The Impact of Socio-Demographic and Economic Factors on Household Indebtedness in Slovakia – a Microeconomic Analysis[1]

*Erik GOGOLA – Erika PASTORÁKOVÁ – Patrícia KRUPOVÁ**

Abstract

In recent years, the low-interest rate environment combined with a positive macroeconomic outlook has led to a significant increase in the indebtedness of Slovak households. Analysing data from multiple waves of the Slovak Household Finance and Consumption Survey (HFCS), the paper investigates the impact of various socio-demographic and economic factors on the use of secured and unsecured debt by Slovak households by employing logistic regression. The results of the study indicate that age has a statistically significant and negative impact on the probability of having a mortgage debt. On the contrary, the number of dependent children and gross wealth have a statistically significant and positive impact on the probability of indebted households having a mortgage debt. The findings are consistent with the life-cycle hypothesis, highlighting age as a significant factor in shaping individuals' engagement in the debt market. Moreover, our study shows that relatively high debt levels can be observed among the older indebted households in the last two waves of the HFCS. The high indebtedness among retired households may raise concerns about their social and financial stability.

Keywords: *household indebtedness in Slovakia, socio-demographic and economic factors, life-cycle hypothesis, logistic regression, HFCS*

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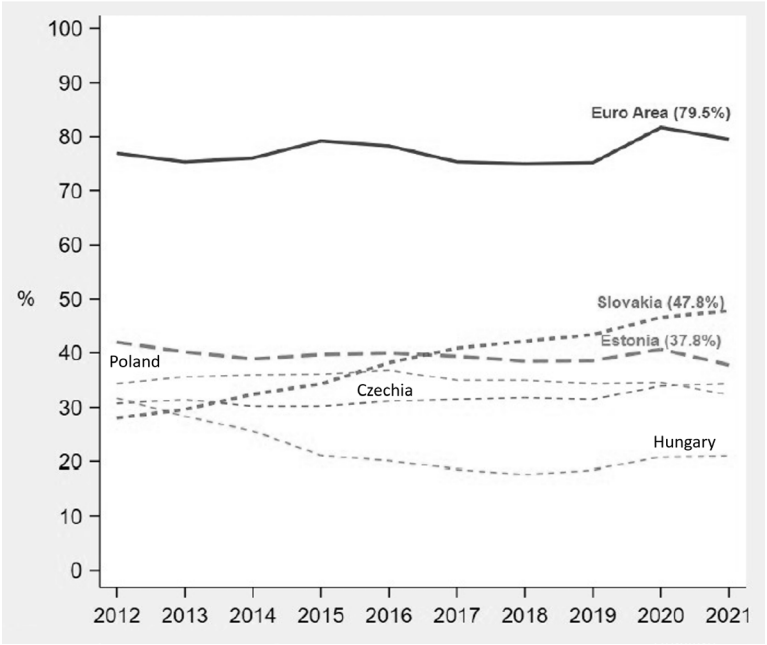
Introduction

Research on household finance typically highlights Slovak households in two main respects: they exhibit the highest rate of homeownership among euro area countries, while simultaneously having the lowest share of indebted households (Fessler et al., 2015; Cupak et al., 2023; and others). However, according to data from the Household Finance and Consumption Survey (HFCS), between 2014 and 2021, Slovak households reached the highest annual increase in both mortgage and non-mortgage debt among European Union countries. Eurostat data (2022) also point to a significant rise in household indebtedness in Slovakia. The debt-to-GDP ratio increased from 28% in 2012 to 47.8% in 2021 (Figure 1), while the household debt-to-gross-income ratio rose from 43.3% in 2012 to 72.6% in 2021. Slovak households have become one of the most indebted in the Central and Eastern European region, approaching the median debt levels observed in more developed European Union countries (Cesnak et al., 2023; Richtárik, 2017). Even among the V4 countries, which share a similar economic transition following the collapse of centrally planned economies in 1989, Slovak households ranked among the most indebted by 2021. This is particularly noteworthy given their common historical and economic background.

F i g u r e 1

Debt-to-GDP Ratio of Households: Annual Growth (percentages)



Source: Eurostat; ECB SDW.

Moreover, studies utilizing HFCS data from the 2010 wave (Fessler et al., 2015) had already highlighted that Slovak debtors are relatively young compared with the euro area average: while the share of debt participants aged 16 to 34 is roughly 55% in the euro area, it amounts to approximately 75% in Slovakia. Furthermore, the share of this age group holding mortgage debt and nonmortgage debt was in 2010 in 22% and 42%, respectively, in the euro area, whereas it was 29% and 55%, respectively, in Slovakia (Fessler et al., 2015).

Under conditions of rapidly increasing household indebtedness in Slovakia, even a small decline in income may, in some cases, lead to financial stress or an inability to meet debt obligations. A recent significant surge in inflation and interest rates, caused by rising geopolitical tension and the adverse economic consequences of the COVID-19 pandemic, coupled with the continuous increase in household indebtedness in Slovakia, implies a renewed rise in household balance sheet stress. In particular, the increased cost of essential expenditure, which has occurred simultaneously with an increase in the cost of debt payments in the form of higher interest rates, will put higher pressure on households to make ends meet.

To assess financial vulnerability issues, it is decisive to know details about the distribution of households' indebtedness. Which part of household debt is covered by assets? What factors form indebtedness in Slovakia, and how does the typical household with mortgage and non-mortgage debt look like? How does household indebtedness vary across age groups, and have these patterns changed over different HFCS waves in Slovakia?

This study examines household indebtedness in Slovakia using microdata from multiple waves of the Household Finance and Consumption Survey (HFCS). We focus on the liabilities side of the household balance sheet, considering the recent substantial increase in total household indebtedness, which could have adverse implications for economic growth and financial stability in the medium or long term (Debelle, 2004; IMF, 2017; Mian et al., 2017).

We focus on the impact of socio-demographic and economic factors on the indebtedness of Slovak households, mainly depending on whether they have mortgage or non-mortgage debt, by analysing data from the multiple waves of the HFCS survey. We base our analysis on the Life-Cycle Hypothesis (LCH), which suggests individuals borrow in early life and repay later. However, some studies (e.g. Lusardi, 2020) show recent cohorts of older adults holding more debt, indicating possible global trends. This contrasts with Slovak research highlighting younger households as the most indebted (Fessler et al., 2015). These differences call for an updated investigation of indebtedness across Slovak socio-demographic groups.

The need to analyse data in the context of sociodemographic and economic factors is further reinforced by significant demographic changes that have taken

place in Slovakia in recent years. One of the most notable shifts since the country's independence has been in age structure: the proportion of children has declined, while the share of the post-productive population has grown. Population ageing, which began in the early 1990s, has accelerated over the past decade due to both declining birth rates and increasing life expectancy. Between 1993 and 2023, the average age in Slovakia rose from just over 34 to nearly 42 years, and the ageing index more than doubled – from 45 to nearly 115, indicating that there are now significantly more people aged 65+ than children (Statistical Office of the Slovak Republic, 2024; Šprocha, Bleha and Vaňo, 2024).

