviewer and interviewee motivation, and the representativeness of the survey. He compares the 2003 random sample and the German microcensus 2002 with respect to the joint distributions of age, household net income, and household size, and he concludes that the SAVE random sample "fits the German microcensus extremely well" (p. 12). He also confirms that various financial measures, such as income and financial wealth, are in line with findings

from a related German survey, the German Socio-Economic Panel 2003 (GSOEP).[5] Finally, Essig concludes that unit and item nonresponse rates are very similar to related other surveys in Germany or other countries.

Item nonresponse to sensitive questions about household financial circumstances is documented and discussed in Essig and Winter (2003) and in Schunk (2007). To prevent biased inference based on an analysis of only complete cases, an iterative multiple imputation procedure has been applied to the SAVE data (Schunk, 2007). Multiple imputation simulates the distribution of missing data and allows for a more realistic assessment of variances in subsequent analyses than single imputation. The procedure uses a Markov-Chain Monte-Carlo method to replace missing data by draws from an estimate of the conditional distribution of the data. The multiple imputation algorithm generates five data sets with all missing values replaced by imputed values. For all descriptive statistics and all estimation results presented in this paper, the five imputed datasets are analyzed separately, and the results of the five analyses are then combined based on methods derived by Rubin (1987). The use of these methods assures that the missing data uncertainty is reflected in all findings presented in this paper.

2.2   Basic Demographic Characteristics

Table 1 shows basic demographic characteristics of the households in the 2003 random sample. Statistics concerning the age, marital status, number of children, education, and employment status of the household head are tabulated. Table 1 and all other statistics and estimations presented in this paper are not weighted.

< Include table 1 about here >

2.3   Measuring Household Saving Behavior

2.3.1   Saving Motives

The SAVE survey asks directly about saving motives. Households are asked how important they rate the considered saving motives in their own view. Each reason for saving has to be rated on a scale from 0 ("*of absolutely no importance*") to 10 ("*of highest importance*"). To mitigate interpersonal differences in the response behavior to this question, a common approach is to classify the answers on a more coarse symmetric scale: All answers from 0 to 3 are in the lowest category (which I denote as "*unimportant*"), answers from 4 to 6 are in the middle category ("*important*"), and answers from 7 to 10 are in the highest category ("*very important*").

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[5] The representativeness of the SAVE random sample has been further investigated by the author along other dimensions, results are obtainable upon request. All results underline the high representativeness of the SAVE random sample.

Table 2 shows the distribution of the answers across the four age classes that are considered in this study. Many households rate "saving as a precaution" and "saving for old age" as very important motives, whereas the bequest and the housing motive are overall of much less importance in all age classes.[6] These findings are in line with findings in Alessie et al. (1999) which are based on an analysis of binary measured saving motives.

<p align="center">*< Include table 2 about here >*</p>

2.3.2 Annual Saving

After a number of questions that introduce to household finances and saving, respondents are directly asked for their saving in the previous year 2002 ("*Can you tell me how much money you and your partner saved in total in the year 2002*?"). Households that did not have any positive saving marked that they had zero saving or dipped into their saving; i.e., the answers are left-censored at zero. Repayments of all recorded types of housing debt (excluding the interest paid) are then added in order to obtain a measure for *active* saving in 2002.[7,8] This study is concerned with the relationship between saving motives and active saving decisions, therefore, any passive saving flows are not taken into account in the considered saving measure.[9]

Figure 1 shows the mean and quartile saving rates for the 2003 cross section in each of the age classes that are considered in this study. The cross-sectional data exhibit two main features that are broadly in line with findings by Börsch-Supan et al. (2003) based on cross-sections of the German Income and Expenditure Survey (EVS) in various years: First, the saving rate has a hump shape and, second, median saving rates are positive even for elderly respondents. The appendix gives further information on the distribution of wealth and income across age classes in the SAVE sample.

<p align="center">*< Include figure 1 about here >*</p>

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[6] In this paper, the measure for the bequest motive captures the intention to leave assets to heirs after death *and* the intention to transfer money to children or grandchildren inter vivos (see, e.g., Reil-Held, 2006).

[7] Household saving(s) can be measured and defined in different ways. For a discussion of micro data measures for household saving(s) and the corresponding statistical and methodological issues, see, e.g., Alessie et al. (1997), Börsch-Supan et al. (1999), Brugiavini and Weber (2003), and Kennickell and McManus (1994).

[8] For 98 households I find that the repayments of housing debt are positive while the answer to the direct saving question is zero. For these households, I count the repayments of housing debt as total *active* saving of the household. The conclusions from this study do not change if these 98 households are excluded from the analysis.

[9] Note that in the SAVE questionnaire, the question about the importance of saving motives is asked in the context of a series of questions about active saving decisions; that is, the respondents are framed to think about active savings when they answer the questions about the importance of saving motives.

2.3.3 Saver Types

SAVE elicits information on whether households save in a planned or regular manner, or whether households save irregularly and without a savings plan. The following question is asked:

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Which sentence best describes the personal saving behavior of you and your partner?

☐ *I/we save a fixed amount regularly, for instance in a savings plan, in a savings account,*
   in shares or in a life insurance scheme.   [1]

☐ *I/we put something aside each month, but I/we decide on the amount according to the*
   financial circumstances.   [2]

☐ *I/we put something aside when I/we have something left over to save.*   [3]

☐ *I/we do not save because I/we do not have enough financial scope to do so.*   [4]

☐ *I/we do not save because I/we would prefer to enjoy life now.*   [5]

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The questionnaire asks households explicitly to choose only the one behavioral pattern that characterizes best their behavior. Clearly, the fact that one of the categories has been chosen does not rule out that actual saving behavior is more complicated and consists of several patterns. Nevertheless, the answers to this question are informative concerning the predominant saving pattern of the household. According to the answers given to this question, I classify households into four different saver types: Households that plan their saving or engage in some sort of savings plan that is associated with fixed regular saving (category [1]); households that save regularly, but do not engage in a savings plan (category [2]); households that save irregularly (category [3]); and households that do not save (category [4] and [5] combined).

Table 3 cross-tabulates the answers to this question with age classes and shows key financial statistics for each saver type. The table shows in particular that a very large proportion of households plans their saving and saves a fixed amount regularly. This proportion is significantly lower for households in the highest age class; further investigation reveals that there is also a significant difference between retired and non-retired households. Furthermore, table 3 shows that the average saving rate is highest for the group of households that engages in fixed regular saving, and decreases across saver types.

< Include table 3 about here >

3   Saving Motives and Existing Literature

This section discusses the existing literature in the context of the four considered saving motives and it relates the literature to the study presented in this paper.

Classical life-cycle theory goes back to Modigliani and Brumberg (1954) and Friedman (1957) and derives consumption and saving behavior from a well-defined intertemporal optimization problem that assumes rational and forward-looking agents who face a deterministic income path and smooth the utility of consumption over their life-cycle. Under standard assumptions about the utility function and combined with the fact that income is usually substantially lower after retirement than before, classical life-cycle theory thereby essentially captures an *old-age provision motive*. While the original intuition of the classical life-cycle model – that households save during their working years to accumulate assets which they use to sustain consumption after they retire – has been confirmed by numerous empirical studies over the years, there is also vast evidence that a large fraction of elderly households do not use up their wealth as predicted by the classical model; Mirer (1980) and Menchick and David (1983), for instance, are among the earliest of these studies. Alessie et al. (1999) show in a panel study that many elderly households even continue to accumulate wealth.

The basic model has been extended to include specific saving motives. To present an extension that includes a precautionary saving motive, I follow the prominent example of Carroll (1992, 1997). Consider a household who faces a risky labor income path and maximizes the discounted value of future utility from consumption up to time T, his time of death:

$$\max_{\{C_t\}_{t=0}^{T}} \sum_{t=0}^{T} \beta^t E[U(C_t)] \quad . \tag{1}$$

The household faces an intertemporal budget constraint:

$$X_{t+1} = R(X_t - C_t) + Y_{t+1} . \tag{2}$$

And the household faces a borrowing constraint:

$$X_t - C_t \geq 0 \qquad \text{for all t.} \tag{3}$$

Here, C_t is consumption, X_t is cash-on-hand at the beginning of the period, Y_t is labor income which is assumed to follow a stochastic path, β^t is the subjective discount rate, and R is the constant gross interest rate.

