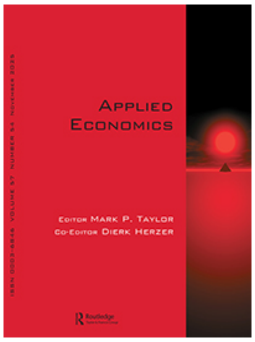


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# The role of financial literacy in payment defaults

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# The role of financial literacy in payment defaults

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**ABSTRACT**
Household indebtedness has increased in recent decades, and young adults have become financially independent during an era of low inflation and very low interest rates. However, recent changes in macroeconomic conditions have made it essential for individuals to understand the effects of inflation and interest rates on their net residual income. Otherwise, low financial literacy may cause individuals to make inferior financial decisions, which can be highly costly. In this paper, we study how financial literacy is related to payment defaults using Finnish survey data from early 2023. Our results suggest that financial literacy is negatively related to the likelihood of severe debt problems. We also show that being financially fragile is positively associated with the risk of default and that financial literacy substantially reduces the default risk for financially fragile individuals.

**KEYWORDS**
Financial literacy; personal finance; overindebtedness; credit default

**JEL CLASSIFICATION**
G51; G53; D14

## I. Introduction

People often make minor and major financial decisions. Some decisions are mundane, and the cost of making suboptimal choices is low. Some decisions, however, require financial sophistication. For such decisions, the cost of a poor choice can be substantial, which can have long-lasting effects. Borrowing is one such decision that can be very costly if not considered carefully.

Not surprisingly, the expansionary monetary policies implemented during the COVID-19 pandemic by central banks worldwide brought about inflation. After a long period of stable and low inflation, inflation increased on average by eight percentage points, between 2020 and 2022 (Eurostat n.d.; World Bank n.d.). Naturally, interest rate hikes followed. In the Eurozone, the ECB interest rate increased by more than four percentage points between July 2022 and October 2023 (Bank of Finland n.d.-a). This had an impact on consumer credit interest rates (Bank of Finland n.d.-b).

During the same period, the number of default entries started to increase in Finland. Between 2021 and 2022, new default entries among individuals under 25 years old more than doubled (Suomen Asiakastieto 2022). In 2023, the default entry trend among young adults was spread to the whole population, and by the end of June 2023, 352,800 individuals had active default entry (Suomen Asiakastieto 2023).

In recent decades, household indebtedness,[1] measured as debt-to-income ratio, has increased in Finland, from 107% (2002) to 171% (2022) among households with outstanding debt (Statistics Finland 2023). Moreover, the amount of unsecured consumer credit increased during the 2010s, regardless of the type of credit (Bank of Finland, n.d.-b). A similar trend has been observed in the United States: Since 2004, non-housing debt, and since 2022, the delinquency[2] rate for credit card loans and other types of non-housing debt have been increasing (Federal Reserve Bank of New York 2024).

Approximately 35% of the adult population in the United States consider the most important consequence of inflation to be increased complexity of daily economic decisions (Binetti, Nuzzi, and Stantcheva 2024). People also tend to dislike inflation because of its impact on purchasing power, which forces them to make costly adjustments in their budget and behaviour (Stantcheva 2024). This is prevalent particularly among lower income groups. Thus, it is important to understand how

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[1]Excluding mortgages.
[2]Measured as a percentage of the balance that is 90+ days delinquent.

inflation influences the value of money so that one can make adjustments early enough to prevent excessive consumption. Financial literacy involves knowledge about interest calculations (e.g. how interest rates influence debt payments and the future value of payouts for savings today), as it is important for making sound financial decisions. Especially when economic conditions change rapidly, it is important to have basic financial literacy to match consumption streams with income streams.

This paper studies the role of financial literacy and financial fragility in payment defaults. The empirical evidence on how financial literacy influences debt repayment problems is somewhat mixed. Financial education reduces the degree of debt delinquency (Brown et al. 2016; Frisancho 2023). In the United States, financial education in high schools (Urban et al. 2020) and among military personnel (Skimmyhorn 2016) has been shown to lower delinquency rates. However, Cole, Paulson, and Shastry (2016) did not observe the effect of financial education on debt problems but instead find that mathematics education reduces delinquency. Moreover, a study by Frisancho (2023) has shown that an intervention aimed at ameliorating debt issues had no effect on the likelihood of having debt problems. Additionally, Gathergood (2012) find no association between financial literacy and delinquency in the UK by using survey data.

This paper is closest to Gathergood (2012) not only methodologically but also in terms of the timing of the study, given that both studies present results after a major global crisis. However, even though the global financial crisis and the COVID-19 pandemic share similarities, the two adverse events are still quite different. In particular, during the COVID-19 pandemic, the freedom of individuals was restricted in many countries. Thus, our study differs from that of Gathergood's (2012) in that the study was carried out after an exogenous event (COVID-19) led to increases in inflation, interest rates, and unemployment, which resulted in quite a different economic picture than the global financial crisis. This exogenous event gives us an opportunity to study how financial literacy influences default risk after a systematic adverse economic event rather than idiosyncratic shocks that affect certain people. People who already have financial problems may be more likely to experience idiosyncratic shocks, whereas an aggregate shock may reveal how financially resilient ordinary people are. Such a study is valuable since it can provide information on how to reduce welfare losses caused by systematic adverse economic events. Therefore, our study contributes to the literature on aggregate shocks and their effects on personal finance.

Second, taking the limitations discussed in Section 4.2 into account, our study uses data from a representative sample of the Finnish adult population, among whom the level of financial literacy is quite high (See, Klapper, Lusardi, and Van Oudheusden 2015). This would provide additional insights into the growing debt problem, as studies in the literature largely report results from countries where financial literacy is not high.

Our main finding is that financial literacy is negatively correlated with payment defaults, whereas financial fragility is positively correlated with payment defaults. The association between financial fragility and payment defaults is moderated by financial literacy. That is, for financially fragile respondents, financial literacy reduces default risk by approximately 40%.

The rest of the paper is organized as follows. In Section 2, we delve into the previous literature and discuss how financial literacy influences financial decisions and, in greater depth, the previous literature on financial literacy and financial problems. In Sections 3 and 4, we present the data and variables used in the paper, summary statistics, and estimation results from regressions and, further, discuss the limitations of the study. Finally, Section 5 concludes the paper.

## II. Literature review

### *Payment default entry in Finland*

In Finland, payment default entry can occur in two ways depending on the type of debt. First, the creditor can file a lawsuit, and after the district court's conviction, the individual enters a default state. This applies to the non-payment of bills, such as electricity bills. Second, in the case of consumer credit, certain insurance bills, and taxes, the creditor can directly inform the credit registry after 60 days of delinquency. When the credit registry receives the information, the debtor enters into a default state. In both cases, the creditor must send at least three reminders to the debtor, and there must be at least two weeks between the reminders. For a more detailed description of the process, see.

