The role of risk attitudes and expectations in household borrowing: evidence from Estonia

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ABSTRACT
This study investigates the role of risk attitudes and financial expectations in households’ borrowing behaviour. The central research question is whether risk aversion and optimistic expectations provide additional information beyond the main economic and sociodemographic characteristics in predicting applications for credit and the size of debt. The paper uses microdata from the Estonian Household Finance and Consumption Survey (HFCS) and estimates probit and Heckman models. My analysis shows that risk-tolerant households apply for loans more often than risk-averse households do and that their loans are larger. The variables describing the household’s expectations for its future financial situation are on their own related to the decision to apply for a loan, but they do not contain any relevant additional information beyond the main economic and sociodemographic characteristics of the household.

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1. Introduction
This paper studies the relations between risk attitudes and financial expectations and different aspects of borrowing by households in Estonia. The aim of the study is to assess whether risk aversion and optimistic expectations of households about their real income and house prices provide additional information beyond that given by the main economic and sociodemographic characteristics in predicting borrowing behaviour. Data from the 2013 and 2017 waves of the Estonian Household Finance and Consumption Survey are employed for the analysis.

It is important to assess these relationships since over-optimism and willingness to take on too much risk may lead to excessive borrowing, which could entail a risk to the households themselves and to overall financial stability. The knowledge gained through the study could be of use in predicting borrowing behaviour and credit growth, and this could be of interest for financial stability analysis.

The theoretical foundations of this study are based on the Life-cycle/Permanent Income Hypothesis (Modigliani and Brumberg (1954), Friedman (1957)), which suggests
that consumers aim to hold their consumption levels steady over time at the level of their permanent income by borrowing and saving. Consumption smoothing provides a link between financial expectations and borrowing, while risk averseness affects the shape of the utility function. Brown et al. (2005) describe two versions of the life-cycle model, showing there to be a positive relationship between optimistic expectations for future income and the size of a loan, and Brown et al. (2013) use a life-cycle model to show theoretically how risk aversion impacts the size of debt. The models by Brown et al. (2005) and Brown et al. (2013) provide the theoretical motivation for this study.

My study relates to a large strand of literature studying the determinants of household debt. Data from the Eurosystem Household Finance and Consumption Survey have been used by Bover et al. (2014) to investigate different measures of debt, and by Du Caju et al. (2016) to study how different household-level characteristics affect the likelihood of a household being over-indebted. The financial vulnerability of euro area households has been analysed using the Household Finance and Consumption Survey data by Ampudia et al. (2016), while Terraneo (2018) employs HFCS data to analyse the financial fragility of households in Southern Europe.

In the literature discussing the relations between households’ expectations and their economic behaviour, relatively few studies have focused on household borrowing. My study is similar in the object of its research and its use of microdata to the studies of Brown et al. (2005) and Brown et al. (2008), but there are some additional aspects of borrowing that are explored. Brown et al. (2005) and Brown et al. (2008) find that optimistic financial expectations are positively related to the size of non-mortgage debt and mortgage debt of households, respectively.

The risk preferences of households have been highlighted in several studies as a factor related to household debt. The importance of risk attitudes in explaining household indebtedness in Southern European countries has been pointed out using data from the Household Finance and Consumption Survey by Massó and Abalde (2020). My study also shares similarities with the study by Brown et al. (2013) in that it analyses mortgage loans and non-mortgage loans separately. Brown et al. (2013) show from US data that aversion to risk is negatively related to the level of debt held by the household.

Compared to previous studies, my study contributes to a greater understanding of household financial behaviour by looking at more aspects of the borrowing of households in relation to their expectations and risk attitudes, such as the decision of whether to apply for a loan or not, the size of debt they decide to take on, and the resulting debt service burden. My study also contributes by applying models that use the panel component in the dataset and entail a logic that the values of the explanatory variables are from the previous survey wave, compared to the dependent variables. The rationale behind this is the assumption that the situation for the loan liabilities of households in 2017 survey was affected by the decisions taken previously, which are assumed to be affected by the past values of different explanatory variables.

There are relatively few studies on how attitudes to financial risk have formed in Eastern European countries and the Baltic states (e.g. Dohmen et al. (2016), Pońsko (2018)) and how these affect the financial behaviour of households. Estonia’s case is interesting since the credit and financial markets in Estonia are relatively young and households have had relatively little experience of financial risk-taking. Households borrowed actively before the global financial crisis and have also done so since a few years after
the global financial crisis. The investment opportunities for households and the interest in investing have also broadened since then. This has made questions about financial risk-taking increasingly topical.

My analysis shows that risk-tolerant households apply for loans more often than risk-averse households do, and their loans are larger even when other characteristics of households are controlled for. For mortgage loans, risk aversion is associated with a smaller probability of having a loan, whereas for non-mortgage loans, risk aversion is negatively related to the size of the debt. Households’ expectations about their future financial situation do not contain any relevant additional information for predicting the applying for a loan and the size of debt beyond that given by the main economic and sociodemographic characteristics. The study also shows that risk aversion is related to several characteristics of the household, such as income, reference person’s education, age, employment status, gender and the perceived ability to get financial assistance from friends or relatives.

The paper proceeds as follows. Section 2 describes the theoretical background of the study and reviews the related literature. Section 3 gives an overview of the data used in this study. Section 4 describes the methods applied. Section 5 presents the results: section 5.1 on the factors of optimistic expectations and risk aversion, section 5.2 on the factors of borrowing decisions and section 5.3 on the factors deciding the size of debt and the debt burden of households. Section 6 concludes.

2. Literature review

One of the main concepts that can explain the relations between the expectations households have for their future financial situation and their borrowing is the Life-cycle/Permanent Income Hypothesis (Modigliani and Brumberg (1954), Friedman (1957)). The Life-cycle/Permanent Income Hypothesis suggests that consumers aim to hold their consumption levels steady over time at the level of their permanent income by borrowing and saving. Consumption smoothing creates a positive relationship between optimistic financial expectations and borrowing. Important aspects that should be considered when applying the concept of the Life-cycle/Permanent Income Hypothesis are precautionary saving (Leland (1968)) and borrowing constraints (Zeldes (1989)). Precautionary saving implies that uncertainty about future income reduces current consumption and increases saving. Borrowing constraints can reduce consumption directly if they are currently binding, or indirectly through the possibility of borrowing constraints becoming binding in the future. The life-cycle model also provides an important theoretical background for studying how risk aversion affects borrowing, since risk averseness is reflected in the utility function of the household.

