Knowing what not to do: financial literacy and consumer credit choices.[*]

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Abstract

Based on a rich panel of household data, we investigate the determinants of the use of consumer credit in Germany. We find that the usage frequency of an easily accessible, but relatively expensive source of consumer credit decreases with financial literacy but is unrelated to household income. This result is robust to household structure, age, formal education, and occupational status. Based on childhood-related information on spending behavior, we control for the influence of self- control on credit decisions. We document that neither self-control, nor low numeracy drive out financial literacy when explaining the frequency of (expensive) credit usage. Hence, financial education plays an important role to improve consumer choices.

1 Introduction

Empirical studies reveal substantial limitations of traditional finance theory in explaining financial decisions by private households (Campbell, 2006). In particular, a poor understanding of products and mechanisms in financial markets (i.e., low *financial literacy*) leads to suboptimal saving decisions (Lusardi and Mitchell, 2007; Bucher-Koenen and Lusardi, 2011; van Rooij, Lusardi, and Alessie, 2012), to lower stock market participation (van Rooij, Lusardi, and Alessie, 2011) and to lower portfolio diversification (Guiso and Jappelli, 2009). More recently, research on financial literacy has extended its focus to credit-related issues, looking at the conditions of credit card contracts, at over-indebtedness (Lusardi and Tufano, 2009), at the delinquency on (general) debt (Gathergood, 2012) and on subprime mortgages (Gerardi, Goette, and Meier, 2010). While all these studies examine outcomes of past financial decisions (the stock of debt, the chosen contract), relatively little is known about the factors determining the decisions of households. We therefore study the interplay between financial literacy and consumers' attitudes towards the usage of credit products in their daily lives. In contrast to, for example, singular decisions about mortgage credits, customers repeatedly make decisions about ignoring, using or settling short-term consumer credit lines. Complementary to financial literacy we identify two other relevant factors influencing credit taking decisions when controlling for household circumstances: cognitive ability and a character trait important in the credit context - a proxy for self-control. Information on childhood spending behavior allows us to derive an exogenous measure of self-control, which is - to the best of our knowledge - novel to the literature on financial literacy. This fact also enables us to carve out the contribution of financial education.

Our investigation into the determinants of credit usage decisions is relevant given the clear link between households' financial wealth, financial planning, and financial literacy. For example, Bernheim, Skinner, and Weinberg (2001) point out that wealth accumulation and consumption behavior of surveyed American households are difficult to reconcile with rational optimization according to classical life cycle theory. Ameriks, Caplin, and Leahy (2003) use American survey data to demonstrate that households differ in terms of their propensity to plan their financial affairs. They show that households who monitor their expenses more closely than others tend to accumulate more wealth. Identifying determinants of credit usage decisions is important given the availability and the ease of use of consumer credit: it is available to the vast majority of the adult population in almost all de-

veloped countries, either by means of credit cards, or (as in the case of Germany considered here) by credit facilities associated with current accounts. As households typically make such decisions without financial advisers, our study determines the role of financial education for the improvement of credit decisions.[1]

Our study investigates the determinants of credit line usage by analyzing a broad panel of German households (the SAVE dataset). This underlying representative survey is conducted on a yearly basis by the Munich Institute of Economic Ageing (MEA). It has also been used for research on financial literacy by, e.g., Bucher-Koenen and Lusardi (2011), Bucher-Koenen and Ziegelmeyer (2011) and Glaser and Klos (2012), and is particularly well suited to study potential links between financial knowledge and the usage of credit lines, as it contains detailed information about the households' financial literacy, attitudes and socio-economic characteristics. Also, due to the specific institutional setup in Germany (credit limits are based on current accounts instead of credit cards), the use of consumer credit lines is independent from the method of payment. Hence, unlike most literature on the use of credit cards (e.g., Klee, 2008; Koulayev, Rysman, Schuh, and Stavins, 2012), we unambiguously measure credit decisions rather than a mixture of credit decisions and transaction method choices. Furthermore, due to the broad availability of overdraft credit lines among the German population a differentiation between usage of this credit form and access to it is not an important hurdle.

In order to analyze the determinants of credit line usage, we proceed in several steps: First, we investigate the impact of financial literacy on consumer credit usage, while controlling for the households' economic and social circumstances. Correspondingly, the influence of financial literacy on credit decisions is the first hypothesis ($H1$) we test in our investigation. Evidence in favor of this relationship calls for financial education as a key solution: people with lower levels of financial literacy appear to be unaware of the cost involved or the inappropriateness of a convenient but expensive product (a conclusion also drawn by Disney and Gathergood, 2011, in the U.K. context).[2] Similar arguments in favor of financial education have been made in different contexts by van Rooij, Lusardi, and Alessie (2011), Guiso and Jappelli (2009) or Bucher-Koenen and Lusardi (2011). However, the scope of financial education (which explains the products and mechanisms at financial markets) to

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[1] Complementary, Clark, Morrill, and Allen (2012) demonstrate that external influence affects retirement decisions.

[2] A comparison with an alternative form of consumer credit (installment credit) shows differences: installment credits are used more frequently by people with higher income, whereas financial literacy does not matter.

change character traits (self-control) or cognitive ability (numeracy) is severely limited.[3] Hence, in a second step, we explicitly test the hypothesis that instead of financial literacy (a lack of) self-control is responsible for increased credit activity ($H2$). Similar to Gathergood (2012), we find a relationship between a lack of self-control and credit decisions. Importantly, however, we are able to demonstrate that the consideration of self-control does not entirely drive out the effect of financial literacy. Thirdly, we turn our attention to the role of numeracy: according to Gustman, Steinmeier, and Tabatabai (2012), financial literacy can be thought of as an intermediary channel linking numeracy to financial outcomes. Christelis, Jappelli, and Padula (2010) find that numeracy matters for investment decisions. While we are able to confirm the hypothesis that numeracy and the use of consumer credit are negatively related, we again find that the effect of numeracy does not drive out the importance of financial literacy ($H3$). This result is reassuring given the concerns by Smith, McArdle, and Willis (2010), who argue that a lack of numeracy is a more fundamental issue than a lack of financial literacy, and by Banks (2010), who highlights the importance of disentangling financial literacy and numeracy. Our analysis therefore concludes that financial education can improve consumer credit decisions, even if a lack of self-control and numeracy are further determinants of consumer credit use.

Our analysis is connected to the literature on self-control. In theoretical models including self-control, agents typically know the ideal strategy, but are tempted to deviate from it. For instance, in their seminal paper, Thaler and Shefrin (1981) argue that self-control problems should be taken into account when modeling saving decisions. Similarly to subsequent papers such as Laibson (1997), Gul and Pesendorfer (2001, 2004) or Benhabib and Bisin (2005), their model enables agents to protect themselves from deviations from optimality through pre-commitment. Levine and Fudenberg (2006) model self-control and temptation as a game between a short-run impulsive self and a long-run patient self. From an empirical side, Bucciol (2012) demonstrates that models with temptation come closer to reality than models without; furthermore, Ameriks, Caplin, Leahy, and Tyler (2007) document that self-control measures correlate with wealth. The idea that a lack of self-control (as opposed to poor financial literacy) is responsible for suboptimal financial decisions challenges the claim that financial education has a beneficial impact. In our study, we take these considerations seriously. In particular, we construct a measure of self-control which is unrelated to current consumption and saving decisions and, hence, exogenous to current credit decisions: we use information regarding the respondents'

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[3]For a discussion of the relation between cognitive ability and character traits, see Borghans, Duckworth, Heckman, and ter Weel (2008).

childhood behavior (spending or saving their pocket money) to determine the level of self-control of the adult person. This approach relies on the validity of the assumption that character traits (in particular patience and self-control) are relatively stable for an individual person. An influential line in psychological literature backs our argumentation: Mischel and Peake (1988), Mischel and Rodriguez (1989) and Mischel and Peake (1990) demonstrate that individual differences in self-control measured at the pre-school stage predict the same persons' behavior more than a decade later. Coming to similar conclusions, Moffitta, Arseneault, Belsky, Dickson, Hancox, Harrington, Houts, Poulton, Roberts, Ross, Sears, Thomson, and Caspi (2011) present a longitudinal study which demonstrates that self-control in childhood predicts personal finance (among other criteria) at the age of 32. Therefore, our childhood-based measure of self-control is an imperfect, but valid proxy for self-control of the adult respondent which is not caused by current spending behavior. To the best of our knowledge, this approach to identify determinants of decisions has not been used before.

Most empirical studies on financial literacy are based on survey data. An exception is Carlin and Robinson (2012), who take a direct approach and conduct an experiment in which they provide only some participants with financial training, or Bernheim and Garrett (2003), who conduct a field study. However, most studies rely on responses to survey questions which aim at evaluating the ability to solve basic mathematical problems occurring in financial markets (interest rate compounding, real vs. nominal quantities), or to test the intuition behind specific financial products (or a mixture of both). Our measure of financial literacy aggregates information from mathematical and institutional questions, as is common in the literature. In addition to mathematical questions about (compound) interest and inflation Lusardi and Mitchell (2008) and Bucher-Koenen and Lusardi (2011) also include institutional questions e.g. about the relative riskiness of assets. Behrman, Mitchell, Soo, and Bravo (2012) derive their financial literacy measure from a set of twelve questions, some conventional, others specific to the institutional design of the considered country's (Chile) pension system. The set of questions we rely on comes closest to the questions of van Rooij, Lusardi, and Alessie (2011). In our analysis, we also disentangle measures of financial literacy from measures of numeracy.

The remainder of this study is organized as follows: Section 2 introduces the dataset and the institutional background of consumer credit in Germany. Section 3 describes the details of the regression strategies and discusses the results. Section 4 presents the results of various robustness exercises, whereas Section 5 concludes.