This model illustrates that, in the absence of complete insurance, expected shocks in disposable income lead prudent agents to save for smoothing the consumption path; i.e. under the given assumptions, savings do not only serve to finance consumption after retirement but also to insure households against income shocks. Simulations of (partially) calibrated versions (and various extensions) of the model predict that *savings for precautionary motives* can explain

a large share of total wealth accumulation (see, e.g., Caballero, 1991; Carroll, 1997; Gourinchas and Parker, 2002). Most of the empirical work on precautionary saving focuses on income risk as the origin for precautionary wealth accumulation and estimates the relationship between various measures for income risk and wealth accumulation. Evidence on the precautionary motive based on micro data yields mixed results and ranges from little or no evidence (e.g., Guiso et al., 1992; Skinner, 1988) to evidence for substantial precautionary accumulation (e.g., Bartzsch, 2006; Carroll and Samwick, 1998; Gourinchas and Parker, 2002). In the context of this variety which might be due to numerous reasons such as country and measurement differences, two shortcomings of existing studies are being emphasized in the recent literature. First, Fuchs-Schündeln and Schündeln (2005) who find considerable precautionary savings in Germany based on data from the German Socio-Economic Panel (GSOEP), argue that the extreme differences observed in existing empirical studies of precautionary saving might stem from the fact that many empirical studies fail to control for self-selection into occupations, since they do not include measures for the risk attitude of the households. Second, it is argued that the total amount of saving for precautionary accumulation might have been underestimated because risks other than income risks are not considered in most studies (e.g., Hurst et al., 2005; Kennickell and Lusardi, 2005). The present empirical study intends to circumvent the former shortcoming by including a measure for risk attitude in the multivariate estimation framework; the latter shortcoming is approached by using a measure for the importance of the precautionary motive that does not restrict attention to income risk only.

The basic version of the life-cycle hypothesis has also been extended to include a *housing motive*. Extensions that include a housing motive have been analyzed theoretically by Artle and Varaiya (1978) and by Hayashi et al. (1988). They find that in a world with downpayment constraints, the desire to purchase a house leads to additional saving for the purpose of financing home purchase. Emphasizing the role of downpayment constraints in the Italian housing market, Guiso et al. (1994) present evidence from micro data that the desire to finance housing purchase has an effect on the consumption profile of Italian households. Similarly, Moriizumi (2003) uses household data to investigate the presence of a housing motive in Japan and reports that wealth accumulation for housing purchase increases household saving and suppresses consumption for younger households. The degree of housing financial market imperfections in Italy and Japan might play an important role for the estimated effects in those studies, but it should be noted that German housing markets are also far from being perfect (Chiuri and Jappelli, 2003), suggesting that a housing motive might also have an effect on saving behavior in Germany.

Parents might not only care about themselves but also about the well-being of their children. Hurd (1987) extends the life-cycle hypothesis such that it includes a *bequest motive*. Again, the evidence on the presence and strength of an altruistic bequest motive is mixed (see, e.g., Jürges (2001) and Reil-Held (1999) for an overview and examinations of the bequest motive with the German SOEP data). The observed positive saving rates among many elderly – which contradict the simple form of life-cycle theory – do *not* prove the existence of an altruistic bequest motive. Bequests might also be purely selfish or they might be accidental (see Hurd (1990) and Kotlikoff (2001) for reviews of related literature), in which case they might stem from, e.g., uncertainty about the time of death (e.g., Davies, 1981), or from an unanticipated lack of capacity to consume (Börsch-Supan, 1992; Börsch-Supan and Stahl, 1991). Therefore, it is impossible to identify an operative bequest motive from saving rates or the shape of the wealth profile in the presence of co-existing saving motives that a study does not control for. Since the present study includes *explicit* measures for the saving motives, it identifies whether there is an overall contribution of an *intentional* (vs. an accidental) bequest motive; it is not possible to additionally identify the relative contributions of strategic vs. altruistic intentional bequests to total intentional bequests.

While the above-mentioned studies are representative of the vast literature that focuses on only one specific saving motive and estimates the contribution of one motive versus the potential contributions of all other motives, only few studies have focused on co-existing motives. An early series of these studies was inspired by Kotlikoff and Summers (1981) (and is reviewed in Kotlikoff (1988) and in Kessler and Masson (1989)) and has been explicitly interested in the relative contribution of co-existing motives to the *stock* of accumulated wealth. Three more recent empirical studies investigate the importance of various co-existing saving motives for the *flow* of household saving using micro data sets. First, Horioka and Wanatabe (1997) calculate the contribution of net saving to the flow of household saving for a large number of saving motives. They compute this contribution from direct questions about the hypothetical amount of current wealth that a household would hold for a specific motive, from questions about the household's hypothetical wealth target for that motive, and from questions about the hypothetical number of years until the household's planned realization date of that motive. Horioka and Watanabe find that the old-age provision motive, the precautionary motive and the housing motive are clearly the three most important motives in Japan. Second, in the context of a detailed analysis of wealth holdings, income and savings in Tthe Netherlands, Alessie et al. (1997) report descriptive statistics on a set of binary questions on whether certain saving motives exist at different stages of the life-cycle. They find that the precautionary motive

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is the predominant motive over the life-cycle, a housing motive is indicated by many young households but only by few older households, saving for children is particularly important at older age, and the existence of an old-age provision motive is generally indicated by only very few households in The Netherlands. Third, Alessie et al. (1999) focus on saving after retirement and report descriptive statistics on subjective importance ratings of saving motives; they find that the precautionary motive is the most important motive among retired households.

While these studies, dealing with co-existing saving motives, are based on descriptive statistics of survey questions concerning different saving motives, most studies that focus on one specific motive use multivariate reduced form models, in which the saving rate or accumulated household wealth is regressed on a number of socio-economic and financial household characteristics, and – if available – household preferences and expectations enter the equation additively (see, e.g., Fuchs-Schündeln and Schündeln, 2005; Kennickell and Lusardi, 2005). The present paper uses a classical reduced form, derived from a life-cycle model, and presents different specifications to show the sensitivity of the results with respect to the potential endogeneity of measures for household wealth. Generally, the selection of the included regressors is guided by extended versions of the classical life-cycle model that emphasize the role of households' expectations about the future (see, e.g., Lusardi, 1999).

4 Empirical Analysis

The empirical analysis consists of three parts. In the first subsection, the relationship between saving motives and the *saving rate* is investigated based on different specifications of a semiparametrically estimated saving regression. The second subsection uses an almost identical multivariate specification but is concerned with the association between co-existing saving motives and the *saver type* of the household based on a multinomial model. The last subsection discusses the findings.

4.1 Saving Rate and Saving Motives

The estimation is based on the following specification:

$$y_i = \frac{S_i}{I_i} = \beta_0 + \beta_I I_i + \beta_{I^2} I_i^2 + \beta_W W_i + \beta_{W^2} W_i^2 + \beta_Z' Z_i + \beta_{risk} riskpref_i + \beta_{fut}' fut_i + \beta_{mot}' motives_i + \varepsilon_i \quad (4)$$

$$(i = 1, ..., N)$$

Here, S is annual household saving as described in section 2.3.2., I is net household income, and W is household financial wealth or household total wealth, depending on the specification that is used for the analysis. Z is a vector of household characteristics: *age, age², age³* of the household head, her/his gender, household size, the number of children of the household head or family, homeownership, educational status, and various job characteristics. The variable *riskpref*

captures self-assessed risk attitude of the household head. The inclusion of measures for expectations concerning the future has been motivated in a section above; equation (4) refers to the included controls, such as expectation about income uncertainty and about the future development of the German economic situation, as *fut.* Finally, *motives* stands for the measures for the four saving motives (see section 2.3.1). These four measures are interacted with dummies for the four age classes (*< 35 years*, *35-49 years*, *50-64 years*, *≥ 65 years*) that are considered in this study. All included regressors are described in more detail in the appendix.[10]

As is clear from section 2.3.2, the dependent variable in the saving regression is left-censored at zero. A censored regression model is used to explain the saving rate *y* for all *i = 1,..., N*:

$$y_i^* = \beta' X_i + \varepsilon_i, \qquad\qquad y_i = \max(y_i^*, 0) \qquad\qquad (5)$$

Tobit estimates will generally be inconsistent if the error terms are heteroscedastic or non-normal (e.g., Goldberger, 1983; Hurd, 1979). And for all specifications that I consider, the assumptions of homoscedasticity and normality of the error term are rejected in the present censored model at the 5% level based on the corresponding Lagrange Multiplier tests for censored models (Chesher and Irish, 1987). Therefore, I use Powell's (1984) semiparametric censored least absolute deviations (CLAD) estimator, which is consistent and asymptotically normal even if errors are heteroscedastic. In contrast to the assumption of homoscedastic and normal errors, which is imposed in the Tobit model, CLAD imposes the following conditional median restriction:

$$Med(\varepsilon_i \mid X_i) = 0 \qquad\qquad (6)$$

The CLAD-estimator requires the minimization of a nondifferentiable function, Buchinsky's (1994) iterative linear programming algorithm (ILPA) is used. The properties of CLAD with respect to the degree of censoring and the sample size have been investigated in various simulation studies (Deaton, 1999; McDonald and Xu, 1996; Paarsch, 1984). Both the degree of censoring and the sample size of the considered estimation in this paper, fall well beyond the limits that are specified in those studies and therefore strongly advocate the use of

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[10] To see that the findings concerning saving motives are meaningful, note also that in *each* single age class and for *each* considered saving motive, the importance ratings of the saving motives are non-degenerately distributed over the three importance rating categories (see table 2). As well, the saving rate has considerable and very similar variation in *each* age class. This is important in order to ensure that the effect of saving motives on the saving rate is identified. If, for example, *all* respondents in a certain age class would rate a certain saving motive as "very important", the saving motive could be operative, although the estimation would not find a significant coefficient for the motive in the particular age class. Note further that the results presented in this study are robust to the choice of the symmetric scale in section 2.3.1.

the CLAD estimator rather than Tobit estimation. Standard errors for the CLAD estimates are computed using 150 bootstrap replications.