A key contribution of this paper lies in using microdata to analyse household indebtedness. Unlike macrodata based on aggregates, which do not show the extent to which households with debt also hold assets, microdata reveals the joint distribution of key risk components – such as debt levels, repayment capacity, and collateral. Aggregate data obscure these relationships, limiting their usefulness for assessing credit risk. Microdata, on the other hand, provide detailed insights into how these elements interact at the household level.

Our second contribution to literature lies in the utilization of multiple waves of the Slovak HFCS microdata to investigate the development of debt distribution among indebted Slovak households and their levels of indebtedness in relation to specific socio-demographic and economic factors. Many existing studies tend to focus on only a single wave of HFCS data when analysing household finance and indebtedness. For instance, the ECB published results from the first and second waves separately (ECB, 2013; 2016), and national-level studies such as Cupak et al. (2023) also report results from the 2021 Slovak wave in isolation. Similarly, Slovak studies examining the determinants of indebtedness, such as Piovarči (2021) or Messner and Zavadil (2015), base their findings on a single wave of data. While these studies provide important insights, they do not capture dynamic trends over time.

Another contribution of this paper is the consideration of behavioural factors, such as risk aversion, in explaining household indebtedness. This allows us to capture differences in borrowing behaviour beyond economic and demographic characteristics.

In the present study, we examine the significant increase in household indebtedness in Slovakia in recent years. We characterize indebted households and discuss the relationship between different household characteristics, and their probability of holding debt, which is especially important in the context of financial stability risks. Section 1 provides a literature review on the socio-demographic and economic factors of household indebtedness. Section 2 is divided into two parts: Subsection 2.1 describes the data and variables, and subsection 2.2 outlines

the econometric specifications. The main part of the paper, section 3, is also split into two parts. Subsection 3.1 presents descriptive statistics on the development of household indebtedness in Slovakia from 2010 to 2021. In subsection 3.2, we present our regression outcomes, examining the socio-demographic and economic factors affecting the probability of holding secured and unsecured debt. Unlike many previously mentioned studies, we analyse data from all HFCS waves. The last section concludes the paper.

1. Literature Review

Although numerous theoretical contributions emphasize the amplification effects of household indebtedness in explaining recent macroeconomic dynamics, empirical studies employing micro-level data to validate these assumptions remain relatively scarce (Kukk, 2014). Early research by Cox and Jappelli (1993) explored the influence of socio-demographic and economic variables on the likelihood of household indebtedness in the United States, accounting for liquidity constraints. Their findings indicate that financially constrained households tend to be younger and possess lower income and wealth levels compared to their unconstrained counterparts. Moreover, they observed that the probability of holding debt increases with age until the mid-thirties, after which it declines. Crook (2001), utilizing data from the Survey of Consumer Finances (SCF), found that households headed by individuals over 55 exhibit reduced demand for credit and are less likely to face borrowing constraints. Conversely, results from a bivariate probit model suggest that debt demand is positively associated with higher current income, larger household size, and employment status of the household head.

The analysis of household indebtedness in Slovakia presents a distinct case within the euro area. Despite a homeownership rate approaching 90% – the highest in the eurozone – the proportion of indebted households remains among the lowest (Fessler et al., 2015). Fessler and co-authors examine household debt from the perspective of banking sector exposure. They underscore that even a small segment of highly indebted households can exert significant influence on financial market dynamics and on bank solvency. Risks may arise not only from actual defaults but also from deteriorating repayment capacity, which can hinder banks' ability to refinance their liabilities (Fessler et al., 2015). Among their key findings is that Slovakia's household debt structure is less dependent on mortgage financing compared to other euro area countries. Furthermore, debt distribution is markedly uneven, with certain households bearing disproportionately high debt burdens. The study highlights the critical role of asset buffers in evaluating household financial resilience.

Regular analyses of the latest waves of the Household Finance and Consumption Survey (HFCS) are conducted by researchers at the National Bank of Slovakia (Cupak and Strachotová, 2015; Cupak et al., 2023; Cesnak et al., 2023; Cesnak et al., 2025). In addition to assessing core household finance indicators, these studies explore the relationship between financial literacy and household financial behavior. A notable contribution to the literature is their analysis of loan repayment deferrals during the COVID-19 pandemic. Their findings corroborate those of Clark et al. (2021), demonstrating that financially literate households were better equipped to absorb economic shocks induced by the crisis. Moreover, they reveal a significant link between households' financial expectations and their indebtedness levels (Cesnak et al., 2023).

Empirical research based on micro-level data consistently identifies age as a key determinant of household indebtedness. Most studies show that both the likelihood of holding debt, and the debt-to-asset ratio tend to decline with age (Yilmazer and Devaney, 2005; Del-Rio and Young, 2005; Costa and Farinha, 2012; Fasianos et al., 2014). For secured and unsecured debt alike, younger households are more likely to participate in credit markets and to hold higher levels of debt relative to their total wealth. The probability of borrowing typically peaks in midlife, particularly among individuals aged 35 – 54, and declines significantly among older cohorts (Fasianos et al., 2014).

Household income, employment status, and self-employment are consistently found to positively influence both the probability of holding debt and the amount of debt relative to assets. Retirement status, on the other hand, is associated with reduced debt participation. The presence of children and larger household size are also positively correlated with mortgage and unsecured debt holdings (Costa and Farinha, 2012).

Cross-country comparisons using harmonized HFCS data reveal that demographic and financial characteristics – particularly age, presence of dependent children in the household, employment status, education, income, and wealth – are the most influential factors shaping household debt structures and vulnerability. These findings underscore the importance of integrating microeconomic insights into macroeconomic models of household finance and financial stability.

2. Research Data and Methodology

2.1. Data and Variables

Our analysis utilizes data from all available waves of the Household Finance and Consumption Survey (HFCS) for the years 2010, 2014, 2017, and 2021. Data collection for the fourth wave of Slovak HFCS took place from July to October

2021, and the final sample size includes 2,174 households. The HFCS dataset is a valuable repository of microdata providing comprehensive information about the financial situation of Slovak households, including both the liability and asset side of households' balance sheets. We focus on the liabilities side of the Slovak household balance sheet, which provides a comprehensive insight into the intensive and extensive margin of indebtedness of households in Slovakia. Furthermore, each household's balance sheet is combined with relevant socio-demographic and economic characteristics, such as gender, age, education, and employment status. The HFCS microdata offers a more comprehensive understanding of the indebtedness of private households in Slovakia.