2 Data

Our empirical analysis relies on a micro dataset from a household panel study (SAVE Study), which has been conducted among households in Germany by the Munich Research Institute for the Economics of Aging (MEA) since 2001. The data cover information on demographic and economic characteristics and focus on savings and old-age provisions. The sampling unit of the panel is the household. For the purposes of our analysis, we mainly rely on data collected in the survey year 2009 because this survey questionnaire includes a comprehensive module of financial literacy questions which is broader than the set of questions in previous survey waves. Also, for the first time the respondents can actively refrain from answering financial literacy questions by choosing the option "I cannot/do not want to answer". This option reduces the probability that individuals try to guess the right answer and therefore allows for a cleaner definition of the proxy for financial literacy. Hence, we are able to link detailed information on financial literacy to information on credit usage and household characteristics. Furthermore, we consider several questions regarding pocket money in childhood, which the panelists were asked in 2008.[4] We do not rely on imputed values in the SAVE data but instead reconstruct missing values using the indicator file provided by MEA which identifies imputed values.

Information about consumer credit, financial literacy and demographic characteristics is central to our analysis. Concerning **consumer credit**, we primarily focus on data on overdraft facilities on checking accounts ("Dispokredite"). As documented by the household survey, about 80 percent of all households in Germany are eligible to use a credit line on their current account, and in fact, half of them do so at least occasionally. The size of these credit lines is substantial (on average three times the monthly net income), and the interest rates charged at between 10 and 20 percent p.a. are considered to be rather expensive.[5] Unlike consumer installment credit (which we also consider in this study for comparison), the credit line is meant to be used on a short-term basis, and it is not associated with a specified purpose (as e.g., an installment credit for a car purchase). In this sense, a credit line is a convenient, but also costly way to smooth consumption in the face of temporary liquidity gaps.

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[4]Fortunately, the panel structure allows to link information from subsequent survey waves. Since it is always the same household member participating in the survey and all respondents of the 2009 wave were already included in the preceding year no observations are lost because of this merge.

[5]Although a subjective, this judgment is the prevailing view in the political debate in which, e.g., the German Federal Ministry of Consumer Protection (BMELV) has appealed to credit institutes to decrease interest charges on credit limits.

In 2009, 2,176 out of 2,222 respondents (98 percent) indicate whether their checking accounts possess an overdraft credit facility. Of the 1,733 households with an available overdraft facility (almost 80 percent of the responding participants), 97 percent indicate the frequency of consumer credit use. The panelists can choose among the four predefined answers "never", "1 to 3 times a year", "4 to 6 times a year", "more often or constantly"; hence, the variable of interest regarding the usage of overdraft is of categorial nature and censored on both sides (naturally censored by zero on the lower bound and by questionnaire design on the upper bound). The distribution of answers on usage frequency is displayed in Table 1. The largest share of 46.8 percent of respondents indicate to never use overdraft credit, but there is also a considerable fraction of 17 percent who answer that they use overdraft credit more than six times a year or constantly.

[Insert Table 1 here.]

In order to obtain a comprehensive measure of **financial literacy**, we consider all financial literacy questions included in the special module of the 2009 SAVE questionnaire except those related to the German old age pension scheme ("gesetzliche Rentenversicherung"). The nine remaining questions are a subset of the financial literacy questions discussed in van Rooij, Lusardi, and Alessie (2011). Four of these questions capture basic financial concepts which do not go much beyond pure percentage calculus numerical skills. These skills are certainly necessary in the context of financial decision making and compounding interest as well as inflation considerations. Five advanced questions assess more innate financial concepts regarding knowledge of financial assets' characteristics, the stock market, risk-return relationship and diversification.[6] We compute a score of financial literacy by counting the number of correct answers to the nine questions; henceforth, we take this measure as our proxy for financial literacy. If at least one answer is missing the score will be missing as well. In contrast, the choice "I cannot/do not want to answer" is counted as a wrong answer. The empirical distribution of responses is reported in Table 2. Panel A shows that some basic and advanced financial concepts are conceived better or worse than others. Very broadly speaking, each question is answered correctly by about 50 to 80 percent of respondents. Especially the concepts of interest compounding when a realistic interest rate for a savings account is assumed (basic question 1) and return volatility of different assets (advanced question 1) are well understood. However, one more difficult advanced question about the relation between interest rate and fixed coupon bonds is answered correctly by

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[6]A translation of the original questions in multiple choice format is provided in Appendix A.

only 9.4 percent of respondents. For advanced questions respondents indicated much more frequently that they cannot or do not want to answer a question instead of answering incorrectly than for the basic questions. Panel B reports the fractions of respondents who were able to answer a specified number of answers correctly. If the number of correct answers is zero respondents answered either incorrectly, indicated that they do not know or completely refused to answer questions. About 40 percent of respondents answer at least 4 questions correctly. The mean of correct answers is 5. Close to 60 percent of panelists indicate at least once that they do not know the correct answer, which is evidence for the importance to provide this answering option.

[Insert Table 2 here.]

Since we ask whether personal traits determine credit usage we asses respondents' **self-control**. We approximate this unobservable trait by considering participants' agreement to the statement "[As a child] I used to spend my pocket money immediately". Fur this purpose we enrich cross-sectional data from the 2009 SAVE survey with two additional variables from the 2008 questionnaire. Respondents can indicate their agreement to the statement on a scale ranging from 0 ("strongly disagree") to 10 ("agree completely"). Low values therefore imply higher levels of self-control.

In order to examine whether financial literacy is mainly due to **numeracy** we construct a corresponding proxy. This proxy is derived from the number of correct answers given to three math text problems included in the 2009 SAVE survey. Again, we set the whole score to missing if at least one question was not answered. Compared to the financial literacy questions refusals occur much more often for the brain teasers since the option "I cannot/do not want to answer" is not provided.[7] Responses to the questions are reported in Table 3, Panel A. While two out of the three exercises were answered correctly by about 40 percent of respondents, one question was solved correctly by only one fifth. Therefore, the proportion of respondents answering all questions correctly amounts to only 13.9 percent. Nearly one half is not able to correctly answer a single math question of the three questions given (see Table 3, Panel B).

[Insert Table 3 here.]

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[7]A translation of the questions is provided in Appendix B.

The analysis takes into account several **demographic characteristics** of the respondent and the household as a whole which potentially play a role in the context of overdraft credit usage. These characteristics include household monthly net income,[8] age, family status, education, occupation and employment status. More specifically, the family status is captured by dummy variables indicating whether the respondent is single, a single parent, a couple or a couple with children. Education is measured by respondents' schooling experience: as in Germany at least a lower secondary education ("Hauptschulabschluss") is compulsory, we capture higher education by mid-level education ("Mittlere Reife" or equivalent) and A-level education ("(Fach-)Hochschulreife"). For the occupational status, respondents indicate whether they are blue- or white-collar worker, civil servant, self-employed or others (e.g. retiree). We do not consider the respondent's gender since only for respondents living in single households without children gender differences might come into effect.[9]

3 Empirical Analysis

Empirical approach. We take a systematic look at the determinants of the frequency of short-term consumer credit ("Dispokredite") use, $Creditfreq^\star$. We focus on the role of financial literacy, $FinLit$, and include (depending on the specification) a battery of control variables Φ on the RHS of the equation, i.e.

$$Creditfreq_i^\star = \beta FinLit_i + \gamma' \Phi_i + \epsilon_i \tag{1}$$

The vector of control variables Φ includes (log) income, age, dummy variables for the family status (with singles being the base group), for the occupational status (with white-collar employees being the base group), for the educational status (with a lower secondary degree being the base group), as well as a dummy variable capturing unemployment of the respondent and/or the respondent's spouse. As the data about the usage of consumer credit is of categorical nature (there are four subgroups), $Creditfreq^\star$ is not directly observable; hence, we consider Eq. (1) a latent variable model and run ordered probit regressions. By the means of the latter approach, we are able to compute, e.g., $P[(Creditfreq_i = "\text{Never}")|FinLit_i, \Phi_i]$, i.e., the probability of not using short-term credit depending on financial literacy and other control variables. Likewise, we are also able to compute $P[(Creditfreq_i =$

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[8]We excluded two implausible observations with overly high net household incomes (more than 15,000 EUR).

[9]In unreported regressions analyzing gender differences in overdraft credit usage behavior of 345 single households do not yield significant estimates for the gender coefficient.

"More often than six times or constantly")$|FinLit_i, \Phi_i]$, i.e., the probability of using short-term credit relatively frequently.

[Insert Table 4 here.]

Financial literacy and consumer credit. Table 4 displays the results of taking Eq. (1) to the SAVE data. As expected, financial literacy enters the regression with a negative coefficient. The relation between overdraft credit usage frequency and financial literacy is highly significant in all regression specifications. This finding speaks in favor of the hypothesis (*H1*) that subjects with higher levels of financial literacy better understand financial concepts such as compound interest. Since they are more likely to be aware of high costs of overdraft credit usage they fall back on it less frequently. Although the regression of overdraft credit usage on financial literacy alone still yields a negative and highly significant relationship, the coefficient on financial literacy is considerably reduced compared to the full specification including household characteristics as control variables. However, financial literacy, household income and respondent's age already cover a large proportion of the overall specification's explanatory power. Comparing the explanatory power of these four variables (column iv) measured by an R^2 of 10 percent to the full specification (column i) with an R^2 of 11 percent reveals that adding variables covering a household's family and occupational situation as well as respondents' education cannot account for much of the variation in overdraft credit use frequency. In columns (iv)-(vii) financial literacy and log income are fixed while we vary household characteristics. Somewhat surprisingly, household income itself is not significant in explaining overdraft credit use frequency. Still, in most specifications it enters with a negative sign which seems reasonable; the coefficients are far from being significant. In line with this regression result the correlation between age and (log) household income is not significantly different from zero when retirees are included.

