

The Impact of Financial Literacy on Debt Behavior of Households: Evidence from Micro Data

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<https://doi.org/10.53465/EDAMBA.2022.9788022550420.128-139>

Abstract. While several papers have focused on the effect of financial literacy on household retirement savings or investment choices, this paper is devoted to its impact on households' debt behavior. We utilize Slovak household finance and consumer survey (HFCS) microdata to analyze the impact of the objective level of financial literacy on Slovak households' debt behavior. We find that Slovak households display different debt behavior with respect to varying levels of financial literacy. We focus on high-cost credit products and find that a household's financial literacy does not have a statistically significant impact on the probability of having an outstanding balance of non-mortgage or credit debt. However, we find that younger households with higher incomes dispose of a higher probability of having an outstanding balance of non-mortgage or credit debt while being more credit-constrained and less able to save from their monthly income compared to more financially literate households. Thus, we may consider households with an outstanding balance of non-mortgage or credit debt to be more financially vulnerable, as they are more frequently engaging with high-cost credit products with a lower ability to save and with a higher probability of being credit constrained. This behavior may lead to a significant decrease in their ability to face unexpected internal or external adverse shocks.

Keywords: Financial Literacy, Debt Behavior, Microdata.

JEL classification: G51, G53, D10

1 Introduction

In many countries, rising household indebtedness is becoming an essential issue. Slovak households belonged for almost a decade (2010 – 2020) among households with the highest annual credit growth rate within the EU and Central and Eastern European (CEE) region while having relatively low financial assets. One of the measures of expressing the level of household indebtedness is the Debt-to-Income ratio (DTI). DTI ratio of Slovak households in the last ten years went from approximately 39% in 2010

to 72% in 2020, and household debt to GDP went from 26% in 2010 to 47% in 2020.¹ Such a development in household indebtedness was supported mainly by a favorable macroeconomic development and historically low-interest rates. From the perspective of economic theory, the financial behavior and situation of households are primarily connected to selected relevant socio-economic, behavioral, and demographic factors. However, in our study, we examine the impact of financial literacy on households' debt behavior, whereas financial literacy is becoming more essential in a world with the increasing complexity of different financial products. It is vital that households dispose of the necessary level of financial literacy not just to understand various financial products and services but also to be able to evaluate the level of risk connected with them. Generally, the financial literacy of Slovak households is low, which is also demonstrated within the HFCS data. Only 17% of respondents were able to correctly answer all questions regarding financial literacy. Meanwhile, 50% of respondents in Germany and 36% of respondents in Finland were able to answer similar questions all correctly. These findings have motivated us to examine more closely the impact of financial literacy on the debt behavior of Slovak households.

Several studies investigated the impact of financial literacy on household retirement saving and planning (Lusardi & Mitchell, 2007; Van Rooij et al., 2012; Pastorakova et al., 2017; Cupák et al., 2019) and stock market participation (Van Rooij et al., 2011; Cupák et al., 2020; Xia et al., 2014; Chu et al., 2017). However, less attention has been devoted to the impact of financial literacy on households' debt behavior. Available studies concerning the examination of the impact of financial literacy on debt behavior and indebtedness found that a low level of financial literacy has a negative impact on debt behavior which is reflected in the high-cost credit choices and in the amount of accumulated debt. (Lusardi & Tufalo, 2015; Disney & Gathergood, 2012; Gathergood, 2011; Allgood & Walstad, 2012). To better understand the determinants of the Slovak household's debt behavior and its relation to financial literacy we utilized the Slovak HFCS microdata from 2017 assembled by the National Bank of Slovakia (NBS). The HFCS data contains questions regarding financial literacy from which we can derive the financial literacy index and the database contains detailed information regarding different debt products as well. This allows us to measure objective financial literacy and its impact on households' debt behavior. Based on the reviewed literature we will focus mainly on low financially literate households with an outstanding balance of non-mortgage or credit debt, whereas our underlying hypothesis is that households with a lower level of financial literacy are more likely to use high-cost credit and more likely to have an outstanding balance of non-mortgage or credit debt.

The paper is structured as follows. The second section contains reviewed previous literature and related theoretical background. The data and variables are described in the third section and the fourth section presents preliminary results from our descriptive analysis. Finally, section five concludes our findings and contains ideas for further research on this topic.