If the debtor does not voluntarily repay the debt due, the debtor's wage, pension or business income can be garnished, or assets can be seized and sold by the debt enforcement agency (National Enforcement Authority Finland n.d.). A payment default entry generates a negative credit mark, which can increase the burden of obtaining credit or a rental apartment. The negative credit mark remains in the registry for two to three years.[3] After the change in legislation in 2022, the negative credit mark is deleted within a month after the individual pays the debt (National Enforcement Authority Finland 2022). However, if the debt is not repaid before it would have been deleted from the registry, then the payment default entry can be renewed (Luotonen, Puttonen, and Rantapuska 2022a).

In this work, the words *payment default* and *default* are interchangeably used, both of which refer to the definitions above.

### Financial literacy and financial decisions

Jappelli and Padula (2013) theoretically predict that financial wealth and stock of financial literacy are positively correlated over the life cycle and empirically validate the prediction. Additionally, a lack of knowledge of compound interest, which is one of the key elements of financial literacy, is related to lower savings, greater borrowing, and shorter debt maturities (Stango and Zinman 2009). Moreover, de Bassa Scheresberg (2013) finds a positive association between financial literacy and the propensity of having precautionary savings. In an experiment conducted in Peruvian high schools, however, Frisancho (2023) observes no significant effect of financial literacy on the probability of having savings in the short term. The results were presumably driven by the fact that high school students rarely have savings.

Research has shown by way of instrumental variable regressions that financial literacy positively influences stock market participation (Bucher-Koenen et al. 2021; van Rooij, Lusardi, and Alessie 2011). Additionally, with Danish administrative data and quasiexperiments, Hvidberg (2023) estimates that individuals with a university degree in economics are more likely to hold stocks.

Financial literacy is negatively related to costly credit behaviour. Financial literacy (Mottola 2013) and debt literacy (Lusardi and Tufano 2015) reduce avoidable costs associated with credit card usage, such as costs arising from paying only the minimum amount and not paying on time. In addition, financially illiterate individuals hold more high-cost credits in their credit portfolios and have a higher debt-to-income ratio (Disney and Gathergood 2013). Hvidberg (2023) estimates that economics graduates tend to have lower interest rates and less debt proportional to income. In contrast, Mottola (2013) finds no correlation between financial literacy and self-reported interest rates.

In recent years, researchers have focused on the relationship between financial literacy and financial fragility, which refers to the ability to cope with an expenditure shock (Clark, Lusardi, and Mitchell 2021). Many studies find that financial fragility is more common among those who are financially illiterate (Bottazzi and Oggero 2023; Clark, Lusardi, and Mitchell 2021; Lusardi and Streeter 2023; Vaahtoniemi et al. 2023). Clark, Lusardi, and Mitchell (2021) argue that such results may be due to behaviour. For example, financially literate individuals tend to make sound consumption-saving decisions. Indeed, financial education positively affects financial savviness[4] (Frisancho 2023).

Financial problems become more likely when interest rates or the debt-to-income ratio increase (Agarwal, Chomsisengphet, and Liu 2011; Kim, Cho, and Ryu 2018). Previous studies have investigated a variety of financial shocks, such as unexpected expenditures or job loss (Gathergood 2012), medical bills (Dobkin et al. 2018), and traffic fines (Mello 2024), and concluded that these shocks increase the likelihood of default.

According to previous studies, financial literacy influences both financial decision-making and financial resilience. Accordingly, our hypotheses

[3]e.g., see the Finnish Competition and Consumer Authority, https://www.kkv.fi/en/consumer-affairs/debt-collection-and-payment-arrangements/payment-default-entry/.

[4]Financial savviness includes measures such as keeping a budget, saving before purchases, comparing prices, and bargaining before shopping.

are as follows: 1) There is a negative (positive) relationship between financial literacy (financial fragility) and payment defaults, and 2) the relationship between financial fragility and debt problems is moderated by financial literacy.

The rationale behind these hypotheses is that financial literacy enhances money management and financial habits, which in turn reduce the risk of excessive consumption and increase resilience to adverse shocks. Conversely, individuals who are financially fragile may experience severe consequences even from minor financial shocks. However, financially literate individuals who are also financially fragile are less likely to default, as they are more likely to make sound financial decisions than those who are only financially fragile.

While several mechanisms may mediate the effect of financial literacy on payment defaults, our current data do not allow us to explore these pathways.

### *Financial literacy and debt problems*

Recent research from Finland has investigated payment defaults; these studies report a negative relationship between having a university degree (Oksanen, Aaltonen, and Rantala 2015), educational attainment in general (Luotonen, Puttonen, and Rantapuska 2022a), and defaults. Recent studies from the United States (Brown et al. 2016; Cole, Paulson, and Shastry 2014, 2016) have shown that increasing mathematics education decreases the likelihood of financial problems, such as foreclosures, delinquency and debt collection. The effect of education on foreclosure is significantly greater during financial crises than in precrisis periods (Cole, Paulson, and Shastry 2014). In Denmark, Hvidberg (2023) reports that having a university degree in economics reduces the default probability in later stages of life. Brown et al. (2016) reported that including economics education in a high school curriculum increased the likelihood of debt and repayment problems among young adults.

An interesting finding in the literature is that people with low levels of debt or financial literacy are more likely to consider themselves overindebted (Bottazzi and Oggero 2023; Lusardi and Streeter 2023; Lusardi and Tufano 2015; Vaahtoniemi et al. 2023). In the UK, Gathergood (2012) did not find a similar association between financial literacy and self-reported overindebtedness. The author finds that financial literacy is negatively related to being a month delinquent, but the relation diminishes when controlling for adverse financial shocks.

Using variation from high school reforms in the United States, Brown et al. (2016) observe that the inclusion of financial literacy education in the high school curriculum reduces the percentage of balance delinquency among young adults. However, the effect of financial education diminishes with age, and for individuals aged 27, education does not influence financial behaviour. In contrast, Cole, Paulson, and Shastry (2016) find no evidence that a personal finance course in high school influences the probability of credit card delinquency in a nationally representative sample. Urban et al. (2020) estimate that individuals between 18 and 21 years old who live in states that mandate financial education in high schools face fewer debt problems. That is, they are less likely to be 30 or 90+ days delinquent.

Like the studies mentioned above, Skimmyhorn (2016) reported that among US military personnel, financial education reduces the probability of being 60 days delinquent in the first year after a financial education course. However, the author found no significant long-term effects of the intervention in this study. More specifically, it no longer significantly explains the variation in delinquency in the second year after the intervention. Finally, the author also reports that financial education has a stronger effect on those who already have debt problems.

