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Towards more sustainable debt attitudes and behaviors: the importance of basic economic skills

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Abstract This research builds on the idea that debt-related financial distress faced by an individual results primarily from the inability to understand and apply fundamental economic concepts to debt decisions rather than from a lack of highly specific financial knowledge. This notion offers a potential explanation for why current financial literacy programs, which generally focus on the latter aspect, are considered to be mostly ineffective. We hypothesize that the understanding of fundamental economic concepts plays an essential role in explaining debt attitudes and behaviors. To test this hypothesis, we empirically examine how basic economic skills relate to these traits among German adolescents while controlling for their levels of financial literacy. Our results indicate that basic economic skills beneficially relate to both individual debt attitudes and behaviors. In contrast, we do not find a significant impact of financial literacy. Therefore, a stronger consideration of fundamental economic concepts in financial literacy programs might be a fruitful way to increase their effectiveness.

Keywords Financial literacy · Economic literacy · Economic education · Debt attitude · Debt behavior

JEL Classification D12 · D14 · D18

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1 Introduction

The rising number of individuals who take on large amounts of debt and face financial distress has become a serious concern to policy makers during the past two decades. According to trade associations and offices for national statistics, the number of personal insolvencies per capita in the U.S. has increased by 27% since 2006, resulting in over 800,000 personal insolvencies or 2.5 per thousand citizens in 2015 (American Bankruptcy Institute 2015; U.S. Census Bureau 2015a, b). In Germany, one personal insolvency per thousand citizens was recorded in 2014 (Destatis 2015a, b), with approximately 90,000 personal insolvencies every year since 2006 (Destatis 2015c). The excessive accumulation of consumer credit in recent years (Kish 2006) played a major role in this development, facilitated by unfavorable debt attitudes (Webley and Nyhus 2001; Haultain et al.2010) and debt behaviors (Anderloni and Vandone 2011; Elliott 2005; Disney et al. 2008). The latter two factors are particularly relevant to policy makers as they are in control of the individual and hence can be subject to interventions.

Policy makers and researchers have been discussing various measures to prevent individuals from taking on unsustainable debt levels. The main suggested remedy is to improve individual financial literacy to facilitate sustainable borrowing behavior (e.g., Anderloni and Vandone 2011). However, evaluations of the link between financial literacy and debt behavior show mixed results (e.g., Lusardi and Tufano 2009; Norvilitis and MacLean 2010), as do findings regarding the effectiveness of existing financial literacy programs (e.g., Danes and Haberman 2007; Mandell 2009; Fernandes et al. 2014; Miller et al. 2015). The question arises as to what can be done to improve the effectiveness of such programs, in particular with respect to their impact on individual debt attitudes and behaviors.

We propose that a stronger emphasis on basic economic skills in financial literacy programs can be a fruitful approach. Rather than teaching only highly specific financial details (e.g., credit terms and fees, cost of revolving credit), we stress the importance of conveying fundamental economic concepts (e.g., scarcity, opportunity costs, the value of flexibility) that are more closely related to the underlying economic decision (debt or no debt) than to the surface of the financial problem (choosing between credit options). This notion is in line with a statement made by Ben S. Bernanke, Chairman of the Federal Reserve Board at the time, who pointed to the importance of teaching essential economic skills ("an economic way of thinking") for an effective financial education (Bernanke 2012).

Methodologically, our proposal relates to the idea of contextualization, an educational approach that connects teaching foundational skills with domain-specific content (Perin 2011). Applied in this domain, it suggests that adding basic economic skills to the curriculum of financial literacy programs allows for an easier and more lasting acquisition of relevant economic and financial knowledge and by extension improves the program effectiveness in fostering more sustainable debt attitudes and behaviors.

To examine whether basic economic skills systematically relate to more beneficial debt attitudes and behaviors, we conducted a large survey of

approximately 1500 German adolescents. Our results indicate that knowledge of fundamental economic concepts is indeed linked to a more favorable borrowing profile. Higher levels of basic economic skills significantly relate to more beneficial attributes regarding the individual affinity for debt-financed consumption and the propensity to take on debt, controlling for financial literacy, which is not related to either.

Section 2 reviews the literature on factors that contribute to the individual risk of facing debt-related distress in the future, paying special attention to the role of debt attitudes and behaviors. It furthermore discusses findings regarding the effectiveness of financial literacy programs. Section 3 outlines the proposed approach towards designing more effective financial literacy programs by taking the importance of basic economic skills into account. Here, we also derive hypotheses to test our approach empirically and present our research design for the empirical study described in Sect. 4. Section 5 concludes.

2 Debt-related financial distress and the effectiveness of financial literacy programs

2.1 Risk factors for debt-related financial distress

Factors that contribute to the individual risk of facing debt-related financial distress can be exogenous or endogenous (for an overview, see Disney et al. 2008). Exogenous factors are beyond individual control, such as income shocks due to unemployment or divorce (Keese 2009; Anderloni and Vandone 2011). Endogenous factors are in control of the individual and are primarily reflected by one's debt attitude and debt behavior (Livingstone and Lunt 1992; Elliott 2005; Lusardi and Tufano 2009; Gathergood 2012). Although individuals who face debt-related financial distress might attribute it to external circumstances, the root of their problems often lies in their inability to manage their finances effectively in combination with unsustainable consumption habits (Waldron and Young 2006; Anderloni and Vandone 2011). Therefore, prevention measures such as financial literacy programs should in particular focus on the endogenous risk factors as they are in control of the individual and can hence be subject to educational interventions. In the following, we will thus address only the endogenous risk factors of debt attitude and debt behavior.