In order to interpret the magnitude of coefficient estimates, Table 5 presents predicted probabilities for a subject with certain characteristics to be in each of the four usage frequency groups, e.g. $P[(Creditfreq_i = "Never")|FinLit_i, \Phi_i]$. Probabilities are calculated based on specification (iv) of the baseline analysis, which does not require to determine characteristics with respect to households structure, respondents' occupation or education. However, this simplification is reasonable since coefficient estimates on financial literacy, log income and age vary modestly between the full specification (column i) and the reduced specification. Three exemplary households are analyzed for differing levels of

financial literacy. For financial literacy we choose the average value as well as one standard deviation away from the average value to both sides. Regarding household specifications, in the upper panel households with average age and average (log) income are analyzed. An average household never uses overdraft credit with a probability of 45.3 percent. However, if financial literacy is (one standard deviation) below the average this probability shrinks to 38.7 percent. To the contrary, highly financially literate subjects show a probability for not using their credit line of 52.8 percent. For the group of most frequent users those figures reverse with low literate households being in the high frequency usage group with a probability of 22.4 percent contrary to the highly literate who enter this group with a probability of 13.1 percent. The probabilities for the groups do not develop monotonically, which can be attributed to the censored nature of the data. As expected from regression results for younger households (results in the second panel) the probabilities of being in the group which frequently uses overdraft credit are much higher. But the differences for low and highly literate subjects are also more pronounced. Contrary to the full sample, probabilities for young households to never use overdraft credit are lower than for using overdraft facilities seldom (1-3 times a year). Abstracting from the censoring to the right the probability distribution indicates a positive skew in the observations for young households.While for households with low income (we analyzed average income in the bottom quartile of the income distribution of the sample in the lower panel) differences in literacy matter considerably in the group which never uses overdraft credit, these differences are less pronounced in the frequent user group.

[Insert Table 5 here.]

Further demographic determinants. While the role of financial literacy remains important when additional demographic characteristics of the households are included on the RHS, it is interesting to look at these control variables in detail: from column (iv) in Table 4 we can learn that a subject's age should not be omitted from the regression. Age plays a role in determining credit usage when taking into account the life cycle hypothesis, and elderly people may be reluctant to buy on credit in general. Also, one could assume a relationship between financial literacy and age. In our regressions the lowered coefficient estimate in regression specification (ii) points into this direction. It is intuitive to assume that an individual can acquire greater financial knowledge during the course of a life through learning by experience which may then have an effect on credit usage. However, when sorting respondents into

deciles according to age (not reported) we find average financial literacy to be spread quite evenly among the first eight deciles. Only the two highest age deciles which include people aged 70 years and older have slightly lower values for average financial literacy.

Column (v) analyzes household family situation in more detail. As in the full specification children increase the frequency of overdraft credit usage. This argument is plausible in light of unexpected expenses in connection with children. Unexpected expenses are all the more a problem for single parents who cannot balance their budged with their partner internally. Taking into account subjects' occupation can be important because of two different aspects: on the one hand banks could prefer certain occupations when granting credit, especially installment credit. Overdraft facilities can then work as a substitute for consumer credit. On the other hand, households with irregular income may especially be forced to bridge short-term liquidity shortages by using overdraft credit. In column (vi) we find no clear pattern for the relationship between occupation and credit usage for respondents with regular income (white-collar workers were defined to be the base group). However, self employed people use overdraft facilities significantly more often. This finding can be explained by income fluctuations of this group.

If the respondent and/or the spouse is unemployed the probability for a higher overdraft use frequency also increases (see column i). Neither general education nor knowledge acquired during the course of occupation can account for the effect of financial literacy. Subjects' schooling background does not decrease financial literacy's role for credit behavior. This result is in line with earlier research reporting that financial literacy covers concepts different from general knowledge and that education is only an imperfect proxy for financial literacy (van Rooij, Lusardi, and Alessie, 2011).

Self-control. It may well be that subjects are aware that overdraft credit is expensive, but nevertheless cannot resist the temptation to consume right away instead of after the next payroll. If this is the case, credit decisions do not rely on a lack of knowledge, but a lack of self-control. We therefore consider a proxy for self-control (based on spending behavior during childhood) on the right-hand side of the baseline regression equation.

The self-control proxy captures whether the respondents usually spent their pocket money immediately in early age (assuming that character traits as impatience or self-control tend to persist over time). Unlike in the regressions above, we can only look at those households which have agreed to

the statement "As a child I regularly received pocket money". The respondents answer question by indicating higher agreement on an 11 point Likert-Scale (0-10) and we consider those respondents who choose at least a value of 6 as regular pocket money receivers. This condition applies to 40 percent of respondents to the pocket money regularity question, leaving us with 878 observations in the sub-sample.[10] This sub-sample differs in its age structure compared to the entire sample of respondents, since elderly generations more often state that they did not receive pocket-money on a regular basis, and are thus excluded from this step of analysis. Accordingly, for those who have not received pocket-money, average age is 60 years, while it is only 48 years for those who did receive pocket money.

The results of the regression analysis including our self-control proxy are presented in Table 6.

[Insert Table 6 here.]

Columns (i) and (ii) reproduce the baseline analysis for the smaller sample of regular pocket money receivers which diverges form the full sample in its age structure. Compared to the baseline analysis the coefficient estimate for the sub-sample is slightly lower in magnitude but still significant at the 5 percent level. The coefficient estimate of financial literacy remains remarkably stable when our proxy for self-control is included into the regression. The proxy for self-control is termed "pocket money spender" and can take values from 0-10 with higher values indicating higher agreement on the statement "I spent my pocket money immediately". The coefficient estimate for the self-control proxy is positive and highly significant: regression results confirm that quick spending behavior in childhood is related to frequent overdraft use. Furthermore, since the coefficients on financial literacy remain remarkably stable, we conclude that financial knowledge and self-control (or impatience) capture different aspects which are both relevant in credit usage behavior; *H2* is thus rejected. The unrelatedness of the two aspects is also mirrored in their uncorrelatedness (see Table 9).

In order to see whether financial literacy or lacking self-control matter more for the usage of overdraft credits in economic terms, we have a look at the predicted probabilities for exemplary

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[10]This exclusion is necessary since for the immediate spending statement there are many "completely disagree" statements and it is impossible to distinguish whether these are due to true disagreement or simply because it was not possible to indicate that the statement does not apply because no regular pocket money was paid. This confusion in answering behavior is also reflected in the high proportion of 54 percent of respondents who completely disagree on the spending statement in the group of irregular pocket money receivers. In the regular pocket money group this share only amounts to 16 percent. Additionally, if pocket money is paid only irregularly it is possible that it is payed out with a certain purchasing purpose (e.g. giving money to a child in order to buy clothes on their own) and not to teach children to manage a budget.

households to fall into the four overdraft usage frequency groups in Table 7. More specifically, we calculate the probabilities by considering specification (vii) from the ordered probit regression of overdraft usage on financial literacy, pocket money spending, household income and age presented in Table 6. The panels in Table 7 present our exemplary households (average household, young household, financially disadvantaged household). The middle row of each panel displays probabilities when both financial literacy and the proxy for self-control take on average values. In the left part of the table we observe the variation of financial literacy by one standard deviation around the mean while keeping numeracy on its average value. In the right column self-control varies by one standard deviation and financial literacy remains constant. Quick pocket money spending (which proxies for low self-control) is associated with higher probabilities to be in groups of more frequent overdraft credit usage. This statement particularly applies to young households which display high probabilities to be in the group of frequent overdraft users for average values of self-control. Young households with low self-control (one standard deviation below the mean) are most likely in the frequent usage group. When comparing the effects of varying financial literacy by one standard deviation to changing self-control by one standard deviation on probability distributions we can see that the magnitude of the changes in probabilities are comparable to the effects of deviations in financial literacy.

[Insert Table 7 here.]

Numeracy. In Table 8 we scrutinize whether the effect of financial literacy on overdraft credit use frequency is mainly due to numeracy (*H3*). Subjects who experience difficulties in mathematical exercises will feel less comfortable in a financial context involving percentage calculation. In accordance with this consideration the correlation between self-reported financial knowledge and mathematical skills amounts to 0.46. Our baseline measure is constructed using basic as well as more advanced questions on financial literacy. More precisely, four questions out of nine focus on basic financial literacy concepts involving interest and compounding interest as well as inflation. Therefore, the issue whether considering financial literacy adds to our analysis when including numeracy becomes all the more striking. To address this concern we construct an advanced financial literacy measure relying on five questions determining respondents' knowledge of financial assets' characteristics, the stock market, risk-return relationship and diversification.

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In the left-hand panel of Table 8 financial literacy spans the values 0-9 while numeracy is measured as a score from 0-3. Both variables enter our regression equation simultaneously. Once more, we control for household characteristics. The right-hand panel of Table 8 presents the advanced financial literacy score and a variation in the numeracy measure. The advanced financial literacy measure spans the values 0-5. In column (v) numeracy is defined differently compared to the rest of the table: besides the math text questions the score also incorporates respondents' results with respect to the basic financial literacy questions which are prone to the suspicion that they rather cover aspects of numeracy than financial literacy. In this last definition numeracy varies between 0-7.

[Insert Table 8 here.]