In Table 1, we present the development of household indebtedness in Slovakia across multiple waves. Most Slovak households do not actively participate in the debt market. However, it is worth noting that the share of households actively participating in the debt market has shown an upward trend over the years. Nevertheless, 61% of Slovak households had neither mortgage nor non-mortgage debt in 2021, compared to 73% in 2010. Overall, the data show a notable increase in household participation in the debt market in 2021, with 38% of households owning various debt instruments (mortgage or non-mortgage debt), compared to just 27% in 2010. Across the initial three waves of HFCS data collection, most indebted households held only non-mortgage debt, and a small percentage of households had both mortgage and non-mortgage debt. It is only in the fourth wave (2021) that the share of households with only mortgage debts exceeds the share of households with only non-mortgage debts.

The proportion of indebted households with only mortgage debts has consistently increased overall waves of the survey. This could be due to a higher proportion of first-time buyer households entering the debt market by taking out a mortgage loan to purchase their first home. Therefore, it is also necessary to consider whether the mortgage taken out by the household is to finance the purchase of their first main residence or whether it is to purchase other properties as an investment to generate passive income.

T a b l e 1

Development of Household Indebtedness in Slovakia

	Debt Participation (%)			
	2010	**2014**	**2017**	**2021**
No debt	73.2	63.3	63.3	61.1
Any debt	26.7	36.7	36.6	38.8
Mortgage debt only	6.8	11.3	15.2	21.2
Nonmortgage debt only	17.1	20.4	15.9	13.4
Mortgage and nonmortgage debt	2.7	4.8	5.4	4.1

Source: HFCS; National Bank of Slovakia; own calculation.

Mortgages for main residences consistently account for the largest portion of total household debt across all survey waves, with their share rising from 77.1% in 2010 to 87.9% in 2021 (Table 2). On contrary, the share of non-mortgage debt declined sharply over the same period, dropping from 18.8% in 2010 to 6.9% in 2021.

T a b l e 2

Shares of Debt Types

Shares of Debt Types (% of aggregated total debt)	**2010**	**2014**	**2017**	**2021**
Main residence mortgages	77.1	74.0	82.3	87.9
Mortgages on other property	NA	8.19	6.8	5.2
Nonmortgage debt	18.8	17.8	10.9	6.9

Source: HFCS; National Bank of Slovakia; own calculation.

2.2. Econometric Specifications

This paper aims to investigate how different socio-demographic and economic determinants affect the use of secured and unsecured debt by Slovak households. Logistic regression is used to assess the influence of specific socio-demographic and economic determinants of households on the probability of having secured or unsecured debts. Using the logistic distribution, we can specify the logistic regression model as follows (Scott and Freese, 2014):

$$p(X) = \frac{e^{\beta_0+\beta_1 X_1+\beta_k X_k}}{1+e^{\beta_0+\beta_1 X_1+\beta_k X_k}} \tag{1}$$

This relationship between probability $p(X)$ and the predictors is nonlinear, but the predictors can be linearized using a simple transformation. This transformation is called logit transformation and is defined as:

$$\frac{p(X)}{1-p(X)} = e^{\beta_0+\beta_1 K_1+\beta_k X_k} \tag{2}$$

$$log\left(\frac{p(X)}{1-p(X)}\right) = \beta_0 + \beta_1 X_1 + \beta_k X_k \tag{3}$$

The issue with logistic regression is that the interpretation of the dependent variable is not just as straightforward as in Linear Regression. The odds ratio is commonly employed to interpret the logit model results. This equation represents the ratio of the probability of an event occurring to the probability of it not occurring:

$$odds\,ratio = \frac{p(x)}{1-p(x)} \tag{4}$$

We use average marginal effects (AME) to interpret parameter estimates after logistic regression. Average Marginal effects show the average change in probability when the predictor or independent variable increases by one unit. In other words, it provides information about the average impact of a change in the independent variable on the probability of the outcome. The AME is calculated as the average of the partial derivative of the predicted probability concerning the independent variable:

$$AME = \frac{1}{N}\sum_{i=1}^{N}\frac{\partial P(Y_i = 1)}{\partial X_i} \tag{5}$$

Missing data are addressed using multiple imputation. Let β be our point estimate of interest – that is, the mean or a regression parameter. For each of the m imputed datasets, we obtain an empirical estimate β_i. The m imputations are drawn with replications from the sample of non-missing observations, which allows us to mimic the distribution of the missing values given the observed data. We set m to the conventional level of five. The pooled parameter estimate $\overline{\beta}$ is calculated as:

$$\overline{\beta} = \frac{1}{m}\sum_{i=1}^{m}\beta_i \tag{6}$$

The total variance used to derive the standard error is computed following Rubin's rules (Little and Rubin, 2002) as:

$$T = \overline{U} + \left(1 + \frac{1}{m}\right)B \tag{7}$$

where

$\overline{U} = \frac{1}{m}\sum_{i=1}^{m}U_i$ – the average within-imputation variance,

$B = \frac{1}{m-1}\sum_{i=1}^{m}\left(\beta_i - \overline{\beta}\right)^2$ – the between-imputation variance.

Our analysis accounts for the complex survey design of the HFCS data. We defined the primary sampling units (PSUs) and applied household probability weights to ensure the sample is representative of the population. To obtain correct variance estimates, we employed the Balanced Repeated Replication (BRR) method, utilizing the 1,000 replicate weights provided with the data.

To assess the assumption that different socio-demographic and economic factors affect the probability of holding secured and unsecured debt, we conduct an analysis distinguishing between households active only in the mortgage market (holding only secured debt), households active only in the non-mortgage market (holding only unsecured debt) and households active in any type of debt market (holding either secured or unsecured debt). Mortgage debt refers to loans secured by a property, such as the household's main residence or other properties, which serve as collateral. Non-mortgage debt includes unsecured loans, overdrafts, credit lines and unsecured credit card debt. Therefore, in our logistic regressions, the dependent variable equals 1 if a household has any debt, only mortgage debt or only non-mortgage debt and 0 otherwise. The categorical independent variables include various socio-demographic and economic characteristics of households, based on the life-cycle hypothesis (LCH) and while controlling for other factors. The detailed characteristics of the categorical independent variables are presented in Table 4 and Appendix. Furthermore, the availability of data from multiple survey waves of HFCS enables us to conduct a comprehensive univariate analysis of the indebted Slovak households' financial situation. Therefore, we conduct an in-depth description of the development of the distribution of household debt levels and their debt participation rates over survey waves.

3. Results

3.1. Descriptive Statistics

Both the median and mean debt levels among households with any form of debt have shown a steady increase over time (Table 3). The median debt rose from EUR 3,200 in 2010 to EUR 18,400 in 2021, while the mean debt grew from EUR 12,400 to EUR 33,900 over the same period. This trend suggests not only a rise in the number of indebted households but also a significant increase in the average debt burden per household.