Livingstone and Lunt (1992) find that the individual attitude of being "pro-credit" rather than "anti-debt" is an important predictor of debt (see also Chien and Devaney 2001). Moreover, the authors point out that the urge to have possessions now rather than to save up for them is positively correlated with higher debt levels. Davies and Lea (1995) employ a broader measure and generate a list of 14 "pro" and "anti" statements towards debt. However, their findings suggest that debt attitude is a function of debt rather than vice versa, pointing to an adaptive preference (Webley and Nyhus 2001).

Haultain et al. (2010) provide a possible explanation for this finding. They extend the list of items from Davies and Lea (1995) and show that debt attitude is best

described by two distinct dimensions: an affective (fear of debt) and a cognitive one (debt utility). They find that the relationship between the affective dimension and debt is not stable over time. In contrast, the attitude of an individual towards the utility of debt does not change. The cognitive dimension also remains a robust predictor of debt levels. The majority of items forming the cognitive dimension in Haultain et al. (2010) focus on consumption today at the cost of taking on debt (e.g., "I would rather be in debt than change my lifestyle" or "It is better to have something now and pay for it later"). The robustness of this debt attitude dimension is also supported by Webley and Nyhus (2001). They perform a factor analysis on the "attitude to saving" scale suggested by Wärneryd (1996) and find across different survey waves one repeatedly emerging factor that reflects attitude towards debt. The three items defining this factor refer to the attitude of an individual towards funding their current consumption level by taking on credit (e.g., for cars or vacations). Since higher debt levels make late payments or personal bankruptcies more likely, a positive attitude towards debt-financed consumption comes with a higher risk of debt-related financial distress in the future. Empirical evidence for this link is provided by Walters et al. (2016), who find that individuals expressing lower debt aversion tend to exhibit worse credit scores.

Studies have shown that debt-related financial distress is a phenomenon whose persistence stems from typical behavioral patterns: Borrowers often become used to a debt lifestyle and take on (more) new debt to pay back old debt (Anderloni and Vandone 2011; Elliott 2005; Disney et al. 2008). Once in this downward spiral, it is often impossible for debtors to break out again. Shah et al. (2012) suggest the sheer presence of scarcity as an explanation for the inevitable downward spiral. They argue that the scarcity of resources causes individuals to focus more on their struggle of financing current needs. This leads individuals to make the most convenient response to pressing demands, that is, by taking on debt, neglecting the negative impact on future consumption levels. The increased debt levels then in turn further aggravate the scarcity of resources, leading to even more financial distress.

2.2 Effectiveness of financial literacy programs

Financial literacy programs aim to reduce widespread financial illiteracy (e.g., Volpe et al. 2006; Lusardi et al. 2010), thereby intending to improve financial behavior (Hastings et al. 2013). This approach is based on documented links between low levels of financial literacy and unfavorable borrowing decisions. Lusardi and Tufano (2009) as well as Gathergood and Disney (2011) find that less financially literate households are more likely to underestimate the cost of consumer credit and are more prone to over-borrowing. Moreover, less financially literate individuals tend to make more disadvantageous debt decisions in general. Campbell (2006) reports that households with lower financial literacy do not promptly respond to low interest periods to refinance their mortgages.

Many public and private organizations have been promoting financial literacy programs during recent decades (e.g., Fox et al. 2005; OECD 2005, 2012). Although several approaches exist (employer-based, school-based, credit counseling, or community-based), resource constraints and institutional complexities limit a

comprehensive evaluation of their effectiveness (Braunstein and Welch 2002; Lyons et al. 2006). However, the available evidence, in particular regarding the impact on individual debt attitudes and behaviors, is rather mixed.

In particular, the increased levels of knowledge seem to strongly diminish over time (Fernandes et al. 2014). For the short run, Danes et al. (1999) as well as Danes and Haberman (2007) find a significant increase in literacy levels for teenagers in certain financial content areas based on a financial planning curriculum, measured directly after the course. Further studies show that financial education programs can increase student performance as assessed by pre- and post-tests. For instance, Walstad et al. (2010) point out the positive and significant influence of well-specified and accurately implemented programs for high school students based on a test conducted immediately after the course. However, for the long run, Peng et al. (2007) do not find a significant association between attending financial courses in high school and the levels of investment knowledge of adults. Mandell and Klein (2009) as well as Mandell (2009) show that adults who attended a course in money management at the senior high school level were as financially literate as those who never took any classes in personal finance.

In addition to the weak long-run impact of financial literacy programs on knowledge levels, the empirical evidence with respect to affecting individual debt attitudes and behaviors is either lacking or ambiguous. While the influence of the programs on debt attitudes has not yet been studied in detail, the effects on debt behaviors are mixed [see Miller et al. (2015) for an overview]. Lusardi and Tufano (2009) as well as Gerardi et al. (2013) point out that individuals with lower financial competencies tend to choose disadvantageous debt products with higher costs. For individuals who already face financial difficulties, there is some evidence suggesting that counseling can improve borrower awareness and help avoid financial distress (Elliehausen et al. 2007). Other studies raise doubts about the impact of financial education programs on debt behavior. Lyons et al. (2006) provide evidence suggesting that the level of financial experience before taking a personal management course in finance has a greater impact on decision making than the quantity of course work. Moreover, Norvilitis and MacLean (2010) do not find a systematic relationship between financial knowledge and problematic credit card usage among college students. Lastly, Mandell and Klein (2009) show that students who attended a program did not display better financial behavior than those who had not taken the course.