As expected, numeracy enters with a significant negative coefficient estimate, indicating that people with higher numeracy use overdraft credit lines less frequently. The coefficient estimates for numeracy are quite stable across regression specifications (i) to (iv). Although there is a considerable correlation between financial literacy and numeracy amounting to 0.41 (see Table 9), financial literacy remains a significant factor in explaining overdraft credit use; hence, *H3* can be rejected. However, compared to our baseline analysis in Table 4 the coefficient estimate on financial literacy is reduced by around one third in the left-hand panel. Coefficient estimates on the advanced financial literacy measure reported in columns (iv) and (v) look equal to our baseline analysis, however the measure only spans values from 0 to 5 such that the coefficients are not directly comparable. The same holds for the numeracy measure in column (v) which is not only based on the results of the mathematical brain teasers but also incorporates the mathematical financial literacy questions and as such takes values from 0 to 7. Overall, adding numeracy to the specification does not considerably increase explanatory power. R^2 remains stable at 12 percent for the full regression specification including household characteristic controls.

To further analyze the relation between the competing explanatory variables, the correlations between the financial literacy measures as well as numeracy and pocket money spending behavior are presented in Table 9. For financial literacy three scores are calculated: first we present our baseline measure including all financial literacy questions while the subsequent measures focus on either basic or advanced financial literacy concepts. For numeracy we include the score counting the correct answers on the math text problems as well as the measure combining numeracy and basic financial

literacy. The proxy for self-control indicates participants' agreement on the question "I immediately spent my pocket money" (with higher values indicating higher agreement).

[Insert Table 9 here.]

Due to their high overlap by construction, the different scores for financial literacy are highly correlated. Although the score is a simple approach it seems to capture variation in financial literacy quite well considering its high correlation with the more sophisticated financial literacy index derived from factor analysis presented in the bottom row of the table and described in more detail in the robustness section. Surprisingly, the correlation between numeracy and basic financial literacy is comparable in magnitude to the correlation between numeracy and the financial literacy measure based on the advanced questions only. This evidence speaks in favor of basic financial literacy capturing aspects differing from pure mathematical skills.

In order to evaluate the impact of a variation in numeracy or financial literacy on overdraft usage we predict the probabilities for exemplary households to fall into the four overdraft usage frequency groups. Table 10 provides a picture of the coefficient estimates' economic significance. For the calculation we refer to specification (iii) from the ordered probit regression of overdraft usage on financial literacy, numeracy, household income and age presented in Table 8. Each panel presents an exemplary household (average household, young household, financially disadvantaged household). The middle row of each panel presents probabilities when both financial literacy and numeracy of a household have average values. On the left-hand side we vary financial literacy by one standard deviation around the mean while keeping numeracy on its average value. On the right-hand side numeracy varies by one standard deviation and financial literacy remains constant. When comparing the left-hand sides and right-hand sides in each panel we can see that raising financial literacy by one standard deviation changes probabilities for the different usage frequency groups in about the same magnitude as increasing numeracy by one standard deviation.

[Insert Table 10 here.]

Consumer installment credit. So far, we have argued that people with lower financial literacy make use of a relatively expensive source of credit. For comparison, we also investigate the determinants of a cheaper, albeit less easily accessible form of credit: consumer installment credit. Generally,

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consumer installment credit comes relatively close to overdraft credit in terms of purchasing goals (SAVE explicitly cites purposes such as buying clothes, electronic devices, cars or vacation trips as examples for what was funded by the credit). However, compared to overdraft credit facilities to which close to 80 percent of respondents have access, there can be groups of people who are credit constrained in the sense that they will not be granted consumer credit by credit providers. I.e., even if these groups would like to take out a consumer loan in order to cover a financing need, they cannot. In order to disentangle consumer credit access and credit demand we rely on information from the SAVE survey, which provides a direct indicator capturing credit constraints: In the survey participants are asked whether in the past five years they were fully or partly denied credit requests. We take this indication as objective evidence for credit constraints. Furthermore, respondents can state that they refrained from requesting credit for fear of denial. This information serves us as subjective measure of credit constraints. Of the respondents 3 percent are objectively credit-constrained, 4 percent feel credit-constrained and 3 percent are subjectively and objectively constrained. In total, 11 percent of respondents are credit-constrained. The results of a logistic regression of respondents' indication on outstanding consumer credit on financial literacy, our battery of control variables and the two dummy variables, indicating credit constraints, presented in Table 11.

[Insert Table 11 here.]

The results of the logistic regression confirm the expected: objectively credit-constrained people report significantly less often to have consumer credit outstanding. Surprisingly, the same does not apply to people who only feel constrained. Other insights from the results of Table 11 concern financial literacy and household income: financial literacy is unrelated to holding consumer installment credit once we control for household income, which is the most important variable in the regression. Hence, people with poor financial literacy are biased towards the expensive form of consumer (overdraft) credit. Interestingly, age again enters significantly and with a negative sign, which is plausible according to life cycle theory.

4 Robustness

As robustness exercises, we demonstrate that the results in the main part are not driven by (i) the choice of our econometric approach, (ii) the way we measure financial literacy or (iii) the definition of the variable assessing self-control by pocket money-spending behavior. Furthermore, we analyze whether households have to rely on overdraft credit because they do not have access to consumer credit, i.e. they are credit-constrained (iv).

Alternative econometric approach. As the SAVE data on overdraft credit usage frequency is of categorical nature and censored on both sides, ordered probit estimation is the natural choice. However, to make sure that the results on the negative relation between financial literacy and overdraft credit usage frequency are not due to the ordered probit approach, we also conduct OLS regressions, which are reported in Table 12.

[Insert Table 12 here.]

Our results turn out to be qualitatively similar to those from the baseline approach reported in Table 4. Most remarkably, coefficient estimates are almost unchanged in magnitude but are now much more straightforward to interpret. Interestingly the intercept turns out to be very high, considering that the dependent variable can only take on values between 1 (never use overdraft credit) and 4 (more frequently than six times a year or constantly in overdraft use). However, this fact becomes plausible when taking into account that age enters the regression negatively and that the average respondent is 55 years old. The difference in expected overdraft credit usage between a person in the lowest quintile of financial literacy and a person in the highest quintile in financial literacy is as large as if one becomes unemployed or a single parent, which are both major life events.

Alternative measurement of financial literacy. In the following, we document that the results of our study are not driven by the way we define our baseline financial literacy measure. As described above, this measure is derived from nine questions on financial literacy contained in the 2009 SAVE survey, which are aggregated into a score measure (counting the number of correct answers). While "I cannot/do not want to answer" is counted as a wrong answer, a missing answer will turn the score

to missing.

In addition to this relatively simple and straightforward measure of financial literacy, we also follow van Rooij, Lusardi, and Alessie (2011) who use an iterated principal factor analysis to construct an index for financial literacy from the quiz questions. When applying factor analysis we assume that financial literacy (which we cannot observe directly) is not mirrored equally well in the answers to the quiz questions. For each question, we construct a dummy indicating correct answers, such that we obtain 9 items which enter the factor analysis (missing values remain in the coding of the binary variables). For our analysis, we rely on the usual Pearson correlations. An indicative principal component analysis leads us to retain only one main factor. We derive loadings for this financial literacy factor from the iterative principal factor analysis. Given the factor loadings from the analysis of all nine items we obtain a financial literacy index by applying the Bartlett method to the rotated factor scores. We analogously derive one factor based on three items indicating correct answers to the numeracy questions. In order to carve out the differences between financial literacy and numeracy we repeat the procedure for only advanced financial literacy items entering the financial literacy factor. When combining numeracy with basic financial literacy items we obtain two factors from the indicative principal component analysis. The second factor derived from the principal factor analysis loads negatively on the numeracy items, which once more indicates that basic financial literacy covers concepts different from pure mathematical abilities.

[Insert Table 13 here.]

Regression results of the full specification including different financial literacy proxies are reproduced in Table 13. The coefficient estimates on different financial literacy proxies are always negative and significant through all specifications. For the specification disregarding numeracy the coefficient estimate is more than twice as large compared to our baseline regression in Table 4, column (i). The same is true when considering numeracy and comparing the coefficient estimate in column (ii) to its simpler equivalent in Table 8, column (i). Columns (iii) and (iv) of Table 13 contrast advanced financial literacy and numeracy. They compare to columns (iii) and (iv) in Table 8. Again, we can reject that numeracy drives out the effect of financial literacy. Interestingly, the second factor for numeracy derived from the principal factor analysis is insignificant. This insignificance indicates that considering basic financial literacy items when deriving numeracy from survey questions is not fruitful

for our analysis of credit usage behavior. Control variables remain largely constant for the different variations of the proxies.

Alternative self-control measures. We consider further ways to measure self-control based on pocket money spending behavior: The results are shown in Table 14. Columns (i) and (iii) reproduce previous findings which employ a score from 0-10, for which higher values indicate quicker spending. In column (ii) we replace this score with a dummy which only turns to one in case of full agreement to the statement (i.e. for respondents choosing a value of 10). This condition applies to 5 percent of the respondents who regularly received pocket money. In column (iii) the analysis is repeated only for those subjects who fully agreed that they regularly received pocket money in childhood (i.e. for respondents choosing a value of 10), however the measure of self-control is remains unchanged compared to our baseline analysis. This condition applies to 25 percent of the respondents and reduces the sample to 552 observations (compared to 885 subjects who received pocket money at least quite regularly). No further restrictions are imposed on spending behavior.

[Insert Table 14 here.]

The relation between financial literacy and overdraft usage frequency is unaffected by different restrictions to the analysis of pocket money spending behavior. This finding is mirrored by very stable coefficient estimates on the financial literacy score for all three specifications. Coefficients on spending behavior are also stable for groups which differ in their agreement on the regularity with which they received pocket money as long as they received pocket money at least on a regular basis (columns i and iii). Expectedly, the coefficient increases markedly in absolute values if a dummy variable is taken into account instead of a score (column ii).