A disaggregation of the data by debt type indicates that mortgage-secured debt is the principal determinant of the observed upward trend. For households holding solely mortgage debt, the median value rose from EUR 24,500 in 2010 to EUR 34,300 in 2021, while the corresponding mean increased from EUR 27,600 to EUR 48,100. More pronounced is the leverage among households with both mortgage and nonmortgage obligations; for this group, the median debt escalated from EUR 29,100 to EUR 52,100 over the same period. Conversely, the expansion of non-collateralized debt was substantially more moderate, with the median rising from EUR 1,000 to EUR 3,200, signifying its secondary role in driving overall household indebtedness.

T a b l e 3

Development of Household Indebtedness in Slovakia – Descriptive Statistics

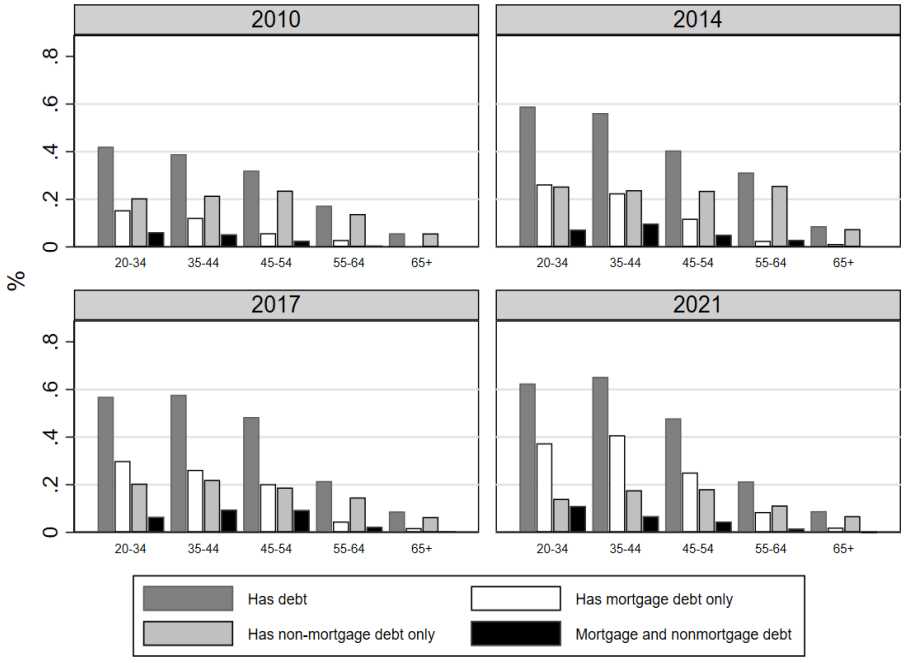
	Conditional Median (EUR thousand)				**Conditional Mean** (EUR thousand)			
Debt participation	**2010**	**2014**	**2017**	**2021**	**2010**	**2014**	**2017**	**2021**
Any debt	3.2	6.0	11.4	18.4	12.4	14.6	25.3	33.9
Mortgage debt only	24.5	22.2	32.0	34.3	27.6	27.7	39.2	48.1
Nonmortgage debt only	1.0	1.5	2.3	3.2	3.0	3.5	4.7	5.4
Mortgage and nonmortgage debt	29.1	26.6	35.3	52.1	33.2	31.2	46.8	53.4

Source: HFCS; National Bank of Slovakia; own calculation.

Furthermore, younger households tend to have a higher rate of participation in the debt market and higher debt levels, which is supported by HFCS data (Figure 2 and Figure 3). However, it is interesting to note that in the last two waves, household debt did not follow the hump-shaped profile suggested by the LCH. A notable rise in indebtedness can be observed within the 63+ age category; for this group, the conditional median debt increased from less than EUR 5,000 in 2010 to EUR 30,000 in 2021.

F i g u r e 2

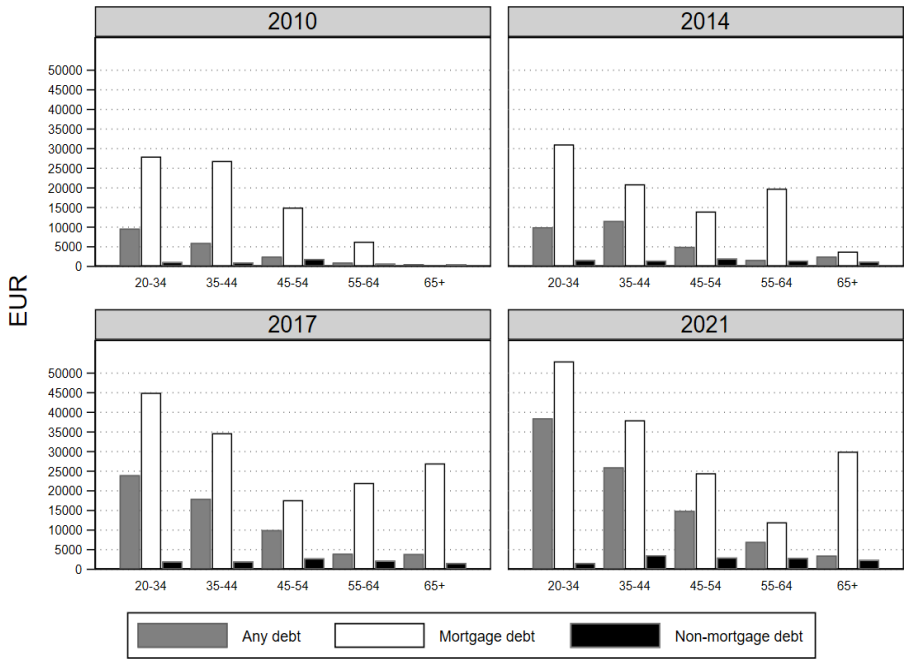
Debt Participation across Age Categories



Source: HFCS; National Bank of Slovakia; own calculation.

F i g u r e 3

Conditional Median Debt across Age Categories



Source: HFCS; National Bank of Slovakia; own calculation.