Frisancho (2023) reports similar results to those in Skimmyhorn regarding the long-term effects of financial education. More specifically, the author found no significant effect of financial education on the likelihood of being in arrears or the amount of debt in arrears three years after the intervention. One reason could be that when the outcome variables were measured, the participants were still young, i.e. less than 20 years old. The author estimates that among those with outstanding loans, the intervention reduces the amount of debt in arrears on loans but has no effect on arrears regarding other bills.

## III. Data and variables

Throughout the analysis, we use Finnish survey data that were collected between January 25th and 6 February 2023. Following the procedure of Greszki, Meyer, and Schoen (2015), we removed very fast respondents from the final sample, after which the sample consisted of 1,806 observations. We define a very fast respondent as a respondent whose response time was 50% shorter than the median response time. The reduction in the sample size due to elimination was approximately 10%. We note that fast responders left the majority of the questions unanswered; hence, their responses make little contribution to our analysis.

The removal leads to a significant difference between the two groups – the original sample and the sample after eliminating fast respondents (See Vaahtoniemi et al. 2023, for more details). The respondents who were removed were, on average, younger and had higher incomes than those included in our analysis. A greater proportion of them were men and employed. However, the two groups do not differ significantly in terms of educational attainment. Moreover, very fast respondents had a lower level of financial literacy, i.e. they were less likely to have correct answers to any of the three questions, and the average number of correct answers was lower. Since differences in financial literacy can be obtained but not in educational attainment, it seems reasonable to assume that fast respondents have not given full attention to the survey because the two factors are correlated (see, e.g. Lusardi and Mitchell 2014). Thus, it is reasonable to eliminate very fast respondents from the sample to increase the data quality, as mentioned in Vaahtoniemi et al. (2023).

We refer the reader to Vaahtoniemi et al. (2023) for a more detailed description of the data collection process and the procedure for removing very fast respondents, as well as a comparison of the two samples.

### *Variables*

The dependent variable in all of the regression specifications is self-reported information about whether the respondent has an active default entry. The variable is a binary indicator that takes a value of 1 if the respondent has an active default entry and 0 otherwise excluding the '*I don't know*' and '*Prefer not to answer*' responses, which are considered missing values. The key independent variable is financial literacy. Our measurement of financial literacy closely follows the definition and – the Big 3 questions[5] — developed by Lusardi and Mitchell (2011). Financial literacy can be defined as the ability to understand basic financial concepts. Individuals are considered financially literate if they can correctly answer all three questions regarding knowledge of inflation and interest compounding and recognition of the benefits of portfolio diversification. In the tables, the *Big 3* variable is an indicator of whether the respondent has correctly answered all three financial literacy questions. The variable takes a value of 1 if all the questions are correctly answered and 0 otherwise. The exact wording of our questions is presented in Table 1.

Another variable of interest is financial fragility. Like Clark, Lusardi, and Mitchell (2021), we define financial fragility as the ability to cope with expenditure shocks. The respondents are defined as financially fragile if they cannot survive an adverse

**Table 1.** Big 3 financial literacy questions.

| | |
|---|---|
| Inflation | Suppose you put 1000€ into a savings account with a guaranteed interest rate of 2% annually. The annual inflation rate is 4%, and you do not make more payments into or take out withdrawals from the account. In one year, you can buy: "More than today", "<u>Less than today</u>" or "Equally as much as today". |
| Compound interest | Suppose you put 100€ in a savings account with a guaranteed interest rate of 2% per year. You do not make any further payments into this account, and you do not withdraw any money out of this account. How much money will you have in five years after the interest payment has been made? Assume that you do not have to pay taxes on capital income and that there are no other fees related to the account: "<u>Over 110€</u>", "Exactly 110€", "Less than 110€" or "It is impossible to know given the information provided". |
| Diversification | Is the following statement true or false? "It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares rather than investing in one share only: "<u>True</u>" or "False". |

The correct answers are underlined. For all the questions, the respondents were provided the possibility of answering "I don't know" or "Prefer not to answer". The compound interest question also had an extra choice, which is as follows: "It is impossible to know given the information provided".

[5]The questions we used were slightly different than those developed by Lusardi and Mitchell (2011) because our survey was conducted with the OECD. The main difference is that in our questionnaire we used knowledge on interest compounding instead of basic interest calculation.

expenditure shock equal to their monthly net income. The exact wording of the question is *'In case of an expenditure shock equal to your monthly net income, would you be able to cope without borrowing or asking for help from family or friends?'* Respondents who answered '*I'm certain that I could not come up with the full payment*' or '*I probably could not come up with the full payment*' are defined as financially fragile.

All specifications use a set of control variables, which are *gender, age, age*$^2$, *university degree*, and *employment status*. Individuals with at least a bachelor's degree from a university of applied sciences are defined as having a university degree. The employment group '*Unemployed*' includes those who are seeking a job, are unable to work due to a sickness or an injury, are a student, or are neither employed nor seeking a job. For all the variables, options such as '*I don't know*' and '*Prefer not to answer*' are considered missing values.

### Summary statistics

Table 2 presents the summary statistics of the data. The second column, '*Sample*', provides the distribution of each variable, e.g. the share of financially literate respondents in the sample. The last three columns show how payment defaults are distributed, for example, the share of respondents who had an active default entry and who correctly answered all the financial literacy questions.

In our sample, 32.2% of the respondents reported having default entry, and 17.5% had active default entry. In 2023, according to Suomen Asiakastieto (2023), 7.9% of the Finnish population had an active payment default entry. Therefore, relative to 'official' figures, our sample overestimates the share of individuals with active default entry.