The existing stock of wealth might be a substitute for, e.g., precautionary or retirement wealth accumulation, that is, it might be endogenous to the saving decision. To investigate the sensitivity to the inclusion of wealth, I use three different specifications: Specification (a) excludes the wealth variables, specification (b) includes financial wealth only, and specification (c) uses total net wealth of the household. The fact that all specifications yield similar results underlines the robustness of the findings.

Table 4 presents the results of the CLAD estimation, and I report on results that are significant at the 10%-level in the text.[11]

< Include table 4 about here >

Each of the three age variables is significant in all specifications, and the three age variables are jointly significant in all specifications. The high school dummy which indicates whether the household head and/or her/his partner have senior high school education (the German "(Fach-)Abitur"), the dummy for civil servants, for unemployed household heads and for households that own their currently occupied house or apartment are all significant in the three specifications: Households in which at least one of the partners has high school education, have on average a saving rate which is about 3 percentage points higher than the saving rate of households for which this is not the case.[12] Households with unemployed household heads have a saving rate, which is about 8 percentage points lower than households whose household head is working, and civil servants have a saving rate, which is about 3 percentage points higher on

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[11] Please refer to the tables for more detailed information on the significance levels.

Two findings stand out in table 4: First, despite the inclusion of many explanatory variables, more than 90% of the variation in the saving rate remains unexplained. This is common in most studies of this type (see, e.g., Lusardi, 1999, p. 103-109). Note that the value of R^2 even decreases further if I follow the common approach of transforming zero saving rates to a very small value and then log-transform the data for the savings rate. This suggests that the linear specification (4) in combination with the CLAD estimation which is robust to outliers (the presence of which is unavoidable in data of this type) should be preferred to the log-transformation in the present case. Second, while most reported coefficients do not vary much across specifications, specification (b) differs somewhat from specifications (a) and (c) – a finding that also shows up in the following section of this paper and that is due to the correlation between financial wealth and the dependent variable.

Finally, note that I find very similar results if I follow a two-step procedure and restrict my sample to only those households with a nonnegative saving rate in the second step. As well, the inclusion of further variables, such as dummies for different regions (to account for differences in unemployment rate), for community size, as well as for household characteristics such as smoking habits does not change the results.

[12] All numerical examples that I use for illustrating the results of the CLAD-estimations refer to specification (a).

average. The coefficient of the home-ownership dummy is positive and significant, suggesting that households that own their occupied house or apartment have a saving rate that is about 8 percentage points higher than the saving rate of households that are not homeowners.

Turning to the main variables of interest, the saving motives, it is first found that despite the many included covariates, some of the interactions between saving motives and age classes still have significant predictive power. The coefficients of those interactions are a measure for the change in the saving rate in percentage points that is associated with a one unit increase in the importance rating of a certain saving motive for a certain age class. That is, on average, a household in the oldest age group that rates the precautionary saving motive as "*very important*" has a saving rate that is 2.4 percentage points higher than the saving rate of a household with identical covariates that rates the precautionary motive as "*important*". Figure 2 shows the coefficients of the four saving motives by the age group of the household head for the three considered specifications. All figures show a similar pattern and illustrate how the association between saving motives and the saving rate varies over age groups.

< Include figure 2 about here >

The findings from this analysis are informative in two respects: First, concerning the subjective information on saving motives that is elicited in the SAVE study and, second, concerning the question which saving motives are operative at what life stage.

Concerning the subjective information on saving motives, I find that while the descriptive statistics on the importance ratings of the single saving motives (see section 2.3.1) do not show a significant trend over all age classes (with the exception of the housing motive), the multivariate analysis does find that saving motives change significantly over age groups in their explanatory power for actual saving behavior. An explanation for the finding that trends over life stages vary between the pure descriptive statistics and the multivariate analysis is that households answer the subjective question about the importance of the saving motives by just stating their *general* importance rating of the saving motives.[13] The multivariate analysis, however, estimates whether information on a single motive is indeed related to actual saving behavior at a certain life stage and under the assumption of co-existing saving motives.

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[13] I want to give two examples: First, almost every sixth childless household in the oldest age class rates the bequest motive as important or very important, although the corresponding question explicitly talks about children or grandchildren as the recipients. Second, Table 2 reveals that almost 30% of the households in the oldest age class think that the housing motive is an important or very important saving motive; however, the age, the financial resources, and the answer to a specific question about the savings goal suggest clearly that almost all of these households will most likely not purchase a house in the future.

Concerning the question which motive is operative at what life stage, table 4 shows that the old-age provision motive and the housing motive are both significantly related to the saving rate in early life stages. While the presence of a housing motive in the youngest age class of German households is of interest for itself, the finding that there is a particularly strong effect of the old-age motive for the youngest age class deserves some more explanation as it might be connected to the increased public debate about the German pension system which started in the late 1990s and which was associated with marketing and information campaigns by insurance and bank companies. These campaigns have especially targeted younger households, which will be affected stronger by the reforms than older cohorts. Börsch-Supan et al. (2004) provide evidence for a recent increase in the awareness about the fact that one effect of the pension reform will be a decrease in pension levels, and young households are particularly aware of these facts.[14]

Table 4 further reveals that in contrast to the old-age provision motive and the housing motive, the bequest motive and the precautionary motive are particularly operative for older age groups. Both findings are comparable with existing studies that focus on only one specific saving motive. First, in his study that focuses exclusively on the bequest motive, Jürges (2001) also finds an operative bequest motive among the elderly. He reports consistently and significantly different wealth trajectories for elderly households that declare that they have a bequest motive compared to households that declare not to have a bequest motive. Second, the effect of the precautionary motive is in line with findings on precautionary wealth accumulation by Kazarosian (1997) and Lusardi (1998, 2000), who investigate older workers, as well as by Carroll and Samwick (1998) and by Kennickell and Lusardi (2005). An explanation for the increase in the precautionary motive with age are the increased health risks that older people face, i.e. risks associated with considerable health costs. Indeed, even controlling for many household characteristics, I find that – with increasing age – expectations concerning the

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[14] Furthermore, the great majority of household heads in the SAVE sample are dependent employees (see table 1), for whom participation in the German pay-as-you-go system is mandatory, and for many of whom private old-age provision has only recently become an important issue, given that a large proportion had completely relied on publicly funded old-age provision provided by the traditionally fairly generous German pension system. The German retirement insurance system has a high replacement rate, generating net retirement incomes that have been about 70 percent of pre-retirement net earnings for a dependent employee with a 45-year earnings history and average life-time earnings in the late 1990s. Overall, public pensions constitute more than 80 percent of the income of households headed by persons aged 65 and older, while funded retirement income, such as asset income or firm pensions, plays a much smaller role than, e.g., in the Netherlands or the Anglo-Saxon countries (Börsch-Supan et al., 2003).

development of the health situation get worse, whereas expectations about the future economic situation are not significantly related to the age of the household, and subjective expectations about future earnings variance decrease with an increase in age (see appendix, section 6.3.1). Additionally, an analysis based on six waves of the official budget and expenditure survey (*Einkommens- und Verbrauchsstichprobe,* conducted every five years by the German Federal Statistical Office), reveals that out-of-pocket medical expenditures are increasing significantly with age, they are about four times as high at the age of 80 than at the age of 50 (see appendix, section 6.3.2, and figure A.1).

4.2   Saver Types and Saving Motives

The previous section shows that information on saving motives helps to explain *how much* households save. Do saving motives also help to explain *how* households save, i.e. whether they engage in regular savings plans, or rather save irregularly and without a savings plan? The goal of this section is to relate heterogeneity in the degree of planning and regularity of saving behavior to households' saving motives in a multivariate framework that includes the saving motives as in the previous section. The results are informative as to whether certain motives for saving are crucial in determining the saver type of a household.

Authors that are concerned with heterogeneity in the extent to which households plan their saving (e.g., Lusardi, 1999; Lusardi and Mitchell, 2006; Venti, 2006) underline that numerous behavioral and psychological factors interfere with the ability to compute optimal plans or to simply make a plan and execute it.

In contrast, conventional life-cycle theory assumes that households are able to formulate savings plans based on expectations about the future, but the theory neither models psychological factors that are relevant in this respect, nor does it take a stand on the regularity and contractual form of household saving and its relationship to saving motives. However, given certain income paths, life-cycle theory has some implications: For example, consider a household with an extremely volatile income path that regularly drops below the expenditure and consumption path and with only a small stock of financial and liquid wealth. This household might well have precautionary savings, which have been accumulated in periods with higher income and which are needed to finance consumption in unforeseen low income periods (see, e.g., Carroll and Samwick (1998), who provide simulations based on the buffer stock model). But in the presence of borrowing constraints, intertemporal consumption smoothing implies that this household would not engage in regular or in contractual saving: The household would not be a regular saver because of the dramatic income shocks that occur from time to time, and the household would not engage in contractual saving since the money should not be bound

contractually, in order to be able to finance consumption in unexpected low-income periods. In turn, high-income civil servants[15], for instance, would probably save very regularly to provide for unforeseen events for which liquid wealth is needed or to provide for old age. Given the attractiveness of certain savings contracts, in particular considering existing state subsidies for certain long-term savings plans, it might also be rational for high-income civil servants to engage in contractual saving. I mention these examples above because they first illustrate that while the life-cycle model is informative concerning the saver type for specific income paths, it is generally rather silent about the relationship between the form of saving and saving motives. And second, they underline that any study that is concerned with the identification of the relationship between saving motives and household saver types should include proxies for the income uncertainty of the household; the present study includes dummies for the type of employment and a subjective measure for future earnings variance.