Brown et al. (2005) demonstrate based on a life-cycle model that there is a positive relationship between optimistic expectations for future income and the size of a loan, and Brown et al. (2013) use a life-cycle model to show theoretically how risk aversion impacts the size of the debt. Brown et al. (2005) model loan sizes as the outcome of simultaneous decisions by borrowers and lenders, while expectations enter the model through the probabilities of occurrence of a high income state and a low state. The expectations are the same for borrowers and lenders. In the model of Brown et al. (2013), the relationship between risk aversion and the optimally chosen level of debt is found by
solving the individual's lifetime expected utility maximisation problem, given the budget constraint.

Quite a lot of studies have investigated the determinants of household debt and the debt burden. Some authors have used macro-level aggregate data, while others have used individual-level or household-level microdata. Microdata from the Eurosystem Household Finance and Consumption Survey have been used by Bover et al. (2014), one of whose several research questions analyses how different household-level characteristics affect different measures of debt, and by Du Caju et al. (2016) to analyse how these affect the likelihood of the household being over-indebted. HFCS data have been employed for analysing the financial fragility of households by Ampudia et al. (2016) and Terraneo (2018). These studies include several euro area countries. Although the focus in these studies is somewhat different than in this paper, they provide important input for the choice of the control variables in my models.

In Bover et al. (2014), for example, among the dependent variables are the dummies of whether the household has mortgage debt or non-mortgage debt and the sizes of mortgage and non-mortgage debt. They find that important factors related to the incidence and size of debt of a household are age, income and education, although age, income and education profiles of borrowers differ to a great extent in different euro area countries. Du Caju et al. (2016) investigate how the labour market status and other household demographic and socioeconomic characteristics affect the likelihood of over-indebtedness (measured by different measures). Their results suggest that the household’s reference person being unemployed significantly raises the likelihood of over-indebtedness. Ampudia et al. (2016) and Terraneo (2018) also analyse different measures of over-indebtedness and stress that the debt burden and risk of default of households are markedly different in countries under observation in their studies.

Risk preference has been observed as a factor affecting household debt in several studies, including Brown et al. (2013) and Massó and Abalde (2020), which are the closest to my study. Brown et al. (2013) find from US data that risk aversion is negatively related to the level of debt of the household. Like the study by Brown et al. (2013), my study analyses the effects of risk attitudes on both the total debt of the household and the mortgage debt and non-mortgage debt separately. The importance of risk attitudes in explaining household indebtedness in Southern European countries has been investigated from the HFCS data by Massó and Abalde (2020).

Relatively few earlier studies have focused on the relations between the expectations of households about their future financial situation and their borrowing decisions. Bialowolski (2019) studies how economic sentiment influences the saving and borrowing behaviour of households in Poland. One of his results is that consumer confidence affects the acquisition of debt for durables and mortgages positively, but has a negative impact on the acquisition of debt for unexpected expenditures or consumption purposes. Klopopcka (2017) finds from data for Poland that indexes of consumer confidence have predictive power on their own and are informative for future household saving and borrowing rates alongside the information contained in economic fundamentals. Hyytinen and Putkuri (2018) analyse the forecast errors that households make and how these relate to the borrowing behaviour of households and their over-indebtedness. They find that the households with the largest optimistic forecast errors have larger debt-to-income ratios and are more likely to perceive difficulties in coping with their liabilities.
Brown et al. (2005) and Brown et al. (2008) find from British microdata that optimistic expectations of households for their financial situation are positively related to the size of their debt.

3. Data

This study employs microdata from two waves of the Estonian Household Finance and Consumption Survey carried out in 2013 and 2017. The Household Finance and Consumption Survey is a joint project by the European Central Bank and national central banks and statistical institutes of the euro area countries, Croatia, Hungary and Poland, and the surveys are conducted in a standardised form in all these states. The Household Finance and Consumption Survey collects information on the assets, liabilities, incomes, and consumption of households, and also on the expectations and opinions of households and on demographic variables for household members (Eesti Pank, 2019). The results of the Estonian Household Finance and Consumption Survey are provided in Meriküll and Rõõm (2016, 2019).

The models describing the factors of optimistic expectations and risk aversion in this paper include all the households that participated in the 2017 survey for which the values for relevant dependent and independent variables are available. The models describing the factors of debt-related variables are based on the households that participated in both the 2013 and 2017 surveys and where the age of the Canberra definition reference person is between 20 and 64 years in the 2013 survey. All the households that participated in the 2013 survey were contacted and invited to participate in the 2017 survey. The 2017 survey also included new split households, where a member of a household that was interviewed in 2013 had moved into a separate household, and new households drawn randomly from the Population Register (Eesti Pank, 2019).

Number of observations in the following tables denotes the number of households. Overview of the variables used in this paper is provided in Table A1 in Appendix.

The means and standard deviations of the variables are presented in Table 1. The statistics are calculated for observations used in each model of this paper separately. Since presenting each model’s statistics separately would be lengthy, Table 1 shows ranges of means and standard deviations of the variables included in the models in 1) section 5.1, 2) section 5.2, and 3) section 5.3.

The HFCS data are multiply-imputed data and the estimations of the models are carried out in the multiple imputation (MI) regime in Stata. Imputed variables in the HFCS dataset include components of net assets, income and consumption; details of loans such as the interest rate, the year the loan was taken, the maturity of the loan, and its initial value and current value; indicators for credit constraints; and some components of pension plans (Eesti Pank, 2019).