Thirty-six percent of the respondents could correctly answer all three financial literacy questions and thus were defined as financially literate. From Table 2, we observe that among those with an active default entry, 21% were financially literate, whereas among those who had never defaulted, 43% were financially literate. By looking at the financial literacy questions independently, we can see that 52% of those having an active default entry understand inflation and 35% have knowledge about how interest compounding influences

**Table 2.** Summary statistics.

| | Sample | Current default | Previous default | Never defaulted |
|---|---|---|---|---|
| **Default** | | 17.52 | 14.70 | 67.78 |
| **Big 3** | | | | |
| All answers correct: Yes | 36.64 | 21.12 | 31.37 | 43.31 |
| All answers correct: No | 63.36 | 78.88 | 68.63 | 56.69 |
| **# of correct answers mean (sd.)** | 1.88 (1.05) | 1.47 (1.07) | 1.77 (1.06) | 2.05 (1.00) |
| **Inflation** | | | | |
| Correct | 66.33 | 51.84 | 63.10 | 71.54 |
| Incorrect | 33.67 | 48.16 | 36.90 | 28.46 |
| **Compound interest** | | | | |
| Correct | 50.00 | 35.14 | 42.57 | 56.66 |
| Incorrect | 50.00 | 64.86 | 57.43 | 43.34 |
| **Risk diversification** | | | | |
| Correct | 76.20 | 62.33 | 74.10 | 81.75 |
| Incorrect | 23.80 | 37.67 | 25.90 | 18.25 |
| **Financial fragility** | | | | |
| Fragile | 46.54 | 87.88 | 61.13 | 31.93 |
| Nonfragile | 53.46 | 12.12 | 38.87 | 68.07 |
| **Gender** | | | | |
| Male | 46.02 | 49.01 | 55.29 | 43.22 |
| Female | 53.98 | 50.99 | 44.71 | 56.78 |
| **University degree** | | | | |
| Yes | 33.69 | 16.44 | 20.87 | 41.42 |
| No | 66.31 | 83.56 | 79.13 | 58.58 |
| **Employment status** | | | | |
| Employed | 39.97 | 30.72 | 31.75 | 44.40 |
| Self-employed | 5.31 | 4.10 | 5.56 | 5.60 |
| Unemployed | 23.91 | 34.47 | 21.43 | 21.90 |
| Retired | 30.81 | 30.72 | 41.27 | 28.10 |
| **Age mean (sd.)** | 49.47 (15.82) | 49.70 (14.08) | 53.43 (14.67) | 48.45 (16.35) |
| **Age {min, max}** | {18, 80} | | | |

The numbers in the table are percentages unless otherwise mentioned. The first column shows the distribution of a variable in the sample. The last three columns show how payment defaults are distributed, e.g. the share of financially literate respondents who had active default entry. The columns sum to 100.

savings, whereas these figures for never defaulters are 43% and 72%, respectively. Similar patterns can be seen for understanding the effects of diversification on investment risk. We note that the first two questions in the Big 3 financial literacy test are more relevant for our study and, in general, for basic money management.

A more striking difference can be observed between those who had an active default entry and those who never defaulted in their self-reported financial fragility assessments. Eighty-eight percent of those who had active default entry and 32% of those who never defaulted were financially fragile. In the sample, 47% of the respondents were financially fragile.

In our sample, we observe that education level is an important variable. Among those who had an active default entry, 84% had no university education, whereas 41% of those who never defaulted had a university education. One-third of those in the sample had a university education. In this univariate comparison, we observe that those who are unemployed are more likely to face financial problems.

The average financial literacy score is the highest among individuals who never defaulted. The maximum score, with correct answers to all the financial literacy questions, is three. The average score for never defaulters is 2.05 (std. dev. = 1.00), whereas it is 1.77 (std. dev. = 1.06) for those who have had a default entry and 1.47 (std. dev. = 1.07) for respondents with active default entry. If we compare the average scores between those having never defaulted and those having an active default entry, we observe a difference of 0.583, which is statistically significant ($p < 0.001$ according to a *t* test). The *t* test therefore indicates that the raw averages differ significantly between the groups. The difference in the average financial literacy scores between those who had an active default entry and those who had previously had a default entry is −0.297, and this difference is statistically significant ($p = 0.001$ according to a *t* test).[6] Moreover, the share of financially literate respondents is greater among those with default entry in the past than among those with active default entry. These findings indicate learning effects and suggest that, after default, individuals may start to invest in financial knowledge.

Moreover, the share of financially fragile respondents is smaller among those with a previous default entry than among those with an active entry. This suggests that a previous default entry presumably has a positive influence on financial savviness.

## IV. Regression results

This section shows our estimation results from multivariate regressions. Since our dependent variable is an indicator, active default entry takes a value of 1 if the respondent indicates that s/he currently has a default entry; otherwise, it takes a value of 0. Our main regression model takes the following form:

$$\Pr(\text{Active default entry} = 1|fl, z) = \mathrm{f}(\mathrm{fl}, z)$$

where *fl* denotes financial literacy and **z** is the vector of control variables. In our specifications, $f(\cdot)$ takes a linear or probit form.

Table A1 in the Appendix presents a correlation matrix between all key independent variables, including *income level*, which is omitted from the main specifications. Excluding the correlation between income brackets and between employment categories, we can observe high correlations between age and retirement status (0.68), and age has a negative correlation (−0.36 and −0.29, respectively) with unemployed and employed individuals. Other correlations above $|0.3|$ are between the lowest income bracket and employment status, income level 30,000–59,999€ and employed. Financial literacy is correlated above $|0.2|$ with financial fragility, gender, and university degree, and financial fragility is correlated with income below 59,999€ and university degree.[7] The correlation matrix indicates that there is no severe multicollinearity between independent variables. Additionally, in Table A2 in the appendix, we provide results

[6]Since financial literacy score is not truly a continuous variable, we also run Wilcoxon rank-sum tests. The *p* values from this test are 0.000 and 0.0011, respectively, which leads to a similar conclusion.

[7]We have estimated Table 3 without the employment status, the results, however, qualitatively do not change. In absolute terms the coefficients for financial literacy, fragility, male, and university degree increases and the coefficient for age slightly decreases. The results are not presented in the manuscript but are available upon request.

from VIF[8] test and observe that only values higher than 10 are for *age* and *age²*, thus, the test also suggests that there is no multicollinearity problem.

## Results

As shown in Table 3, there is a significant negative relationship between financial literacy and the likelihood of default, as suggested by the summary statistics. The estimates of the coefficients and standard errors are similar regardless of whether we use a linear probability or probit model. A positive association between financial fragility and payment default can be observed. This implies that if an individual is unable to cope with an expenditure shock, she or he would have an increased likelihood of default. In specifications LPM3 and Probit3, we include both financial literacy and measurement of financial fragility. We observe that the coefficient estimate of financial literacy decreases more than that of financial fragility does. However, statistical significance remains for both variables. This implies that some of the influence of financial literacy can be due to its relationship with financial fragility.

When sociodemographic factors are examined, we observe that age positively correlates with the likelihood of default, but after a certain point (at age 49), the likelihood seems to decrease.[9] This hump-shaped pattern has also been documented in the U.S. and Finland (Agarwal, Chomsisengphet, and Liu 2011; Luotonen, Puttonen, and Rantapuska 2022a). According to our estimations, respondents who identify themselves as female, especially when controlling for both financial literacy and fragility, or who have a university education are less likely to default. This finding is consistent with recent research from Finland (Luotonen, Puttonen, and Rantapuska 2022b; Oksanen, Aaltonen, and Rantala 2015). Compared with employed people with a salary, those who are unemployed in our sample seem to have a greater likelihood of financial distress, which is not surprising.