I investigate the relationship between saver type and saving motives using discrete choice models. The same explanatory variables as in the analysis in section 4.1 enter the estimation. The only difference is that the saving motives are not interacted with age classes, since there is no a-priori hypothesis that the effect of saving motives on the saver type should vary by age class. Furthermore, the sample for this analysis is restricted to the non-retired population, since life-cycle theory predicts that retired households dissave.[16]

< *Include table 5 about here* >

The relationship between the saver type classification and saving motives is first investigated using a multinomial logit model for three alternatives.[17] Table 5 presents estimation results using the type "irregular saver" (category [3]) as the base category. For reasons stated

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[15] In Germany, civil servants can expect a non-declining income path until retirement. A civil servant can only be transfered to a new position if her wage does not decline due to the transfer. Furthermore, a civil servant can only be dismissed is she is sentenced to a certain period in prison for any criminal charge or for charges associated with treason.

[16] In particular, there should not be an old-age provision motive any more for retired households, i.e. those households do not save for an income drop due to retirement. In fact, the data show, first, a sudden decrease in the saving rate after retirement and a significant increase in left-censored observations with the corresponding saving rate being less or equal to zero.

Second, there is a highly significant difference in the distribution of households across saver types between the retired and the non-retired sample, and only mild and mostly insignificant differences in the distribution between different age classes of the non-retired sample. And, third, the analysis presented above shows that the old-age provision motive has no significant predictive power for households in the highest age class.

[17] In multinomial logit models, the odds ratio between any two choices does not depend on the other choices, this property is termed the independence of irrelevant alternatives (IIA). A Hausman-McFadden test (Hausman and McFadden, 1984) suggests that for all specifications that I consider, the IIA assumption cannot be rejected.

above, I present again the three different specifications that have been used in the previous section.

Table 5 reveals that the estimated coefficients and standard errors do not differ very much across specifications; therefore, the following interpretation of the results does not distinguish between specifications. Focusing on the type of households that plan their saving and engage in a regular savings plan (type 1), it is first found that civil servants are significantly more likely to be of this type, and unemployed households are significantly less likely to be of this type relative to the base category, type 3. While the bequest and the housing motive are not significantly related to the relative probability ratios, an increase in the subjective importance rating of the precautionary motive is associated with a significant decrease in the probability of being of this saver type (type 1) relative to being an irregular saver (type 3). More specifically: Relative to the base alternative, an increase of the precautionary motive from "unimportant" to "important" is associated with a 26% smaller probability of being in the group of households that plan their saving and engage in some sort of regular savings plan. Conversely, an increase in the importance rating of the old-age provision motive comes along with an increase in the relative probability of being in this group. The model estimates a 120% higher probability relative to the base alternative if the old-age provision motive is increased by one unit. For the group of regular savers that do not engage in fixed saving (saver type 2), no significant relationship at the 10% level is found except from the result that an increase in the importance of the old-age provision motive is positively associated with the probability of being a regular saver relative to the base alternative.

An important underlying assumption of the multinomial logit estimation is the independence of irrelevant alternatives (IIA) which implies a certain substitution pattern across alternatives. If substitution actually occurs in this way and if the model is specified correctly, then the multinomial logit model is appropriate. While the IIA property that gives rise to the proportional substitution pattern of the multinomial logit model was not rejected in the present case by a Hausman-McFadden test (see footnote 17), it has been noted that this test has low power under many circumstances (see, e.g., McFadden, 1987). Therefore, I have also estimated a multinomial probit model that relaxes the IIA assumption by allowing for correlation across choices in the unobserved components. The findings from the multinomial probit model are in line with the conclusions presented above, and they are detailed in the appendix, section 6.4. Finally, I have also investigated the relationship between saver type and saving motives based on binary logit models for all three specifications.[18] In the binary choice models the probability

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[18] The results can be obtained from the author upon request.

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of being of a certain saver type is compared to the probability of being in *any* of the other groups. Again, the findings support all conclusions from the multinomial choice analysis.

The analyses in this section present descriptive evidence that there is a relationship between importance ratings of saving motives and the household saver type. First, I found that an increase in the importance attached to precautionary reasons for saving is associated with a decrease in the probability of being of saver type 1 relative to saver type 3, and to a decrease of the probability of being of saver type 1 relative to type 2. An explanation is that households with a strong precautionary motive are aware that they might need their savings at some particular but unknown point in time, and therefore they decide that their savings should not be bound in a savings plan or in shares by that unknown point in time.

Second, I find that an increase in the importance of the old-age provision motive is associated with a significantly higher probability of engaging in regular and planned saving. This finding might have several explanations. One explanation is that households that want to save for retirement react to the incentives of banks and insurance companies as well as to subsidies by the government and use the more attractive longer-term savings plans in order to save for long-term saving goals. This can be confirmed by looking at what specific financial products German households use for their savings. A recent study by Reil-Held and Schunk (2006) reveals that – controlling for co-existing saving motives – there is indeed a strong association between the importance attached to an old-age provision motive and the probability of buying state-promoted and long-term savings plans, such as a so-called Riester-pension, life-insurance schemes, or other private pension schemes. A further plausible explanation is that households indicating a high importance of old-age provision exercise self-commitment: Savings that are planned for retirement should remain untouched during work-life and are therefore made in the form of fixed contractual savings.

Through allowing for the co-existence of various saving motives, the presented results concerning the old-age provision motive add well to existing findings about saving behavior and future planning. First, combined with the descriptive result in table 3 that households that save regularly and in a savings plan also have a higher saving rate on average, the findings are in line with the above-mentioned findings by Lusardi (1999) concerning a relationship between retirement planning and wealth accumulation. Second, they complement findings by Ameriks et al. (2003), who report direct evidence that households with a high propensity to plan their long-term future save more, are better able to exercise self-control, and self-commit to a certain behavior.

4.3   Discussion

The presented estimations include an extensive set of variables. This shows that the measures for saving motives correlate with saving behavior even after controlling for the rich information about households available in the SAVE survey. The fact that three different specifications lead to similar results further underlines the robustness of the results. Of course, the direction of the causality as well as the presence of third factors is debatable in the given context; the presented methodology does not address the question of causation, and any causal interpretation of the results would depend on the underlying model and its underlying assumptions.[19] In the given context, accumulated wealth itself could have an effect on the importance that households attach to certain saving motives. Additionally, it is important to note that the cross-sectional data that are used for this study do not allow to control for cohort effects. The cross-sectional data neither permit the estimation of structural models that account for endogeneity and dynamics. But since the dependent variable in the analysis of saver types characterizes a stable behavioral rule rather than one single observed saving decision, the analysis of saver types is not sensitive to dynamic shocks that might have an impact on the findings.

A limitation of this study is that through providing two independent analyses, I implicitly make the behavioral assumption that households face two independent decisions: They decide how much they save, and they decide whether to engage in savings plans, save regularly, or rather save irregularly. These two decisions are not necessarily independent as table indicates. Another model would be that households decide first about how much they save and then – conditional on the amount that they want to save – they decide about how regular they save or whether they engage in a savings plan. It is not clear which is the correct model for the decision-making process in this case. Further multinomial choice analyses of the saver type in which I include the saving rate as an additional covariate, reveal that the saving rate is significantly and positively associated with the relative probability of being a regular saver (type 2) and a saver who engages in savings plans (type 1); however, the coefficients of the saving motives are not affected by the inclusion of the saving rate, indicating that all established relationships still hold.

Finally, the measures for the saving motives themselves could be related to other included variables – such as risk preferences or future expectations – or to unobserved factors that are relevant for decision-making but that the study does not control for, e.g. psychological traits of the respondent. Given that there is no testable structural theory that relates the psychological

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[19] The most important example is the basic assumption that people are forward-looking: If people were not forward-looking, the saving motives would not play any role for explaining their savings behavior, people would simply save what is left over after consumption, without having any specific saving motive in mind.

traits measured in SAVE to saving motives and saving decisions and that would guide a further analysis of their relationship to savings behavior, I simply included those psychometric variables additively in the regressions, in order to learn about the potential impact of those factors on the presented regressions. As an example, consider that optimism rather than classical preference measures may be linked to major economic decisions, as is claimed by various scholars (Gervais and Goldstein, 2004; Rigotti et al., 2004; Puri and Robinson, 2005). Following this idea, a self-reported measure for optimism has been included in the analysis. While this measure correlates with most elicited measures for future expectations, the inclusion of this measure into the analyses does not have a considerable effect on the coefficient estimates for the saving motives, i.e., it does not alter the conclusions from this paper. In the SAVE survey, the household head is also asked to provide a self-assessment concerning her happiness, her self-assuredness, and she is asked to what degree she considers herself a creature of habit or a person that is open to change.[20] The inclusion of all these subjective measures in the analyses does not have an impact on the conclusions of this paper. As well, SAVE elicits alternative measures for risk preferences than the one considered in the presented analysis;[21] after including these alternative risk measures, still the same relationship between saving motives and saving decisions is found. These findings underline the robustness of all results.