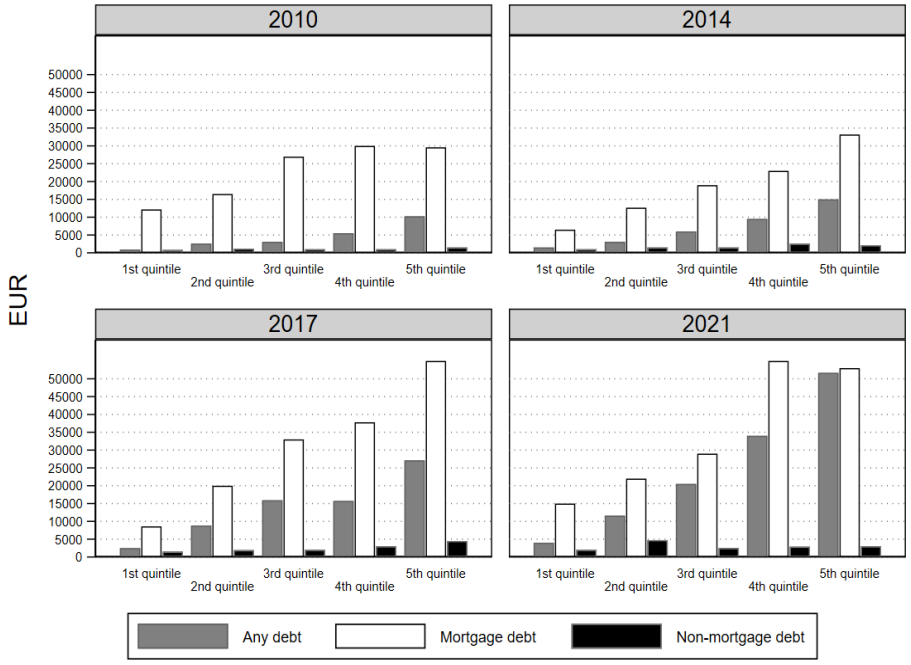
Mortgage debt participation and levels of mortgage debt increase with higher levels of gross wealth quintiles. This association is more evident in the last two waves of the survey (2017 and 2021; Figure 4). In the bottom quintile of gross wealth, we observe that a small fraction of households holds a mortgage debt. This can be attributed to the fact that these households do not own their main residence. Within the top gross wealth quintiles, it is common for households to own their main residence.

Furthermore, we observe a significant difference in mortgage and non-mortgage debt levels across gross wealth quintiles. Since mortgage debt primarily serves to finance housing wealth, in contrast to smaller, noncollateralized purchases typically funded by non-mortgage debt, therefore mortgage debt exhibits significantly higher levels across all gross wealth quintiles.

The significant difference in debt levels between mortgage and non-mortgage debt can be attributed to over 90% of Slovak households owning their main residence (Eurostat, 2021), and the purchase is financed mainly by mortgage debt. Based on HFCS data, the rise in household indebtedness in Slovakia is largely synonymous with a process of wealth creation, facilitated by the repayment of

mortgage loans. In essence, debt is the vehicle through which many Slovak households are acquiring their most significant asset. Furthermore, recent increases in house prices, higher household incomes, and reduced interest rates were the main factors that have stimulated the demand for mortgage debt among households, causing the median amount of mortgage debt to rise in recent years (NBS – Financial Stability Report, 2019b).

F i g u r e 4
Conditional Median Debt across Gross Wealth Quintiles



Source: HFCS; National Bank of Slovakia; own calculation.

3.2. Regression Outcomes

This section of the paper presents the outcomes of a multivariate logistic regression analysis that investigates socio-demographic and economic factors that affect the probability of Slovak households participating in the secured or unsecured debt market in 2021.[2] The results of a logistic regression analysis on households'

[2] For the sake of brevity, the logistic regression results presented in Table 4 are for the most recent wave (2021) only. This approach is justified as the direction (sign) and statistical significance of the key relationships were found to be consistent across all waves. A notable exception to this stability was the effect of age, as its influence on the probability of holding debt appeared to evolve over the survey period. For this reason, we specifically investigate this dynamic by estimating the average marginal effects for different age categories across all waves using the pooled dataset.

probability of having secured or unsecured debt are presented in Table 4.[3] In our regression analysis, we examine the impact of selected socio-demographic and economic determinants on the probability of households having only a mortgage, only a non-mortgage or any debt.[4] Each debt type is presented in two columns. The first column shows the odds ratios, while the second column shows the average marginal effects (AME).

The regression analysis indicates that households with an older reference person are significantly less likely to have any debt or only a mortgage debt than households with a younger reference person. However, the effect of age on non-mortgage debt is not statistically significant. On average, households in the age group of 63 and over are 32% less likely to have only a mortgage debt compared to those in the age group of 20 to 34. Furthermore, on average, households in the age group of 45 to 54 are just 16% less likely to have any debt than households within the age group of 20 to 34. The regression analysis results for the remaining age groups confirm the same outcome. The higher likelihood of obtaining a mortgage among younger age groups can be attributed to the fact that they typically purchase their first primary residence during this stage of their lives. These findings align with the life-cycle hypothesis (LCH), which suggests that younger households experience a period of borrowing and debt accumulation early in their working lives, often due to purchasing their first dwelling. As they grow older and their income increases, they move towards saving and accumulating wealth in preparation for future consumption and retirement. This is because younger households expect their income to increase over time and peak during middle age, enabling them to pay off debts and save for future financial needs, including retirement, which explains the lower probability of debt holding among older households. Essentially, the LCH proposes that younger households make financial decisions to ensure that their consumption is levelled out and their well-being is sustained throughout their lifetime.

The regression findings further indicate that the probability of being in debt, particularly for mortgage debt, rises with the number of dependent children. For example, households with two dependent children are, on average, 9% more likely to have only mortgage debt compared to childless households. Overall, the regression analysis suggests that households with dependent children are more likely to be part of the secured debt market, as these households need to secure adequate housing for themselves and their families.

[3] Wealth was not included as a control variable in our main results presented in Table 4 due to its moderate correlation with income (r = 0.4305*), which may raise concerns about multicollinearity. However, regression results including both income and wealth are provided in the Appendix.

[4] We explored the inclusion of behavioural factors, such as risk aversion, in our analysis but found no statistically significant association with the likelihood of holding any kind of debt. Results are available upon request.

