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Abstract

Financial literacy or “what consumers know about finance” has become part of the scientific discussion in recent years. In Germany, as in many other countries, the structure of social security benefits has changed substantially. Using the German SAVE study conducted by the Mannheim Institute for the Economics of Aging, in this paper financial literacy in Germany is measured and its effect on private retirement provisions is examined. Therefore, the SAVE data is empirically analysed whether financial literacy has an impact on the retirement savings decision in Germany. With our analysis we were able to prove that financial literacy encourages individual retirement planning for households with an above-average income.

Keywords

Financial literacy, Retirement savings, Private pensions, Germany, SAVE

JEL: D14

1 Introduction

Financial literacy or "what consumers know about finance" has become part of the scientific discussion in recent years. Changes in the financial marketplace including the increase in number and complexity of financial products and the demographic shift lead to growing uncertainty about the future in general and the future of each individual (OECD 2005, p.28).

Alan Greenspan commented the development as follows: "As market forces continue to expand the range of providers of financial services, consumers will have much more choice and flexibility in how they manage their financial matters. They will also need to accumulate the appropriate knowledge on how to use new technologies and on how to make financial decisions in an informed manner". Consumers should be "equip(ped) (…) with the fundamental knowledge required to choose among the myriad of products and providers in the financial services industry" (Greenspan, 2001).

Scientists deal with the question of the "appropriate knowledge" by investigating the composition and effects of financial literacy. In other words, there is a scientific discussion about how much people know about finance and what kind of impact this knowledge or lack of knowledge has on their choices.

To contribute to the discussion the Organisation for Economic Co-operation and Development (OECD) came up with a definition that describes financial literacy as "the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop skills and confidence and become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (OECD 2005, p. 21).

In Germany, as in many other countries, the structure of social security benefits has changed substantially. Hartz laws and reduced coverage of health insurance shift

responsibility from the state to individuals (Börsch-Supan et al 2008, p. 22). Concerning retirement provisions, the degree of uncertainty is particularly high. Consequently, consumers react with ambiguity aversion, i.e. the avoidance of decision making (Langer et al. 2007 p.2). The German social network made these decisions obsolete for a long time (Börsch-Supan et al. 2007, p.18). However, today there is no doubt about the necessity of private savings in addition to state-organised old age security (Langer et al. 2007, p.1). Policymakers as well as leading institutions of the private sector have come up with initiatives, such as "Altersvorsorge macht Schule" and the "Initiative Finanzstandort Deutschland" to counteract the new development by providing information about possible old age security (IFD 2008).

It is true that market forces can only prevail if the participants are well informed and that a low level of financial knowledge is bound to lead to sub-optimal decisions in money management harming the economy in the long run. Like the bail out of a bank transfers money from taxpayers to shareholders (Rose, 2008), the social support of people lacking resources when entering retirement creates biases that seem unfair if "the far-sighted subsidise the short-sighted" (Börsch-Supan 2004, p. 3). A financially literate consumer however, encourages competition between the providers in the market. This leads to more innovation and therefore spurs economic growth (OECD 2005, p.20).

Most economic principles will confirm that financial literacy contributes to market efficiency in general, but does it also encourage individual retirement planning? Using the German SAVE study conducted by the Mannheim Institute for the Economics of Aging (MEA) (Börsch-Supan et al. 2008), we will measure financial literacy in Germany and examine its effect on private retirement provisions.

First, we revise the neo-classical as well as the behavioural theory of savings. Part three looks at the existing literature on financial literacy and retirement savings. In part four and five, we will present and arrange the data of the SAVE study and empirically examine whether financial literacy has an impact on the retirement savings decision in Germany. Then, we will examine the interrelation between

financial literacy and the sources of advice that consumers fall back on. The last part concludes our findings and gives an outlook for future research.

Assuming that financial literacy has a positive effect on the retirement savings, we will generate a model in which retirement savings is the dependent variable explained by financial literacy and others. If we can find a positive correlation, we can conclude that improving financial literacy is worthwhile and then examine this variable further to see, if it contains components that society and policymakers can act on.

2 Theory of saving

When dealing with aggregate and individual savings, the neo-classical life-cycle-hypothesis remains the predominant reference. Although it has often been exposed to criticism, scientists never dismissed it. Modern theories rather rest on its basics and introduce modifications.

2.1 The life-cycle-hypothesis

Neo-classical models on savings make, either implicitly or explicitly, three major assumptions: Firstly, capital is fungible i.e. that money is always money, whether it is a bonus, a current or a future income. Secondly, capital markets are assumed to be perfect. Thirdly, consumers behave rationally, have a perfect self-control, understand financial markets and know the risk-return distribution of all assets. These prerequisites enable consumers to take consumption and saving decisions that maximise their well-being (Benartzi 2007, p.81 et seqq.).

The modern economics apply the economic rational approach of the life-cycle-hypothesis by Modigliani, Brumberg (1954) and Friedman (1957) that is based on the discounted utility model. A household adds up its current and expected, discounted future income and distributes it equally on the years to come. This ensures a steady level of consumption throughout the life that is optimal and so are the savings needed to ascertain this consumption level (Ando et al. 1963, p. 56). The household will save whilst receiving an income and spend savings during retirement holding the marginal utility of consumption constant (Börsch- Supan et al. 2008, p.