Overall, the results – established in a framework that controls for the co-existence of different saving motives – show that the subjective assessment of the importance of saving motives is significantly related to two dimensions of household saving behavior. If these relationships are insensitive to a wide range of policy changes and to changes in micro- and macro-economic circumstances, then targeted information campaigns or policy reforms that substantially change the importance of certain saving motives in the eyes of private households might indeed have various effects on the saving behavior of those households. These findings are of particular interest in the context of current policy reforms in Germany, which directly interact with private household saving, and therefore require an understanding of whether and how households react to the desired reforms and the associated information campaigns. Particularly helpful for policy would be the question whether the relative saving contributions of different motives compete

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[20] For all these above-mentioned measures (i.e., optimism, self-assuredness, etc.), respondents are asked on a scale from 0 to 10 whether a statement of the form "*I am optimistic*", "*I am a self-assured person*", etc. "*does not apply at all*" (0), or "*applies very well*" (10).

[21] More specifically, respondents are asked about their willingness to take risks with respect to their health, their career, leisure time and sports, and car driving on a scale from 0 to 10.

with each other. Given that in all life stages most households are constraint in their budget (as an additional analysis of overdrafts reveals), the present analyses suggest that a different set of motives competes at different life stages. Reil-Held and Schunk (2006) investigate specific forms of saving and report additional evidence for competing saving motives: In a multivariate framework that includes the same socioeconomic controls as in this study, they find that for young households an increase in the importance of the home purchase motive is associated with a strong decrease in the likelihood of taking part in state-promoted old-age savings plans; this is in line with the presented findings about saving motives for younger households, given that most households are constraint in their budget. From a policy perspective it is of interest to understand the precise nature of this competition better. How does the nature of this competition change over the life-cycle? The present study illustrates that indeed many motives whose relative contribution changes over age classes are simultaneously associated with saving decisions and must be taken into account when discussing the effect of policy reforms on household behavior.

5   Conclusion

This paper has investigated household saving behavior based on a random sample of German households that have been surveyed specifically to learn about their saving decisions. The data contain rich information on household financial, socio-demographic, and psychological characteristics and they offer the opportunity to investigate saving behavior under the assumption of co-existence of various saving motives which are elicited based on subjective importance ratings.

The results of this study support the view that households' saving decisions are influenced by different saving motives that co-exist over age classes, but whose relative contribution to household saving changes with age. Households' reported importance of various saving motives is related to heterogeneity in saving behavior with respect to two dimensions: First, it is related to heterogeneity in the household saving rate at different life stages. The effects of various saving motives are generally appropriate given the different stages of the households' life-cycle. In particular, further investigations, e.g. based on official survey data, reveal that the increase of the importance of the precautionary motive with age – which is in contrast with most existing literature that derives a precautionary motive only from income variance – is plausible, given the development of households' expectations and medical out-of-pocket expenditures with age. Second, both the old-age provision motive and the precautionary motive are related to heterogeneity in the saver type, i.e. related to a classification of the regularity of household saving. The latter findings suggest that for many households the decision whether to save in a savings plan is related to the purpose of their saving. For instance, households indicating a high

importance of old-age provision have a high probability of saving regularly and in savings plans. At the same time, these relationships can be driven by a wish to exercise self-control on the part of those households that are concerned about their retirement saving. How this relationship works precisely, how psychological determinants and institutional incentives influence the process of wealth accumulation and how the process of wealth accumulation itself might feed back onto the relevant psychological determinants of saving behavior are very interesting and important questions for further research.

The finding of a relationship between the importance that households attach to different saving motives and their actual behavior suggests that policy reforms that substantially change the importance of certain saving motives in the eyes of private households might indeed alter household saving behavior in different ways and with differential effects over the life stages. That is, information and motivation are crucial for the successful implementation of policies. While this seems a trivial insight, the last German pension reform has demonstrated how the German government has neglected necessary information and motivation campaigns, such that banks and insurance companies took over and controlled the dynamics of the process (Reil-Held and Schunk, 2006). The present study has also argued that different saving motives are "competing" for their relative contribution to household saving: Experiences with the German pension reform show that an increase in saving for old age might not be associated with an increase in the overall amount of household savings, but rather with a substitution between different forms of saving. That is, the increase in the importance of a certain motive is likely to come at the expense of the savings flow to a particular other motive. Extensions of this study should investigate the relationship between saving motives – as can be captured in recent behavioral life-cycle models of saving behavior (see, e.g. Binswanger, 2006a, 2006b) – and the flow of household saving to various specific financial assets – such as pension plans, building society contracts etc. – in order to estimate how changes in the importance attached to different motives are reflected in portfolio choice behavior.

6 Appendix

6.1 Wealth and Income

< Include table A.1 here >

6.2 Covariates

Additionally, subjective importance ratings of the four saving motives are included as covariates. In the CLAD-estimation, these measures are interacted with dummies for the four age classes that are considered in this study. In the regression output, "1" stands for the lowest age class (*<35*), "2" refers for the age class *35-49*, "3" indicates age class *50-64*, and the oldest age class is denoted by "4". That is, "mot_oldage1" refers to the old-age provision motive in the lowest age class. In total, $4 \cdot 4 = 16$ interacted variables for the saving motives are included in the regressions.

6.3 Future Expectations and Out-of-Pocket Health Expenditures

6.3.1 Development of Future Expectations with Age

< Include table A.3 here >

Note: This table presents a regression of subjective expectations concerning the health situation, concerning the German economic situation and concerning the variance of future earnings on household characteristics. The table shows in particular that an increase in age is associated with significantly worse expectations concerning the development of the health situation. The findings from this regression – a strong negative effect of the age-variable on the expectation concerning the development of future health, no significant effect of the age-variable for the expectations concerning the development of the German economic situation, and a positive but insignificant effect for expectations concerning earnings variance – remain the same if I include higher order terms of the age variable (age^2 and age^3) and test for joint significance.

6.3.2   Development of Out-of-Pocket Medical Expenditures at Old Age

Figure A.1 shows median annual out-of-pocket medical expenditures for different cohorts, calculated from six waves (1978, 1983, 1988, 1993, 1998, 2003) of the official German Income and Expenditure Survey (EVS), collected by the Federal Statistical Office. All values are in 2001 Euros, they are converted based on CPI-data from the Federal Statistical Office. The oldest cohort is born in 1906, and they enter the picture at the age of 72 in the 1978 wave of the survey. The youngest cohort is born in 1951, they are 52 years old at the time of 2003 wave of the EVS. We see more than a fourfold increase in out-of-pocket medical expenditures in the age range that we observe.

< Include figure A.1 here >

6.4 Multinomial Probit Model for Saver Types

The multinomial probit model allows to relax the assumption of independence of irrelevant alternatives by estimating the variance-covariance parameters of the latent-variable errors, instead of imposing that errors are independently and identically distributed according to a type 1 extreme value distribution. I have not motivated the multinomial choice analysis in section 4.2 based on an additive random utility choice framework, since I consider the underlying econometric model less as a behavioral model of choice in this context but rather as a descriptive analysis of the statistical association between saver types and saving motives. In this line, the purpose of the multinomial probit analysis presented in the appendix is not to claim that a different behavioral structure describes this association better, but only to show that even if I relax the IIA assumption by allowing for correlation between the latent-variable errors, the conclusions from this paper still hold. The multinomial probit model assumes that the stochastic error terms have a multivariate normal distribution. As described by Train (2003), the model requires normalization since both the location and scale of the latent variable are irrelevant. To normalize location, I choose – as in the multinomial logit model – saver type 3 (irregular savers) as the base alternative. To normalize for scale, I fix the diagonal elements to 1. While this still imposes some structure on the covariance matrix that is necessary for identification since the model does not include alternative specific variables, it still allows for correlation between the error terms of saver type 1 and saver type 2, which the multinomial logit model does not do.

The results (see table A.4), which are estimated by maximum simulated likelihood, confirm the role of the precautionary and the old-age provision motive that is discussed in the paper. If other categories are chosen as base categories, e.g. saver type 1, and the model allows for correlation between the error terms of other saver types, I find similar results.

< Include table A.4 here >

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Tables and Figures

Table 1: Demographic characteristics of the random sample of 2184 households.

Characteristic	(%)
Age	
18-34	21.4
35-49	29.7
50-64	23.7
65+	25.2
Marital Status	
Currently married	59.7
Previously married	20.9
Not married	19.4
Education	
Haupt-/Volksschule or below	40.9
Mittlere Reife, Fachhochschulreife	37.8
Allgemeine/fachgebundene Hochschulreife	21.3
Employment Status	
Retired	35.2
Blue collar	16.0
White collar	22.6
Civil servant	4.2
Self-employed	6.0
Unemployed	7.0
Education/Apprenticeship/Military service/Parental leave	9.0
Number of children	
0	24.5
1	22.0
2	32.2
3	13.4
4+	7.9

Table 2: Descriptive statistics on the question about households' saving motives.