¹ Source.: Eurostat

2 Previous literature and theoretical background

Financial literacy by the most base definition is typically connected to a person's competency and the ability for managing money (David L. Remund, 2010). Moreover, financial literacy is the individual's ability to use knowledge, experiences, and skills of basic financial concepts, products, and services to appropriately manage personal financial resources in short-term decision-making and most importantly in long-term financial planning with the aim to achieve a lifetime of financial security and well-being (Hung et al., 2009). Although there is a number of definition of financial literacy in the academic literature, however, there is no standardized definition and measurement of financial literacy, which is commonly used in research studies. Therefore economists in research studies usually adjust the definition of financial literacy with the respect to chosen research areas and research questions. For example, researchers have also shown that there is a negative correlation between wealth, planning for retirement, and financial literacy. Individuals who are less financially knowledgeable are less likely to have thought about retirement and are less likely to know about interest compounding calculation and do not know about inflation and risk diversification, which is critical for an effective savings plan for retirement. (Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2017). Another study focuses on the effect of financial literacy and willingness to participate in the voluntary private pension scheme in Slovakia. The study indicates a strong positive association between an individual's financial literacy and propensity to save for retirement (Cupák et al., 2019). The different research papers focusing on Slovak household participation in voluntary retirement savings found that social factors like gender, marital status, and dependent children are not significant determinants influencing their participation in voluntary retirement savings. (Pastorakova et al., 2017). Therefore authors suggest that "*standard motivational tools used in countries with a long tradition of participation in voluntary retirement saving may not be effective in our conditions*"². Different directions of the literature is focusing on the impact of financial literacy and stock market participation and portfolio diversification (Van Rooij et al., 2011). This study examines on a sample of Dutch households the role of financial literacy on stock market participation. To better understand financial literacy they created questions that measured basic financial literacy related to the basic numerical ability, compound interest rate, and understanding of inflation. Questions to measure more advanced financial literacy were related to different financial instruments such as stocks, bonds, and mutual funds. The study found that only 23,8% of Dutch households own stock or mutual funds and households which display higher levels of "advanced financial literacy" are more likely to participate in the stock market and hold stocks or mutual funds. The mentioned studies have focused on the assets side of the household balance sheet. However, financial literacy should have a positive impact on individuals' ability to effectively manage and plan their personal finances including debt decisions and management. The recent development in household debt behavior in Slovakia has motivated us to look at

² Pastoráková, E., Brokešová, Z., Peliová, J.: (2017). Proaktívny prístup k tvorbe súkromných dôchodkových úspor: kľúčové determinant. *Politická Ekonomie*, 65(6), 709-727

the liability side of the household balance sheet and examine the effect of financial literacy on households' debt behavior.

Due to the rapid development of different debt-related financial instruments in recent years in line with the “democratization” of the banking sector, loans and regulations regarding consumer debt loads, have caused loans to become financial products easily available to many individuals in different financial situations. Slovakia was among the countries with the fastest increase in household indebtedness in Central and Eastern European (CEE). The driving behind such an increase in household indebtedness can be related to rising living standards due to a favorable macroeconomic environment, low-interest, and rising property prices. Besides macro-economic factors of rising household indebtedness, we have to consider micro-economic factors such as disposable income, amount of savings, expenditure, social status, age, education, family size, and the level of financial literacy. In this paper, we will focus on the impact of financial literacy on household debt behavior.