12). The main motif is to support consumption at the habitual level during retirement. Therefore, the life cycle model predicts the optimal age for retirement, the retirement income level and the saving rates required (Clark et al 2003, p. 3). Since aggregated individual consumption functions are equal to the aggregated consumption function of the community, both aggregate wealth and individual wealth can be predicted (Ando et al. 1963, p.56).

Criticism is based on empirical findings that the life cycle model cannot explain. Findings by the Federal Statistical Office of Germany, for instance, prove that the age-effect in Germany differs significantly from life cycle predictions. On the one hand, German households appear to save substantial amounts even in their old age. On the other hand, younger households pay too little attention to consumption. Additionally, the level of the savings shows dependence on the level of income (Börsch-Supan et al. 2002, p. 12 et seqq.). This is however not surprising if we consider the assumptions behind the model, especially those on the rationality of the consumer (Benartzi et al. 2007, p. 81). Almost as long as the life cycle model exists, scientists have tried to modify or enrich it with psychological elements that drive the consumer in order to increase the explanatory power.

2.2 The behavioural life cycle

Thaler et al. (1988) enlarged the neo-classical life-cycle-hypothesis by three major behavioural features: self-control, mental accounting and framing.

2.2.1 Self control and hyperbolic discount functions

Rather than assuming a rational consumer Shefrin and Thaler (1988) incorporate the human taste for instant gratification into their model. People prefer immediate pleasure over future pleasure, even if it is greater then. Saving, i.e. keeping something for later is a question of self-control that requires will power (Thaler et al. 1988, p. 611 et seqq.). Self-control or self-regulation can be described as “any efforts by the human self to alter its own inner states or responses” (Vohs et al. 2004, p. 1). Will power is needed in order to resist the temptation of spending immediately and therefore utility of the present period is impaired. Shefrin and Thaler (1988) employ a dual preference structure to illustrate the phenomenon of time inconsistent

preferences. An individual contains two personalities: the planner who is concerned with the long run and the doer who seeks instantaneous gratification (Thaler et al. 1988, p. 611 et seqq.).

Laibson (1998) later explains this effect by hyperbolic discount functions. He solves the "conflict between today's preferences and the preferences which will be held in the future" (Laibson 1998, p. 862) similarly by assuming a different personality or a different "self" for each period. For the current self of period t future consumption equals today's consumption multiplied by a discount factor for this future period. These discount factors decline monotonically with the course of time (Laibson 1998, p. 862). Together with Repetto and Tobacman (1998) he estimates a short-run discount rate of 30 percent and a long-run discount rate of 5 percent. Obviously, such preferences have economically important implications for consumers' life cycle decisions and especially retirement savings that are only poorly appreciated. Hyperbolic discount functions therefore explain the sharp drop in consumption during retirement (Laibson 1998, p. 867).

2.2.2 Mental accounting and framing

The second alteration of the life-cycle-hypothesis is the relaxation of the fungibility assumption by the idea of mental accounting. It is drawn from findings of the prospect theory by Kahneman and Tversky (1979) who introduced a new utility function that depends on the risk perception of consumers or the "frame" that comes with utility. Money can be perceived in different ways according to how and when it is received (Kahneman et al.1984, p. 344). Other than the traditional life cycle that implicitly assumes frame invariance, the behavioural life cycle model is frame dependent. A consumer unconsciously "frames" by dividing his wealth into three mental accounts: Current income, assets and future income. The accounts differ in propensity to consume that the consumer assigns to each of them. The consumer is most likely to spend parts of the current income, less likely to spend parts of his current assets and unlikely to touch his future income. Already the allocation of money into accounts follows behavioural rules, for it depends on perceived frames. A windfall to the consumer's liquid wealth will be put into the first account with the relatively high marginal propensity to consume whereas a windfall to the illiquid

portfolio will be saved (Thaler et al. 1988, p. 615 et seqq.). The value of illiquid capital is always inferior to the value of liquid assets. Illiquid capital never comes without a discount factor because it takes time until it can be used for consumption (Laibson 1998, p. 869). The total amount of wealth can also be a frame. Saving € 500 out of € 800 requires more will power than saving € 500 out of € 2000 (Thaler 1988, p. 618).

3 Literature review on financial literacy and retirement

All surveys conducted on financial literacy have shown that financial illiteracy is widespread. Hilgert and Hogarth (2002) who used different studies covering different parts of the American population showed that this is true for all age groups. Lusardi and Mitchell (2007a) who conducted a study using the 2004 Health and Retirement Survey (HRS), a representative sample of United States households born between 1931 and 1941, emphasised a high illiteracy level of women, the elderly and the low educated. Also studies with smaller samples support this finding (Mandell 2004[1] or Agnew et al. 2005[2]).

The transnational study by the OECD that mostly relies on data from Japan, Australia, Korea, the United States and the United Kingdom supports the low level of financial understanding on an international level (OECD 2005).

The consequence of this lack of financial knowledge on several fields has been studied since then. Lusardi et al. (2007b) demonstrate a negative effect of low literacy levels on capital market participation leading to welfare loss in the long run (Cocco et al. 2005).

Bernheim et al. (2001) find a negative effect of financial illiteracy on savings. Lusardi et al. (2005) substantiate the negative effect on savings to a negative effect on retirement planning that leads to lower wealth accumulation.

[1] Jumpstart study with high-school seniors
[2] with participants associated to college

Agnew et al. (2005) examined the phenomenon of information overload that makes individuals choose the "path of least resistance" when making investment decisions. Generally, individuals display a reluctance to make investment decisions. Due to procrastination, anticipated regret and choice overload, individuals follow the path of least resistance, which often leads them to pick the default option.