		Old-age provision motive			Precautionary motive		
		(1)	(2)	(3)	(1)	(2)	(3)
	All	22%	19%	59%	14%	24%	62%
Age	<35	20%	21%	59%	15%	25%	60%
	35-49	14%	20%	66%	11%	27%	62%
	50-64	20%	13%	67%	14%	22%	64%
	≥65	35%	20%	45%	18%	21%	61%

		Bequest motive			Housing motive		
		(1)	(2)	(3)	(1)	(2)	(3)
	All	49%	31%	20%	54%	10%	36%
Age	<35	54%	26%	20%	34%	18%	48%
	35-49	43%	38%	19%	48%	11%	41%
	50-64	53%	30%	17%	61%	8%	31%
	≥65	50%	28%	22%	71%	5%	24%

Note: (1) Unimportant, (2) Important, (3) Very important.

Table 3: Descriptive statistics on household saver types.

		Household Saver Type			
		1	2	3	4
		Regular, planned	*Regular*	*Irregular*	*No saving*
	All	35%	20%	21%	24%
Age	<35	34%	14%	19%	33%
	35-49	47%	16%	16%	21%
	50-64	40%	18%	21%	21%
	≥65	20%	32%	27%	21%
	Mean saving rate	18.9%	15.2%	10.3%	1.7%
	Std. err.	1.1%	1.1%	0.9%	0.3%
	Mean financial wealth [€]	40,147	25,050	16,749	9,895
	Std. err. [€]	3,917	2,209	2,340	3,604
	Mean total wealth [€]	201,074	187,800	114,104	75,635
	Std. err. [€]	20,654	18,648	11,063	11,133

Table 4: CLAD estimation of three different specifications of the saving regressions.

savings rate	(a) Coef.	(a) Std. Err.	(b) Coef.	(b) Std. Err.	(c) Coef.	(c) Std. Err.
age	0.263 ***	0.099	0.198 ***	0.076	0.255 ***	0.097
age2	-0.048 **	0.019	-0.037 **	0.014	-0.047 **	0.018
age3	0.003 **	0.001	0.002 **	0.001	0.003 **	0.001
partner	0.027 **	0.013	0.019 *	0.011	0.024 *	0.013
hhsize	-0.010 *	0.005	-0.010 **	0.005	-0.009 *	0.005
children	0.001	0.004	0.003	0.003	0.001	0.004
female	-0.015 *	0.009	-0.013	0.008	-0.012	0.009
highschool	0.030 **	0.012	0.019 *	0.011	0.027 **	0.014
civilservant	0.032 *	0.019	0.034 **	0.017	0.035 *	0.018
selfemployed	0.042	0.025	0.021	0.025	0.038	0.026
unemployed	-0.079 **	0.033	-0.063 ***	0.020	-0.077 ***	0.030
homeowner	0.080 ***	0.010	0.068 ***	0.009	0.070 ***	0.012
retired	0.009	0.020	0.010	0.017	0.005	0.018
unemp_prob	-0.020	0.020	-0.014	0.021	-0.019	0.022
heritage_prob	0.019	0.027	0.012	0.028	0.014	0.027
earnings_var	0.000	0.001	0.000	0.000	0.000	0.001
dev_ger_econ_sit	0.006 ***	0.002	0.005 **	0.002	0.006 ***	0.002
lifeexpect	-0.002	0.004	-0.001	0.004	-0.002	0.004
dev_health_sit	0.002	0.002	0.002	0.002	0.002	0.002
riskpref	0.005 **	0.002	0.002	0.002	0.004 **	0.002
netinc	-0.065	0.089	-0.111	0.051	-0.070	0.095
netinc2	0.005	0.064	0.009	0.036	0.006	0.086
financialwealth			0.125 ***	0.040		
financialwealth2			-0.008	0.015		
wealth					0.004	0.003
wealth2					0.000	0.000
mot_oldage1	0.033 *	0.019	0.025	0.017	0.034 *	0.018
mot_oldage2	0.027 **	0.011	0.021 **	0.010	0.030 ***	0.011
mot_oldage3	0.005	0.010	0.010	0.011	0.006	0.010
mot_oldage4	-0.004	0.010	0.000	0.009	0.000	0.010
mot_precaution1	0.003	0.017	0.010	0.015	0.005	0.016
mot_precaution2	0.010	0.011	0.011	0.010	0.008	0.012
mot_precaution3	0.025 **	0.011	0.014	0.011	0.026 **	0.010
mot_precaution4	0.024 *	0.013	0.022 **	0.010	0.026 **	0.012
mot_homepurchase1	0.025 *	0.015	0.021 *	0.012	0.022	0.015
mot_homepurchase2	0.004	0.008	0.005	0.007	0.006	0.008
mot_homepurchase3	0.005	0.010	0.005	0.009	0.007	0.010
mot_homepurchase4	-0.011	0.011	-0.013	0.009	-0.014	0.011
mot_bequest1	-0.011	0.017	-0.011	0.014	-0.011	0.017
mot_bequest2	0.002	0.010	0.004	0.009	0.001	0.010
mot_bequest3	0.017	0.011	0.013	0.011	0.016	0.011
mot_bequest4	0.022 **	0.011	0.017 *	0.010	0.017	0.012
constant	-0.476 ***	0.172	-0.347 ***	0.130	-0.465 ***	0.168
# obs.	2184		2184		2184	
Pseudo R2	0.069		0.091		0.071	

*Note: *** : 1% significance level; ** : 5% significance level; * : 10% significance level.*

Table 5: Multinomial logit estimation for three different specifications. Base category: Irregular savers.

	(a)		(b)		(c)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Regular						
age	-1.424	2.920	-1.551	2.906	-1.444	2.922
age2	0.357	0.752	0.383	0.748	0.364	0.753
age3	-0.028	0.062	-0.031	0.061	-0.029	0.062
partner	-0.070	0.266	-0.086	0.266	-0.070	0.266
hhsize	-0.087	0.116	-0.082	0.115	-0.092	0.116
children	-0.029	0.114	-0.022	0.115	-0.021	0.115
female	-0.205	0.208	-0.194	0.208	-0.205	0.208
highschool	0.039	0.245	0.019	0.247	0.038	0.246
civilservant	0.931 *	0.480	0.909 *	0.483	0.929 *	0.480
selfemployed	0.397	0.377	0.396	0.378	0.372	0.381
unemployed	-0.732 **	0.341	-0.709 **	0.342	-0.721 **	0.342
homeowner	0.274	0.220	0.199	0.224	0.215	0.244
unemp_prob	-0.121	0.376	-0.100	0.379	-0.114	0.377
heritage_prob	-0.916	0.575	-0.956 *	0.580	-0.921	0.576
earnings_var	-0.004	0.003	-0.004	0.003	-0.004	0.003
dev_ger_econ_sit	0.003	0.045	0.000	0.045	0.004	0.045
lifeexpect	0.024	0.084	0.018	0.084	0.022	0.084
dev_health_sit	0.032	0.055	0.029	0.055	0.033	0.055
riskpref	-0.013	0.043	-0.019	0.043	-0.014	0.043
netinc	1.354 **	0.585	1.074 *	0.591	1.277 **	0.595
netinc2	-0.110	0.068	-0.091	0.078	-0.105	0.069
financialwealth			0.857 *	0.487		
financialwealth2			-0.077	0.085		
wealth					0.030	0.055
wealth2					0.000	0.001
mot_oldage	0.248 *	0.143	0.238 *	0.144	0.250 *	0.143
mot_precaution	-0.129	0.164	-0.138	0.165	-0.131	0.165
mot_homepurchase	0.182	0.116	0.167	0.117	0.182	0.116
mot_bequest	-0.081	0.141	-0.088	0.141	-0.082	0.141
constant	1.074	3.589	1.379	3.578	1.113	3.592
Regular, planned, contractual						
age	1.538	2.535	1.402	2.538	1.490	2.538
age2	-0.223	0.649	-0.200	0.650	-0.209	0.650
age3	0.003	0.053	0.001	0.053	0.002	0.053
partner	-0.103	0.226	-0.143	0.226	-0.104	0.226
hhsize	-0.030	0.100	-0.033	0.100	-0.037	0.100
children	-0.103	0.100	-0.083	0.101	-0.092	0.101
female	-0.157	0.173	-0.138	0.174	-0.161	0.173
highschool	0.155	0.207	0.077	0.210	0.151	0.208
civilservant	0.878 **	0.441	0.841 *	0.446	0.877 **	0.441
selfemployed	-0.026	0.340	-0.081	0.346	-0.061	0.343
unemployed	-0.532 **	0.258	-0.470 *	0.258	-0.516 **	0.258
homeowner	0.498 ***	0.183	0.373 **	0.186	0.420 **	0.204
unemp_prob	-0.151	0.315	-0.104	0.320	-0.139	0.316
heritage_prob	0.060	0.431	-0.057	0.440	0.059	0.431
earnings_var	-0.002	0.001	-0.001	0.001	-0.002	0.001
dev_ger_econ_sit	0.089 **	0.038	0.088 **	0.038	0.091 **	0.038
lifeexpect	0.033	0.068	0.015	0.069	0.030	0.068
dev_health_sit	-0.016	0.045	-0.020	0.045	-0.015	0.045
riskpref	-0.002	0.036	-0.013	0.036	-0.004	0.036
netinc	0.777	0.544	0.206	0.539	0.676	0.551
netinc2	-0.046	0.056	0.004	0.058	-0.037	0.057
financialwealth			1.400 ***	0.408		
financialwealth2			-0.089 ***	0.029		
wealth					0.039	0.048
wealth2					0.000	0.001
mot_oldage	0.790 ***	0.127	0.749 ***	0.127	0.789 ***	0.127
mot_precaution	-0.294 **	0.140	-0.300 **	0.141	-0.292 **	0.140
mot_homepurchase	-0.122	0.097	-0.129	0.098	-0.119	0.097
mot_bequest	0.172	0.115	0.165	0.116	0.168	0.115
constant	-2.829	3.157	-2.331	3.161	-2.750	3.161
# obs.	1066		1066		1066	
Pseudo R2	0.068		0.077		0.068	