4. Method

Probit and Heckman models are estimated using the microdata dataset. Probit models are estimated to investigate the factors that are related to optimistic expectations and risk averseness of households, namely whether 1) the household expects that its income would grow more than prices over the next year, 2) the household expects the price of
the residence the household is living in to increase by more than 5% over the next 12 months, and 3) the household is not willing to take any financial risk. Probit models are also estimated to study borrowing measures, namely the factors of i) whether the household had applied for credit within the previous three years, ii) whether the household received as much credit as it applied for, and iii) whether the household did not apply for credit because of a perceived credit constraint. Probit (or logit) models are commonly used to study binary dependent variables. The logit model, which is a relatively similar approach to the probit model employed in this study, has been used in, for example, Pattnarint and Cosma (2012) to ascertain the relations between attitudes towards credit and

| Variable | Models in section 5.1 | Models in section 5.2 | Models in section 5.3 |
|----------|-----------------------|-----------------------|-----------------------|
|          | Mean (range)          | Standard deviation (range) | Mean (range)          | Standard deviation (range) | Mean (range)          | Standard deviation (range) |
| APPL     | 0.29–0.31             | 0.452–0.461            | 0.62                 | 0.487                  |
| REC      | 0.89                  | 0.318                 |                       |                       |
| PC       | 0.07                  | 0.257                 |                       |                       |
| HD       | 0.50–0.68             | 0.469–0.500            | 0.53                 | 0.499                  |
| HMD      | 0.07                  | 0.257                 |                       |                       |
| NMDS     | 22 587–40 649         |                       | 22 587–40 649         |                       |
| INC1     | 0.20                  | 0.397–0.399            | 0.26–0.37             | 0.436–0.484            |
| INC2     | 0.09–0.14             | 0.291–0.351            | 0.26–0.38             | 0.436–0.485            |
| INC3     | 0.20–0.21             | 0.397–0.404            | 0.36–0.43             | 0.481–0.495            |
| INC4     | 0.20–0.25             | 0.25                  | 0.20–0.38             | 0.403–0.486            |
| INC5     | 0.20–0.37             | 0.453–0.484            | 0.14–0.38             | 0.346–0.486            |
| AGE<35   | 0.22                  | 0.414–0.415            | 0.79–0.87             | 0.332–0.409            |
| AGE>=54  | 0.33                  | 0.469                 | 0.37                 | 0.483–0.484            |
| EDU1     | 0.10                  | 0.498                 | 0.11–0.13             | 0.317–0.341            |
| EDU2     | 0.09–0.11             | 0.282–0.314            | 0.07–0.12             | 0.255–0.324            |
| EDU3     | 0.20–0.21             | 0.397–0.404            | 0.49–0.52             | 0.500–0.501            |
| MALE     | 0.25                  | 0.435                 | 0.07–0.12             | 0.255–0.324            |
| EMPL     | 0.20–0.27             | 0.446–0.463            | 0.49–0.52             | 0.500–0.501            |
| MAR      | 0.39–0.46             | 0.487–0.500            | 0.36–0.44             | 0.480–0.497            |
| HS       | 2.20–2.21             | 1.299                 | 2.67                 | 1.408                  |
| FA       | 0.30                  | 0.457                 | 0.76–0.85             | 0.358–0.428            |

Note. Figures are calculated using survey weights of households (variable HW0010 in the HFCS User Database). Sources: Estonian Household Finance and Consumption Survey; author’s calculations and compilation.
the use of consumer credit. The logit model has also been applied in Bover et al. (2014) to model the probability of holding debt, and in Du Caju et al. (2016) to model the probabilities of different measures of indebtedness. The ordered logit approach has been used in Colasante and Riccetti (2021) to model the factors of risk attitudes.

The Heckman model is estimated to ascertain the factors of the size of the outstanding liabilities of households. The selection equation estimates the probability of the household having debt and the outcome equation estimates the size of the debt, conditional on borrowing. The rationale behind using the Heckman model is the assumption that the group of households that have a loan liability is different from the group of households that do not have a loan liability in certain characteristics, meaning that the sample of households that have debt is not randomly drawn from the population. The Heckman model is then used to correct for the non-random sampling. The actual estimation of the Heckman model supports this assumption, since the inverse of the Mills’ ratio that is included in the outcome equation turns out to be statistically significant.

The variables of the exclusion restriction that are included in the Heckman selection equation but not in the outcome equation are a dummy that takes the value 1 if the reference person of the household is employed, and a variable indicating the size of the household. Exclusion restrictions are selected following the intuition that employment status and household size play a significant role in the probability of a household applying for and having a loan above all, while they are of lesser importance for explaining the size of the debt. Before the exclusion restrictions were selected, correlations between the dependent variable of the selection equation and different control variables and correlations between the dependent variable of the outcome equation and different control variables were investigated.

The control variables in the models were selected on the basis of the previous theoretical and empirical literature and the analysis of correlations done for this study. Bover et al. (2014), for example, point out that important factors of debt holdings of households in the euro area are the age, income and education level of household members. My analysis of correlations shows that among these three variables, age is most strongly related to the dependent variables under observation in my paper for Estonia.

The Heckman selection equation is as follows:

\[
\text{Probability}(HD_{2017i} = 1) = F(\alpha_0 + \alpha_1 RA_{2013i} + \alpha_2 EIP_{2013i} + \alpha_3 EHP_{2017i} + \sum_{k=1}^{K} \gamma_k x_{2013ik} + \sum_{s=1}^{2} \delta_s z_{2013is} + u_i)
\]

where \(HD_{2017i}, RA_{2013i}, EIP_{2013i}, \) and \(EHP_{2017i}\) denote the values of the variables ‘HD’, ‘RA’, ‘EIP’, and ‘EHP’ described in Table A1 in Appendix for household \(i\) in the 2017 or 2013 survey, \(x_{2013i1}, x_{2013i2}, \ldots, x_{2013ik}\) denote the control variables and \(z_{2013i1}, z_{2013i2}\) denote exclusion restrictions, and \(u_i\) denotes the error term. The control variables include age and education of the reference person of the household, income of the household and a dummy indicating whether the household owns its main residence. The parameters of the equation are \(\alpha_0, \alpha_1, \alpha_2, \alpha_3, \gamma_1, \gamma_2, \ldots, \gamma_k\) and \(\delta_1, \delta_2\). \(F(.)\) denotes the cumulative distribution function for a standard normally distributed random variable.
The Heckman outcome equation is:

\[
\ln(LS_{2017i}) = \beta_0 + \beta_1 RA_{2013i} + \beta_2 EIP_{2013i} + \beta_3 EHP_{2017i} + \sum_{k=1}^{K} \mu_k x_{2013ik} + \theta IMR_i + u_i
\]  

(2)

where \(LS_{2017i}\) is the outstanding balance of liabilities of household \(i\) in the 2017 survey and \(IMR_i\) denotes the inverse of the Mills’ ratio for household \(i\), which corrects for the selection in the outcome equation. The parameters of the equation are \(\beta_0, \beta_1, \beta_2, \beta_3, \mu_1, \mu_2, \ldots, \mu_k\) and \(\theta\).

The Heckman selection and outcome equations described above are estimated for the total debt, covering both mortgage and non-mortgage loans, and for mortgage loans and non-mortgage loans separately. The Heckman model is also used for modelling the debt service-to-income ratio of the household.