By differentiating between highly literate and less literate individuals they found that reducing the number of options reduces the information overload only for the highly literate, not for low-knowledge individuals (Agnew et al. 2005, p.66). Benartzi et al. (2007) argue that consumers use heuristics in order to handle complex information. Also the employment of rules of thumb depends on the complexity of the situation (Benartzi et al. 2007, p. 87). The investment decision is thus a complex structure affected by external factors, such as options available as well as internal factors, e.g. the individual literacy level.

Moreover, Agnew et al. (2005) discover a correlation between test scores and personal perception of relative knowledge suggesting a weak perception of the low educated. That means that individuals who need the education the most, often have the weakest perception of their own relative knowledge. The findings suggest that financial literacy should be improved in order to invest successfully (Agnew et al. 2005, p. 69).

With his article "Financial Literacy: Does it matter?" Mandell (2008) points out that improving financial literacy in order to improve saving and investment may not be worthwhile, or even impossible. He finds that seminars that should actually have a positive effect on knowledge, do not improve the literacy level.

He studied the 2004Jump$tart survey that asked high-school seniors to comment on their thriftiness, experience with finance and measured their financial literacy level. Surprisingly, the best literacy scores were achieved by those students claiming to be neither thrifty nor very spending orientated. Those students who consider themselves as very spending orientated achieved the worst results. He thus concludes that there is no positive link between literacy and thriftiness, an important contributor to

financial success. The effect of a financial education seminar was unexpected, too: Mandell finds a positive effect on thriftiness, but only a slight effect on literacy. He concludes that financial literacy is only one factor contributing to the saving decision. Other factors depend on how money has been earned. Part-time workers and those who receive their allowance only for doing chores around the house, also show a higher level of thriftiness (Mandell 2008).

Ignoring the question of financial literacy, i.e. the direct knowledge about finance, Clark et al. (2003) test the effect of financial education seminars on consumers' behaviour. They offered seminars to employees that aimed at improving knowledge about risk and return of retirement assets, the estimation of the amount of consumption levels and the estimation of the appropriate and realistic retirement age. Post-seminar surveys display that participants seem to accept the information and show a willingness to actively prepare retirement by working longer, saving more or dealing more intensively with financial products. Financial education programs thus change the retirement saving goals expressed in terms of higher income objectives and an increased expected retirement age. However, we will only observe a positive effect if those goals are also pursued.

Laibson, Repetto and Tobacman (1998) point out that there is a considerable gap between intention and action, for humans have a taste for instant gratification and tend to ignore retirement savings even though they intend to deal with it. Lusardi et al. (2005) do not only confirm the positive effect of seminars on saving and retirement goals, but they also prove that seminars encourage consumers to stick to their goals and succeed in carrying out their plans. Furthermore, they succeed in linking the phenomenon of planning and the ability to successfully plan to increased financial literacy. They do so by defining the term "planning" as an important predictor for saving success that is determined by three criteria: The financial education, the ability to plan and the tools used.

Using the 2004 HRS Health and Retirement Study they show that financial knowledge and planning are clearly interrelated.[3] Participants were asked whether they had ever tried to figure out the amount of money needed for retirement, whether they had developed a plan and if they had been able to stick to it. They were allocated to the following groups: Non-planners, simple planners, serious planners and successful planners. The information on planning tools is represented by the questions on whether participants seek advice from friends, banks, retirement seminars etc. The results display a low level of financial literacy and a high proportion of non-planners. The multivariate regression analysis shows that in fact, those who report that they are "unable to plan for retirement and (…) cannot carry out their retirement saving plans (are also those who are) unaware of the fundamental economic concepts driving economic wellbeing during the life-time and in old age" (Lusardi et al. 2005, p. 2).

Furthermore, planning correlates with the sophistication of the tools used. Planners turn out to be more successful with rising sophistication of their tools. Almost 50 percent of successful planners benefit from a financial planner's advice against only 39 percent among the simple planners while the proportion of simple planners talking to friends and family about financial matters is higher than the proportion of successful planners (Lusardi et al. 2005, p. 14).

Seminars therefore encourage the accumulation of retirement wealth by reducing the planning costs necessary (Lusardi 2003, p. 18). Lusardi (2003) finds that the effect of these seminars is particularly large for the two low-income and low-education quartiles. It is thus important that education programs are targeted specifically to particular subgroups to address large differences in preferences and saving needs (Lusardi et al. 2007a, p. 43).

[3] Two thirds of all planners answer all financial literacy questions correctly.

4 SAVE

4.1 Description of data

The German SAVE study by the Mannheim Research Institute for the Economics of Aging (MEA) is a collection of data generated in ten waves in the years 2001, 2003, 2004, 2005, 2006 and 2007. Other than the German Socio-Economic Panel (SOEP), the data allow to examine the constitution of the wealth of households and its changes. This information can also be found in the official budget and expenditure survey (Einkommens- und Verbrauchersticproben, EVS) by the Federal Statistical Office, but then again this source lacks data about sociological and psychological aspects (Schunk 2006, p. 2). By examining a representative sample of German households and a wide range of sociological, socio-demographic and psychological characteristics, the SAVE survey allows us to better understand the decision-making process for saving decisions (Börsch-Supan et al. 2002, p. 25 et seqq.).