3 Integration of basic economic skills in financial literacy programs

3.1 Conceptual foundations

The mere temporary improvements of individual literacy levels resulting from current financial literacy programs point to didactical problems with existing approaches. Mandell (2009) criticizes a lack of opportunities to apply and practice the newly learned financial knowledge. Moreover, the missing link between financial literacy and debt behavior raises the more fundamental question of whether

the contents currently labeled as financial literacy are indeed relevant for individual debt attitudes and behaviors. The importance of content specificity for inducing behavioral changes has been shown for different financial domains (Croy et al. 2010) and might be the key to understanding why individuals are not able to leverage financial literacy and adequately update their behavioral norms (Willis 2009) or rules-of-thumb (Drexler et al. 2014).

Our approach aims to address both problems simultaneously: Rather than only teaching financial vocabulary, financial mathematics, and highly specific details about financial products, we stress the importance of additionally conveying basic economic skills. This idea relates to contextualization, an educational approach connecting foundational skills instruction and domain-specific content based on psychological theories of transfer and motivation (for an overview, see Perin 2011). Its primary objective is to teach basic skills that facilitate the acquisition of new domain-specific content as well as its preservation in the long run (see Boroch et al. 2007 for an application in the context of general academic skills). There is a growing body of literature showing the effectiveness of this approach. For instance, Nokes et al. (2007) find that teaching history students not only the book-based history content but also a set of heuristics that historians use to critically think about texts, that is, basic skills, can significantly increase student performance. Since understanding fundamental economic concepts such as scarcity or opportunity costs represent the necessary foundation to make sound economic decisions of any kind, they can also be considered basic skills required in financial decisions. Hence, enriching financial literacy programs with fundamental economic concepts can be thought of as an integrated basic skills instruction.

It remains to be argued why basic economic skills should have the potential to induce the desired changes in individual debt attitudes and debt behaviors. We unpack the debt decision and conceptualize it as a two-stage decision: First, the individual needs to decide whether to take on debt to fulfill consumption needs that cannot be realized under current budget constraints. This is predominantly an economic decision on how to address scarce resources and whether relaxing current budget constraints at the cost of future consumption is a desirable choice. It is only after the individual decides in favor of taking on debt in this first decision stage that a second decision has to be made. The second stage is predominantly a financial decision about choosing the credit option with the most favorable terms regarding, e.g., interest rate and repayment plan. While financial literacy can arguably be of great help for choosing between available credit options, that is, in the second stage, the decision of whether to take on (more) debt in the first stage requires basic economic skills. In this context, financial literacy can help to slow down the dynamic with which an individual heads towards high levels of debt through choosing less expensive credit options. However, since it primarily affects the second stage of the debt decision, it is less instrumental in reversing the overall downward spiral towards debt-related financial distress.

This intuition also relates to empirical evidence pointing to the importance of an individual's basic economic understanding. Norvilitis and MacLean (2010) do not find a systematic relationship between general financial literacy levels and problematic credit card usage among college students. However, students who

received parental advice on how to address their scarce (financial) resources and reduce impulsive spending in favor of future consumption were less likely to report problematic debt levels. In their study, Norvilitis and MacLean (2010) do not explicitly measure their subjects' basic economic skills but only their exposure to parental mentoring. Hence, while they are able to show that parental mentoring has an impact on problematic credit card usage, they cannot (and do not intend to) disentangle to what extent this effect is related to basic economic skills fostered in the process or simply to more caring parents and transmission of a more skeptical attitude towards debt-financed consumption.

3.2 Hypotheses and research design

Our empirical study is motivated by the attempt to explore whether a link between basic economic skills and an individual's borrowing profile exists. Only if such a link is identified can subsequent research determine the ways in which it can be optimally leveraged in the design of financial literacy programs. We aim to test the following two hypotheses:

H1 Basic economic skills are positively related to a more sustainable debt attitude.

H2 Basic economic skills are positively related to a more sustainable debt behavior.

To be more precise with respect to Hypothesis H2, our study only considers debt behavior during the first stage of the debt decision as described in the previous section. We are interested in the relationship between basic economic skills and the decision of whether to take on debt. The problem of disadvantageous debt choices among different credit options (the second stage of the debt decision) is not addressed in this study for the aforementioned reason that when choosing among different credit options by comparing interest rates, repayment plans, etc., specific financial literacy arguably plays an important role. To make an efficient choice in the second stage of the debt decision, subjects need to understand the technical details of debt products. As argued above, even though we expect basic economic skills to help decision makers acquiring and maintaining financial literacy, we do not hypothesize that basic economic skills in isolation could ensure efficient choices in the second decision stage, making examining this link expendable. As a direct consequence of the supposed importance of financial literacy for the second decision stage, we do not argue that basic economic skills should entirely replace financial literacy but rather serve as a crucial addition to the curriculum of financial education programs.

Because our study aims to explore the potential of including basic economic skills in financial literacy programs, we need to be able to disentangle the sources of economic and financial knowledge. This can only be achieved if the study sample consists of subjects for which the presence of other sources of learning such as financial experience or financial literacy programs can be ruled out. Therefore, the sample has to meet two requirements: First, subjects shall not have gained any relevant financial experience and second, subjects shall not have received any type of financial literacy education. We used a sample of German adolescents that

arguably satisfies both of these requirements. German adolescents at the age of 16 are not fully contractually capable and we can rule out any (legally relevant) debt-related experience (German civil code § 106 BGB). Additionally, 16-year-old German adolescents have to attend one of three German high school tracks where students benefit from systematic economic education, but do not receive dedicated financial education (MSJK-NRW 2004; Reifner 2006).