T a b l e 4

Logit Regression Results: Secured and Unsecured Debt in 2021

	Any debt	Any debt	Only Mortgage debt	Only Mortgage debt	Only Non-mortgage debt	Only Non-mortgage debt
Variables	**Odds ratio**	**Average marginal effect (AME)**	**Odds ratio**	**Average marginal effect (AME)**	**Odds ratio**	**Average marginal effect (AME)**
Age of Reference Person (base 20 – 34)						
35 – 44	0.91 (0.2582)	–0.02 (0.0607)	0.94 (0.2576)	–0.01 (0.0545)	1.32 (0.5270)	0.03 (0.0406)
45 – 54	0.47*** (0.1287)	–0.16*** (0.0589)	0.51* (0.1789)	–0.12* (0.0649)	1.27 (0.4999)	0.03 (0.0396)
55 – 62	0.20*** (0.0638)	–0.33*** (0.0676)	0.21*** (0.0794)	–0.23*** (0.0617)	0.87 (0.3651)	–0.01 (0.0394)
63+	0.16*** (0.0932)	–0.36*** (0.1095)	0.04*** (0.0328)	–0.32*** (0.0708)	1.65 (1.0537)	0.06 (0.0766)
Nr. of dependent children (base Childless)						
1	1.72*** (0.3618)	0.10** (0.0395)	2.04*** (0.4758)	0.10*** (0.0330)	0.88 (0.2806)	–0.01 (0.0339)
2	1.66** (0.3638)	0.09** (0.0412)	1.90*** (0.4223)	0.09*** (0.0314)	1.07 (0.2479)	0.01 (0.0272)
3 and more	1.18 (0.4027)	0.03 (0.0615)	1.36 (0.4564)	0.04 (0.0437)	0.72 (0.3645)	–0.03 (0.0465)
Gender of Reference Person (base Male)						
Female	0.80 (0.1416)	–0.04 (0.0308)	0.57** (0.1314)	–0.07** (0.0284)	1.19 (0.2614)	0.02 (0.0254)
Main labour status of Reference Person (base Employee)						
Self-employed	1.08 (0.2694)	0.01 (0.0489)	1.08 (0.2930)	0.01 (0.0366)	1.14 (0.3329)	0.02 (0.0445)
Unemployed	0.33* (0.1945)	–0.20** (0.0905)	0.05*** (0.0451)	–0.20*** (0.0203)	1.28 (0.9025)	0.04 (0.1147)
Retired	0.39* (0.2128)	–0.17* (0.0966)	0.90 (0.7459)	–0.01 (0.1064)	0.20*** (0.1122)	–0.14*** (0.0403)
Other	0.51 (0.4541)	–0.12 (0.1552)	1.00 (0.4932)	–0.00 (0.0655)	0.41 (0.3651)	–0.10 (0.0710)
Gross Income Quintiles (base I quintile)						
II Quintile	1.01 (0.8535)	0.01 (0.0466)	5.51 (7.6598)	–0.01 (0.0378)	1.20 (0.9321)	0.03 (0.0319)
III Quintile	1.26 (1.3814)	0.09* (0.0480)	2.20 (3.4037)	0.04 (0.0392)	1.18 (1.1303)	0.02 (0.0338)
IV Quintile	2.79 (3.7090)	0.05 (0.0498)	5.30 (7.4828)	0.00 (0.0347)	4.36 (4.4091)	0.05 (0.0399)
V Quintile	6.88 (12.2727)	0.15** (0.0635)	186.53*** (336.2989)	0.10** (0.0437)	1.05 (1.3710)	0.02 (0.0413)
Education of Reference Person (base Primary)						
Secondary	1.07 (0.5079)	–0.10 (0.0878)	17.58** (20.6497)	0.00 (0.0589)	0.60 (0.3034)	–0.13* (0.0783)
Tertiary	0.35 (0.2454)	–0.11 (0.0906)	5.66 (7.4161)	0.05 (0.0644)	0.13*** (0.0899)	–0.19** (0.0761)
Income × Education Interaction	YES	NO	YES	NO	YES	NO

Note: Odds ratio and average marginal effects (AME) are reported, standard errors are in parentheses (calculated with bootstrap, 1.000 replications). Logistic regression estimates using multiply imputed data of five implicate. ***p < 0.01, **p < 0.05, *p < 0.1.

Source: HFCS; National Bank of Slovakia; own calculation.

Regarding employment status, the results suggest that households with an unemployed reference person were, on average, 20% less likely to have only mortgage debt than households with an employed reference person. Overall, the employment status of households does not have a significant impact on the likelihood of having other types of debt.

Furthermore, the effect of education on debt is strongly moderated by income: among low-income individuals, higher education often reduces the likelihood of holding debt – particularly mortgage debt – while among high-income individuals, higher education significantly increases the likelihood of having debt, amplifying the effect of income. This pattern is most pronounced for mortgage debt, where the combination of high income and high education is the strongest predictor of debt ownership. A key interpretation of our findings is that higher educational attainment improves a household's capacity for realistic financial self-assessment. This helps explain the observed behaviour of low-income households in the credit market. While they may aspire to homeownership, those with higher education appear to more accurately judge their inability to sustain long-term mortgage repayments. Consequently, they prudently avoid entering mortgage contracts, a behaviour consistent with our regression outcomes.

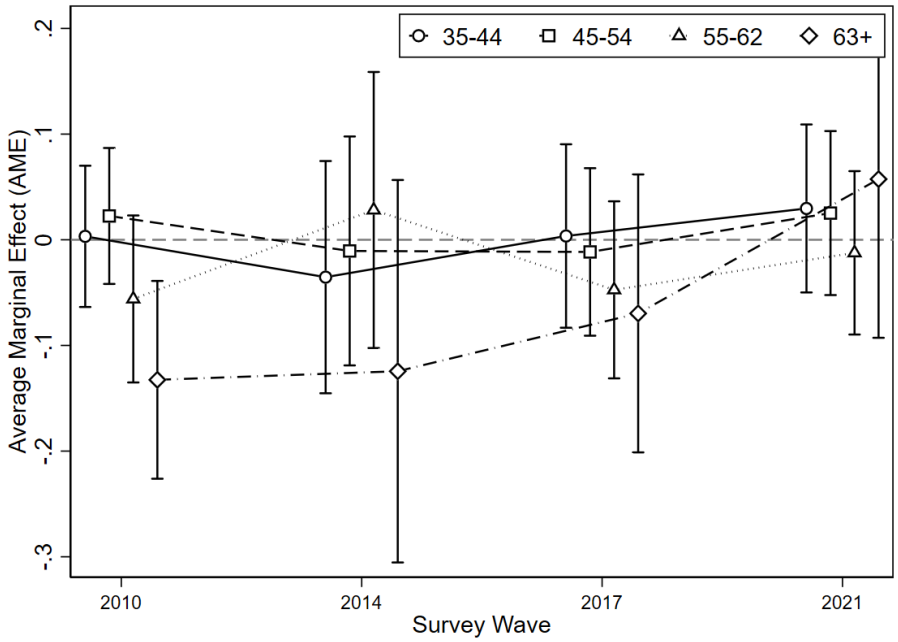
As a robustness check, we conducted additional estimations that incorporated wealth as an explanatory variable (see Appendix). These supplementary analyses indicate that wealth is a statistically significant determinant of debt holding. The increasing coefficients on gross wealth across wealth quintiles imply that the probability of having only a mortgage debt should increase with the purchased property's value, given that most mortgages are used to purchase property as collateral. A substantial part, up to 90%, of the gross wealth of Slovak households consists of real assets, while only 10% is accounted for by financial assets. Within the real assets category, the majority (70%) is derived from the value of the household's main dwelling (Cupak et al., 2023). Moreover, given that gross wealth consists mainly of real assets, which can be used as collateral to secure loans, higher real wealth is expected to facilitate accessing credit. For non-mortgage debt, the coefficient tends to decrease across gross wealth quintiles, aligning with the expectation that households with higher gross wealth may have less need to finance minor expenditures using consumer or non-mortgage debt.

Overall, our analysis reveals that the typical Slovak household with debt – primarily driven by mortgages – aligns with a key life-cycle stage. The household is generally young, with the head aged between 20 and 34, and is supporting one or two dependent children. This profile is underpinned by strong economic credentials: the head of household is employed, has achieved a secondary or tertiary level of education, and the household's income and wealth places it in the top (fifth) quintile of the distribution.