It should be noted that the models with the dependent variable for whether the household had applied for credit are estimated for the panel of households that participated in both the 2013 and 2017 HFCS. The values of the dependent variable of the models are taken from the 2017 HFCS, while the values of the explanatory variables are taken from the 2013 HFCS. The same applies for the models with the dependent variables for whether the household received credit and for whether the household did not apply for credit because of a perceived credit constraint, and also for the Heckman models estimated. The rationale behind this is the assumption that the situation for the loan liabilities of households in 2017 was affected by the decisions taken previously, which are assumed to be affected by the past values of different explanatory variables. The variable for house price expectation is only available in the 2017 survey and so this is used. In the probit models estimated with expectations and risk aversion as dependent variables, the values of both the dependent variables and the explanatory variables are taken from the 2017 HFCS and these models are estimated using the whole sample of the 2017 HFCS.

The models describing the factors of expectations and risk aversion are estimated so that the household member-level variables take the values of the interview reference person. The other models are estimated so that the household member-level variables take the values of the Canberra definition reference person. The interview reference person was in the large majority of cases the person who answered the household questionnaire, including the questions about the risk attitudes and expectations of the household. This means it may be informative to use the characteristics of this person to analyse the factors of those risk attitudes and expectations. The characteristics of the Canberra definition reference person may, however, provide more information for the household’s borrowing decisions. As a robustness check, the models are also estimated so that the household member-level variables take the values of the Canberra definition reference person for models describing the factors of risk aversion and expectations and of the interview reference person for the other models. Robustness checks were also carried out using different variables for risk attitudes and expectations. The main results of this paper are robust to changes in the choice of the reference person and the choice of the explanatory variables included in the models.
5. Results

5.1. Factors of optimistic expectations and risk aversion

Before the analysis of the relationships between expectations, risk attitudes and the borrowing-related variables is conducted, the factors related to these expectations and risk attitudes are clarified. Table 2 gives an indication of the main variables that are related to positive expectations and risk averseiness. Income, age, education, employment status, gender, and the perceived ability to get financial assistance from friends or relatives can be noted as particularly important factors.

In the 2017 survey, 73% of households were not willing to take any financial risk. Income, education, being employed, and perceiving the ability to get financial assistance from friends or relatives were positively related to and age negatively related to a willingness to take risk. The magnitude of the average marginal effect is largest for age. Households where the reference person is younger than 35 are 29.3 percentage points less likely to be risk averse than households where the reference person is more than 54 years old.

Table 2. Estimated probit models for predicting expectations and risk aversion.

| Income group (reference group: INC1) (2017) | Dependent variable: EIP (2017) | Dependent variable: EHP (2017) | Dependent variable: RA (2017) |
|------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| INC2 | -0.0140 (0.0252) | -0.0258 (0.0274) | -0.0269 (0.0405) |
| INC3 | 0.000174 (0.0269) | -0.0347 (0.0276) | -0.0546 (0.0396) |
| INC4 | 0.00853 (0.0283) | -0.0279 (0.0295) | -0.114*** (0.0425) |
| INC5 | 0.0147 (0.0295) | -0.0318 (0.0312) | -0.181*** (0.0468) |

| Age (reference group: AGE>54) (2017) | Dependent variable: EIP (2017) | Dependent variable: EHP (2017) | Dependent variable: RA (2017) |
|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| AGE<35 | 0.104*** (0.0200) | 0.0213 (0.0185) | -0.293*** (0.0346) |
| AGE35-54 | 0.0568*** (0.0155) | 0.0210 (0.0194) | -0.143*** (0.0266) |

| Education level (reference group: EDU1) (2017) | Dependent variable: EIP (2017) | Dependent variable: EHP (2017) | Dependent variable: RA (2017) |
|-----------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| EDU2 | 0.0114 (0.0151) | 0.000318 (0.0231) | -0.0909*** (0.0285) |
| EDU3 | 0.0289 (0.0201) | -0.0164 (0.0227) | -0.177*** (0.0326) |
| MALE (2017) | 0.0299*** (0.0127) | 0.0127 (0.0127) | -0.0387*** (0.0189) |
| EMPL (2017) | 0.00620 (0.0158) | 0.00501 (0.0173) | -0.0625** (0.0258) |
| MAR (2017) | -0.0139 (0.0124) | 0.00333 (0.0127) | 0.00959 (0.0211) |
| FA (2017) | 0.0525*** (0.0144) | 0.0275* (0.0157) | -0.117*** (0.0208) |
| HS (2017) | -0.000364 (0.00529) | 0.00209 (0.00542) | 0.00311 (0.00824) |
| Number of observations | 2,610 | 2,637 | 2,634 |
| Pseudo R² | 0.134 | 0.014 | 0.222 |

Notes. Average marginal effects of the variables. Standard errors in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively. Values of Pseudo R² are calculated for each implicate separately and the minimal values across implicates are reported in the table (a similar approach has been used in Kukk (2017)). Sources: Estonian Household Finance and Consumption Survey; author’s calculations.
The magnitude of the effect is also quite large for income and education. Households in the quintile with the highest income are about 18.1 percentage points less likely to be risk averse than households in the lowest income quintile. The probability of those with tertiary-level education being risk averse is 17.7 percentage points lower than the probability for those with less than upper-secondary education. The results also indicate that men are less risk averse than women, but that effect is relatively small next to the effects of age, income and education.

My results that income and education are negatively related to risk averseness are in line with previous studies (examples of these are provided in Van de Venter et al. (2012) and Tavor (2019)). Previous studies have also found a positive relationship between age and risk averseness, and have found that women are more risk averse than men are (examples of these are provided in Van de Venter et al. (2012) and Tavor (2019), while some examples for gender differences are also provided in Fisher and Yao (2017) for example). Banks et al. (2020) show that an increase in risk averseness at older ages can largely be explained by health changes and other life events, such as retirement, widowhood or marital change. Fisher and Yao (2017, p. 191) point out that ‘gender differences in financial risk tolerance are explained by gender differences in the individual determinants of financial risk tolerance, and that the disparity does not result from gender in and of itself’. Their study finds income uncertainty to be a variable that intermediates the effect of gender on financial risk tolerance.

As can be seen from Table 2, most of the main characteristics of a household are not significantly related to its expectations about its future financial situation. The household’s perceived ability to get financial assistance from friends or relatives seems to contribute to optimism in its expectations, though it is not impossible that optimism encourages the expectation that assistance is available from friends or relatives. It is notable that younger people and men may be more optimistic in their real income expectations, though the magnitude of the effect of gender is not very large.