Potentially credit-constrained groups. Credit-constrained people, who do not have access to consumer credit can be forced to rely on overdraft credit lines when they experience financing needs. However, this fact does not influence the relation between financial literacy and overdraft usage frequency. In Table 15 we explicitly take into account the measures for objective and subjective credit constraints discussed previously. Additional to these direct measures we also take a more indirect approach: since for credit providers one important aspect in their decision to grant credit is regular

income streams such that future interest and repayments can be covered (also compare our results in Table 11), groups with irregular or low incomes may be denied credit. As such groups we identify the unemployed, self-employed and other occupations (which comprise retirees, students and house-wives). Furthermore, single parents can experience difficulties in obtaining credit, since they often work part-time and banks could conclude that the disposable income is insufficient to cover credit commitments. Besides including indicators of direct credit constraints, in Table 15 we also conduct regressions excluding potentially credit-constrained groups.

[Insert Table 15 here.]

According to the results in Table 15 column (i) access to consumer credit is an important aspect in the overdraft usage decision: constrained households use overdraft credit lines significantly more often compared to unconstrained households. In these cases, overdraft credit serves as a substitute for consumer credit. Especially respondents fearing credit denial use overdraft credits more frequently, probably for convenience and ease. Still, explicitly controlling for credit constraints does not affect the coefficient estimate on financial literacy, which amounts to the same value as in the very first baseline regression. The coefficient estimate on the impact of financial literacy also remains stable and highly significant across specifications (ii) to (vi), in which potentially affected groups are excluded from the regression. In column (vii) all groups identified as potentially or objectively credit-constrained are excluded completely, which does not harm the relation between financial literacy and overdraft credit use.

5   Conclusion

Our analysis aims at extending our knowledge about households' financial decisions. Motivated by several recent studies on financial literacy, we investigate whether determinants of credit decisions can be explained by the lack of understanding of financial products. More specifically, we focus on an easily accessible, but expensive credit form (overdraft credit) which is available to a vast majority of German households.

Based on a micro dataset on German households, we test several hypotheses: we test whether financial literacy is central to credit decisions, whether this finding is due to the households' educational

status, or to their cognitive abilities to calculate, and we test whether financial knowledge or character traits are more important.

Financial literacy is in fact a crucial determinant of the use of credit products. Financial literacy is a qualification on its own which cannot be substituted by general education or cognitive training (i.e. numeracy). Also, the lack of financial literacy and its importance for credit decisions cannot be explained by character traits (i.e. self-control). All these findings suggest that, while financial literacy is certainly not the unique determinant of credit decisions, financial education programs could still substantially improve households' financial decisions.

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Table 1: Descriptive statistics on overdraft credit usage frequency

The table shows the distribution of household overdraft credit usage frequency. Only those households indicating that they have access to an overdraft facility on their checking account are taken into account. Percentages do not add up to unity because of refusals.

	Frequency	Percent
never	811	46.8
1-3 times p.a.	438	25.3
4-6 times p.a.	152	8.8
more often or constantly	295	17.0

Table 2: Financial literacy - Empirical distribution of answers to nine questions

Panel A reports the proportion of households providing correct and incorrect answers as well as the proportion of "I cannot/do not want to answer" and refusals to answer for each of the nine financial literacy questions. Panel B shows which percentages answer correctly (incorrectly/do not know) to a given number of questions, i.e. if no question is answered correctly the answers were either wrong, do not know or complete refusal or a combination of these possibilities. Means do not add up to nine due to refusals.

Panel A: Financial literacy - percentages of correct, incorrect and do not know answers (N= 2,222)

	Correct	Incorrect	Do not know	Refusal
Basic FL questions				
1) Interest (2%)	82.8	5.3	9.1	2.8
2) Interest (20%)	63.7	23.2	10.7	2.5
3) Inflation	78.1	4.0	15.0	2.9
4) Money illusion	54.8	31.1	11.3	2.7
Advanced FL questions				
1) Return volatility	70.0	9.4	17.1	3.6
2) Stock market	51.0	16.2	29.6	3.2
3) Diversification	63.7	6.4	27.5	2.4
4) Balanced funds	44.7	7.1	44.6	3.7
5) Bond prices	9.4	52.9	33.4	4.3

Panel B: Summary of responses - percentages of numbers of correct, incorrect and do not know answers (N=2,222)

	None	1	2	3	4	5	6	7	8	All	Mean
Correct	8.1	3.7	5.6	8.1	10.6	10.9	15.6	16.1	17.1	4.5	5.18
Incorrect	20.3	35.3	24.6	11.9	5.2	2.1	0.5	0.1	-	-	1.55
Do not know	42.0	16.0	11.2	7.5	7.5	4.7	3.0	2.5	1.6	4.0	1.98

Table 3: Numeracy - Empirical distribution of answers to three brain teasers

Panel A reports the proportion of households providing correct and incorrect answers as well as the proportion of refusals to answer for each of the three numeracy questions. The questionnaire does not provide the possibility to choose "I cannot/do not want to answer" for the brain teasers. Panel B shows which percentages answer correctly (incorrectly/do not answer at all) to a given number of questions, i.e. if no question is answered correctly some of the three questions on numeracy were either not or falsely answered.

Panel A: Numeracy - percentages of correct, incorrect and missing answers (N= 2,222)			
	Correct	Incorrect	Refusal
1) Bat and ball	19.4	69.8	10.8
2) Production time	40.3	43.9	15.8
3) Lily pond	42.6	39.6	17.8

Panel B: Summary of responses - percentages of numbers of correct, incorrect and missing answers (N=2,222)				
	None	1	2	All
Correct	45.1	21.4	19.6	13.9
Incorrect	23.9	25.5	24.6	26.3
Refusal	78.8	7.2	4.9	9.1

Table 4: Ordered probit regression of overdraft usage frequency on financial literacy

This table shows our baseline ordered probit regression of overdraft credit usage frequency on financial literacy. Respondents indicate their overdraft credit usage frequency by choosing among four usage frequency intervals: "never", "1 to 3 times a year", "4 to 6 times a year", "more often or constantly". We therefore employ an ordered probit estimation procedure with heteroskedasticity robust standard errors in all regressions. Financial literacy is a score taking the values 0-9 counting the number of correct answers to nine financial literacy questions included in the 2009 SAVE survey. When at least one answer to the questions is missing the score will turn to missing, too. We omit the dummy indicating a single household. With regard to occupation, white-collar employment is taken as the base group and among the educational variables lower secondary education is excluded. Unemployment is included as a dummy variable indicating whether the respondent and/or the spouse is unemployed. Column (i) displays the full regression specification including all control variables. Columns (iv) to (vii) show coefficient estimates when fixing financial literacy and income as baseline specification and varying the set of control variables. Standard errors are given in parentheses with the usual significance levels. (Significant at the *** 1%-level, ** 5%-level, * 10%-level.)

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Financial literacy	-0.074	-0.040	-0.053	-0.073	-0.059	-0.064	-0.058
	***(0.015)	***(0.013)	***(0.015)	***(0.015)	***(0.015)	***(0.015)	***(0.015)
Log income	-0.040		0.002	-0.050	-0.046	-0.069	-0.003
	(0.063)		(0.056)	(0.056)	(0.066)	(0.062)	(0.056)
Age	-0.023			-0.026			
	***(0.003)			***(0.002)			
Couple	-0.007				-0.053		
	(0.088)				(0.088)		
Single parent	0.392				0.552		
	**(0.165)				***(0.157)		
Couple with children	0.152				0.383		
	(0.096)				***(0.093)		
Blue-collar worker	0.021					0.015	
	(0.107)					(0.105)	
Civil servant	0.100					0.035	
	(0.145)					(0.138)	
Self-employed	0.363					0.081	
	***(0.139)					(0.135)	
Other occupation	0.011					-0.417	
	(0.086)					***(0.073)	
Mid-level education	0.037						0.220
	(0.079)						***(0.076)
A-level education	-0.072						0.099
	(0.087)						(0.083)
Unemployed	0.336						
	**(0.157)						
μ_1	-1.997	-0.287	-0.363	-2.323	-0.641	-1.150	-0.312
	***(0.487)	***(0.080)	(0.415)	***(0.443)	(0.471)	**(0.471)	(0.419)
μ_2	-1.256	0.417	0.324	-1.590	0.060	-0.448	0.376
	***(0.486)	***(0.081)	(0.416)	***(0.442)	(0.472)	(0.471)	(0.420)
μ_3	-0.932	0.709	0.627	-1.270	0.368	-0.141	0.680
	*(0.486)	***(0.083)	(0.417)	***(0.443)	(0.472)	(0.471)	(0.420)
N	1348	1554	1348	1348	1348	1348	1348
R^2	0.11	0.01	0.01	0.10	0.04	0.04	0.02

Table 5: Predicted probabilities for overdraft usage frequency groups

We report probabilities for exemplary households to be in the different usage frequency groups when varying the level of financial literacy. For the analysis we rely on our baseline specification from Table 4 column (iv) describing the regression of overdraft usage frequency on financial literacy, log income and age. We therefore do not have to impose numerous assumptions on household structure and respondent's education and occupation. We start with an average age, average income household and then vary assumptions about age and income in the lower panels. A young person is considered to be younger than 35. The average age of all respondents below 35 is employed for the young respondent scenario. For the low income scenario the average monthly net log income of the lowest quartile income group is chosen.

| | Probabilities for average age and average income | | | |
	P(Y=never)	P(Y=1-3 times)	P(Y=4-6 times)	P(Y=more often)
FL=3 (mean-1 STD)	38.7	28.5	10.6	22.4
FL= 5.4 (mean)	45.3	27.8	9.4	17.5
FL=8 (mean+1 STD)	52.8	26.1	8.0	13.1
	Probabilities for young respondents with average income			
	P(Y=never)	P(Y=1-3 times)	P(Y=4-6 times)	P(Y=more often)
FL=3 (mean-1 STD)	16.6	24.0	12.7	46.7
FL= 5.4 (mean)	21.3	26.2	12.3	39.8
FL=8 (mean+1 STD)	27.3	27.8	12.2	32.7
	Probabilities for financially disadvantaged, average age households			
	P(Y=never)	P(Y=1-3 times)	P(Y=4-6 times)	P(Y=more often)
FL=3 (mean-1 STD)	36.7	28.6	10.9	23.8
FL= 5.4 (mean)	43.5	28.0	9.8	18.7
FL=8 (mean+1 STD)	51.0	26.6	8.4	14.0