According to our results, age and wealth are the most significant determinants affecting Slovak households' debt participation probability. Since our results point out the important role of these factors in terms of indebtedness, we plot their coefficients over time. We investigated the relationship between age and different types of debt holdings (secured, unsecured, and overall) and found that the link between age and unsecured (non-mortgage) debt exhibits an unexpected trend that warrants closer examination. Figure 5 displays the average marginal effects (AMEs) of different age cohorts on the probability of having non-mortgage debt for the survey waves 2010, 2014, 2017, and 2021. The reference category is the 20 – 34 age group. Points represent the AME, and vertical lines indicate the 95% confidence intervals.

F i g u r e 5

Average Marginal Effect on Likelihood of Having Non-Mortgage Debt across Waves



Source: HFCS; National Bank of Slovakia; own calculation.

The likelihood of holding non-mortgage debt for the 35 – 44 (circles) and 45 – 54 (squares) or 55 – 62 (triangles) age groups generally hovers close to that of the 20 – 34 reference group. The most distinct pattern is observed for the 63+ age group (diamonds). In 2010, this group was significantly less likely to hold non-mortgage debt compared to the 20 – 34 age group, as indicated by a negative AME whose confidence interval is entirely below the zero line. Over the subsequent

decade, this effect diminished. The point estimate trended upwards towards zero, and by 2017, the difference was no longer statistically significant. This suggests a convergence in debt-holding behaviour between the oldest and youngest cohorts over this period. This trend may reflect a convergence of powerful forces: rising costs of essential goods, the distinct financial behaviours of the Baby Boomer generation, and the economic pressures associated with increasing longevity. This finding is in line with Lusardi (2020), who shows that an increasing share of older adults holds debt later in life compared to previous cohorts. A deeper understanding of these dynamics would be a valuable direction for future research.

In addition, we examined the development of the average marginal effects (AME) of wealth quintiles on all types of debt. Across all HFCS waves, however, no statistically significant differences were observed. This suggests that the influence of wealth on any, mortgage or nonmortgage debt participation has remained relatively stable over time.

Our logistic regression analysis reveals that the key socio-demographic and economic determinants influencing the probability of Slovak households holding debt are the age of the reference person, the number of dependent children, and gross wealth. This aligns with findings from several studies, such as Cox and Jappelli (1993) or Crook (2001). Our results confirm the profile of a typical indebted household – primarily driven by mortgage borrowing – as generally young, with a head aged between 20 and 34, supporting one or two dependent children, and situated in the top quintile of the income and wealth distribution. Furthermore, our findings indicate a relationship between education and debt (see also Fessler et al., 2015). However, we show that higher educational attainment enhances a household's capacity for realistic financial self-assessment, leading educated but low-income households to prudently avoid mortgage contracts they cannot sustain.

Moreover, the most distinct pattern to emerge from our analysis is the changing role of age. While younger households remain the most indebted, we observe a notable shift regarding older cohorts. Contrary to the findings Fessler et al. (2015), in the 63+ age group the likelihood of holding non-mortgage debt has increased over the last decade, narrowing the gap with the youngest households and deviating from the classic LCH profile. Our results are consistent with Lusardi (2020), who concludes that cohorts of older adults are increasingly holding debt. There is a risk that this trend will limit the ability of customers who are in financial difficulty or have inadequate pension provisions to reduce their debt repayments by extending the duration of their loans. We recommend that policymakers closely monitor this trend in the future. The high indebtedness among retired households may raise concerns about their social and financial stability. To address these issues, it is decisive for policymakers to have detailed knowledge about the

distribution of household indebtedness. Our study contributes to this understanding and highlights the need to closely monitor these evolving demographic trends to ensure financial stability.

Conclusions

Our study examines the factors that form indebtedness in Slovakia and how these patterns have evolved across recent HFCS waves. Slovak households have recorded the highest annual debt growth among European Union countries for several consecutive years (e.g., ECB, 2013; ECB, 2016). Our analysis builds on the Life-Cycle Hypothesis (LCH), which posits that individuals borrow early in life and repay later. Yet, recent evidence (e.g., Lusardi, 2020) shows older cohorts increasingly holding debt, while Slovak studies identify younger households as the most indebted (Fessler et al., 2015). These contrasting findings highlight the need for an updated analysis of Slovak indebtedness across socio-demographic groups, especially in light of recent demographic changes.

Our analysis confirms an increase in household participation in the debt market in 2021, with 38% of households owning various debt instruments (mortgage or non-mortgage debt), compared to just 27% in 2010. During the initial three waves of data collection for the HFCS, most indebted households held non-mortgage debt. However, in the last wave in 2021, this trend shifted towards mortgage debt, and most indebted households in the survey (21.3%) had mortgage debt.

Overall, our logistic regression shows that the typical indebted Slovak household reflects a key life-cycle stage: a young head aged 20 – 34, supporting one or two children, employed, with secondary or tertiary education, and positioned in the top income and wealth quintile. Our findings indicate a marked convergence in non-mortgage debt holdings across age groups: while older adults (63+) were initially much less likely than younger households (20 – 34) to hold such debt, this gap has narrowed over time, and by 2017 it was no longer statistically significant, suggesting a shift in the traditional life-cycle pattern of indebtedness. To our knowledge, this specific development among older Slovak households has not been sufficiently examined in the literature, and it would be beneficial for future research to verify and explain this trend.

A limitation of our study is the primarily cross-sectional nature of the HFCS data. While the survey design allows for a small subset of households to be tracked over time, our analysis treats each wave as a distinct snapshot. Finally, our findings rely on self-reported data, which is subject to potential measurement error. Households may not recall financial details with perfect accuracy or may be inclined to underreport liabilities and overreport assets.

References

CESNAK, M. – CUPAK, A. – KLACSO, J. (2025): Determinants of Households' Indebtedness – Evidence Based on Newly Available Slovak Microdata. Slovak Statistics and Demography, 3/2025. Available at: <https://ssad.statistics.sk/SSaD/index.php/determinanty-zadlzenosti-domacnosti-zistenia-na-zaklade-novych-dostupnych-slovenskych-mikro-dat/>.

CESNAK, M. – CUPAK, A. – KLACSO, J. – ŠUSTER, M. (2023): The Impact of Loan Payment Deferral on Indebted Households and Financial Stability during the Covid-19 Pandemic: Survey Results from Slovakia. Czech Journal of Economics and Finance (Finance a Úvěr), *73*, No. 3, pp. 220 – 250. DOI: 10.32065/CJEF.2023.03.01.

CLARK, R. L. – LUSARDI, A. – MITCHELL, O. S. (2021): Financial Fragility during the COVID-19 Pandemic. AEA Papers and Proceedings, *111*, May, pp. 292 – 296. DOI: 10.1257/pandp.20211000.

COSTA, S. – FARINHA, L. (2012): Households' Indebtedness: A Microeconomic Analysis based on the Results of the Households' Financial and Consumption Survey. [BDP Economic Bulletin and Financial Stability Report.] Lisboa: National Bank of Portugal.