**5.2. Factors of borrowing decisions of households**

This subsection focuses on the analysis of factors that affect the demand for and the supply of loans. Models (1) and (2) in Table 3, which include no control variables, show that optimistic expectations are statistically significantly and positively related to the decision of the household to apply for credit. The estimated average marginal effects are significant and positive for real income expectations as well as house price expectations. At the same time, model (3) shows that risk averse households are less likely to apply for credit. However, when control variables are added, the variables describing expectations become insignificant (model (4) in Table 3). It seems that expectations are on their own related to the decision to apply for a loan, but in this setting they do not contain any relevant additional information beyond the main economic and sociodemographic characteristics of the household. These results could be viewed in the context of the general state of the economy in Estonia in 2013–2017, which was a time of economic expansion. Ahmed and Cassou (2016, p. 86) point out that ‘during economic expansions, consumer confidence shocks likely reflect news, while during economic contractions, consumer confidence shocks are consistent with animal spirits’. It might in consequence be that the confidence indicators of households
Table 3. Estimated probit models for predicting households applying for credit, receiving credit and not applying for credit due to perceived credit constraints.

| Dependent variable: APPL (2017) | Dependent variable: REC (2017) | Dependent variable: PC (2017) |
|---------------------------------|---------------------------------|------------------------------|
| (1)                             | (2)                             | (3)                          |
| EIP (2013)                      | 0.0960*                         | 0.00728                      |
|                                 | (0.0511)                        | (0.0466)                     |
| EHP (2017)                      | 0.0868**                        | 0.0579                       |
|                                 | (0.0433)                        | (0.0552)                     |
| RA (2013)                       | −0.149***                       | −0.0573*                     |
|                                 | (0.0301)                        | (0.0331)                     |

Income group (reference group: INC1) (2013)

| INC2                            | −0.0174                         | 0.0198                       |
|                                 | (0.0661)                        | (0.134)                      |
| INC3                            | −0.0288                         | 0.0737                       |
|                                 | (0.0611)                        | (0.109)                      |
| INC4                            | −0.0364                         | 0.0421                       |
|                                 | (0.0595)                        | (0.119)                      |
| INC5                            | 0.0341                          | 0.166                        |
|                                 | (0.0629)                        | (0.106)                      |

Age (reference group: AGE50-64) (2013)

| AGE20-34                        | 0.221***                       | −0.0131 (0.0618)            |
|                                 | (0.0446)                        | (0.073)                      |
| AGE35-49                        | 0.123***                       | 0.0575                       |
|                                 | (0.0357)                        | (0.0585)                     |

Education level (reference group: EDU1) (2013)

| EDU2                            | −0.0706                         | 0.122*                      |
|                                 | (0.0497)                        | (0.0712)                     |
| EDU3                            | −0.0916*                        | 0.0841                      |
|                                 | (0.0519)                        | (0.0769)                     |
| EMPL (2013)                     | 0.113***                       | −0.0624                     |
|                                 | (0.0405)                        | (0.0439)                     |

Household type (reference group: HT1) (2013)

| HT2                             | −0.0226                         | −0.00742                    |
|                                 | (0.0434)                        | (0.0562)                     |
| HT3                             | −0.00582                        | −0.0324                     |
|                                 | (0.0369)                        | (0.0546)                     |
| HD (2013)                       | 0.132***                       | −0.0512                     |
|                                 | (0.0310)                        | (0.0416)                     |

Number of observations           | 1,318                           | 2,278                       |
|                                 | 1,321                           | 1,318                       |
| Pseudo R²                       | 0.003                           | 0.002                       |
|                                 | 0.019                           | 0.019                       |
|                                 | 0.094                           | 0.06                        |
|                                 | 1,318                           | 1,318                       |
|                                 | 0.038                           | 0.038                       |

Notes. Average marginal effects of the variables. Standard errors in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively. Values of Pseudo R² are calculated for each implicate separately and the minimal values across implices are reported in the table. Sources: Estonian Household Finance and Consumption Survey; author's calculations.

did not contain much of the animal spirits, which are states that cannot be explained by economic rationality.

In the 2017 survey, 31% of households had applied for credit within the previous three years. Model (4) in Table 3 shows the reluctance of the household to take any financial risk is, on average, related to the probability of the household applying for a loan being 5.7 percentage points lower. The magnitude of the effect is not very large, but still sizeable compared to several other control variables in the model.
In an alternative specification, which is otherwise similar to model (4) but where risk attitudes are measured by a dummy taking the value 1 if the household is willing to take substantial or above average financial risks, the variable for risk willingness turns out to be significant and has a positive and of larger magnitude effect than the effect of being risk averse. Households willing to take substantial or above average financial risks apply for a loan with about 9.2 percentage points higher probability, compared to other households. This indicates that being willing to take significant financial risks encourages applying for credit more than being risk averse discourages it.

Although risk averseness is related to a smaller probability of applying for a loan, it is statistically insignificant in predicting whether the loan application was satisfied, as shown in model (5) in Table 3. It is also irrelevant for the probability of not applying for credit because of a perceived credit constraint, as shown in model (6) in Table 3. Risk averseness is insignificant in models with these dependent variables even when other controls for household characteristics are not included.

### 5.3. Factors of the size of debt and debt burden of households

Tables 4–6 present the estimated Heckman models. Table 4 covers the total debt of the household, Table 5 presents mortgage debt and non-mortgage debt separately, and Table 6 shows the debt service burden. Table 4 shows that the reluctance of a household to take any financial risk is statistically significantly and negatively related to the size of household’s debt even when other main characteristics of the household and selection are controlled for. It is interesting that income is a statistically significant factor in predicting whether or not the household has debt, meaning it is important in the Heckman selection equation, but after the selection is controlled for, income is insignificantly related with the size of total debt in the Heckman outcome equation. Table 5 shows that income is still important for predicting the size of mortgage debt.