The questionnaire consists of six parts the first part being the introduction and determination of the person interviewed within the household. The second part asks about basic information on socio-economic characteristics of the household. The third part deals with qualitative questions concerning the saving behaviour, income and wealth. Part four consists of quantitative questions linked to income and wealth. The fifth part tackles psychological and social factors of the saving behaviour. Finally, the sixth part lets both interviewer and interviewee conclude about the interview situation. Using different interview techniques, systemic errors are minimised (Schunk 2006, p. 4 et seqq.).

4.2 Operationalisation of the data

For our estimates, we will use the dataset of the 2007 wave. The sample consists of 2931 observations ranging from 21 to 96 years. 51.69 percent are women and 36 percent of the sample are already retired. Of those who are not, 76.87 percent are employed.

4.2.1 The financial literacy variable

The dataset of the 2007 wave is the first to include questions on financial knowledge. Those three "literacy questions" are the same as the ones in the 2004 Health and Retirement Study (HRS). The work by Lusardi and Mitchell (2005) will later allow me to compare results of Germany and the USA.

Table 1. Questions on financial knowledge in the 2007 SAVE

Question 1: Suppose you had $ 100 in a savings account and the interest rate was 2 % per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than $102, exactly $ 102, less than $ 102?
Question 2: Imagine that the interest rate on your savings account was 1 % per year and inflation was 2 % per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?
Question 3: Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund"

The information obtained made it possible to generate the variable "financial literacy" adopting a value between zero if no question was answered correctly and three if all answers were correct.

Looking at results of other countries, such as the US, Japan or Australia (OECD 2005, p. 42), we expect a relatively low level of financial literacy also in Germany.

Table 2. Financial literacy scores of the 2007 SAVE

Financial literacy	**Germany**	**USA**
No correct answer	0.96 %	9.9 %
One correct answer	12.96 %	16.3 %
Two correct answers	31.42 %	35.8 %
Three correct answers	54.66 %	34.3 %

Although the Germans score higher than their American counterparts, the level of financial literacy is still relatively low. Only 54.66 percent of the respondents answer all three questions correctly. It shall be noted that even these three isolated questions might be biased towards correct answers. Lusardi et al. (2007b) found that the answers given are very sensitive to the wording of the questions, which indicates that interviewees relied to a certain extent on guessing (Lusardi et al 2007b, p.3).

4.2.2 The retirement variable

After we have created a variable expressing the level of knowledge of consumers, we have to define a measure for retirement. As we are interested in the retirement behaviour of consumers, the retirement variable accounts for the ownership of voluntary retirement products. Possible products are firstly, the Riester pension which is an additional private lifelong pension care, secondly, a corporate life insurance and thirdly, a corporate pension scheme. The dummy variable adopts the value one if any of the three voluntary provisions is owned.

First, we will look at the distribution of voluntary retirement arrangements in Germany. Excluding those who are already retired gives us a total of 1537 observations of which 45.48 percent do not hold any voluntary pension scheme. This is alarming but also surprising. The Riester pension, for instance, is state supported meaning that the owners receive grants and tax advantages (NSR 2005, p. 7 et seqq.). The following model is an attempt to explain this phenomenon.

5 Effect of financial literacy on retirement arrangements

Is it true, that the relatively low level of financial literacy is a problem for Germany's retirement system? Are those who have a poor understanding of finance also those who do not have a voluntary retirement arrangement?

Using the newly generated variable “financial literacy”, we now examine the impact of financial knowledge on retirement provision. Assuming that financial education plays an important role in a household’s decision-making process concerning old age provision, we expect a positive correlation between “financial literacy” and “retirement”.

5.1 Model on retirement

Our model is an attempt to explain on what the decision to opt for additional retirement provision depends on. we will use a logistical regression as the dependent variable “retire” is binary and adopts the value one if arrangements for old age provisions have been made and zero if this is not the case. The results are expressed using marginal effects. we exclude people who have already retired.

According to Hogarth (1989), it is necessary “to understand how (a) person conceptualizes the world and the meaning he or she gives to information" in order to understand a person’s judgement and the financial strategy that derives from it (Hogarth 1989, p. 7).

Besides basic sociological factors such as education, wealth and personal attitudes, we will therefore use the information that the SAVE survey provides on expected retirement age and life expectancy. we include attitudes towards the future as well as information about the interviewees past, namely on parental attitudes and on whether the person received a regular allowance (Börsch-Supan et al. 2008, p. 17 et seqq.). we suppose that the decision for voluntary retirement can be described as

$$y_i = x_i\beta' + \varepsilon$$

whereby

$y = 1$ if any retirement arrangement is held and

$y = 0$ if no retirement arrangement is held.

The vector x incorporates all explaining variables that are summed up in table 3.

Table 3. Determinants on retirement arrangements and expected signs

Financial literacy	+
Age	+
Children	+
Education	+
Married	–
Male	+
Employment	+
Conversation with banks	+
Health	+
Life expectancy men	+
Life expectancy women	+
Expected retirement age	+
Probability of rising income	+
Creature of habit	-
Presence orientation	-
Satisfaction with economic status	+
Willingness to take risks	-

We take the logarithm of the income as we assume its effect on retirement provisions to have decreasing economies of scale. For the age effect, we assume a hump shaped curve and add the term age-squared to our estimation.

The effect of children, we expect to be positive, for families are more dependent on planning and precaution. However, we will add an interaction variable linking children and age because it is possible that young families postpone retirement savings to a time when their children have grown up.