Table 6: Ordered probit regression of overdraft usage frequency on financial literacy and self-control

We use respondents pocket money spending behavior as a proxy for self-control assuming that quick spending indicates low self-control and that character traits persist over time. In order to include pocket money spending behavior into the ordered probit regression a sub-sample is taken into account. Only those respondents are considered who indicated having received pocket money on a regular basis (i.e. they chose at least a value of 6 on a range from 0 ("strongly disagree") to 10 ("agree completely") assessing respondents' agreement on the statement "As a child I regularly received pocket money"). This condition reduces the sample size from 2,222 to 885 observations. The variable termed pocket money spender indicates the agreement to the statement "I used to spend my pocket money immediately" and again spans values 0-10 where a value of 10 signals high agreement. Columns (i) and (ii) repeat the baseline regressions for the reduced sample size. Columns (iii) to (x) examine the effect of including the proxy for self-control. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Financial literacy	-0.060 **(0.024)	-0.045 **(0.020)	-0.056 **(0.025)	-0.042 **(0.020)		-0.052 **(0.023)	-0.059 **(0.023)	-0.051 **(0.023)	-0.062 ***(0.024)	-0.047 *(0.024)
Pocket money spender			0.077 ***(0.018)	0.080 ***(0.016)	0.076 ***(0.015)	0.083 ***(0.017)	0.072 ***(0.017)	0.086 ***(0.017)	0.082 ***(0.017)	0.084 ***(0.017)
Log income	-0.116 (0.102)		-0.136 (0.103)			-0.150 *(0.081)	-0.104 (0.083)	-0.212 **(0.095)	-0.192 **(0.084)	-0.146 *(0.081)
Age	-0.022 ***(0.005)		-0.020 ***(0.005)				-0.019 ***(0.004)			
Couple	0.282 *(0.148)		0.302 **(0.148)					0.267 *(0.147)		
Single parent	0.590 ***(0.224)		0.676 ***(0.230)					0.685 ***(0.230)		
Couple with children	0.208 (0.153)		0.199 (0.152)					0.305 **(0.146)		
Blue-collar worker	-0.109 (0.163)		-0.095 (0.164)						-0.059 (0.160)	
Civil servant	-0.051 (0.195)		0.002 (0.199)						-0.032 (0.190)	
Self-employed	0.450 **(0.211)		0.476 **(0.207)						0.349 *(0.199)	
Other occupation	-0.045 (0.132)		-0.026 (0.131)						-0.258 **(0.118)	
Mid-level education	-0.091 (0.142)		-0.032 (0.146)							0.046 (0.146)
A-level education	-0.217 (0.151)		-0.166 (0.155)							-0.049 (0.153)
Unemployed	0.323 (0.239)		0.304 (0.234)							
μ_1	-2.492 ***(0.751)	-0.473 ***(0.133)	-2.148 ***(0.776)	-0.138 (0.154)	0.102 (0.077)	-1.388 **(0.616)	-2.051 ***(0.644)	-1.619 **(0.689)	-1.860 ***(0.653)	-1.331 **(0.626)
μ_2	-1.720 **(0.749)	0.268 **(0.132)	-1.359 *(0.776)	0.623 ***(0.155)	0.844 ***(0.080)	-0.640 (0.616)	-1.279 **(0.643)	-0.862 (0.690)	-1.104 *(0.652)	-0.582 (0.626)
μ_3	-1.337 *(0.748)	0.609 ***(0.134)	-0.964 (0.775)	0.976 ***(0.157)	1.211 ***(0.083)	-0.266 (0.616)	-0.894 (0.642)	-0.484 (0.689)	-0.727 (0.651)	-0.208 (0.626)
N	540	631	539	629	675	539	539	539	539	539
R^2	0.11	0.01	0.14	0.05	0.04	0.07	0.11	0.09	0.08	0.07

Table 7: Predicted probabilities for overdraft usage frequency groups - Comparison of financial literacy and self-control

We report probabilities for exemplary households to be in the different usage frequency groups when varying the level of financial literacy (FL) in the left-hand panel and the proxy for self-control based on quick spending of pocket money (QS) in the right-hand panel of the table. For the analysis we rely on the specification from Table 6 column (vii) describing the regression of overdraft usage frequency on financial literacy, pocket money spending behavior, log income and age. We therefore do not have to impose assumptions on household structure and respondents' education and occupation. We start with an average age, average income household and then vary assumptions about age and income in the lower panels. A young person is considered to be younger than 35. The average age of all respondents below 35 is employed for the young respondent scenario. For the low income scenario the average monthly net log income of the lowest quartile income group is chosen.

Probabilities for average age and average income

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	38.1	30.6	12.4	18.9	QS=1 (mean-1 STD)	52.8	27.7	9.0	10.5
FL= 5.4 (mean)	43.3	29.9	11.2	15.5	QS=4.1 (mean)	43.3	29.9	11.2	15.5
FL=8 (mean-1 STD)	49.1	28.7	9.9	12.3	QS=7 (mean+1 STD)	34.8	30.7	13.1	21.4

Probabilities for young respondents with average income

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	24.8	29.5	15.0	30.8	QS=1 (mean-1 STD)	37.9	30.6	12.5	19.1
FL= 5.4 (mean)	29.2	30.3	14.2	26.2	QS=4.1 (mean)	29.2	30.3	14.2	26.2
FL=8 (mean+1 STD)	34.4	30.7	13.2	21.7	QS=7 (mean+1 STD)	22.0	28.7	15.3	34.0

Probabilities for financially disadvantaged, average age households

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	34.1	30.7	13.3	22.0	QS=1 (mean-1 STD)	48.5	28.9	10.0	12.6
FL= 5.4 (mean)	39.1	30.5	12.2	18.2	QS=4.1 (mean)	39.1	30.5	12.2	18.2
FL=8 (mean+1 STD)	44.8	29.7	10.9	14.6	QS=7 (mean+1 STD)	30.9	30.5	13.9	24.7

Table 8: Ordered probit regression of overdraft usage frequency on financial literacy and numeracy

This table reports the effect of including numeracy into the ordered probit regression specification. While the financial literacy score in the left-hand panel (columns (i) to (iii)) can take values from 0-9, numeracy only spans a range from 0-3. Just as the financial literacy score, numeracy counts the number of correct answers to three math text problems included in the 2009 SAVE survey and turns missing if an answer is missing. In order to disentangle the effects of financial literacy and numeracy columns (iv) and (v) the financial literacy score only considers five advanced financial literacy items. In column (v) the numeracy score also includes respondents' results on four basic financial literacy questions. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

| | All FL questions | | | Advanced FL questions | |
	(i)	(ii)	(iii)	(iv) Numeracy	(v) Numeracy+Basic FL
Financial literacy	-0.047		-0.042	-0.075	-0.071
	**(0.019)		**(0.018)	***(0.026)	**(0.028)
Numeracy	-0.100	-0.111	-0.098	-0.105	-0.057
	***(0.034)	***(0.027)	***(0.034)	***(0.033)	**(0.024)
Log income	-0.094		-0.103	-0.086	-0.086
	(0.077)		(0.067)	(0.077)	(0.077)
Age	-0.024		-0.027	-0.025	-0.024
	***(0.003)		***(0.002)	***(0.003)	***(0.003)
Couple	-0.048			-0.054	-0.057
	(0.097)			(0.096)	(0.097)
Single parent	0.411			0.443	0.399
	**(0.183)			**(0.181)	**(0.182)
Couple with children	0.121			0.095	0.113
	(0.106)			(0.105)	(0.106)
Blue-collar worker	-0.041			-0.039	-0.040
	(0.115)			(0.114)	(0.116)
Civil servant	0.221			0.208	0.220
	(0.147)			(0.146)	(0.146)
Self-employed	0.297			0.324	0.307
	*(0.154)			**(0.152)	**(0.154)
Other occupation	0.022			0.014	0.021
	(0.095)			(0.094)	*(0.095)
Mid-level education	0.059			0.062	0.062
	(0.087)			(0.087)	(0.088)
A-level education	-0.039			-0.047	-0.039
	(0.097)			(0.096)	(0.097)
Unemployed	0.205			0.195	0.209
	(0.177)			(0.170)	(0.178)
μ_1	-2.437	-0.190	-2.696	-2.372	-2.425
	***(0.576)	***(0.049)	***(0.523)	***(0.572)	***(0.575)
μ_2	-1.712	0.491	-1.977	-1.652	-1.700
	***(0.575)	***(0.051)	***(0.522)	***(0.571)	***(0.574)
μ_3	-1.379	0.808	-1.648	-1.322	-1.368
	**(0.575)	***(0.054)	***(0.522)	**(0.571)	**(0.574)
N	1167	1398	1167	1189	1167
R^2	0.12	0.01	0.11	0.13	0.12

Table 9: Correlations of alternative financial literacy proxies and competing explanatory variables

This table shows correlations between the different proxies for financial literacy, numeracy and self-control. All variables are defined as scores. In the bottom line we also present correlations for the alternative measurement of financial literacy based on a principal factor analysis considering all financial literacy questions. The correlations are computed based on the full sample.