Conducting our empirical study with a sample of 16-year-old adolescents has further advantages. First, an individual's personality is already established by the age of 16 and is closely related to their adult personality (Allik et al. 2004). This makes it a reliable predictor for adult attitudes and behaviors. Moreover, Shim et al. (2010) show that financial socialization during adolescence is a significant predictor of current financial attitudes and behaviors as a young adult. The established strong impact of parental guidance on financial matters during childhood on future financial attitudes and behaviors (Shim et al. 2009) provides further evidence that financial habits that form during adolescence are likely to persist throughout adulthood. Second, since major exogenous risk factors for facing debt-related financial distress, such as unemployment or divorce, do not exist during adolescence, the possible interaction between these factors and the measured debt attitudes and behaviors can also be ruled out. This allows us to examine the endogenous risk factors without potential noise caused by exogenous risk factors. Third, the Organisation for Economic Co-operation and Development (OECD) recommends that financial literacy programs should be introduced as early as possible and preferably through inclusion in the school curriculum (OECD 2012).

4 Empirical study

4.1 Survey

The survey was conducted in 2010 in a midsize German city as part of a research project on economic and financial literacy (see also Erner et al. 2015, 2016). Recruiting 10th-grade students from all three pillars of the three-tier German high school system (*Hauptschule*, *Realschule*, *Gymnasium*, ordered from lowest to highest in terms of difficulty and obtainable degree) ensured that all participating students had received comparable economic education according to the relevant German curriculum (MSJK-NRW 2004), were on average 16 years old, and had not received dedicated financial education. The three different high school types were represented with similar proportions in our sample of 25 schools (*Hauptschule*: 8 schools; *Realschule*: 8 schools; *Gymnasium*: 9 schools). These 25 schools were distributed geographically throughout all city districts, representing different socioeconomic backgrounds.

Subjects had to complete the paper-based questionnaire while in school and were supervised during the session. A payment scheme was implemented to incentivize complete and correct responses. In addition to the key variables presented in the following section, the questionnaire also covered details on the sociodemographic background, learning abilities, and learning environment of the subject. Participants

who did not comply with the test procedure were identified by the supervisor and their data were dropped prior to analysis, yielding a sample of $N = 1416$ subjects.

4.2 Variable measurement

To measure *basic economic skills*, we employed an adjusted version of the Test of Economic Literacy (TEL; Soper and Walstad 1987; Walstad and Soper 1988; Walstad and Rebeck 2001) tailored to the German high school curriculum, as used by Erner et al. (2015). The TEL is one of the most established instruments for measuring economic literacy and has been administered to various populations in many countries (Walstad et al. 2013). The particular test version consisted of 24 multiple choice questions and covers economic knowledge across four different content categories: Fundamental economic concepts, microeconomics, macroeconomics, and international relations. Since basic economic skills (such as understanding scarcity or opportunity costs) are tested for in the fundamental content area of the TEL, we used the corresponding percentage-correct score (PCS) achieved in this content area as the measure of basic economic skills (EL_FUNDAMENTAL). The PCS is defined as the number of correct answers divided by the number of questions asked and is commonly used as a measure of literacy (e.g., Walstad and Allgood 1999). To control for the performance of a subject in the three remaining content areas, we also calculated the combined PCS over these areas (EL_MICMACINT).

As *financial literacy* measures, we used the set of basic and sophisticated financial literacy questions from the Rand American Life Panel (ALP). The 13 questions were developed by Lusardi and Mitchell (2009) and have been widely employed in financial literacy research. Variations of this set have been used in the American Health and Retirement Study (Lusardi and Mitchell 2011), the De Nederlandsche Bank Household Survey (Van Rooij et al. 2011), and the German SAVE survey (Bucher-Koenen and Lusardi 2011). Following the literature, we will refer to the PCS over the 5 basic questions as basic financial literacy (FL_BASIC) and will label the PCS over the 8 sophisticated questions as sophisticated financial literacy (FL_SOPHISTICATED).

We now turn to the *debt attitude* measure. As previously discussed, the preference for present consumption at the cost of higher debt levels is at the very core of one's debt attitude. Therefore, our debt attitude measure focuses on this aspect. Because of time constraints we could not use a complete item battery, but tried to cover the underlying concept by asking the following item: "When you want to buy something expensive, you should save up first rather than borrow money to pay for it." Our subjects had to state whether they agree or disagree with this statement on a 5-point Likert-type scale (1 "I strongly disagree"; 5 "I strongly agree"). Responses were reverse-coded so that a higher value indicates a stronger preference for debt-financed consumption and hence a more positive attitude towards debt (PRO_DEBT).

It becomes difficult to elicit a subject's *debt behavior* directly if the individual is legally not allowed to take on debt as in the case of our subject pool. We could not employ current debt levels, credit card usage, or number of credits. However, even

under-aged adolescents can borrow money from their family and friends and develop a distinct behavioral pattern in this context. Hence, we asked how often one borrows larger amounts of money from friends or family (daily, weekly, monthly, seldom, or never). We coded the variable (FREQUENT_BORROWER) such that higher values indicate more frequent borrowing behavior.

Our set of control variables consists of commonly used sociodemographic characteristics (gender, age, level of integration, household and student income, job activity) as well as variables measuring a subject's general learning ability (intellectual curiosity, procedural knowledge) and level of education (high school track). The latter control variables are included to differentiate the effect of basic economic skills from general reasoning or intellectual capabilities.

We further elicited the extent to which subjects seek information about general economic topics via the media and internet or by talking to family and friends (ECON_INFORM). It is important to control for these social interactions as the potential transmission of experience and expectations potentially constitutes another channel shaping individual debt attitudes and behaviors (Shim et al. 2009).

Table 1 provides an overview of all variables used, including their specification and coding as well as descriptive statistics.