For employment, we expect a positive effect, because an employed person is more likely to consider old age provision especially in terms of corporate life insurance or a corporate pension scheme.

To represent the willingness to take risks, we will use the variable “risk in free time”. It adopts a value between zero and ten, zero standing for high risk aversion. Column we in Table 4 presents the estimation results.

Table 4. Determinants of Retirement arrangements in the 2007 SAVE

Variable	I	II	III
lnincome	0.1250***	0.1738**	0.1589***
	(0.0293)	(0.0693)	(0.0483)
Financial literacy	0. 0428**	0.0623**	0.0256
	(0.0201)	(0.0284)	(0.0275)
Age	0.0332**	0.0318	0.0347*
	(0.0136)	(0.0209)	(0.0186)
Age-squared	-0.0005***	-0.0004**	-0.0006***
	(0.0001)	(0.0002)	(0.0002)
Children	-0.2237	-0.1216	-0.2973
	(0.1409)	(0.2176)	(0.1869)
Children*age	0.0044	0.0026	0.0053
	(0.0032)	(0.0049)	(0.0042)
Education	-0.0241***	-0.0423***	-0.0074
	(0.0077)	(0.0101)	(0.0119)
Married’	-0.0068	0.0391	-0.0413
	(0.0329)	(0.0473)	(0.0483)
Male’	-0.0230	0.0274	-0.0566
	(0.0288)	(0.0405)	(0.0417)
Employment’	0.1318***	0.1935***	0.0930*
	(0.0383)	(0.0651)	(0.0495)
Bank consultation’	0.1126***	0.0943**	0.1438***
	(0.0278)	(0.0378)	(0.0419)
Health	-0.0033	-0.0113	0.0062
	(0.0076)	(0.0106)	(0.0110)
Life expectancy men	0.0001	-0.0073	0.0044
	(0.0041)	(0.0066)	(0.0052)

Life expectancy women	0.0032	0.0063	0.0014
	(0.0041)	(0.0067)	(0.0052)
Longer years	0.0160**	0.0230**	0.0098
	(0.0081)	(0.0114)	(0.0125)
Live longer’	-0.1019	-0.0835	-0.1350
	(0.0739)	(0.1008)	(0.1131)
Expected retirement age	-0.0007	-0.0049	0.0018
	(0.0042)	(0.0066)	(0.0056)
Probability rising income	0.0150***	0.0241***	0.0052
	(0.0046)	(0.0063)	(0.0068)
Presence orientation	-0.0115**	-0.0102	-0.0129
	(0.0054)	(0.0074)	(0.0078)
Creature of habit	0.0068	-0.0041	0.0167**
	(0.0057)	(0.0082)	(0.0080)
Willingness to take risks	-0.0065	-0.0139*	-0.0027
	(0.0053)	(0.0076)	(0.0073)
Satisfaction	-0.0087	0.0014	-0.0166*
	(0.0072)	(0.0109)	(0.0096)
Pseudo R-squared	0.0964	0.0952	0.1179
Number of observations	1502	764	738

Note: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

dependent variable: possession of one or more of the three retirement arrangements: Riester Pension, corporate life insurance, other corporate pension scheme

Column I: overall effect, Column II: income > mean, Column III: income < mean

(‘) dy/dx is for discrete change of dummy variable from 0 to 1

Source: German SAVE Survey

As predicted, the probability of having retirement provisions increases with an additional unit of financial education by 0.04. This leads to the conclusion that a person who has understood basic financial principles is more likely to plan for retirement.

The effect of income is striking: An increase of income by 1 percent increases the probability of the ownership of retirement provision by 12.5 percentage points.

It is irritating that an additional unit of education decreases the probability to hold a pension scheme by 2.4 percentage points. It is possible though that higher education leads to more confidence about money management and increases the purchase of assets, such as stocks and bonds rather than the proposed products.

Moreover, the impact of children seems twisted as they also have a negative effect. Nevertheless, as discussed it is likely that families with children require more liquidity and are less able to save. The need for present consumption results in higher discount rates and less appreciation of consumption in the future (Laibson 1998, p. 862).

The effect of age is positive but only to a certain extent. With the assumption made by incorporating the age-squared, we have shown that the probability of having a retirement security rises in the course of life until it has reached a peak and falls again. This should rather be a cohort than an age effect. As the development of voluntary retirement provision is relatively new, it is understandable that older people do not hold extra securities.

The probability to own retirement provisions for people who ask banks for financial advice is on average 11 percentage points higher than for people who do not seek professional support. Although we expected a positive correlation, this finding is particularly interesting, for the effect exceeds the effect of financial literacy.

An employed person is 13 percentage points more likely to have an additional retirement provision. This does not surprise because two of the voluntary provisions are linked to an employment.

Expectations about the future also have a positive impact. A consumer expecting a higher income is 1.4 percentage points more likely to have a retirement provision,

whereas people who describe themselves as "present-orientated" are 1.2 percentage points less likely to have one.

Surprisingly, neither the expected retirement age nor the estimated life expectancy nor perceived health conditions show a significant effect. Only the number of years one expects to live longer than the average has a small positive impact on the probability to hold old age provision. The retirement age is a factor most people might not like to include in their future calculations although they do have expectations on it. We could try to explain this using the approach by Thaler (1980). Maybe expected retirement age can be allocated in a "mental account" that has, like future income a very low "marginal propensity to consume". In other words, even if a consumer expects to retire or even die early, he might not want to rely on it today, because the relatively wide time-horizon brings to much uncertainty with it.