Table 5 shows that the estimated effects for mortgage loans and non-mortgage loans differ by some relevant aspects. For mortgage loans, risk aversion is negatively related to the probability of the household having a loan, as risk aversion is statistically significant in the Heckman selection equation, whereas for non-mortgage loans, risk aversion is negatively related to the size of the outstanding liabilities since risk aversion is statistically significant in the Heckman outcome equation. This result seems intuitively logical. Since a mortgage loan is a large liability for a long period of time, the decision on whether or not to take on such a liability depends on how risk averse the household is. Non-mortgage loans are usually smaller and have a shorter term, so the decision of whether to take on this type of liability is easier to take and less demanding of risk-tolerance. It is, however, risk-tolerant households that take larger non-mortgage loans. Interestingly, Brown et al. (2013) find based on data on US households a negative relationship between risk aversion and the level of debt for both mortgage and non-mortgage debt.

It is worth noting from Tables 4 and 5 that the magnitude of the effect that the risk aversion has on loan size is relatively large. The relatively large effect of risk attitudes on the level of debt is also pointed out by Brown et al. (2013). Tables 4 and 5 show that the outstanding balance of total liabilities is on average 73.6% smaller for households reluctant to take any financial risk and the balance of non-mortgage debt is 38.8% smaller ceteris paribus.
As can be seen from Tables 4–5, the variables on expectations are insignificant in predicting the sizes of debt. Brown et al. (2005) and Brown et al. (2008), however, find from British microdata that positive financial expectations are significantly and positively related to the sizes of non-mortgage debt and mortgage debt, respectively, and the effects of expectations are relatively large. There can be different reasons why my results are different, for example different macroeconomic or cultural context, or the way expectations are measured.

Table 6 presents the results of the Heckman model describing the factors of the debt service burden of the household. It shows that the expectations and risk aversion of the household are not significantly related to the household’s debt service-to-income ratio. In an alternative model specification, which is otherwise similar to that presented in Table 6, but where risk attitudes are measured by a dummy taking the value 1 if the household is willing to take substantial or above average financial risks, the variable for risk willingness turns out to be significant. Households willing to take substantial or above average financial risks have, on average, by about 3 percentage point higher debt service-to-income ratio.
A relevant conclusion that can be drawn from Table 6 is that risk aversion is not related to the level of the debt service burden of the household, but the willingness to take substantial or above average financial risks is related to a higher debt service burden. However, it should be noted here that the debt service-to-income ratio is not fully controlled by households themselves and may change over time through increases in interest rates or falls in incomes for example.

### 6. Conclusion

The results of this study highlight the importance of households’ risk attitudes in borrowing-related decisions. The analysis shows that risk-tolerant households apply for loans more often than risk-averse households do, and their loans are typically larger. Optimistic expectations in the household on its real income and its house price are on their own
positively related to the decision of the household to apply for credit, but they do not contain any relevant additional information beyond the household’s main economic and sociodemographic characteristics.

It is shown that the effect of risk aversion on debt size is quite large. The size of the total debt is, on average, by about 73.6% smaller for households unwilling to take on any financial risk, and the size of the non-mortgage debt is by about 38.8% smaller. Risk aversion is not related to the level of the debt service burden measured by the debt service-to-income ratio of the household, but the willingness to take substantial or above average financial risks is related to a 3 percentage point higher debt service-to-income ratio. All of these results are relevant for financial stability analysis, since if risk-tolerant households do not increase their debt service burden by too much more than risk-averse households do, the risks for households themselves and for the financial system are reduced. However, the absolute size of debt, which my analysis shows to be related to risk averseness, is relevant for the extent of the possible problems that households and the financial system could face if the incomes of households were to fall or interest rates to rise, and loan repayment difficulties were then to

| Table 6. Estimated Heckman model for predicting the debt service-to-income ratio. |
|---------------------------------|-----------------|-----------------|
|                                  | Selection equation: | Outcome equation: |
|                                  | HD (2017)         | DSTI (2017)      |
| EIP (2013)                       | 0.0426 (0.0491)   | −0.0139 (0.0100) |
| EHP (2017)                       | −0.00425 (0.0539) | 0.0142 (0.0164)  |
| RA (2013)                        | −0.0431 (0.0331)  | −0.0147 (0.0107) |
| AINC (2013)                      | 0.0283** (0.0125) | 0.00501 (0.00632)|
| **Age (reference group: AGE50-64) (2013)** |                  |                  |
| AGE20-34                         | 0.256*** (0.0423) | 0.0368 (0.0277)  |
| AGE35-49                         | 0.220*** (0.0393) | 0.0408 (0.0266)  |
| **Education level (reference group: EDU1) (2013)** |                  |                  |
| EDU2                             | −0.0159 (0.0512)  | −0.00642 (0.0206)|
| EDU3                             | −0.0157 (0.0527)  | −0.0245 (0.0201) |
| OWN (2013)                       | 0.0321 (0.0413)   | 0.00382 (0.0139) |
| EMPL (2013)                      | 0.123*** (0.0451) |                  |
| HS (2013)                        | 0.0328** (0.0129) |                  |
| Constant                         | −0.118 (0.161)    | 0.372* (0.209)   |
| Inverse of Mills’ ratio          |                  |                  |
| Number of observations           | 1,318            | 663              |
| Pseudo R²                        | 0.112            | 0.112            |
| Adjusted R²                      |                  | 0.017            |

Notes. Average marginal effects of the variables in the selection equation and coefficients of the variables in the outcome equation. Standard errors in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively. Annual income is transformed by inverse hyperbolic sine. Values of Pseudo R² and Adjusted R² are calculated for each implicate separately and the minimal values across implicates are reported in the table. Sources: Estonian Household Finance and Consumption Survey; author’s calculations.
arise. Also, it should be noted that although the share of households willing to take substantial or above average financial risks is small, their higher DSTI ratios may pose a risk to financial stability.

Further analysis is merited for the differences between the results for mortgage loans and those for non-mortgage loans. My analysis shows that for mortgage loans, risk aversion is negatively related to the probability of having a loan, whereas for non-mortgage loans, risk aversion is negatively related to the size of the outstanding liabilities. This is intuitive. Since a mortgage loan is a large liability for a long period of time, deciding to take that loan requires a certain amount of risk tolerance. The amount of risk tolerance needed to take a non-mortgage loan depends on the size of the loan, and larger non-mortgage loans are taken by risk-tolerant households.

My study also assesses the characteristics of households that are not willing to take any financial risk. Risk aversion is negatively related to the household’s income, its reference person’s level of education, its reference person being employed, and it perceiving the ability to get financial assistance from friends or relatives, while risk aversion is positively related to the age of the household’s reference person. The results also indicate that men are less risk averse than women. These results for Estonia are in line with previous studies by other authors from different countries and regions, and examples of such studies are provided in Van de Venter et al. (2012), Tavor (2019), and Fisher and Yao (2017) among others.