2.1 Financial literacy and debt behavior

The previous section focused on financial literacy linked with individual and household assets. In this section, the focus will be concentrated on the studies examining the effect of financial literacy on individual and household debt and borrowing. The low level of financial literacy may negatively contribute to a level of household indebtedness. The study, (Lusardi & Tufalo, 2015) found that debt literacy (consisting of questions regarding interest compounding, working of credit card debt, and ability to choose the most advantageous means of payment) was particularly low among women, the elderly, minorities, and those who are divorced. The same results concerning the relationship between credit card behavior, gender, and financial literacy were confirmed by (Mottola, 2013). The study revealed that women with a lower level of financial literacy were more likely to have costly credit card behaviors like paying late or over-the-limit fees and higher interest rates on their credit cards than men with lower financial literacy. Moreover, a study (Lusardi & Tufalo, 2015) shows, that only one-third of respondents in the population can apply concepts of interest rate compounding in everyday situations or understand how credit cards work. They used cluster analysis to create four clusters with respect to their demographic characteristics and debt literacy. Those who had a lower level of debt literacy and reported lower self-assessed financial literacy levels as well were much more likely to have reported difficulties with their debt burden, were unable to assess their debt position and were characterized by high-cost borrowing. Moreover, less financially literate individuals pay a larger fraction of fees and finance charges on credit cards compared to the more financially literate individuals, due to lack of knowledge. Allgood & Walstad, 2012 investigated the effects of actual and perceived financial literacy on a wide range of financial behaviors. One of the investigated financial topics was related to the usage of credit cards and paying credit card bills. The results showed that respondents with high actual and perceived financial literacy are 16% less likely not to always pay their credit card balance in full each month than respondents with low actual and perceived financial literacy. Furthermore, respondents with high actual and perceived financial literacy were 13% less likely to carry a credit card balance, 11% less likely to be charged a late

fee for late payment, and 6% less likely to be charged an over-the-limit fee for exceeding their credit limit. From these results, we can derive the importance of financial literacy in the relation to individuals' level of indebtedness. Furthermore, individuals who engage in the consumer credit market display on average poorer levels of financial literacy and own consumer credit portfolios with higher costs in comparison with individuals who are not engaged in this market. (Disney & Gathergood, 2012). Moreover, households with a lower level of financial literacy are associated with the use of high-cost credit such as store cards, mail order catalogs, customs union loans, and payday loans, have lower net worth, and are more likely to report problems with paying their debts (Disney & Gathergood, 2011).

While most of the studies which analyzed the link between financial literacy and indebtedness were focusing on North America (U.S) and West Europe (UK, Sweden) region. To the best of our knowledge, there is no study concerning the relationship between financial literacy and household debt behavior for CEE countries using microdata. Households and individuals in the CEE region had different economic, social, and political development compared to households in more developed western countries. Therefore, the aim of this study is to investigate the overall level of objective financial literacy among Slovak households. First, according to selected relevant socio-economic and demographic characteristics and subsequently, examine the relationship between the level of financial literacy and household debt behavior. For this purpose, we use data from Household Finance and Consumption Survey collected in 2017.

3 Data & Methodology

We used the latest publicly available wave of Slovak Household Finance and Consumption Survey (HFCS) data collected by the National Bank of Slovakia in 2017. HFCS data contains information regarding households' financial situation and their balance sheets such as households' assets, liabilities, income, and expenditures. Moreover, the HFCS data contains detailed information regarding individual household demographic characteristics, gender, education, employment status, and marital status. The HFCS database is a probability sample of households, meaning that there is always a weight connected to each sampled household. Therefore it is necessary during the computation of different statistics outcomes to take into account the final sample weights, which confirms the representativeness of the sample at the country level. The final sample of the Slovak HFCS data from 2017 consists of 2178 households with 10 895 observations. Questions regarding financial literacy were answered only by the reference persons of households. Even though we can only evaluate the financial literacy of the reference persons, we consider their answers as the answer of the households, as we assume that those individuals were the most competent member of the household to answer questions related to financial literacy.

To analyze the relationship between the ownership of outstanding balance of non-mortgage or credit debt and the level of financial literacy and other socioeconomic variables we used the descriptive statistic method cross-tabulation. First, we focused on the overall portion of households with or without an outstanding balance of non-mortgage or credit debt and their level of financial literacy, demographic and

socioeconomic characteristics. Subsequently, we focused specifically on the characteristics of households that exhibited low financial literacy with an outstanding balance of non-mortgage or credit debt.

To predict the influence of financial literacy and other selected control variables on the outstanding balance of non-mortgage and credit debt we created a dichotomous dependent variable. Our dependent binary variable reaches the value 1 in the case when a household has an outstanding balance of non-mortgage or credit debt and 0 otherwise. In the proposed logistic regression model the dependent binary variable is the probability of having an outstanding balance of non-mortgage or credit debt, while we applied several categorical variables as independent variables.