To increase the number of observations, we omit the income level from the main specifications. This allowed us to run regressions with 131 to 144 more observations.[10] Using Danish administrative data, Hvidberg (2023) and Kreiner, Leth-Petersen, and Willerslev-Olsen (2020) showed that differences in

**Table 3.** Regression of payment default on financial literacy and fragility.

| | LPM1 | LPM2 | LPM3 | Probit1 | Probit2 | Probit3 |
|---|---|---|---|---|---|---|
| Big3 – All correct | −0.115*** | | −0.073*** | −0.120*** | | −0.080*** |
| | (0.018) | | (0.017) | (0.020) | | (0.019) |
| Financially fragile | | 0.277*** | 0.266*** | | 0.268*** | 0.257*** |
| | | (0.019) | (0.019) | | (0.018) | (0.018) |
| Male | 0.035* | 0.027 | 0.042** | 0.034* | 0.028* | 0.044** |
| | (0.019) | (0.018) | (0.018) | (0.018) | (0.017) | (0.018) |
| Age | 0.023*** | 0.012*** | 0.013*** | 0.024*** | 0.012*** | 0.013*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| Age$^2$ | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000** | −0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| University degree | −0.088*** | −0.061*** | −0.045*** | −0.097*** | −0.074*** | −0.056*** |
| | (0.017) | (0.017) | (0.017) | (0.021) | (0.020) | (0.020) |
| Employment (ref. employed) | | | | | | |
| Self-employed | 0.033 | 0.063 | 0.065* | 0.037 | 0.077 | 0.084* |
| | (0.040) | (0.039) | (0.038) | (0.042) | (0.049) | (0.049) |
| Unemployed | 0.124*** | 0.073*** | 0.072*** | 0.113*** | 0.058** | 0.058** |
| | (0.026) | (0.026) | (0.026) | (0.025) | (0.023) | (0.023) |
| Retired | 0.082** | 0.039 | 0.037 | 0.077** | 0.034 | 0.032 |
| | (0.035) | (0.033) | (0.033) | (0.031) | (0.030) | (0.029) |
| $N$ | 1654 | 1615 | 1606 | 1654 | 1615 | 1606 |
| adj. $R^2$ | 0.067 | 0.166 | 0.173 | | | |
| pseudo $R^2$ | | | | 0.083 | 0.205 | 0.215 |

Robust standard errors are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Dependent variable: has an active default entry (=1). Average marginal effects presented for probit regressions. In the table, −0.000 and 0.000 refer to quantities greater than −0.001 (i.e. > −0.001) and less than 0.001 (i.e. < 0.001), respectively.

[8]Variance inflation factor.
[9]Using Probit1 estimates for age and age$^2$. The exact functional form is $0.0237 * age - 0.000243 * age^2$.
[10]When using imputation, the gain in the number of observations due to omitting the income variable is between 90 and 100.

income do not explain the variation in default risk. Therefore, we consider that it is safe to exclude it. Table A3 in the Appendix, however, present the linear probability estimations when income levels are included. The inclusion of the income variable does not qualitatively alter our findings related to financial literacy or fragility. This is consistent with Luotonen, Puttonen, and Rantapuska (2022a), who find that income levels do not significantly alter the estimates for general ability. Moreover, we can observe a negative association between payment defaults and income. However, most of the effect of income on the likelihood of default disappears once we control for financial fragility. This finding suggests that the effect of income can also be captured by a financial fragility measure.

Table A4 in the Appendix includes additional variables in the regression model, which could influence financial problems. Like Gathergood (2012), we find no evidence that the self-reported time preference measure is correlated with payment defaults. In addition, we do not observe any correlation between risk preferences and payment defaults. Our impulsivity – more precisely, *impulsive spender*—scale does not have a significant coefficient estimate even when we do not control for financial shocks. This finding is slightly different from that of Gathergood's (2012), who reported that impulsive spenders are more likely to face financial troubles. When financial shocks are included in regressions, the significance of impulsivity diminishes (Gathergood 2012). This difference could be due to differences in the impulsivity scales used in the two surveys, as they may measure different latent factors. Moreover, we find that the likelihood of default is greater for individuals who have experienced an income shock in the past 12 months. This observation aligns with previous findings that adverse financial events increase the likelihood of having financial problems (Böheim and Taylor 2000; Gathergood 2012; Mello 2024). However, our income shock measurement must be considered with caution, since the payment default could have happened prior to the shock. Overall, the inclusion of the additional variables does not truly change the relationships observed in Table 3. The inclusion of the income shock variable reduces the coefficient estimate of financial fragility. In contrast to Gathergood (2012), who estimated that having dependent children positively correlates with delinquency, we observe a negative association between living with underaged child(ren) and payment defaults.

Next, we add an interaction term between financial literacy and financial fragility to specifications LPM3 and Probit3 in Table 3 and estimate them. By doing so, we aim to test whether the relationship between default and financial fragility is moderated by financial literacy. The estimation results are reported in Table 4 below.

In Table 4, the interaction term is negative and statistically significant for the linear probability model. The coefficient estimates from the linear probability model suggest that financial literacy reduces the default risk induced by financial fragility by approximately 40%.[11] The last three columns in Table 4 present the marginal effects from the probit regression. Column 4 [Column 5] reports the estimations of the marginal effects when financial literacy has been set equal to 0 [1], which refers to a financially illiterate [literate] individual. The coefficient estimate of the interaction term in the probit model is statistically insignificant. Nevertheless, we observe that the coefficient for financial fragility is smaller when financial literacy has been set equal to 1. These two observations imply that financial literacy can reduce the default risk for financially fragile individuals.

## Discussion and limitations

The negative relationship between financial literacy and payment defaults is in line with some experimental studies (Brown et al. 2016; Skimmyhorn 2016; Urban et al. 2020) and, to some extent, with Frisancho's (2023) results, which are discussed in Section 2.3. However, the conclusions differ from

[10]When using imputation, the gain in the number of observations due to omitting the income variable is between 90 and 100.

[11]Since the total 'effect' on the probability of default is $-0.037 + 0.300 - 0.091 = 0.172$ if an individual is financially literate and financially fragile. Thus, we observe that financial literacy reduces the risk for financially fragile individuals by $(0.172 - 0.300)/0.300 \approx -0.427$.