Marital status or sex do not show significant effects either. The fact that females are just as likely to save for retirement as males seems odd. Women are less likely to be gainfully employed[4] and employment encourages the holding of a retirement product significantly. However, it is possible that those women who do work, are more likely to save than working men. Indeed, females tend to be more conservative investors showing a higher risk aversion than men (Clark et al. 2003, p. 10).

Unfortunately, some interesting variables, such as the expected pension level or the probability of becoming unemployed had to be eliminated, for they contained information only on a very limited number of observations that impaired the representativeness of the sample.

We have seen that financial literacy affects individual retirement arrangement positively. we would now like to see if the effect of financial literacy on retirement also depends on the income as suggested by Lusardi, who found that low-income consumers are more affected by financial education than high-income households (Lusardi 2003, p. 13).

We have divided the sample into earners above and below the mean and performed the same probit regression as before. Column II of Table 4 presents the estimation results.

It is striking that households with an income above the mean are more affected by financial education than the average. Their probability to have an old age provision rises from 4 to 6 percentage points.

Still important is whether individuals are employed or not, the level of education and if they expect to live longer or to increase their income.

Consultancy from banks is also still important, the positive effect falls from 0.11 to 0.09 though.

Age and presence-orientation lose their significance when moving from the average to richer households whereas the attitude towards risk gains influence. The more these individuals are likely to assume risks in their free time, the less likely they are to have additional retirement arrangements.

Column III of Table 4 presents the estimation result for the low-income class. We find that the result for financial literacy becomes insignificant, which means that an additional unit of financial literacy has no effect on retirement savings. Also education and life expectancy loose their influence.

Still important are the effects of income, age and employment. The importance of bank consultancy is the highest for this group. With a coefficient of 0.14, its influence is almost as important as the influence of income.

Results that are only significant for this particular group are habit orientation with a positive effect and satisfaction with a negative effect on the retirement variable.

[4] The proportion of unemployed women in the sample is 29 percent against 15.9 percent for men.

5.2 Discussion

The overall model suggests that financial literacy has a positive effect on retirement savings. However, if we distinguish between households with income above and households earning less than the mean income we find a different result. The coefficient for financial education becomes insignificant for the lower income class meaning that encouraging financial literacy will not lead to more retirement savings. This seems contradictory to the findings by Lusardi (2003). However, the effect of financial advice from banks is particularly strong for low-income households. The probability of having additional retirement arrangements rises by 14 percentage points if the low-income earners seek professional advice against 9 percent points for high-income households. This is consistent with Lusardi (2003) and Mandell (2008) if we distinguish between financial knowledge and financial education events and consider the consulting from banks as such an event. Financial education events will not necessarily increase financial literacy (Mandell 2003) but affect the low-income class positively in saving in general but also in retirement saving (Lusardi 2003, p. 13 et seqq.).

The trade-off between knowledge and education can be understood if we look at the trade-off between intentions and actions (Laibson et al. 1998, p. 92). An individual might know what it should be doing in order to optimise saving for old age, but still it might not act. Character traits like inertia (Klos et al. 2007, p. 23 et seqq.) or weak will power (Thaler et al. 1988, p. 611) might prevent action. Furthermore, the consumer could be paralysed by information overload (Agnew et al. 2005).

The fact that financial literacy does not influence the saving for low-income households underlines the notion of will power in the behavioural life cycle. The poor have a higher will power effort for the same amount saved especially because pension wealth is framed as future retirement income with a very low marginal propensity to consume (Thaler et al. 1988, p. 614 et seqq.).

A seminar or a bank consultancy can help to overcome certain human characteristics. The current self (Laibson 1998) or the doer (Thaler et al. 1988) is exposed to the optimisation problem urging the desire to find a solution quickly. Once the topic of

retirement has been tackled, the propensity to save increases and the will power effect diminishes. The future is taken into consideration which results in immediate action (Daniel 1997). The doer might act as the planner imposing liquidity constraints by investing into a pension plan that disallows withdrawal (Thaler et al. 1988, p. 613).

Secondly, a seminar can teach rules of thumb and heuristics (Börsch-Supan et al. 2008, p. 14) that facilitate the consumer's choice without making him more literate (Mandell 2008). The same is true if the seminars offer a pre-selection of financial products that empower the consumer only by reducing choice.

This also explains our findings about consumers' attitudes. While high-income households possess a wider financial scope, a positive attitude towards risk affects the retirement provision adversely. They put less consideration to consequences in the future or are more confident about their financial handling. Low-income households can be seen as more passive. Satisfaction with the economic status has a slightly negative effect on retirement savings of low-income households. This clearly shows a lack of awareness of the consequences of this behaviour, namely the deterioration of the economic status in old age. In return, they benefit from a habit-orientated attitude. It is possible that this attitude reduces will power efforts.

5.3 Financial literacy and financial education events

The question now is how financial literacy and financial education events are linked. Lusardi et al. 2005 find that financial literacy correlates with tool use. Looking at the sources that consumers rely on and their level of financial literacy respectively, leads to the conclusion that financial advice influences financial decision making towards better saving and investment decisions (Lusardi et al. 2005, p. 14). High proportions of respondents with low literacy rely on informal sources such as parents, friends and acquaintances. The higher the literacy level, the more sophisticated the tools used (Lusardi et al. 2007b, p. 14). Table 5 presents the relation between literacy levels and source of information for the German data.