The baseline model in this study is given as follows:

$$P(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 Fin.lit_1 + \beta_2 Gen.2 + \beta_3 Age_3 + \beta_4 QInc_4 + \beta_5 Doabletsave_5 + \beta_6 docredit_6 + \epsilon_i)}} \quad (1)$$

For the interpretation of parameter estimates after logistic regression, we used average marginal effects. Marginal effects refer to the impact of independent variables on a dependent variable as a discrete change from the from the baseline level.

3.1 Financial literacy and debt behavior

According to the literature, we found that authors are distinguish between objective (actual) and subjective (perceived) financial literacy. The subjective (perceived) financial literacy is measured with the help of self-assessment of the level of financial literacy by individuals mainly across the different ranges of the Likert scale (Allgood & Walstad, 2012). The objective financial literacy is measured by the set of questions concerning financial literacy and is based on a number of correct and incorrect answers to test questions. The first who tried to measure the objective financial literacy of the US population was Lusardi and Mitchell (2006) who created a module that contained three questions “Big Three” regarding financial literacy for the 2004 US Health and Retirement Study (HRS). These questions were formulated with the aim to test basic financial knowledge associated with the working of interest compounding, the effects of inflation, and risk diversification. However, some studies wanted to provide a more comprehensive view of financial literacy in connection with specific areas such as retirement savings, stock market participation, and debt management. Therefore they have adjusted the questions related to financial literacy in line with the examined topic. With these adjustments, they were able to specifically measure the impact of the level of debt literacy on indebtedness (Lusardi & Tufalo, 2015). Others created questions regarding financial literacy with different difficulties to examine the possible effect on stock market participation (Van Rooij et al., 2011).

The Slovak HFCS data 2017 contains four questions regarding financial literacy in order to discover the ability of reference persons (households) to understand the basic concepts of personal finance including interest rates, inflation, the riskiness of financial products, and portfolio diversification. The difficulty level of those questions increased

gradually. In order to create our financial literacy index, we measured financial literacy as a sum of binary variables. If the reference person answered the financial literacy question correctly the value is 1 and 0 otherwise. Thus, for each household, the financial literacy index ranges between 0 and 4. The average value of the number of correct answers across households was 2.38 which means that most of the households were able to correctly answer more than 2 questions out of 4 questions related to financial literacy. However, only 12% of households were able to correctly answer all four financial literacy questions which suggests low financial literacy among Slovak households in comparison with other countries. While more than 50% of respondents in Germany and 36% (Koenen & Lusardi, 2011; Kalmi & Ruuskanen 2017) of respondents in Finland were able to correctly answer all four similar financial literacy questions. The distribution of answers across different individual characteristics was the following. The lowest financial literacy we could observe among households with low income, unemployed status and older age categories. On the other hand, the highest financial literacy was observed among middle age, high-income households, having an employment or self-employment status. In the following section, we will take a closer look at the characteristics of households with low financial literacy with an outstanding balance of non-mortgage or credit debt. This part includes a descriptive analysis of the percentage of households with or without an outstanding balance of non-mortgage or credit debt in relation to the relevant characteristics.

4 Results

After we examined households' overall financial literacy level and socio-demographic characteristics, we will focus on their debt behavior. We will mainly focus on the portion of households with an outstanding balance of non-mortgage or credit debt. We will look closely at households with low financial literacy with an outstanding balance of non-mortgage or credit debt. First, we created a binary variable to distinguish between households with or without an outstanding balance of non-mortgage or credit debt. Table 2 shows us that only 18% of households hold an outstanding balance of non-mortgage or credit debt. Further, we find that those who have outstanding balance of non-mortgage or credit debt balances are more likely to be households who exhibit lower levels of financial literacy. Approximately 60% of those households could answer no more than two financial literacy questions correctly. The results from cross-tabulation suggest that a higher share of households with a lower level of financial literacy are using debt instruments associated with higher costs. In terms of socio-demographic characteristics, the higher share of households with an outstanding balance of non-mortgage or credit debt are employed, young, or middle age males with secondary education. Further, we examine in more detail the category of households with low financial literacy (no more than two correct answers out of four) with an outstanding balance of non-mortgage or credit debt.