	All FL	Basic FL	Adv. FL	Numeracy	Numeracy +basic FL	Quick spender
Basic FL score	0.85					
Advanced FL score	0.91	0.56				
Numeracy score	0.41	0.34	0.36			
Numeracy+basic FL	0.75	0.82	0.53	0.82		
Quick spender score	0.05	0.01	0.07	-0.01	-0.01	
FL index	0.99	0.84	0.91	0.40	0.73	0.05

Table 10: Predicted probabilities for overdraft usage frequency groups - Comparison of financial literacy and numeracy

We report probabilities for exemplary households to be in the different usage frequency groups when varying the level of financial literacy (FL) on the left-hand side and the proxy for numeracy (num) on the right-hand side of the table. For the analysis we rely on the specification from Table 8 column (iii) describing the regression of overdraft usage frequency on financial literacy, numeracy, log income and age. We therefore do not have to impose assumptions on household structure and respondents' education and occupation. We start with an average age, average income household and then vary assumptions about age and income in the lower panels. A young person is considered to be younger than 35. The average age of all respondents below 35 is employed for the young respondent scenario. For the low-income scenario the average monthly net log income of the lowest quartile income group is chosen.

Probabilities for average age and average income

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	44.8	27.6	9.9	17.7	num=0.5 (mean-1 STD)	46.1	27.4	9.7	16.9
FL= 5.4 (mean)	49.3	26.7	9.1	14.9	num=1.3 (mean)	49.3	26.7	9.1	14.9
FL=8 (mean+1 STD)	54.1	25.5	8.1	12.3	num=2.0 (mean+1 STD)	52.0	26.1	8.5	13.4

Probabilities for young respondents with average income

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	22.6	26.3	13.1	38.1	num=0.5 (mean-1 STD)	23.5	26.6	13.0	36.9
FL= 5.4 (mean)	26.0	27.3	12.8	33.9	num=1.3 (mean)	26.0	27.3	12.8	33.9
FL=8 (mean+1 STD)	30.1	28.0	12.4	29.5	num=2.0 (mean+1 STD)	28.3	27.7	12.6	31.4

Probabilities for financially disadvantaged, average age households

	P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)		P(Y=0)	P(Y=1-3)	P(Y=4-6)	P(Y>6)
FL=3 (mean-1 STD)	41.4	28.0	10.5	20.0	num=0.5 (mean-1 STD)	42.7	27.9	10.3	19.1
FL= 5.4 (mean)	45.9	27.4	9.7	17.0	num=1.3 (mean)	45.9	27.4	9.7	17.0
FL=8 (mean+1 STD)	50.7	26.4	8.8	14.1	num=2.0 (mean+1 STD)	48.7	26.9	9.2	15.3

Table 11: Logistic regression of consumer installment credit usage on financial literacy

In a logistic regression, we analyze how different household characteristics are related to prevalence of consumer credit. Respondents were asked whether they have any outstanding balances on consumer credit (e.g. car loan, credit for buying clothes or electronic devices). We apply the same battery of control variables as in the earlier regressions. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Financial literacy	-0.047	0.064	-0.020	-0.037	-0.020	-0.030	-0.039
	(0.031)	**(0.025)	(0.029)	(0.029)	(0.029)	(0.029)	(0.030)
Log income	0.621		0.770	0.778	0.669	0.661	0.726
	***(0.154)		***(0.127)	***(0.124)	***(0.144)	***(0.130)	***(0.128)
Age	-0.023			-0.033			
	***(0.006)			***(0.005)			
Couple	0.072				-0.096		
	(0.197)				(0.189)		
Single parent	-0.159				0.018		
	(0.330)				(0.323)		
Couple with children	0.199				0.430		
	(0.206)				**(0.194)		
Blue-collar worker	0.153					0.065	
	(0.202)					(0.196)	
Civil servant	-0.118					-0.180	
	(0.290)					(0.287)	
Self-employed	-0.230					-0.442	
	(0.286)					(0.278)	
Other occupation	-0.377					-0.816	
	**(0.178)					***(0.153)	
Mid-level education	0.339						0.545
	**(0.168)						***(0.162)
A-level education	0.317						0.442
	*(0.189)						**(0.179)
Unemployed	-0.070						
	(0.268)						
Obj. constrained	1.076	1.278	1.284	1.120	1.219	1.224	1.219
	***(0.256)	***(0.233)	***(0.248)	***(0.252)	***(0.250)	***(0.252)	***(0.249)
Subj. constrained	0.241	-0.128	0.219	0.152	0.210	0.256	0.250
	(0.273)	(0.245)	(0.268)	(0.270)	(0.269)	(0.269)	(0.269)
μ	-4.898	-1.903	-7.275	-5.496	-6.607	-6.017	-7.181
	***(1.111)	***(0.160)	***(0.946)	***(0.945)	***(1.025)	***(0.998)	***(0.956
N	1628	1885	1628	1628	1628	1628	1628
R^2	0.08	0.03	0.05	0.07	0.05	0.07	0.05

Table 12: Robustness: OLS regression of overdraft usage frequency on financial literacy

This table reruns the baseline regression by employing OLS estimation procedure with heteroskedasticity robust standard errors. As in the baseline specification we include financial literacy as an explanatory variable and our set of control variables. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Financial literacy	-0.071	-0.042		-0.070	-0.059	-0.062	-0.058
	***(0.015)	***(0.013)		***(0.014)	***(0.015)	***(0.015)	***(0.015)
Log income	-0.035		-0.082	-0.058	-0.054	-0.067	-0.012
	(0.055)		(0.055)	(0.052)	(0.064)	(0.060)	(0.055)
Age	-0.022			-0.024			
	***(0.003)			***(0.002)			
Couple	0.003				-0.030		
	(0.078)				(0.083)		
Single parent	0.388				0.561		
	**(0.170)				***(0.166)		
Couple with children	0.129				0.370		
	(0.092)				***(0.093)		
Blue-collar worker	0.051					0.041	
	(0.109)					(0.111)	
Civil servant	-0.069					0.011	
	(0.149)					(0.146)	
Self-employed	0.352					0.093	
	**(0.138)					(0.142)	
Other occupation	0.060					-0.366	
	(0.084)					***(0.071)	
Mid-level education	0.033						0.206
	(0.074)						***(0.076)
A-level education	-0.067						0.085
	(0.078)						(0.080)
Unemployed	0.359						
	**(0.159)						
α	3.739	2.201	2.596	4.145	2.601	3.017	2.305
	***(0.434)	***(0.081)	***(0.425)	***(0.416)	***(0.460)	***(0.460)	***(0.409)
N	1348	1554	1454	1348	1348	1348	1348
R^2	0.12	0.01	0.00	0.10	0.04	0.04	0.02

Table 13: Robustness: Ordered probit regression of overdraft usage on factor analysis-based proxies

This table reports ordered probit regressions on different proxies for financial literacy and numeracy which are obtained applying an iterated principal factor analysis as in van Rooij, Lusardi, and Alessie (2011). Columns (i) and (ii) show the results of a financial literacy factor based on all nine financial literacy questions included in the 2009 SAVE survey. In columns (ii) and (iii) we add an analogous factor based on the three numeracy questions. In order to disentangle the effects of financial literacy and numeracy, the factor for financial literacy in columns (iii) and (iv) is derived based only on the five advanced financial literacy questions, which address pure financial knowledge an cannot be solved with calculus skills. In column (iv) we base the principal factor analysis for numeracy on three math text questions and four basic financial literacy questions. We obtain two factors of which the first one loads negatively on the math text items. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	All FL questions		Advanced FL questions	
	(i)	(ii) Numeracy	(iii) Numeracy	(iv) Numeracy + Basic FL
Financial literacy factor	-0.162	-0.099	-0.102	-0.124
	***(0.036)	**(0.045)	***(0.037)	***(0.040)
Numeracy factor 1		-0.094	-0.098	-0.096
		***(0.031)	***(0.030)	***(0.031)
Numeracy factor 2				0.039
				(0.036)
Log income	-0.046	-0.098	-0.093	-0.087
	(0.063)	(0.077)	(0.077)	(0.078)
Age	-0.023	-0.024	-0.025	-0.025
	***(0.003)	***(0.003)	***(0.003)	***(0.003)
Couple	-0.008	-0.049	-0.051	-0.051
	(0.088)	(0.097)	(0.095)	(0.097)
Single parent	0.395	0.414	0.444	0.414
	**(0.165)	**(0.183)	**(0.179)	**(0.182)
Couple with children	0.154	0.123	0.115	0.110
	(0.096)	(0.106)	(0.104)	(0.106)
Blue-collar worker	0.027	-0.037	-0.028	-0.022
	(0.107)	(0.115)	(0.113)	(0.115)
Civil servant	0.097	0.220	0.238	0.221
	(0.146)	(0.147)	(0.146)	(0.147)
Self-employed	0.359	0.293	0.328	0.298
	***(0.139)	*(0.154)	**(0.152)	*(0.156)
Other occupation	0.010	0.021	0.022	0.026
	(0.086)	(0.095)	(0.094)	(0.095)
Mid-level education	0.034	0.057	0.075	0.068
	(0.079)	(0.087)	(0.086)	(0.087)
A-level education	-0.081	-0.044	-0.039	-0.039
	(0.087)	(0.097)	(0.095)	(0.097)
Unemployed	0.332	0.202	0.154	0.214
	**(0.157)	(0.177)	(0.175)	(0.177)
μ_1	-1.642	-2.090	-2.074	-2.025
	***(0.497)	***(0.588)	***(0.581)	***(0.593)
μ_2	-1.712	-1.364	-1.356	-1.297
	*(0.575)	**(0.587)	**(0.580)	**(0.593)
μ_3	-0.579	-1.032	-1.019	-0.963
	(0.496)	*(0.587)	*(0.580)	(0.592)
N	1348	1167	1202	1167
R^2	0.11	0.12	0.13	0.12

Table 14: Robustness: Ordered probit regressions of overdraft usage on alternative proxies for self-control