**Table 4.** Regression of payment default on financial literacy and fragility, including an interaction term.

| | LPM (1) | Probit (2) | Probit AME (3) | Probit MER (4) Financially illiterate | Probit MER (5) Financially literate |
|---|---|---|---|---|---|
| Big3 – All correct | −0.037*** | −0.403** | −0.079*** | −0.088*** | −0.065*** |
| | (0.014) | (0.177) | (0.020) | (0.024) | (0.013) |
| Financially fragile | 0.300*** | 1.269*** | 0.257*** | 0.284*** | 0.213*** |
| | (0.024) | (0.120) | (0.018) | (0.022) | (0.030) |
| Big3 – All correct **x** Financially fragile | −0.091** | 0.013 | | | |
| | (0.038) | (0.205) | | | |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| N | 1606 | 1606 | 1606 | 1606 | 1606 |
| adj. $R^2$ | 0.176 | | | | |
| pseudo $R^2$ | | 0.215 | | | |

Robust standard errors are in parentheses. *$p$ < 0.10, **$p$ < 0.05, ***$p$ < 0.01. Dependent variable: has an active default entry (=1). The additional control variables are gender, age, and age sq., university degree, employment status. AME average marginal effects, MER marginal effects at representative values.

those in Cole, Paulson, and Shastry (2016) and Gathergood (2012), which is methodologically the closest paper to ours.

Notably, two out of the three financial literacy questions measure numerical skills. To determine whether numerical skills drive the results, we run an additional regression by using the financial literacy questions individually. Table 5 shows that all the individual questions correlate negatively with the likelihood of default. When we include all the financial literacy questions together with financial fragility, the coefficient estimates of inflation and interest questions remain significant, whereas that of diversification becomes insignificant. This suggests that numerical skills have influence beyond financial fragility. Thus, the results are not as contradictory to those of Cole, Paulson, and Shastry (2016) as they seem at first glance.

Next, we attempt to explain the difference between our estimates and that of Gathergood's (2012). We believe that slight differences in the financial literacy questions between the two studies are unlikely to explain the difference in the findings.[12] One possible reason may be the timing of data collection. Even though both datasets were collected immediately after exogenous events – the global financial crisis and the COVID-19 pandemic – the ways in which the shocks influenced individuals were different. For example, during the COVID-19 pandemic, governments declared lockdowns and other measures that restricted people's freedom. This could have led to increased time spent at home and demand for online shopping, especially if one has impulsive shopping habits. Lührmann, Serra-Garcia, and Winter (2018) conducted an experiment among adolescents in Germany and

**Table 5.** Regressions of payment default on each financial literacy question separately.

| | Linear probability estimates | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inflation | -0.118*** | | | -0.085*** | -0.078*** | | | -0.062*** |
| | (0.022) | | | (0.024) | (0.022) | | | (0.024) |
| Interest | | −0.098*** | | −0.060*** | | −0.063*** | | −0.040** |
| | | (0.019) | | (0.020) | | (0.018) | | (0.020) |
| Diversification | | | −0.123*** | −0.072** | | | −0.056** | −0.023 |
| | | | (0.026) | (0.029) | | | (0.026) | (0.029) |
| Financially fragile | | | | | 0.270*** | 0.271*** | 0.267*** | 0.263*** |
| | | | | | (0.019) | (0.020) | (0.020) | (0.020) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| *N* | 1624 | 1602 | 1635 | 1573 | 1579 | 1556 | 1589 | 1531 |
| adj. $R^2$ | 0.069 | 0.064 | 0.067 | 0.082 | 0.178 | 0.174 | 0.170 | 0.182 |

Robust standard errors are in parentheses. *$p$ < 0.10, **$p$ < 0.05, ***$p$ < 0.01. Dependent variable: has an active default entry (=1). Additional control variables: gender, age, age sq., university degree, employment status.

[12]Instead of using inflation and risk diversification questions, Gathergood (2012) used simple interest and monthly payment questions.

reported that financial education increases the likelihood of allocating payments on a single payment date rather than spreading payments across two dates. Thus, a possible mechanism that may explain the difference in the findings of the two studies is that financial literacy reduces the use of instalments or impulsive shopping choices. Finally, the estimates could be biased due to the selection of or, in general, omitted variables.[13] Moreover, we cannot rule reverse causality out, i.e. a default entry could create an incentive to increase financial knowledge. These problems will be discussed next.

We note that our study has several limitations that potentially affect our estimates. Like many other studies that use surveys, our study potentially suffers from self-selection: more precisely, individuals with better financial knowledge may be more willing to answer a survey such as ours. This might have artificially increased the level of financial literacy in the sample. Selection based on an exogenous variable would not be an issue, whereas it may cause problems if the econometric model already suffers from endogeneity (Heckman 1979; Verbeek 2004).[14] Similarly, if the sample selection is based on the dependent variable, i.e. people in severe financial distress would be less likely to answer the survey, the OLS estimates would be biased due to selection. However, this seems not to be the case since our sample overestimates the share of individuals with an active default entry.

Despite these issues, we find that the coefficient estimate of financial literacy is highly significant and robust to varying specifications and estimation methods. However, we note that these issues cause the estimations to be interpreted as correlations rather than causal effects.

## V. Conclusions

In this paper, we study the role of financial literacy and financial fragility in payment defaults. The results confirm our hypothesis: financial literacy is negatively associated with default risk, financial fragility is positively associated with default risk, and financial literacy reduces default risk for financially fragile individuals. However, owing to the data issues discussed in the previous section, we are unable to draw causal interpretations about the relationship between financial literacy and payment defaults. Moreover, we observe that individuals may learn from their financial mistakes. That is, the average financial literacy score is higher when individuals have default entry than when individuals currently have default entry.

Given the limitations of our data, the results suggest that through financial education, it may be possible to reduce payment defaults and therefore increase financial welfare. The results, which support previous findings, indicate that financial education should focus on basic numeracy skills, financial phenomena, and improving financial habits, e.g. making individuals more able to cope with adverse shocks by discussing consumer credit and instalments.

Future research is needed to estimate the causal relationship between financial literacy and debt problems, and the mechanisms, to make proper conclusions, which is what financial education should focus on. In other words, further research is needed to take reverse causality, possible self-selection and timing issues fully into account to obtain more robust estimates for ‘regular’ times. For example, researchers could use administrative data from payment defaults and other variables, which could help identify better instrumental variables and reduce potential bias due to selection. Since financial literacy is a self-reported measurement, the fact that people with better financial knowledge are more willing to respond to surveys is something that future research should consider.

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[13]General abilities have been shown to be linked to financial literacy (Lusardi, Mitchell, and Curto 2010, 2014) and payment defaults (Kreiner, Leth-Petersen, and Willerslev-Olsen 2020; Luotonen, Puttonen, and Rantapuska 2022a).