From our survey analysis, we may consider that 53% of households with an outstanding balance of non-mortgage or credit debt have low financial literacy. However, almost 80% of the low financially literate households were able to answer 2 questions concerning financial literacy correctly. The age structure of households suggests that

the share of low-literate households with outstanding balance non-mortgage or credit debt is declining with age. This can be explained by Modigliani and Brumberg's life-cycle hypothesis, where younger households report higher expenditure and often consumption financed through debt by the assumption of increasing incomes over the course of their lifetime and subsequent gradual reduction of debt financing among older households. Regarding the working status of households, we can observe a higher share of economically active individuals with an outstanding balance of non-mortgage or credit debt. Meanwhile, the most often achieved education is secondary education in this category. Households that perform lower levels of financial literacy tend to have a lower average value of income and assets than households with higher levels of financial literacy. Although households with low financial literacy with an outstanding balance of non-mortgage or credit debt have higher median income value than households without an outstanding balance of non-mortgage or credit debt. On the other hand, we can observe a higher share of households with an outstanding balance of non-mortgage or credit debt are not able to save from their monthly income and are more likely to be credit-constrained households. These observations may have two implications. First, is that these households may have self-control problems and make disproportionate use of quick-access credit products which facilitate impulse-driven purchases and leads to higher indebtedness. The second implication is that these households are more financially vulnerable in case of the occurrence of internal or external adverse events.

Table 1 presents the results of the logistic regression. The dependent variable is the probability of households having an outstanding balance of non-mortgage or credit debt. Compare to a cross-tabulation analysis, this approach is more appropriate for differentiating the characteristics of households with and without an outstanding balance of non-mortgage or credit debt. Especially, it allows us to better understand the variables influencing the characteristics of households with an outstanding balance of non-mortgage or credit debt. We calculated the average marginal effects from the logistic regression analysis, which are useful for the interpretation of parameter estimates after the nonlinear regression model. The first column in Table 1 contains the odds ratio and the second column contains marginal effects interpreted as a discrete change from the baseline level.

Marginal effects of low financial literacy (according to our definition) did not have a statistically significant effect on the probability of having an outstanding balance of non-mortgage or credit debt. The result of the regression did not confirm our hypothesis that households with a lower level of financial literacy are more likely to use high-cost credit and more likely to have an outstanding balance of non-mortgage or credit debt. This could be attributed to several factors, the usage of non-mortgage or credit debt is not as common in Slovakia as in western countries with more developed financial markets and higher financial literacy among citizens. We may assume that households who are using such debt instruments in Slovakia are households with higher income, which allows them to be more likely to obtain access to these debt instruments. This assumption is confirmed by the data when the marginal effect of the Income quintiles independent variable was statistically significant. Each additional income quintile (higher household income) is associated on average with a 3 percentage point increase in the probability of having an outstanding balance of non-mortgage or credit debt. In

terms of age, on average each additional age category (older household) is associated with a 5 percentage point decrease in the probability of having outstanding non-mortgage or credit debt. Further, households with outstanding non-mortgage or credit debt are on average 15 percentage points less likely to be able to save and 12 percentage points more likely to be credit constrained. Thus, we may consider households with outstanding non-mortgage or credit debt to be more financially vulnerable, as this behavior may significantly decrease their ability to face unexpected internal or external adverse shocks.

Table 1: Logistic regression results for the probability of having an outstanding balance of non-mortgage or credit debt

VARIABLES	(1) Odds ratio	(2) Marginal effects
Non-Mortgage or Credit debt dummy		
Low Financial Literacy	0.866 (0.129)	-0.02 (0.024)
Gender (Female)	1.435** (0.230)	0.06** (0.025)
Age categories	0.711*** (0.0374)	-0.05*** (0.008)
Income quintiles	1.202*** (0.0665)	0.03*** (0.009)
Do able to save	0.388*** (0.0715)	-0.15*** (0.028)
Credit constrained	2.094*** (0.509)	0.12*** (0.038)
Constant	0.562** (0.163)	
Observations	10,510	10,510

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Source: Own calculations based on the Household Finance and Consumption Survey 2017

5 Conclusion

This study has examined the relationship between the level of financial literacy and outstanding non-mortgage or credit debt using Slovak HFCS 2017 survey data. Slovak households were among the households with the fastest increase in household indebtedness in the Central and Eastern European (CEE) region. Such an increase in household indebtedness was supported by a favorable macroeconomic development combined with historically low-interest rates. More affordable loans may lead to excessive indebtedness which represents an important problem that may threaten the financial well-being of many individuals and households. Therefore, understanding the factors that influence individual or household debt behavior is crucial for regulators, policymakers, and financial institutions. In this study, we focused on financial literacy specifically on households with a low level of financial literacy as one of the factors that may influence their debt behavior on the credit market.