Notes

1. The views expressed are those of the author. The results published and the related observations and analysis may not correspond to the results or analysis of the data producers. The previous version of the paper was issued as a working paper in the Eesti Pank Working Paper Series: Branten, E. (2021). The role of risk attitudes and expectations in household borrowing in Estonia. Eesti Pank, Working Paper Series, 5/2021. https://www.eestipank.ee/en/publications/working-papers/2021/52021-eva-branten-role-risk-attitudes-and-expectations-household-borrowing-estonia
2. Bover et al. (2014) and Du Caju et al. (2016) include 11 euro area countries: Austria, Belgium, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Portugal, Slovakia, Spain. Ampudia et al. (2016) include 14 euro area countries: Austria, Belgium, Cyprus, France, Germany, Greece, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, Slovakia, Spain. The analysis by Terraneo (2018) includes Greece, Italy, Portugal and Spain.
3. The household reference person here is chosen according to the international standards of the Canberra Group (UNECE, 2011), which suggests applying the following criteria in the following order to select a unique reference person in the household: 1) one of the partners in a registered or de facto marriage with dependent children, 2) one of the partners in a registered or de facto marriage without dependent children, 3) a lone parent with dependent children, 4) the person with the highest income, 5) the oldest person.
4. More information on the multiple imputation of the data can be found in the methodological reports of the HFCS: Eesti Pank (2019); European Central Bank (2013); European Central Bank (2016); European Central Bank (2020c).
5. The probit model is used here instead of the Heckman model because the inverse of the Mills’ ratio did not appear to be statistically significant in the Heckman outcome equation that was estimated during the analysis process for this paper.
6. The sample selection approach has also been applied in Brown et al. (2008) to model the size of mortgage debt and in Aristei and Gallo (2016), for example, who apply a sample selection ordered probit in the context of the repayment difficulties of households. In the first stage, a
probit model describing the likelihood of mortgage insolvency is estimated, and in the second stage, an ordered probit model describing the intensity of arrears is estimated for insolvent households.

7. The term first described by Keynes (1936).
8. Expectations in their studies are measured by the following question: “Looking ahead, how do you think you will be financially a year from now, will you be: Better off; Worse off; Or about the same?”

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No potential conflict of interest was reported by the author(s).

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Appendix

Table A1. Description of the variables used in the analysis

| Variable | Description of the variable |
|----------|-----------------------------|
| APPL     | Household has applied for credit within the last three years (1 = yes, 0 = no). Variable APPL is given the value 1 if HC1300 = 1, the value 0 if HC1300 = 2 and the value is missing if the value for HC1300 is missing. |
| REC      | Household received as much credit it applied for within the last three years (1 = yes, 0 = no). Variable only defined for households that had applied for credit within the last three years. Variable is defined based on the variable HC1310a in the HFCS User Database. Variable REC is given the value 1 if HC1310a = 3, the value 0 for other values of HC1310a and the value is missing if the value for HC1310a is missing. |
| PC       | Household has not applied for credit due to perceived credit constraints (1 = yes, 0 = no). The variable is defined based on the variable HC1400 in the HFCS User Database. Variable PC is given the value 1 if HC1400 = 1, the value 0 if HC1400 = 2 and the value is missing if the value for HC1400 is missing. The question in the HFCS questionnaire was: ‘In the last three years, did you (or another member of your household) consider applying for a loan or credit but then decided not to, thinking that the application would be rejected?’ |
| HD       | Household has debt (1 = yes, 0 = no). Variable DL1000i in the HFCS User Database. |
| HMD      | Household has mortgage debt (1 = yes, 0 = no). Variable DL1100i in the HFCS User Database. |
| HNMD     | Household has non-mortgage debt (1 = yes, 0 = no). Variable DL1200i in the HFCS User Database. |
| LS       | Total outstanding balance of household’s liabilities, in euros. Variable only defined for households with debt. Variable DL1000i in the HFCS User Database. |
| MDS      | Outstanding balance of household’s mortgage debt, in euros. Variable only defined for households with mortgage debt. Variable DL1100i in the HFCS User Database. |
| NMDS     | Outstanding balance of household’s non-mortgage debt, in euros. Variable only defined for households with non-mortgage debt. Variable includes outstanding balances on credit lines or overdrafts, outstanding balance of credit cards for which the owner of the card is charged interest, and outstanding balances on other non-mortgage loans (including private loans from relatives, friends, etc.) and leases. Variable DL1200i in the HFCS User Database. |
| DSTI     | Share of debt payments to gross income of the household. Variable only defined for households holding debt instruments for which payments are collected. Variable DODSTOTALp in the HFCS User Database. |
| EIP      | Household expects its total income to go up more than prices over the next year (1 = yes, 0 = no). The variable is defined based on the variable HG0800 in the HFCS User Database. Variable EIP is given the value 1 if HG0800 = 1, the value 0 for other values of HG0800 and the value is missing if the value for HG0800 is missing. The question in the HFCS questionnaire was: ‘Over the next year, do you expect your (household’s) total income to go up more than prices, less than prices, or about the same as prices?’ |
| EHP      | Household expects the price of the residence the household is living in to increase by more than 5 per cent over the next 12 months (1 = yes, 0 = no). Variable is defined based on the variable HBZ010e in the HFCS User Database. Variable EHP is given the value 1 if HBZ010e = 10, the value 0 for other values of HBZ010e and a missing value if the value for HBZ010e is missing. The question in the HFCS questionnaire was: ‘We are interested in knowing how you think the price of the residence you are living in might change over the next 12 months. Please distribute a total of 10 points among the 5 changes shown in the card below, assigning more points to the scenarios you think are more likely and zero points if a scenario seems nearly impossible to you.’ |
| RA       | Household is not willing to take any financial risk (1 = yes, 0 = no). The variable is defined based on the variable HD1800 in the HFCS User Database. Variable RA is given the value 1 if HD1800 = 4, the value 0 for other values of HD1800 and the value is missing if the value for HD1800 is missing. The question in the HFCS questionnaire was: ‘Which of the following statements comes closest to describing the amount of financial risk that you (and your husband/wife/partner) are willing to take when you save or make investments?’ The options for answer were the following: a) take substantial financial risks expecting to earn substantial returns (variable HD1800 has the value 1); b) take above average financial risks expecting to earn above average returns (variable HD1800 has the value 2); c) take average financial risks expecting to earn average returns (variable HD1800 has the value 3); d) not willing to take any financial risk (variable HD1800 has the value 4). |
| AINC     | Annual gross income of the household, in euros. Variable DI2000 in the HFCS User Database. |
| INC1     | Household’s income is in the lowest (first) income quintile (1 = yes, 0 = no). Variable is defined based on the variable DHIQ01 in the HFCS User Database. Variable INC1 is given the value 1 if DHIQ01 = 1, the value 0 for other values of DHIQ01 and the value is missing if the value for DHIQ01 is missing. |
| INC2     | Household’s income is in the second income quintile (1 = yes, 0 = no). Variable is defined based on the variable DHIQ01 in the HFCS User Database. Variable INC2 is given the value 1 if DHIQ01 = 2, the value 0 for other values of DHIQ01 and the value is missing if the value for DHIQ01 is missing. |
| INC3     | Household’s income is in the third income quintile (1 = yes, 0 = no). Variable is defined based on the variable DHIQ01 in the HFCS User Database. Variable INC3 is given the value 1 if DHIQ01 = 3, the value 0 for other values of DHIQ01 and the value is missing if the value for DHIQ01 is missing. |
| INC4     | (Continued) |
### Table A1. Continued.