4.3 Results

We first discuss the distributions of the key variables. *Basic economic skills* (EL_FUNDAMENTAL) substantially vary in our sample. The average score on the fundamental economic concepts is 56.4% and the median is 60.0%. Thirteen subjects (0.92%) could not answer any of the respective questions correctly, 46% correctly answered half or fewer of them and 21 obtained a perfect score (1.48%). As expected and indicated by a significant Wilcoxon signed-rank test ($p < 0.01$), the respondents demonstrated higher levels of basic economic skills than of expertise in more specific economic content areas (microeconomics, macroeconomics, international relations; EL_MICMACINT; mean: 49.8%, median: 50.0%). We also find considerable variation in *financial literacy* (see Table 1). The mean score for basic financial literacy (FL_BASIC) is 64.2%, which is, as expected, significantly higher than for sophisticated financial literacy (FL_SOPHISTICATED; 53.6%; $p < 0.01$).

The correlations between the four literacy measures are provided in Table 2. We observe positive and significant correlations both within (economic literacy: $\rho = 0.596$; financial literacy: $\rho = 0.399$) and between knowledge domains ($0.422 \leq \rho \leq 0.462$).

Regarding the *debt attitude* (PRO_DEBT) of individuals, we find only a small fraction to be pro-debt (5% responded with 4 or 5 on the 5-point Likert-type scale). The vast majority is opposed to the idea of financing expensive goods by means of consumer credit and wants to save up first (87% responded with 1 or 2). The elicited *debt behavior* (FREQUENT_BORROWER) is in line with this generally skeptical attitude towards debt. Only 6% of subjects reported borrowing larger amounts of money from friends or family on at least a monthly basis. 41% stated that they seldom borrow money. The distribution of these endogenous risk factors appears

Table 1 Variable specifications and summary statistics

Variable	Specification	5%	Mean	50%	95%
Debt behavior					
FREQUENT_BORROWER	Borrowing behavior	1	1.55	1	3
	Likert-type scale (1 never, 2 seldom, 3 monthly, 4 weekly, 5 daily)				
Debt attitude					
PRO_DEBT	Attitude towards consumer credit	1	1.54	1	4
	Likert-type scale (1 highly negative, 5 highly positive)				
Financial literacy					
FL_BASIC	Percentage-correct score over all basic financial literacy questions	20.0%	64.2%	60.0%	100.0%
FL_SOPHISTICATED	Percentage-correct score over all sophisticated financial literacy questions	12.5%	53.6%	50.0%	87.5%
Economic literacy					
EL_FUNDAMENTAL	Percentage-correct score for the fundamental content area (basic economic skills)	20.0%	56.4%	60.0%	90.0%
EL_MICMACINT	Percentage-correct score for the microeconomic, macroeconomic, and international content areas	14.3%	49.8%	50.0%	85.7%
Control variables					
ECON_INFORM	Frequency of searching for information on general economic topics (via media/internet or by talking to family/friends)	1	3.54	4	5
	Likert-type scale (1 Never/DK, 5 daily)				
MALE	Gender	–	0.49	–	–
	Dummy variable (1 male, 0 female)				
YOUNG	Being younger than average.	–	0.07	–	–
	Dummy variable (1 = 15 or younger, 0 = 16 or older)				
INTEGRATED	Level of integration.	–	0.81	–	–
	Dummy variable (1 born in Germany and German spoken with parents, 0 otherwise)				
ONLY_CHILD	Being an only child	–	0.10	–	–
	Dummy variable (1 yes, 0 no)				

Table 1 continued

Variable	Specification	5%	Mean	50%	95%
HOUSHOLD_BOTH_PARENTS	Both parents living in household	–	0.71	–	–
	Dummy variable (1 yes, 0 no)				
HOUSHOLD_INCOME	Parental income as proxied by housing situation (owning vs. renting) and occupational status (high-paying job vs. low-paying job).	–	0.35	–	–
	Dummy variable (1 high, 0 low)				
INCOME	Monthly income available to subject (in EUR)	20.5	84.0	63.0	300.5
JOB	Working activity of the subject	–	0.48	–	–
	Dummy variable (1 have/had job, 0 never had job)				
MEMBER_ORGANIZATION	Being member of an organization, e.g., sports club, NPO	–	0.62	–	–
	Dummy variable (1 yes, 0 no)				
IQ_COMPLEX	Interest in complex problems	1	2.83	3	5
	Likert-type scale (1 low, 5 high)				
IQ_FUNCTION	Eagerness to understand how things work	1	3.27	3	5
	Likert-type scale (1 low, 5 high)				
GRADE_GERMAN	Grade in German from last report card	3	4.24	4	6
	6 categories (1 fail, 6 excellent)				
GRADE_MATH	Grade in mathematics from last report card	2	4.17	4	6
	6 categories (1 fail, 6 excellent)				
GRADE_FOREIGN	Grade in first foreign language from last report card.	3	4.25	4	6
	6 categories (1 fail, 6 excellent)				
HIGH_SCHOOL_TRACK	High school track attended by subject	1	3.17	3	4
	(1 = HSA [Hauptschule Typ A], 2 = HSB [Hauptschule Typ B], 3 = RS [Realschule], 4 = GYM [Gymnasium])				

Summary statistics based on the sample of $N = 1416$ subjects

Table 2 Correlations between literacy measures

	FL_BASIC	FL_SOPHISTICATED	EL_FUNDAMENTAL	EL_MICMACINT
FL_BASIC	1			
FL_SOPHISTICATED	0.399	1		
EL_FUNDAMENTAL	0.437	0.422	1	
EL_MICMACINT	0.453	0.462	0.596	1

Pearson's correlation coefficients. All correlations are significant ($p < 0.01$)

plausible when compared to the actual number of individuals who face financial distress due to excessive borrowing in Germany: In 2012, 9.65% of German citizens were found to be in debt-related financial distress (Woydt et al. 2012).