This table tests an alternative proxy for self-control in column (ii) and compares it to the earlier results reproduced in column (i). While in column (i) we employ a score where higher values indicate lower self-control specification (ii) considers a dummy variable in order to approximate low self-control. The dummy turns to one only if respondents "agree completely" on the statement "I spent my pocket money immediately" (i.e. choose the highest value on the scale of 0-10). Column (iii) tests the effect of lower self-control only for those individuals who strongly agreed on the statement "In childhood I regularly received pocket money" in order to leave out subjects who did not receive pocket money regularly. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	(i) score(baseline) quite regular receivers	(ii) dummy quite regular receivers	(iii) score most regular receivers
Financial literacy	-0.056 **(0.024)	-0.060 **(0.024)	-0.064 **(0.032)
Pocket money spender	0.077 ***(0.018)	0.544 **(0.241)	0.076 ***(0.022)
Log income	-0.136 (0.103)	-0.123 (0.102)	-0.118 (0.138)
Age	-0.020 ***(0.005)	-0.022 ***(0.005)	-0.013 **(0.006)
Couple	0.302 **(0.148)	0.285 *(0.148)	0.291 (0.188)
Single parent	0.676 ***(0.230)	0.617 ***(0.224)	0.815 ***(0.312)
Couple with children	0.199 (0.152)	0.207 (0.153)	0.124 (0.195)
Blue-collar worker	-0.095 (0.164)	-0.094 (0.165)	0.009 (0.231)
Civil servant	0.002 (0.199)	-0.018 (0.196)	-0.191 (0.231)
Self-employed	0.476 **(0.207)	0.472 **(0.210)	0.514 **(0.243)
Other occupation	-0.026 (0.131)	-0.018 (0.133)	-0.295 (0.179)
Mid-level education	-0.032 (0.146)	0.064 (0.144)	-0.156 (0.192)
A-level education	-0.166 (0.155)	-0.187 (0.153)	-0.270 (0.199)
Unemployed	0.304 (0.234)	0.320 (0.238)	0.413 (0.302)
μ_1	-2.148 ***(0.776)	-2.492 ***(0.753)	-1.935 *(1.068)
μ_2	-1.359 *(0.776)	-1.715 **(0.751)	-1.154 (1.067)
μ_3	-0.964 (0.775)	-1.327 *(0.750)	-0.706 (1.066)
N	539	539	336
R^2	0.14	0.11	0.16

Table 15: Robustness: Ordered probit regressions of overdraft usage considering potentially credit-constrained groups

This table shows ordered probit regression results when different potentially credit-constrained groups are excluded from the regression analysis. Furthermore, we include two dummy variables indicating whether a household is credit-constrained objectively (i.e. was fully or partly denied credit in the past five years) or subjectively (i.e. in the past five years a household did not request credit for fear of denial). In column (ii) the constrained households are excluded from the regression. In columns (iii) to (v) we exclude households according to their occupation or occupational status. Single parents are potentially credit-constrained and excluded in column (vi). In column (vii) we exclude all potentially credit-constrained groups simultaneously. Standard errors are given in parentheses with significance levels *** 1%-level, ** 5%-level, * 10%-level indicated in front.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Financial literacy	-0.075	-0.062	-0.076	-0.084	-0.070	-0.073	-0.071
	***(0.016)	***(0.016)	***(0.017)	***(0.023)	***(0.016)	***(0.016)	***(0.015)
Log income	-0.017	-0.055	-0.029	-0.093	-0.038	-0.005	-0.052
	(0.072)	(0.071)	(0.077)	(0.110)	(0.079)	(0.073)	(0.062)
Age	-0.022	-0.02	-0.022	-0.021	-0.020	-0.022	-0.025
	***(0.003)	***(0.003)	***(0.003)	***(0.004)	***(0.003)	***(0.003)	***(0.003)
Couple	0.027	0.033	0.033	0.120	0.035	0.020	-0.054
	(0.092)	(0.094)	(0.094)	(0.136)	(0.096)	(0.092)	(0.084)
Single parent	0.374	0.341	0.380	0.302	0.420		
	**(0.163)	**(0.173)	**(0.172)	(0.197)	**(0.167)		
Couple with children	0.154	0.178	0.122	0.201	0.202	0.141	0.062
	(0.101)	*(0.102)	(0.104)	(0.136)	*(0.105)	(0.101)	(0.092)
Blue-collar worker	0.031	0.036	0.044	0.033	0.027	0.041	-0.006
	(0.109)	(0.113)	(0.113)	(0.115)	(0.109)	(0.111)	(0.101)
Civil servant	0.119	0.086	0.109	0.121	0.125	0.126	0.067
	(0.144)	(0.149)	(0.145)	(0.149)	(0.143)	(0.152)	(0.141)
Self-employed	0.373	0.398	0.424	0.370		0.398	
	***(0.142)	***(0.143)	***(0.143)	**(0.148)		***(0.145)	
Other occupation	0.003	0.003	-0.032		-0.022	-0.002	
	(0.088)	(0.089)	(0.091)		(0.089)	(0.091)	
Mid-level education	0.019	-0.024	0.040	0.058	0.007	0.009	0.036
	(0.081)	(0.082)	(0.084)	(0.115)	(0.083)	(0.083)	(0.079)
A-level education	-0.094	-0.118	-0.061	-0.060	-0.105	-0.116	-0.046
	(0.089)	(0.091)	(0.092)	(0.127)	(0.092)	(0.092)	(0.087)
Unemployed	0.272	0.200		-0.102	0.369	0.305	
	*(0.159)	(0.172)		(0.244)	**(0.163)	*(0.168)	
Obj. constrained	0.639		0.658	0.427	0.679	0.622	
	***(0.169)		***(0.179)	**(0.209)	***(0.171)	***(0.176)	
Subj. constrained	0.902		0.808	1.131	0.887	0.853	
	***(0.183)		***(0.197)	***(0.221)	***(0.186)	***(0.189)	
μ_1	-1.714	-2.001	-1.808	-2.307	-1.730	-1.656	-2.251
	***(0.552)	***(0.539)	***(0.588)	***(0.843)	***(0.591)	***(0.556)	***(0.472)
μ_2	-0.945	-1.227	-1.026	-1.472	-0.962	-0.889	-1.517
	*(0.551)	**(0.539)	*(0.587)	*(0.841)	(0.591)	(0.555)	***(0.471)
μ_3	-0.596	-0.886	-0.676	-1.102	-0.617	-0.530	-1.197
	(0.551)	(0.539)	(0.587)	(0.840)	(0.591)	(0.556)	***(0.472)
N	1316	1247	1249	711	1240	1253	1348
R^2	0.16	0.10	0.15	0.12	0.16	0.16	0.10

A   Financial Literacy Questions

This appendix provides a translation of the questions on financial literacy in the 2009 SAVE questionnaire. Correct answers are in bold font. The first four questions displayed here, refer to basic financial literacy while the latter five gauge more advanced financial concepts. The order in the original questionnaire deviates from ours. The designations in quotation marks of the basic financial literacy items refer to van Rooij, Lusardi, and Alessie (2011) as do the numbers in brackets for the advanced financial literacy questions.

Basic financial literacy questions:

1. "Numeracy": Suppose you own € 100 in a savings account. This balance yields interest of 2% per year and you leave it on this account for 5 years. What do you think: What is the deposit account balance after 5 years? - **More than € 102**; Exactly € 102; Less than € 102; Don't know.

2. "Interest compounding": Suppose you had € 100 in a savings account and the interest rate is 20% per year and you leave it on this account for 5 years. What do you think: What is the deposit account balance after 5 years? - **More than € 200**; Exactly € 200; Less than € 200; Don't know.

3. "Inflation": Assuming your savings account yields interest of 1% per year and inflation amounts to 2 % per year. What do you think: Will you be able to buy more, less, or as much as today with your deposit account balance after one year? - More; As much as today; **Less**; Don't know.

4. "Money illusion": Suppose that in the year 2012 your income has doubled and prices of all goods have doubled too. How much will you be able to by with your income in 2012? - More than today; **As much as today**; Less; Don't know.

Advanced financial literacy questions:

1. Which of the following assets exhibits the highest return volatility? - Savings books, bonds, **stocks**, don't know. [11]

2. What is the main task of the stock market? - The stock market predicts stock gains, the stock market increases stock prices; **The stock market is the place where equity demand meets equity supply**; None of the above; Don't know. [6]

3. Is the following statement right or wrong: An investment in a single stock is less risky than an investment in an equity mutual fund? - Right; **False**; Don't know. [15]

4. Which of the following statements is correct? - If you invest in a balanced fund, you cannot withdraw money within the first year of your investment; **Balanced funds invest in several asset classes like stocks and bonds**; Balanced funds guarantee a fixed interest rate which is based on past performance; None of the above statements is correct; Don't know. [8]

5. How does a fixed-coupon bond price react to decreasing interest rates? - **Bond price increases**; Bond price remains constant; Bond price decreases; Don't know. [16]

B   Numeracy Questions

This appendix provides a translation of the numeracy questions in the 2009 SAVE survey. In the questionnaire they are captioned brain teasers and are provided in fill in format. We indicate correct answers in brackets.

1. A bat and a ball together cost 110 cents. The bat is 100 cents more expensive than the ball. How much is the ball? - Price of the ball: _ _ _ cents (please fill in) [5]

2. It takes 5 machines 5 minutes to produce 5 products. How long do 100 machines need to produce 100 products? - Time required: _ _ _ minutes (please fill in). [5]

3. On a lake there grow water lilies. Every day the surface covered doubles. After 48 days the lake is completely covered with water lilies. How long does it take until the lake is half covered with water lilies? - Duration, until lake is covered half with water lilies: _ _ _ days (please fill in). [47]