Table 5. Links between sources of advice and financial literacy

	Sources of advice					
	None	Neigh-bours	Friends	Rela-tives	Col-leagues	banks
Total use of source	**O.40**	**0.00**	**0.06**	**0.16**	**0.03**	**0.35**
No correct answer	0.68	-	0.16	0.21	-	0.37
One correct answer	0.46	0.00	0.05	0.25	0.01	0.22
Two correct answers	0.42	0.00	0.07	0.20	0.02	0.29
Three correct answers	0.37	0.00	0.05	0.12	0.04	0.42

	Sources of advice		
	None	Friends & Relatives	banks
Total use of source	**O.40**	**0.22**	**0.35**
No correct answer	0.68	0.37	0.37
One correct answer	0.46	0.30	0.22
Two correct answers	0.42	0.27	0.29
Three correct answers	0.37	0.17	0.42

Distribution of tool use expressed in percent with rounded values.

The sources most frequently used are banks which are consulted by 35 percent and friends and relatives consulted by 16 percent or 6 percent of Germans respectively. However, the majority indicates not to talk about personal finances at all.

The percentage of people who talk to friends and relatives falls with literacy level, whereas the share of people seeing bankers rises with literacy. This supports the findings by Lusardi et al. (2005) who also found a high interdependence between tool use, financial knowledge and retirement planning. However, the causation of

these effects is questionable. It is striking that 37 percent, a considerable share, of highly literate consumers does not have financial conversations at all. On the other hand, the percentage of poorly literate consumers who rely on bank consultancy is relatively high.[5] However, we can establish that literacy goes along with higher sophistication of tool use and sophisticated tools encourage retirement planning.

We could conclude that financial literacy implicitly encourages retirement planning through better tool use. This could be correct for low-income households that are not directly influenced by financial literacy. However, the high-income households show sensitivity to financial literacy per se in addition to the sensitivity of their retirement saving decision to financial advice.

6 Conclusion and outlook

With our empirical investigation we were able to prove that financial literacy encourages individual retirement planning for households with an above-average income. After we had received a positive coefficient for financial literacy in our retirement model, we tested whether this effect was stronger for the low-income households as suggested by Lusardi (2003). The empirical estimations do not support this finding. Financial literacy has no significant effect on retirement arrangement for households whose earnings fall below the mean. Anyhow, we found that for this group the professional advice has an important positive influence. This led to the idea of a strict distinction between financial literacy, a snapshot of knowledge, and financial education, more or less well-targeted events such as seminars or occasional conversations with banks. They both have a positive effect on retirement decisions for different reasons. The lack of retirement planning derives from different, heterogeneous sources. Therefore, it can be approached by different measures. Evidence suggests that financial literacy reduces information overload and short-sightedness and improves planning (Agnew et al. 2005, Lusardi et al. 2005) whereas financial education improves the propensity to save, changes saving goals and reduces inertia by forcing consideration and awareness (Clark et al. 2003, Mandell 2008). That these effects can be independent derives from our findings about low-

[5] This is also true when ignoring the proportion of people with no correct answer who only represent less than one percent.

income households who are affected by education but not by literacy. Nevertheless, the two are also interrelated as we have shown in part five. The positive effects sometimes reinforce each other if, e.g. financial literacy encourages the sophistication of tools used (Lusardi et al. 2005) and sometimes they are independent from each other if e.g. a financial education event does not contribute to literacy (Mandell, 2008).

The distinction between financial literacy and financial education makes it possible to agree on the findings of this paper and previous findings. However, both have a positive effect on retirement arrangements and therefore both financial literacy and education should be encouraged.

To promote education, policymakers and society should act on the awareness of the consumer about the necessity of financial sophistication and offer opportunities to learn. As shown by Agnew et al. (2005) the perception of knowledge is biased. More difficult, it seems, is the improvement of financial literacy, as Mandell (2008), for example, did not find a significant link between seminars and knowledge. However, there is a significant influence from schooling on financial literacy (Lusardi et al. 2005, p. 10). Incorporating finance as school subject will certainly contribute to basic financial understanding and improve overall literacy levels.

Causation between knowledge and education should be more intensively scrutinised. It is desirable to collect information on how individuals perceive their own financial literacy level, whether they are satisfied with it and what measures are taken to improve. Besides, more research should be done on how people react on seminars. However including questions on whether a seminar has been visited recently will not bring representative results because this suggests a special interest that could be correlated to a high level of wealth (Lusardi 2003, p. 9). To compare before and after seminar attitudes, skills and perceptions, the study by Clark et al. (2003) should be pursued to know if and how seminars influence successful planning.

Similar to Lusardi et al. (2005) questions on saving goals could be added in order to find out more about the planning ability of Germans. The set-up of SAVE as panel

data is very suitable for questions on planning because it can be examined whether goals have been met.

References

Agnew, J. R., L. R. Szykman (2005): *Asset Allocation and Information Overload: The Influence of Information Display, Asset Choice, and Investor Experience.* The Journal of Behavioral Finance, (6), p. 57-70.

Ando, A. and F. Modigliani (1963): *The "Life Cycle" Hypothesis of Saving: Aggregate Implications and Tests.* The American Economic Review, (53), p. 55-84.