To account for the hierarchical nature of our data with students nested in classes and classes nested in schools, we employed three-level mixed models with school and class random intercepts. We ran linear regressions if debt attitude was the dependent variable (Table 3) and ordinal logistic regressions if debt behavior was the dependent variable (Table 4), corresponding to the respective scale type. In total, we estimated six models, three for each risk factor. Since including the control variables left our results qualitatively unchanged, we only present the regression results from the models including them. The set of control variables is identical for both dependent variables with one exception. The models for debt behavior additionally include individual debt attitude as an independent variable because debt attitudes are commonly hypothesized to be predictors of debt behavior (e.g., Wang et al. 2011).

The key difference between the three models in each table concerns the literacy variables. The first model (left column in the respective table) only includes the two variables capturing financial literacy (FL_BASIC; FL_SOPHISTICATED). In the second model (middle column), only the two variables measuring economic literacy are included (EL_FUNDAMENTAL; EL_MICMACINT). The third regression model (right column) then contains the full set of financial and economic literacy variables. This separate and sequential inclusion of literacy variables allows us to identify potential interactions between the two knowledge domains with respect to their impact on the dependent variable. Moreover, while the first model resembles the conceptual status quo of current financial education programs (with their exclusive focus on financial literacy), the subsequent models permit evaluation of the proposed approach of considering (second model) and including (third model) basic economic skills.

We inspected the data for multicollinearity using the variance inflation factor (VIF) for each variable. We did not find any problematic levels (mean VIF = 1.62; all VIFs smaller than two, except for the three high school track indicator dummies [2.05; 3.92; 5.31]). Table 3 reports regression coefficients as well as goodness of fit statistics for the three models explaining variations in debt attitudes. For the ordinal logistic regressions for debt behavior, we report odds ratios because coefficients resulting from an ordinal logistic regression are difficult to interpret directly (Table 4). As a higher level of the dependent variable indicates a more disadvantageous borrower profile and a higher risk of debt-related financial distress in the future, the hypothesized beneficial link between basic economic skills and debt attitude (debt behavior) would be indicated by a negative and significant regression coefficient (an odds ratio smaller than 1).

We begin with Hypothesis H1 and the importance of basic economic skills for debt attitude. The regression coefficients shown in Table 3 indicate if and how the respective variable is associated with a more positive, that is, less sustainable attitude towards debt. The regression results provide evidence for a beneficial and statistically significant link between basic economic skills and debt attitude. In both models containing the relevant variable EL_FUNDAMENTAL (models [2] and

Table 3 Regression results for debt attitude

Dependent variable	[1] Debt attitude b (SE)	[2] Debt attitude b (SE)	[3] Debt attitude b (SE)
Financial literacy			
FL_BASIC	−0.162 (0.121)		−0.030 (0.120)
FL_SOPHISTICATED	−0.319* (0.174)		−0.230 (0.175)
Economic literacy			
EL_FUNDAMENTAL		−0.715*** (0.189)	−0.676*** (0.183)
EL_MICMACINT		−0.086 (0.143)	−0.041 (0.153)
Control variables			
ECON_INFORM	−0.050** (0.025)	−0.044* (0.026)	−0.043* (0.025)
MALE	0.335*** (0.088)	0.353*** (0.085)	0.362*** (0.088)
YOUNG	−0.077 (0.119)	−0.062 (0.120)	−0.052 (0.120)
INTEGRATED	−0.065 (0.095)	−0.039 (0.095)	−0.032 (0.095)
ONLY_CHILD	−0.104 (0.066)	−0.080 (0.065)	−0.084 (0.066)
HOUSEHOLD_BOTH_PARENTS	0.043 (0.052)	0.053 (0.051)	0.052 (0.050)
HOUSEHOLD_INCOME	0.029 (0.053)	0.041 (0.052)	0.036 (0.053)
INCOME	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
JOB	−0.068** (0.030)	−0.072** (0.030)	−0.077** (0.030)
MEMBER_ORGANIZATION	−0.108* (0.065)	−0.104* (0.061)	−0.101* (0.060)
IQ_COMPLEX	−0.045** (0.023)	−0.048** (0.023)	−0.042* (0.023)
IQ_FUNCTION	−0.003 (0.023)	0.005 (0.024)	0.005 (0.024)
GRADE_GERMAN	0.036 (0.038)	0.052 (0.040)	0.050 (0.040)
GRADE_MATH	−0.048 (0.030)	−0.043 (0.029)	−0.041 (0.030)
GRADE_FOREIGN	0.029 (0.035)	0.022 (0.035)	0.028 (0.036)

Table 3 continued

Dependent variable	[1] Debt attitude b (SE)	[2] Debt attitude b (SE)	[3] Debt attitude b (SE)
HIGH_SCHOOL_TRACK_HSB	−0.261* (0.156)	−0.225 (0.161)	−0.212 (0.166)
HIGH_SCHOOL_TRACK_RS	−0.103 (0.168)	−0.058 (0.163)	−0.039 (0.169)
HIGH_SCHOOL_TRACK_GYM	−0.126 (0.173)	−0.058 (0.166)	−0.024 (0.178)
Variance components			
Variance of school (level 3; $N = 25$)	0.0092213	0.0066425	0.0062984
Variance of class (level 2; $N = 68$)	0.0000000	0.0000000	0.0000000
Variance of residual (level 1; $N = 1081$)	0.6747195	0.6666499	0.6652829
Log-pseudolikelihood (model fit)	−1326.74	−1319.01	−1317.72
Likelihood ratio test (compared to Model [3])	$D = 18.05^{***}$	$D = 2.57$	

Coefficients (*b*) and robust standard errors (SE) from three-level mixed linear models with school and class random intercepts