[14]More precisely, selection does not cause a problem if the zero conditional mean assumption holds for the selected subsample (Heckman 1979). As the zero conditional mean implies exogeneity (i.e. $E[X_i\varepsilon] = 0$), violation of exogeneity implies the violation of the zero conditional mean assumption. Thus, in the presence of endogeneity, self-selection may cause further biased estimates, even if the selection is based on the independent variable $X_i$.

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## Appendix

### *Correlation matrix of independent variables*

**Table A1.** Correlation matrix.

| | Big3 – All correct | Financially fragile | < 30,000€ | 30,000–59,999€ | 60,000€ or more | Self-employed | Unemployed | Employed | Retired | Age | Age sq. | Male | University degree |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Big3 – All correct | 1 | −0.2085 | −0.1798 | 0.1446 | 0.0797 | 0.0370 | −0.1070 | 0.0321 | 0.0467 | 0.1372 | 0.1237 | 0.2308 | 0.2314 |
| Financially fragile | −0.2085 | 1 | 0.2844 | −0.2296 | −0.1229 | −0.0961 | 0.1734 | −0.0678 | −0.0400 | −0.0534 | −0.0707 | −0.0856 | −0.2010 |
| < 30,000€ | −0.1798 | 0.2844 | 1 | −0.8691 | −0.3202 | −0.0472 | 0.3361 | −0.4220 | 0.1621 | 0.0241 | 0.0336 | −0.1407 | −0.2899 |
| 30,000–59,999€ | 0.1446 | −0.2296 | −0.8691 | 1 | −0.1904 | −0.0149 | −0.2973 | 0.3850 | −0.1275 | −0.0048 | −0.0165 | 0.0736 | 0.2069 |
| 60,000€ or more | 0.0797 | −0.1229 | −0.3202 | −0.1904 | 1 | 0.1215 | −0.0967 | 0.0993 | −0.0770 | −0.0385 | −0.0351 | 0.1386 | 0.1808 |
| Self-employed | 0.0370 | −0.0961 | −0.0472 | −0.0149 | 0.1215 | 1 | −0.1328 | −0.1933 | −0.1581 | −0.0670 | −0.0692 | 0.0000 | 0.0387 |
| Unemployed | −0.1070 | 0.1734 | 0.3361 | −0.2973 | −0.0967 | −0.1328 | 1 | −0.4574 | −0.3741 | −0.3642 | −0.3545 | −0.0874 | −0.0614 |
| Employed | 0.0321 | −0.0678 | −0.4220 | 0.3850 | 0.0993 | −0.1933 | −0.4574 | 1 | −0.5444 | −0.2954 | −0.3469 | −0.0142 | 0.1063 |
| Retired | 0.0467 | −0.0400 | 0.1621 | −0.1275 | −0.0770 | −0.1581 | −0.3741 | −0.5444 | 1 | 0.6820 | 0.7287 | 0.0955 | −0.0750 |
| Age | 0.1372 | −0.0534 | 0.0241 | −0.0048 | −0.0385 | −0.0670 | −0.3642 | −0.2954 | 0.6820 | 1 | 0.9881 | 0.0717 | −0.0467 |
| Age$^2$ | 0.1237 | −0.0707 | 0.0336 | −0.0165 | −0.0351 | −0.0692 | −0.3545 | −0.3469 | 0.7287 | 0.9881 | 1 | 0.0770 | −0.0458 |
| Male | 0.2308 | −0.0856 | −0.1407 | 0.0736 | 0.1386 | 0.0000 | −0.0874 | −0.0142 | 0.0955 | 0.0717 | 0.0770 | 1 | −0.0335 |
| University degree | 0.2314 | −0.2010 | −0.2899 | 0.2069 | 0.1808 | 0.0387 | −0.0614 | 0.1063 | −0.0750 | −0.0467 | −0.0458 | −0.0335 | 1 |

## VIF test for multicollinearity

**Table A2.** VIF test for multicollinearity.

| Variable | VIF (1/VIF) | | | | | |
|---|---|---|---|---|---|---|
| Big3 – All correct | 1.16 (0.865) | | 1.19 (0.842) | 1.16 (0.863) | | 1.19 (0.842) |
| Financially fragile | | 1.11 (0.897) | 1.14 (0.874) | | 1.16 (0.86) | 1.18 (0.845) |
| Male | 1.08 (0.928) | 1.02 (0.979) | 1.08 (0.923) | 1.11 (0.901) | 1.06 (0.940) | 1.11 (0.898) |
| Age | 52.56 (0.019) | 53.9 (0.018) | 54.5 (0.018) | 53.0 (0.019) | 53.9 (0.018) | 54.8 (0.018) |
| Age$^2$ | 59.32 (0.017) | 61.1 (0.016) | 61.4 (0.016) | 60.0 (0.017) | 61.3 (0.016) | 61.9 (0.016) |
| University degree | 1.09 (0.921) | 1.06 (0.946) | 1.11 (0.902) | 1.17 (0.856) | 1.13 (0.885) | 1.17 (0.851) |
| Income (ref. < 30,000€) | | | | | | |
| 30,000–59,999€ | | | | 1.43 (0.699) | 1.47 (0.678) | 1.48 (0.677) |
| 60,000€ or more | | | | 1.23 (0.815) | 1.25 (0.802) | 1.25 (0.802) |
| Employment (ref. Employed) | | | | | | |
| Self-employed | 1.08 (0.924) | 1.08 (0.923) | 1.08 (0.922) | 1.10 (0.908) | 1.11 (0.905) | 1.11 (0.904) |
| Unemployed | 1.28 (0.779) | 1.31 (0.764) | 1.31 (0.765) | 1.57 (0.635) | 1.57 (0.636) | 1.58 (0.635) |
| Retired | 2.76 (0.362) | 2.79 (0.358) | 2.79 (0.359) | 3.04 (0.329) | 3.07 (0.326) | 3.06 (0.327) |
| Mean VIF | 15.04 | 15.44 | 13.97 | 12.48 | 12.71 | 11.82 |

## Additional regressions

Missing age information is replaced with the median age within demographic groups (gender, employment, and income). Missing educational attainment is replaced with the median value according to gender and employment status. Missing income information is replaced with the median value according to gender, employment status, and educational attainment. Missing employment status is replaced with the median value according to gender, age, and education. Only missing values and '*I don't know*' answers were imputed, and '*Prefer not to say*' answers were defined as missing values.