Benartzi, S. and R. H. Thaler (2007): *Heuristics and Biases in Retirement Savings Behaviour.* Journal of Economic Perspectives, (21), p. 81-104.

Bernheim, D., D. Garrett, D. Maki (2001): *Education and Saving: the long-term effects of high school financial curriculum mandates.* Journal of Public Economics, (80), p. 435-465.

Börsch-Supan, A. (2004): *Mind the gap: The Effectiveness of Incentives to boost Retirement Saving in Europe.* MEA Discussion Paper Series, No. 52, Mannheim.

Börsch-Supan, A., M. Coppola, L. Essig, A. Eymann, D. Schunk (2008): *The German SAVE study. Design and Results.* MEA Studies 06, [online], Available from: http://madoc.bib.uni-mannheim.de/madoc/volltexte/2008/1935/. [cited 12. Apr. 2010].

Börsch-Supan, A. and L. Essig (2002): *Sparen in Deutschland. Ergebnisse der ersten SAVE-Studie.* Köln: Deutsches Institut für Altersvorsorge.

Clark, R. L., M. B. d'Ambrosio, A. A. McDermed, K. Sawant (2003): *Sex Differences, Financial Education, and Retirement Goals.* PRC Working Paper, No. 15, Philadelphia.

Cocco, J., F. Gomes, P. Maenhout (2005): *Consumption and portfolio choice over the life-cycle.* Review of financial Studies, (18), p. 490-533.

Daniel, T. (1997): *The economic psychology of saving: The role of the individual differences associated with intertemporal choice.* Paper presented at the 22nd IAREP conference, Valencia, Spain.

Friedman, M. (1957): *A theory of the Consumption function.* Princeton: Princeton University Press.

Greenspan, A. (2001) Remarks by Chairman Alan Greenspan: *The importance of education in today's economy.* Speech presented at the Community Affairs Research Conference of the Federal Reserve System, April 6.

Hilgert, M. and J. Hogarth (2002): *Financial knowledge, experience and learning preferences: Preliminary results from a new survey on financial literacy.* Consumer Interest Annual, (48).

Hogarth R., (1987): *Judgement and Choice: The Psychology of Decision*. 2nd ed. Chichester: Wiley.

IFD (2008): *Finanzstandort Deutschland.* Bericht Nr. 4 – 2008. [online], Available from: http://www.finanzstandort.de/BaseCMP/pages/contentdelivery?JOB_NAME=DISPLAY_HOMEPAGE. [cited 12. Apr. 2010].

Kahneman, D., A. Tversky (1979): *Prospect Theory: An Analysis of Decision under Risk.* Econometrica, (47), p. 263-291.

Kahneman, D., A. Tversky (1984): *Choices, Values, and Frames.* The American Psychologist, (39), p. 341-350.

Klos A. and T. Langer (2007): *Psychologie und Altersvorsorge. Was die Behavioral Finance- Wissenschaft leisten kann.* Köln: Deutsches Institut für Altersvorsorge.

Laibson, D. (1998): *Life-cycle consumption and hyperbolic discount functions.* European Economic Review, (42), p. 861-871.

Laibson, D., A. Repetto, J. Tobacman (1998): *Self-Control and Saving for Retirement.* In: G. L. Perry and W. C. Brainard (eds.): Brookings Papers on Economic Activity. Washington: Brooking Institution Press.

Lusardi, A. (2003): *Saving and Effectiveness of Financial Education.* PRC Working Paper, No. 14, Philadelphia.

Lusardi, A., M. van Rooij, R. Alessie (2007b): *Financial literacy and Stock Market Participation.* DNB Working Paper, No. 146, Amsterdam.

Lusardi, A., O. Mitchell (2005): *Financial literacy and planning: Implications for retirement wellbeing.* DNB Working Paper, No 78, Amsterdam.

Lusardi, A., O. Mitchell (2007a): *Financial literacy and retirement preparedness: Evidence and implications for financial education.* Business Economics, (42), p. 35-44.

Mandell, L. (2008): *Financial Literacy: Does it Matter?* In: Lucey, T. A., K. S. Cooter (eds): Financial Literacy for Children and Youth. [online], Available from: http://www.jumpstartcoalition.org/upload/Mandell Paper April 2005.doc. [cited 12. Apr. 2010].

Modigliani, F. and R. Brumberg (1954): *Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data.* In: K. Kurihara (ed.): Post Keynsian Economics. New Brunswick: Rutgers University Press.

NSR (2005): *National Strategy Report on Old-age Pension provision. Germany.* Employment, Social Affairs, & Equal Opportunities. European Commission.

OECD (2005): *Improving Financial Literacy. Analysis of Issues and Policies.* Paris: OECD publishing

Rose, L. (2008): *Financial Literacy: Who cares?* New Zealand Management, (55), p. 66-66.

Schunk, D. (2006): *The German SAVE Survey: Documentation and Methodology.* MEA Discussion Paper Series, No. 109, Mannheim.

Thaler, R. H. (1980): *Towards a positive theory of consumer choice.* Journal of Economic Behavior and Organization, (1), p. 39-60.

Thaler, R. H. and H. M. Shefrin (1988): *The Behavioural Life-Cycle Hypothesis.* Economic Inquiry, (26), p. 609-643.

Vohs, K.D., Baumeister, R. F. (2004): *Understanding self-regulation: An introduction.* In R.F. Baumeister & K.D Vohs (Eds): Handbook of self-regulation: Research, Theorie and application. New York: Guilford Press.