| Variable | Description of the variable |
|----------|-----------------------------|
| **INCS** | Household’s income is in the fifth income quintile (1 = yes, 0 = no). Variable is defined based on the variable DHIQ01 in the HFCS User Database. Variable INC4 is given the value 1 if DHIQ01 = 4, the value 0 for other values of DHIQ01 and the value is missing if the value for DHIQ01 is missing. |
| **AGE20-34** | Age of the reference person of the household is in the range of 20–34 years (1 = yes, 0 = no). Variable is defined based on the variable RA0300 in the HFCS User Database and has a missing value if RA0300 value is missing. |
| **AGE35-49** | Age of the reference person of the household is in the range of 35–49 years (1 = yes, 0 = no). Variable is defined based on the variable RA0300 in the HFCS User Database and has a missing value if RA0300 value is missing. |
| **AGE50-64** | Age of the reference person of the household is in the range of 50–64 years (1 = yes, 0 = no). Variable is defined based on the variable RA0300 in the HFCS User Database and has a missing value if RA0300 value is missing. |
| **AGE<35** | Age of the reference person of the household is below 35 years (1 = yes, 0 = no). Variable is defined based on the variable RA0300 in the HFCS User Database and has a missing value if RA0300 value is missing. |
| **AGE>54** | Age of the reference person of the household is more than 54 years (1 = yes, 0 = no). Variable is defined based on the variable RA0300 in the HFCS User Database and has a missing value if RA0300 value is missing. |
| **EDU1** | Highest completed education of the reference person of the household is second stage of basic education of below (1 = yes, 0 = no). Variable is defined based on the variable PA0200 in the HFCS User Database. Variable EDU1 is given the value 1 if PA0200 = 0, 1 or 2, the value 0 for other values of PA0200 and a missing value if the value for PA0200 is missing. |
| **EDU2** | Highest completed education of the reference person of the household is upper secondary or post-secondary non-tertiary education (1 = yes, 0 = no). Variable is defined based on the variable PA0200 in the HFCS User Database. Variable EDU2 is given the value 1 if PA0200 = 3 or 4, the value 0 for other values of PA0200 and a missing value if the value for PA0200 is missing. |
| **EDU3** | Highest completed education of the reference person of the household is tertiary education (1 = yes, 0 = no). Variable is defined based on the variable PA0200 in the HFCS User Database. Variable EDU3 is given the value 1 if PA0200 = 5, 6, 7 or 8 in the 2017 survey or if PA0200 = 5 or 6 in the 2013 survey. Variable EDU3 is given the value 0 for other values of PA0200 and a missing value if the value for PA0200 is missing. |
| **MALE** | Gender of the reference person of the household is ‘male’ (1 = yes, 0 = no). Variable is defined based on the variable RA0200 in the HFCS User Database. Variable MALE is given the value 1 if RA0200 = 1, the value 0 if RA0200 = 2 and a missing value if the value for RA0200 is missing. |
| **EMPL** | The reference person of the household is employed (including self-employed) (1 = yes, 0 = no). Variable is defined based on the variable PE0100a in the HFCS User Database. Variable EMPL is given the value 1 if PE0100a = 1, the value 0 for other values of PE0100a and a missing value if the value for PE0100a is missing. |
| **MAR** | The reference person of the household is married (1 = yes, 0 = no). Variable is defined based on the variable PA0100 in the HFCS User Database. The variable MAR is given the value 1 if PA0100 = 2, the value 0 if PA0100 has any other value, and a missing value if the value for PA0100 is missing. |
| **HT1** | Household consists of two or more adults (1 = yes, 0 = no). Variable is defined based on the variable DHHTYPE in the HFCS User Database. Variable HT1 is given the value 1 if DHHTYPE = 6, 7 or 8, the value 0 for other values of DHHTYPE and a missing value if the value for DHHTYPE is missing. |
| **HT2** | Household consists of one adult with or without children (1 = yes, 0 = no). Variable is defined based on the variable DHHTYPE in the HFCS User Database. Variable HT2 is given the value 1 if DHHTYPE = 9, 51 or 52, the value 0 for other values of DHHTYPE and a missing value if the value for DHHTYPE is missing. |
| **HT3** | Household consists of two or more adults with children. Variable is defined based on the variable DHHTYPE in the HFCS User Database. Variable HT3 is given the value 1 if DHHTYPE = 10, 11, 12 or 13, the value 0 for other values of DHHTYPE and a missing value if the value for DHHTYPE is missing. |
| **HS** | Number of members in the household. Variable DH0001 in the HFCS User Database. |
| **FA** | The household perceives that it can get financial assistance from friends or relatives (1 = yes, 0 = no). Variable is defined based on the variable HI0800 in the HFCS User Database. Variable FA is given the value 1 if HI0800 = 1, the value 0 if HI0800 = 2 and a missing value if the value for HI0800 is missing. The question in the HFCS questionnaire was: ‘In an emergency, could (you/your household) get financial assistance of say EUR 5,000 from friends or relatives who do not live with you?’ |
| **OWN** | Household owns its main residence (1 = yes, 0 = no). Variable DA1110i in the HFCS User Database. |

Sources: Author’s compilation based on: Eesti Pank, 2019; European Central Bank, 2020a; European Central Bank, 2020b.