The preliminary finding of this research suggests that households present different debt behavior with respect to varying levels of financial literacy. The cross-tabulation analysis showed that only 18% of households have an outstanding balance of non-mortgage or credit debt. Subsequently, we discovered that a higher share of households with a lower level of financial literacy (according to our definition) has an outstanding balance of non-mortgage or credit debt. Therefore, we took a closer look at the characteristics of a specific group of individuals who displayed low financial literacy with an outstanding balance of non-mortgage or credit debt. The socio-economic characteristics suggest that these households are most likely to be employed with the highest achieved secondary education. However, from our regression analysis, we were not able to prove our hypothesis that households with a lower level of financial literacy display a higher probability of having an outstanding balance of non-mortgage or credit debt, as the marginal effects of low financial literacy independent variable did not have a statistically significant effect. This could be attributed to the factor, that the majority of Slovak households are generally not using non-mortgage or credit debt. Those households who decided to have an outstanding balance of non-mortgage or credit debt were not affected by their level of financial literacy. Although, we found a statistically significant association between income quintiles and age categories on the probability of having an outstanding balance of on non-mortgage or credit debt. Younger households with higher income display a higher probability of having an outstanding balance of non-mortgage or credit debt, which is in line with the life-cycle hypothesis, which describes the financial behavior of agents over their lifetime.

Furthermore, we discovered that households with an outstanding balance of non-mortgage or credit debt are on average 15 percentage points less likely to be able to save and 12 percentage points more likely to be credit constrained than households without an outstanding balance of non-mortgage or credit debt. Households with these characteristics may present a self-control problem connected with impulsive purchasing behavior by using quick access but higher-cost credit. We may consider those households more financially vulnerable when they are hit by unexpected internal or external negative shocks and carry higher debt loads combined with a lower ability to save, which might lead to credit constraints and the inability to borrow to overcome unexpected adverse shocks.

In further research on this topic, we will more closely examine the impact of financial literacy on the level of indebtedness among younger households by calculating the different debt indicators as debt to income ratio (DTI), debt service to income ratio (DSTI), and loan to value ratio (LTV) and by regression model examine the relationships and estimate the probability of how the level of financial literacy influence the households level of indebtedness.

Acknowledgement

This paper was supported by the University of Economics in Bratislava under the research project called Projekt mladých učiteľov, vedeckých pracovníkov a doktorandov No. I-22-112-00 entitled „Rast podpory populistických radikálnych pravicových strán: Vplyv efektu susedstva na volebné preferencie jednotlivca“.

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Appendix

Table 2. Individuals with/without an outstanding balance of non-mortgage or credit debt & low financial literate individuals with an outstanding balance non-mortgage or credit debt

	Has an outstanding balance of non-mortgage or credit debt	Don't have an outstanding balance non-mortgage or credit debt	Low financial literate individuals with an outstanding balance of non-mortgage or credit debt
Overall	0.18	0.82	0.53
Financial Literacy			
0 or 1 correct	0.17	0.16	0.29
2 correct	0.42	0.45	0.71
3 correct	0.29	0.28	NA
4 correct	0.12	0.11	NA
Gender			
Male	0.64	0.60	0.56
Female	0.36	0.40	0.44
Age group			
Under 35	0.10	0.05	0.16
35-44	0.24	0.11	0.30
45-54	0.26	0.15	0.20
55-64	0.26	0.27	0.22
65- and over	0.14	0.42	0.12
Working Status			
Employee	0.53	0.33	0.55
Self-employed	0.11	0.12	0.12
Unemployed	0.11	0.05	0.10
Retired	0.25	0.50	0.23
Education			
Secondary	0.78	0.79	0.80
Tertiary	0.22	0.21	0.20
Income			
Median	17.424€	14.357€	15.940€
Assets			
Median	60.100€	69.000€	52.000€
Able to save			
No	0.80	0.64	0.85
Yes	0.20	0.36	0.15
Credit constrained			
No	0.88	0.95	0.84
Yes	0.12	0.05	0.16

Source: Own calculations based on the Household Finance and Consumption Survey 2017