Table A.1: Distribution of wealth and income of German households in SAVE 2003.

		Financial wealth in 2002 [€]		
		Mean	Std. err.	Median
	All	25,125	1,771	7,986
Age	<35	9,252	922	1,200
	35-49	31,778	4,417	10,500
	50-64	32,852	2,551	14,100
	≥65	23,490	3,920	9,000

		Total wealth in 2002 [€]		
		Mean	Std. err.	Median
	All	150,833	9,005	25,486
Age	<35	48,215	6,346	2,000
	35-49	168,627	23,103	40,000
	50-64	206,210	17,545	74,681
	≥65	164,889	14,582	37,250

		Net income in 2002 [€/month]		
		Mean	Std. err.	Median
	All	2,476	92	1,866
Age	<35	2,215	194	1,500
	35-49	2,945	158	2,315
	50-64	2,832	273	1,990
	≥65	1,810	71	1,500

Note: The difference in standard errors is often due to a few extremely large values, for instance the standard error of household net income in age class 50-64.

Table A.2: Description of covariates included in the estimated models.

Variable	Description
age, age2, age3	*age* is the age (in years) of the household head divided by 10, i.e.: *age* = (age of household head)/10. *age2* is squared *age*, and *age3* is cubic *age*.
partner	Dummy: 1 if the household is married and/or lives permanently with a partner in his/her household.
hhsize	Total number of people living in the household.
children	Total number of children and children-in-law of the household.
female	Dummy: 1 if household head is female.
highschool	Dummy: 1 if the household head and/or his/her partner have a general senior high school leaving certificate or a comparable certificate for University of Applied Sciences ("(Fach-)Abitur").
civilservant	Dummy: 1 if the household head is a civil servant (see also footnote 15).
selfemployed	Dummy: 1 if the household head is running a business or any other self-employed activity.
unemployed	Dummy: 1 if the household head is currently unemployed.
homeowner	Dummy: 1 if a household member owns the currently occupied house/apartment.
retired	Dummy: 1 if the household head is retired.
unemp_prob	Subjective probability of becoming unemployed in the year of the survey. If living with partner and both partners are working: Subjective probability that at least one of the partners becomes unemployed.
heritage_prob	Subjective probability of inheriting a substantial amount or receiving a gift in the future. The probability is included only for those respondents who answer in the follow-up question that the inheritance or the gift or will improve the financial situation significantly.
earnings_var	Subjective earnings variance. The measure of subjective earnings variance is calculated from the subjective unemployment probability of both partners, from net income, and from the replacement rate, as in Lusardi (1998).
dev_ger_econ_sit	Expectation about future development of German economic situation, 0 for very negative expectation, 10 for very positive expectation.
lifeexpect	Subjective life expectancy of the household head, 7 brackets: < 65, 65-70, 71-75, 76-80, 81-85, 86-90, > 90
dev_health_sit	Expectation about future development of health situation, 0 for very negative expectation, 10 for very positive expectation about future health situation.

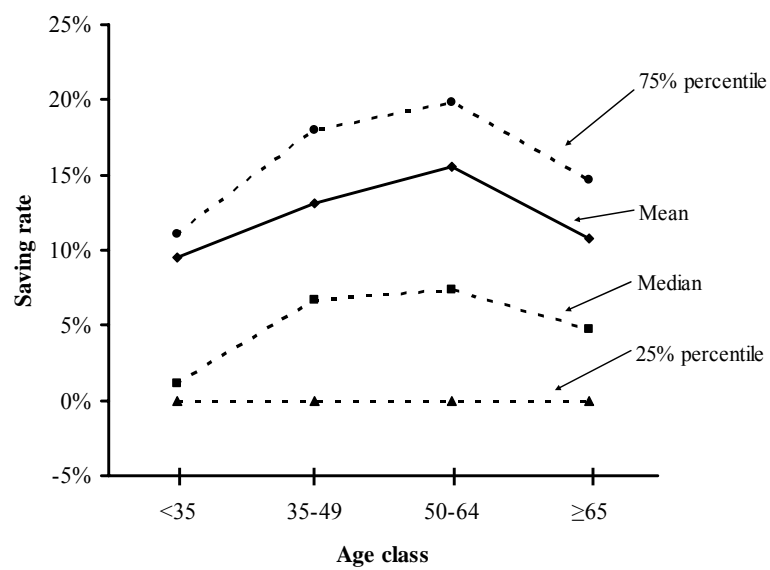|	
riskpref	Risk attitude: Willingness to take risks with respect to money matters. 0: no willingness to take risks, 10: high willingness to take risks.
netinc	Net income of the household, divided by 10,000 €.
netinc2	*netinc · netinc*
wealth	Total net wealth of the household (i.e., savings investments, savings bonds, share- and real-estate bonds, occupational and private pension schemes, real estate, business wealth etc.), divided by 100,000 €.
wealth2	*wealth · wealth*.
financialwealth	Financial wealth of the household (i.e., savings investments, savings bonds, share- and real-estate bonds, occupational and private pension schemes etc.), divided by 100,000 €.
financialwealth2	*financialwealth · financialwealth*.

Table A.3: Linear regression of future expectations on age and further household characteristics.

	dev_health_sit		dev_ger_econ_sit		earnings_var	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
age	-0.391 ***	0.046	0.054	0.049	-1.948	1.385
partner	0.342 ***	0.114	-0.002	0.122	-8.452 **	3.461
hhsize	-0.024	0.053	0.069	0.056	-1.555	1.595
kids_no	-0.172 ***	0.040	-0.028	0.043	-0.437	1.211
female	-0.259 ***	0.091	-0.066	0.097	-6.709 **	2.758
highschool	0.328 ***	0.122	0.503 ***	0.130	-6.709 *	3.677
civilservant	0.226	0.251	0.252	0.267	-18.702 **	7.580
selfemployed	0.464 **	0.223	0.032	0.238	-8.067	6.771
unemployed	-0.568 ***	0.153	-0.662 ***	0.165	2.346	4.657
homeowner	0.302 ***	0.105	-0.010	0.112	-0.868	3.181
retired	-0.651 ***	0.163	-0.310 *	0.173	8.094 *	4.883
riskattitude	0.008	0.020	0.104 ***	0.021	-0.154	0.601
netinc	0.284	0.206	0.525 **	0.220	152.712 ***	6.791
netinc2	-0.028	0.025	-0.036	0.027	-10.096 ***	0.808
wealth	-0.007	0.020	-0.022	0.021	-3.567 ***	0.603
wealth	0.000	0.000	0.000	0.000	0.028 ***	0.007
constant	8.804 ***	0.245	2.491 ***	0.260	-2.971	7.373
# obs.	2184		2184		2184	
R2	0.227		0.046		0.286	

Table A.4: Multinomial probit estimation for three different specifications. Base category: Irregular savers.