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$

Table 4 Regression results for debt behavior

Dependent variable	[4] Debt behavior OR (SE)	[5] Debt behavior OR (SE)	[6] Debt behavior OR (SE)
Debt attitude			
PRO_DEBT	1.479*** (0.171)	1.464*** (0.170)	1.460*** (0.169)
Financial literacy			
FL_BASIC	0.984 (0.303)		1.029 (0.331)
FL_SOPHISTICATED	0.665 (0.226)		0.671 (0.230)
Economic literacy			
EL_FUNDAMENTAL		0.396*** (0.135)	0.413** (0.144)
EL_MICMACINT		1.877 (0.932)	1.990 (0.993)
Control variables			
ECON_INFORM	0.971 (0.049)	0.970 (0.049)	0.973 (0.049)
MALE	0.997 (0.146)	0.998 (0.142)	1.013 (0.145)
YOUNG	1.003 (0.267)	1.014 (0.275)	1.030 (0.280)
INTEGRATED	1.072 (0.255)	1.083 (0.261)	1.094 (0.263)
ONLY_CHILD	0.824 (0.172)	0.845 (0.177)	0.837 (0.176)
HOUSEHOLD_BOTH_PARENTS	0.764* (0.109)	0.773* (0.111)	0.770* (0.112)
HOUSEHOLD_INCOME	1.148 (0.178)	1.160 (0.181)	1.150 (0.177)
INCOME	0.997** (0.001)	0.997** (0.001)	0.997*** (0.001)
JOB	0.961 (0.099)	0.974 (0.106)	0.966 (0.105)
MEMBER_ORGANIZATION	1.015 (0.128)	1.022 (0.125)	1.026 (0.124)
IQ_COMPLEX	0.985 (0.078)	0.973 (0.078)	0.982 (0.078)
IQ_FUNCTION	1.032 (0.085)	1.035 (0.086)	1.035 (0.086)
GRADE_GERMAN	0.907 (0.088)	0.909 (0.088)	0.909 (0.087)

Table 4 continued

Dependent variable	[4] Debt behavior OR (SE)	[5] Debt behavior OR (SE)	[6] Debt behavior OR (SE)
GRADE_MATH	0.848*** (0.053)	0.842*** (0.052)	0.842*** (0.053)
GRADE_FOREIGN	0.987 (0.072)	0.980 (0.071)	0.988 (0.072)
HIGH_SCHOOL_TRACK_HSB	1.288 (0.406)	1.331 (0.445)	1.347 (0.448)
HIGH_SCHOOL_TRACK_RS	1.489 (0.372)	1.542 (0.419)	1.581* (0.432)
HIGH_SCHOOL_TRACK_GYM	1.856** (0.477)	1.796** (0.524)	1.883*** (0.553)
Variance components			
Variance of school (Level 3; $N = 25$)	0.0000000	0.0000000	0.0000000
Variance of class (Level 2; $N = 68$)	0.1040133	0.1151501	0.1153990
Variance of residual (Level 1; $N = 1081$)	–	–	–
Log-pseudolikelihood (model fit)	−923.02	−921.06	−920.49
Likelihood ratio test (compared to Model [3])	$D = 5.07$*	$D = 1.15$	

Odds ratios (*OR*) and robust standard errors (*SE*) from three-level mixed ordered logistic models with school and class random intercepts

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$

[3]), the respective coefficient is negative and significant ($p < 0.01$). Subjects with strong basic economic skills (EL_FUNDAMENTAL = 1) had, on average, approximately 0.7 points more averse attitudes towards debt than subjects with no basic economic skills (EL_FUNDAMENTAL = 0). This difference is substantial given that debt attitude is measured on a Likert-type scale with only five levels. Hence, our results strongly support Hypothesis H1. In contrast, we find neither a significant effect for expertise in the remaining economic content areas (EL_MICMACINT) nor in the two financial literacy measures (FL_BASIC, FL_SOPHISTICATED) when we control for basic economic skills. Only in Model [1], that is, in the absence of economic literacy variables, is the coefficient for sophisticated financial literacy significant ($p < 0.10$). However, as the coefficient is no longer significant once basic economic skills are included in the regression (Model [3]), this finding might represent a spurious result stemming from the strong correlation between financial and economic literacy (see Table 2). The lack of additional predictive contribution of the financial literacy variables is also supported by the likelihood ratio tests. While adding the economic literacy to the financial literacy variables (comparing Model [1] to Model [3]) yields a significantly improved model fit ($p < 0.01$), adding the financial literacy to the economic literacy variables (comparing Model [2] to Model [3]) does not. In addition, we tested the coefficients of the two financial literacy variables for their joint significance. While we find a jointly significant effect ($p < 0.05$) in the model without the economic literacy variables (Model [1]), the joint effect is not significant ($\chi^2(2) = 1.94$; $p = 0.38$) when controlling for economic literacy (Model [3]), supporting our previous conclusion.

The regression results in Table 3 also indicate the relevance of some control variables for explaining the debt attitude of an individual. Since the results are highly similar across the three models, we only discuss the most comprehensive Model [3] in the following. Male subjects have a more positive attitude towards debt-financed consumption than their female counterparts, supporting the previously established gender differences in debt attitudes (Haultain et al. 2010). The gender difference is $b = 0.36$ and is significant ($p < 0.01$). Furthermore, subjects who have or had a job have a significantly more averse attitude towards debt ($b = -0.08$; $p < 0.05$). This is potentially driven by the fact that subjects who (have to) make money on their own are aware of the required effort, which leads them to more strongly value their income (Loewenstein and Issacharoff 1994; Zink et al. 2004; Camerer et al. 2004) and makes them more reluctant to spend it (Arkes et al. 1994). This stronger reluctance also holds for spending future income by borrowing money for current consumption. The complexity of identifying and understanding this intertemporal trade-off might also explain why individual interest in complex problems (IQ_COMPLEX) is positively related to a more sustainable debt attitude ($p < 0.10$). Our results also point to the importance of social interactions: Both being a member in an organization (MEMBER_ORGANIZATION) and more frequent social interactions regarding economic topics (ECON_INFORM) are associated with a more skeptical attitude towards debt-financed consumption ($p < 0.10$).