- Time preferences: *A variable ranging from 1 to 10, where 1 denotes heavily preferring the present over the future and 10 heavily preferring the future over the present.*
- Risk preferences: *Are you risk averse or a risk taker? Ranging from 1 to 10, where 1 indicates that the individual is completely unwilling to take risks, 5 indicates that the individual is neutral towards risks, and 10 indicates that the individual is willing to take risks.*
- Impulsive spender: *I carefully consider before making a purchase. 1 totally disagree/disagree, 0 totally agree/agree.*
- Income shock: *Occasionally, earnings do not cover expenditures. Has this happened to you during the past 12 months? 1 Yes, 0 No.*
- Child(ren) < 18yo: *A dummy variable for whether underage (below 18yo) children live in the household.1 Yes, 0 No.*

**Table A3.** Regression of payment default on financial literacy and fragility (LPM estimates).

| | Original sample | | | Imputed | | |
|---|---|---|---|---|---|---|
| Big3 – All correct | -0.118*** | | -0.080*** | -0.114*** | | -0.076*** |
| | (0.019) | | (0.018) | (0.019) | | (0.018) |
| Financially fragile | | 0.277*** | 0.265*** | | 0.279*** | 0.268*** |
| | | (0.020) | (0.020) | | (0.020) | (0.020) |
| Male | 0.037* | 0.030 | 0.045** | 0.037* | 0.031* | 0.045** |
| | (0.020) | (0.019) | (0.019) | (0.020) | (0.019) | (0.019) |
| Age | 0.025*** | 0.013*** | 0.015*** | 0.024*** | 0.013*** | 0.015*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| Age$^2$ | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| University degree | −0.068*** | −0.059*** | −0.043** | −0.069*** | −0.057*** | −0.042** |
| | (0.018) | (0.018) | (0.018) | (0.018) | (0.018) | (0.018) |
| Income (ref. < 30000€) | | | | | | |
| 30,000–59,999€ | −0.085*** | −0.037* | −0.034 | −0.087*** | −0.040* | −0.037* |
| | (0.022) | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) |
| 60,000€ or more | −0.062* | −0.010 | −0.008 | −0.062* | −0.011 | −0.009 |
| | (0.036) | (0.036) | (0.035) | (0.035) | (0.035) | (0.035) |
| Employment (ref. employed) | | | | | | |
| Self-employed | 0.020 | 0.059 | 0.061 | 0.012 | 0.048 | 0.052 |
| | (0.042) | (0.040) | (0.040) | (0.040) | (0.039) | (0.038) |
| Unemployed | 0.096*** | 0.070** | 0.070** | 0.088*** | 0.062** | 0.061** |
| | (0.030) | (0.030) | (0.030) | (0.030) | (0.030) | (0.030) |
| Retired | 0.058 | 0.037 | 0.039 | 0.048 | 0.026 | 0.027 |
| | (0.038) | (0.037) | (0.037) | (0.038) | (0.036) | (0.036) |
| *N* | 1510 | 1479 | 1475 | 1554 | 1521 | 1516 |
| adj. $R^2$ | 0.081 | 0.172 | 0.180 | 0.078 | 0.173 | 0.180 |

Robust standard errors are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Dependent variable: has an active default entry (=1). The last three columns use imputed information for age, education, employment and income variables. "*I don't know*" answers and missing values are imputed. In the table, −0.000 and 0.000 refer to quantities greater than −0.001 (i.e. > −0.001) and less than 0.001 (i.e. < 0.001), respectively.

**Table A4.** Regression of payment default on financial literacy and fragility, including additional variables.

| | LPM | | | | Probit | | | |
|---|---|---|---|---|---|---|---|---|
| Big3 – All correct | -0.071*** | -0.070*** | -0.071*** | -0.069*** | -0.076*** | -0.075*** | -0.076*** | -0.073*** |
| | (0.018) | (0.018) | (0.018) | (0.018) | (0.020) | (0.020) | (0.020) | (0.020) |
| Financially fragile | 0.259*** | 0.256*** | 0.214*** | 0.213*** | 0.249*** | 0.246*** | 0.205*** | 0.200*** |
| | (0.020) | (0.020) | (0.021) | (0.021) | (0.018) | (0.018) | (0.020) | (0.020) |
| Time preferences | 0.002 | 0.001 | 0.002 | 0.002 | 0.001 | 0.001 | 0.002 | 0.002 |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| Risk preferences | 0.006 | 0.007 | 0.007 | 0.008* | 0.005 | 0.007 | 0.005 | 0.007* |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| Impulsive spender | | −0.017 | −0.011 | −0.012 | | −0.018 | | −0.015 |
| | | (0.019) | (0.019) | (0.019) | | (0.021) | | (0.021) |
| Income shock | | | 0.100*** | 0.105*** | | | 0.095*** | 0.104*** |
| | | | (0.019) | (0.019) | | | (0.021) | (0.021) |
| Child(ren) < 18yo | | | | −0.061** | | | | −0.059** |
| | | | | (0.024) | | | | (0.024) |
| Male | 0.041** | 0.038** | 0.041** | 0.039** | 0.044** | 0.041** | 0.047** | 0.042** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.018) | (0.018) | (0.019) | (0.018) |
| Age | 0.015*** | 0.016*** | 0.017*** | 0.019*** | 0.014*** | 0.016*** | 0.014*** | 0.018*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) | (0.004) |
| Age$^2$ | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** | −0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| University degree | −0.049*** | −0.048*** | −0.048*** | −0.045*** | −0.059*** | −0.057*** | −0.057*** | −0.053** |
| | (0.017) | (0.017) | (0.017) | (0.017) | (0.021) | (0.021) | (0.021) | (0.021) |
| Employment (ref. employed) | | | | | | | | |
| Self-employed | 0.066* | 0.070* | 0.060 | 0.057 | 0.084* | 0.088* | 0.066 | 0.068 |
| | (0.039) | (0.039) | (0.039) | (0.038) | (0.049) | (0.050) | (0.046) | (0.045) |
| Unemployed | 0.081*** | 0.085*** | 0.072*** | 0.065** | 0.066*** | 0.070*** | 0.056** | 0.053** |
| | (0.026) | (0.026) | (0.026) | (0.026) | (0.023) | (0.023) | (0.023) | (0.023) |
| Retired | 0.057* | 0.059* | 0.054 | 0.051 | 0.050* | 0.054* | 0.047 | 0.047 |
| | (0.034) | (0.034) | (0.034) | (0.034) | (0.030) | (0.030) | (0.031) | (0.030) |
| *N* | 1498 | 1487 | 1453 | 1453 | 1498 | 1487 | 1464 | 1453 |
| adj. $R^2$ | 0.171 | 0.174 | 0.189 | 0.192 | | | | |
| pseudo $R^2$ | | | | | 0.215 | 0.221 | 0.234 | 0.246 |

Robust standard errors are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Dependent variable: has an active default entry (=1). In the table, −0.000 and 0.000 refer to quantities greater than −0.001 (i.e. > −0.001) and less than 0.001 (i.e. < 0.001), respectively.