	(a)		(b)		(c)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Regular						
age	-0.497	2.495	-1.540	2.483	-0.526	3.015
age2	0.152	0.507	0.347	0.562	0.158	0.619
age3	-0.014	0.038	-0.025	0.043	-0.015	0.035
partner	-0.052	0.190	-0.051	0.201	-0.050	0.191
hhsize	-0.057	0.087	-0.063	0.087	-0.061	0.086
children	-0.030	0.096	0.001	0.087	-0.024	0.097
female	-0.145	0.145	-0.143	0.153	-0.148	0.144
highschool	0.042	0.200	-0.019	0.185	0.037	0.200
civilservant	0.666 *	0.347	0.576 *	0.327	0.660 *	0.353
selfemployed	0.217	0.323	0.363	0.277	0.196	0.335
unemployed	-0.533 **	0.237	-0.480 *	0.256	-0.523 **	0.240
homeowner	0.235	0.231	0.068	0.169	0.190	0.231
unemp_prob	-0.088	0.286	-0.033	0.288	-0.079	0.284
heritage_prob	-0.472	0.594	-0.814 *	0.441	-0.484	0.593
earnings_var	-0.002	0.002	-0.003	0.003	-0.002	0.002
dev_ger_econ_sit	0.015	0.048	-0.020	0.034	0.015	0.049
lifeexpect	0.023	0.058	0.015	0.061	0.022	0.057
dev_health_sit	0.015	0.043	0.027	0.041	0.016	0.041
riskpref	-0.005	0.030	-0.010	0.032	-0.006	0.030
netinc	0.795 *	0.411	0.861 **	0.429	0.731 *	0.430
netinc2	-0.062	0.049	-0.081	0.070	-0.057	0.051
financialwealth			0.508	0.367		
financialwealth2			-0.144	0.095		
wealth					0.020	0.037
wealth2					0.000	0.001
mot_oldage	0.285	0.318	0.043	0.112	0.277	0.323
mot_precaution	-0.121	0.160	-0.047	0.126	-0.119	0.159
mot_homepurchase	0.079	0.144	0.167 *	0.088	0.084	0.143
mot_bequest	-0.015	0.147	-0.109	0.105	-0.021	0.146
constant	0.245	2.643	1.310	3.092	0.288	2.734
Regular, planned, contractual						
age	1.019	2.763	1.738	2.057	1.040	2.679
age2	-0.140	0.498	-0.302	0.502	-0.143	0.467
age3	0.001	0.036	0.011	0.040	0.001	0.033
partner	-0.071	0.176	-0.096	0.176	-0.071	0.177
hhsize	-0.028	0.083	-0.021	0.078	-0.032	0.083
children	-0.075	0.081	-0.076	0.079	-0.068	0.082
female	-0.115	0.139	-0.090	0.133	-0.120	0.138
highschool	0.112	0.160	0.052	0.160	0.108	0.160
civilservant	0.647 *	0.345	0.543 *	0.298	0.641 *	0.350
selfemployed	-0.021	0.303	-0.193	0.255	-0.059	0.308
unemployed	-0.461 **	0.232	-0.353 *	0.210	-0.445 *	0.234
homeowner	0.367 ***	0.143	0.306 **	0.142	0.312 **	0.157
unemp_prob	-0.115	0.251	-0.073	0.251	-0.105	0.248
heritage_prob	0.023	0.445	0.133	0.338	0.029	0.452
earnings_var	-0.001	0.001	0.000	0.001	-0.001	0.001
dev_ger_econ_sit	0.063 *	0.033	0.077 ***	0.029	0.065 **	0.033
lifeexpect	0.027	0.053	0.019	0.052	0.026	0.052
dev_health_sit	-0.008	0.039	-0.022	0.036	-0.008	0.038
riskpref	-0.001	0.028	-0.006	0.027	-0.002	0.028
netinc	0.495	0.476	-0.117	0.360	0.401	0.492
netinc2	-0.027	0.047	0.027	0.040	-0.019	0.048
financialwealth			0.862 ***	0.233		
financialwealth2			-0.055 ***	0.018		
wealth					0.027	0.034
wealth2					0.000	0.001
mot_oldage	0.588 ***	0.121	0.623 ***	0.102	0.590 ***	0.118
mot_precaution	-0.216 *	0.114	-0.241 **	0.110	-0.216 *	0.111
mot_homepurchase	-0.080	0.104	-0.138 *	0.075	-0.079	0.105
mot_bequest	0.118	0.103	0.160 *	0.089	0.116	0.103
constant	-1.787	4.731	-2.865	2.598	-1.807	4.919
# obs.	1066		1066		1066	
Log Likelihood	-996.902		-987.599		-996.342	

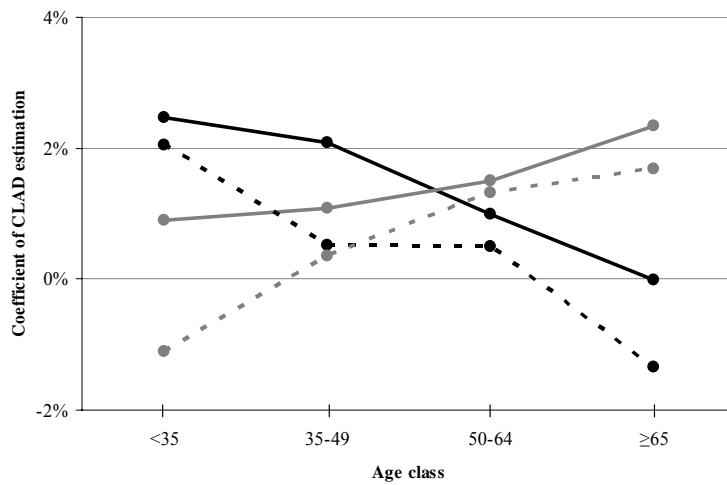**Figure 1:** Mean and median saving rates for different age classes, SAVE 2003.

Note: Data points are connected to facilitate readability

Figure 2: Coefficients of the CLAD estimation for four saving motives and age classes. The coefficients of the CLAD estimation denote the change in the saving rate in percentage points due to a change in the subjective rating of a certain saving motive by one unit.
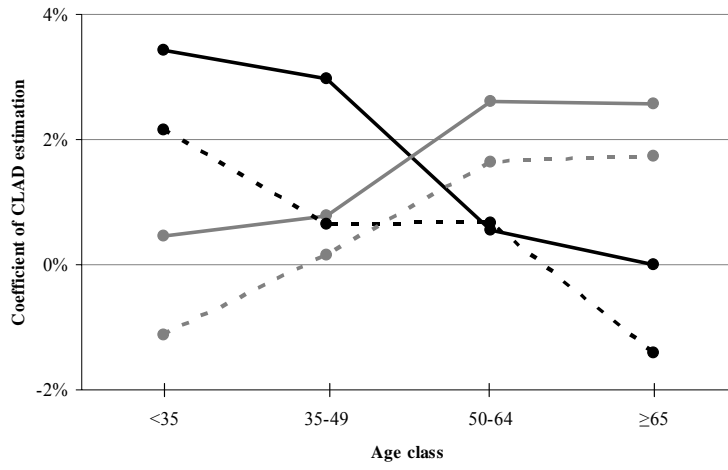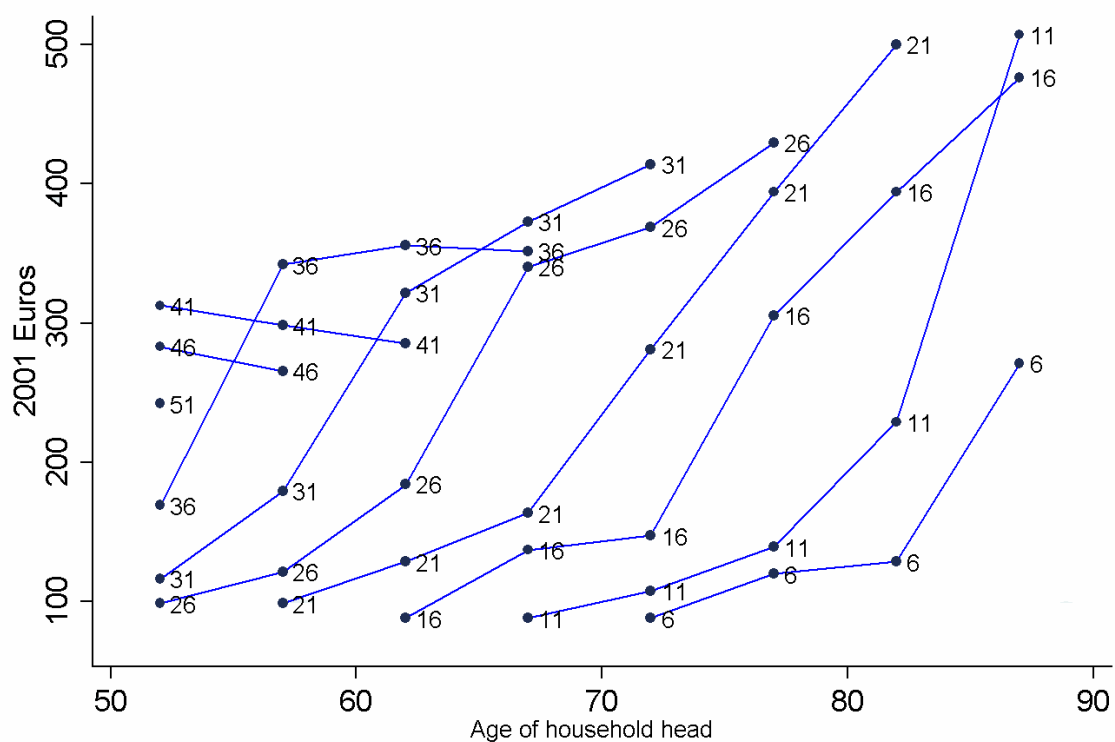
Specification (a):

Specification (b):

Specification (c):

Note: Data points are connected to facilitate readability

Figure A.1: Out-of-Pocket Medical Expenditures at Old Age[22]

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