Hypothesis H2 predicts that basic economic skills are associated with more sustainable debt behavior. The odds ratios provided in Table 4 indicate if and how the respective variable is associated with borrowing frequency. An odds ratio significantly smaller than one implies a beneficial link, an odds ratio significantly greater than one denotes a positive and hence disadvantageous relationship between the respective independent variable and borrowing frequency. As the results across models are highly similar, we only discuss the most comprehensive Model [6] in the following. The results suggest that basic economic skills are significantly associated with more favorable debt behavior ($p < 0.05$). The likelihood of an individual to borrow money more frequently is significantly lower for those with higher basic economics skills, providing evidence in favor of Hypothesis H2. For subjects with strong basic economic skills (EL_FUNDAMENTAL = 1), the odds of borrowing money more frequently are less than half ($OR = 0.41$) that of subjects with no basic economic skills (EL_FUNDAMENTAL = 0). We do not find such a systematic effect for individual performance in the other economic content areas (EL_MIC-MACINT) or in the two financial literacy domains (FL_BASIC, FL_SOPHISTI-CATED). We again tested for the joint contribution of the two financial literacy variables but do not find a significant effect ($\chi^2(2) = 1.40$; $p = 0.50$). Hence, financial literacy neither systematically affects the debt attitude of an individual nor the propensity to take on debt, a finding that supports the critical view of current financial education programs (Mandell and Klein 2009; Norvilitis and MacLean 2010). In contrast, we document a significant link between basic economic skills and both endogenous risk factors, emphasizing the potential of the proposed approach.

Model [6] in Table 4 also points to the importance of further variables in the context of explaining variations in debt behavior. As expected, debt attitude (PRO_DEBT) is a significant predictor of borrowing frequency ($p < 0.01$). For subjects with a one-unit higher, that is, more positive attitude towards debt-financed consumption, the odds of borrowing money more frequently are almost 50% greater ($OR = 1.46$). Additionally, subjects with higher income are found to borrow money less often ($p < 0.05$). This finding is intuitive as one might expect the urge to borrow to be lower for those with more financial resources. This expectation is in line with the scarcity argument made by Shah et al. (2012) as discussed above and is also consistent with findings by Lea et al. (1993). The odds ratio for the grade in mathematics is significantly smaller than one (GRADE_MATH; $p < 0.01$), emphasizing again the power of cognitive abilities and logical thinking in the context of making more sustainable debt decisions. A one-unit better grade in mathematics translates into 0.84 times smaller odds of borrowing money more frequently. This result might be driven by the fact that subjects with higher mathematical skills are not only better in handling numbers in an abstract but also in an applied sense. Furthermore, adolescents who are raised in a household where both parents are present are less likely to frequently borrow money ($p < 0.10$). This finding is in line with Norvilitis and MacLean (2010) who also emphasize the beneficial impact of parental mentoring on debt behavior.

In summary, our results provide empirical evidence in favor of our two hypotheses. Basic economic skills beneficially relate to a subject's debt attitude and

debt behavior. Individuals with higher basic economic skills demonstrate a more favorable risk profile regarding debt-related financial distress above and beyond what is explained by their levels of financial literacy.

5 Conclusion

Current financial literacy programs are commonly found to be mostly ineffective in preventing individuals from incurring debt-related financial distress. They can neither build lasting improvements in financial literacy nor can it be shown that financial literacy itself has a positive impact on problematic debt behavior. Hence, key risk factors for debt-related financial distress are not beneficially affected by financial literacy programs in their current form.

In this research, we propose a new approach to increase the effectiveness of such programs. Rather than only focusing on the transmission of highly specific financial details, we suggest the addition of basic economic skills ("an economic way of thinking") to the curriculum. Our proposal to engage in this integrated basic skills instruction is rooted in learning theory, which promises not only an easier but also a more lasting acquisition of financial literacy. Moreover, by also conveying basic economic skills in financial literacy programs, the underlying economic problem within the debt decision (taking on debt at the expense of future consumption) can be more directly addressed.

To explore the potential of this new approach, we empirically examine the link between basic economic skills and individual debt attitude and behavior. Our results confirm that basic economic skills are significantly related to both a more sustainable attitude towards debt-financed consumption as well as more sustainable behavior with respect to taking on debt. Hence, subjects with higher levels of basic economic skills have a lower endogenous risk of facing debt-related financial distress in the future. In contrast, we do not find a significant impact of financial literacy on debt attitude or the propensity to take on debt. In combination, these results indicate the potential of adding basic economic skills to the curriculum of financial literacy programs.

Further research should examine whether teaching basic economic skills within financial literacy programs actually leads to higher effectiveness of such programs and a lower likelihood of facing debt-related financial distress in the future. Moreover, an important next step would first be to determine which additional basic economic skills are most powerful in shaping more sustainable debt attitudes and behaviors. Such a directed content analysis would facilitate identification of the most promising additions. In this study we relied on a highly standardized test instrument to measure economic literacy. It was not optimized with respect to selecting fundamental economic concepts that might be most useful in the context of debt decisions. Second, the discussion about integrating basic economic skills should be extended to domains beyond debt to evaluate other financial decisions which might benefit from additional basic economic skills.

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