COX, D. – JAPPELLI, T. (1993): The Effect of Borrowing Constraints on Consumer Liabilities. Journal of Money, Credit and Banking, *25*, No. 2, pp. 197 – 213. DOI: 10.2307/2077836.

CROOK, J. (2001): The Demand for Household Debt in the USA: Evidence from the 1995 Survey of Consumer Finance. Applied Financial Economics, *11*, No. 1, pp. 83 – 91. DOI: 10.1080/09603100150210291.

CUPAK, A. – KUCSEROVÁ, J. J. – KLACSO, J. – STRACHOTOVÁ, A. (2023): Household Finance and Consumption Survey 2021: Results from Slovakia. [NBS Working and Discussion Paper, No. 2.] Bratislava: National Bank of Slovakia.

CUPAK, A. – STRACHOTOVÁ, A. (2015): Výsledky druhej vlny HFCS. [Príležitostná štúdia NBS, 2/2015, No. 2 (2015), pp. 1 – 70.] Bratislava: Národná banka Slovenska, November 2015.

DEBELLE, G. (2004): Macroeconomic Implications of Rising Household Debt. [BIS Working Paper, No. 153.] Basel: Bank for International Settlements.

DEL-RIO, A. – YOUNG, G. (2005): The Determinants of Unsecured Borrowing: Evidence from the British Household Panel Survey. [BoE Working Paper, No. 263.] London: Bank of England.

ECB (2013): The Eurosystem Household Finance and Consumption Survey. Results from the First Wave. [Statistics Paper Series, No. 2.] Frankfurt am Main: European Central Bank.

ECB (2016): The Eurosystem Household Finance and Consumption Survey. Results from the Second Wave. Frankfurt am Main: European Central Bank.

EUROSTAT (2022): Gross Debt-to-Income Ratio of Households. Available at: <https://ec.europa.eu/eurostat/databrowser/view/tec00104/default/table?lang=en>.

EUROSTAT (2021): Owning or Renting? What Is the EU's Housing Situation? Available at: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-20211230-1>.

FASIANOS, A. – GODIN, A. – KINSELLA, S. – WU, W. (2014): Household Indebtedness and Financial Fragility across Age Cohorts. Evidence from European Countries. [Working Paper.] Limerick: University of Limerick.

FESSLER, P. – JÄGER-GYOVAI, K. (2015): What Can We Learn from Eurosystem Household Finance and Consumption Survey Data? – An Application to Household Debt in Slovakia. Focus on European Economic Integration, Oesterreichische Nationalbank (Austrian Central Bank), No. 2, pp. 76 – 87.

INTERNATIONAL MONETARY FUND (2017): Global Financial Stability Report: Is Growth at Risk? Washington, DC: IMF, October. Available at: <https://www.elibrary.imf.org/display/book/9781484308394/9781484308394.xml>.

KUKK, M. (2014): Distinguishing the Components of Household Financial Wealth: The Impact of Liabilities on Assets in Euro Area Countries. [Bank of Estonia Working Papers, No. 2.] Tallinn: Bank of Estonia.

LITTLE, R. – RUBIN, D. B. (2002): Statistical Analysis with Missing Data. Second ed. New York: John Wiley.

LUSARDI, A. – MITCHELL, O. S. – OGGERO, N. (2020): Debt and Financial Vulnerability on the Verge of Retirement. Journal of Money, Credit and Banking, *52*, No. 5, pp. 1005 – 1034. DOI: 10.1111/jmcb.12671.

MESSNER, T. – ZAVADIL, T. (2015): Are Indebted Households Poorer? Evidence from Slovakia. [NBS Working and Discussion Paper, No. 2.] Bratislava: National Bank of Slovakia. Available at: <https://nbs.sk/_img/documents/publik/wp_2_2015_zavadil_messner_indebted_households_slovakia.pdf>.

MIAN, A. – SUFI, A. – VERNER, E. (2017): Household Debt and Business Cycles Worldwide. The Quarterly Journal of Economics, *132*, No. 4, pp. 1755 – 1817. DOI: 10.1093/qje/qjx017.

NATIONAL BANK OF SLOVAKIA (2019): Financial Stability Report, November 2019. Bratislava: NBS. Available at: <https://nbs.sk/_img/documents/zaklnbs/publik/sfs/fsr_112019.pdf>.

PIOVARČI, V. (2021): The effect of Socio-Economic and Demographic Factors on Household Indebtedness: Evidence from Slovakia. Ekonomické rozhľady / Economic Review, *50*, No. 2, pp. 181 – 202.

RICHTÁRIK, Š. (2017): Vplyv nízkych úrokových sadzieb na finančnú stabilitu na Slovensku. Biatec, *25*, No. 3, pp. 2 – 6.

SCOTT, S. J. – FREESE, J. (2014): Regression Models for Categorical Dependent Variables Using Stata. Third edition. College Station: Stata Press. ISBN 1-59718-111-0.

STATISTICAL OFFICE OF SLOVAK REPUBLIC (2024): Hlavné trendy populačného vývoja v SR [Main Trends in Population Development in the Slovak Republic.] Bratislava: Statistical Office of Slovak Republic. ISBN 978-80-8121-990-0.

ŠPROCHA, B. – BLEHA, B. – VAŇO, B. (2024): Kmeňová populačná prognóza Slovenska (2022 – 2080). [Core Population Projection of Slovakia (2022 – 2080).] Bratislava: INFOSTAT – Výskumné demografické centrum. ISBN: 978-80-89398-49-2. Available at: <https://www.humannageografia.sk/stiahnutie/Kmenova_populacna_prognoza_Slovenska_2022-2080.pdf>.

YILMAZER, T. – DEVANEY, S. A. (2005): Household Debt Over the Life Cycle. Financial Services Review, *14,* No. 4, pp. 285 – 304.

Appendix

Robustness Check
Logit Regression Results: Secured and Unsecured Debt in 2021

	Any debt	Any debt	Only Mortgage debt	Only Mortgage debt	Only Non-mortgage debt	Only Non-mortgage debt
	Odds ratio	**AME**	**Odds ratio**	**AME**	**Odds ratio**	**AME**
Age of Reference Person (base 16 – 34)						
35 – 44	0.95 (0.2716)	–0.01 (0.0623)	0.90 (0.2707)	–0.02 (0.0595)	1.36 (0.5478)	0.03 (0.0368)
45 – 54	0.49** (0.1396)	–0.15** (0.0611)	0.45** (0.1438)	–0.15** (0.0608)	1.49 (0.5745)	0.04 (0.0359)
55 – 62	0.21*** (0.0680)	–0.32*** (0.0687)	0.17*** (0.0603)	–0.26*** (0.0619)	1.20 (0.4949)	0.02 (0.0370)
63+	0.17*** (0.0933)	–0.35*** (0.1076)	0.04*** (0.0304)	–0.34*** (0.0762)	2.20 (1.4243)	0.09 (0.0788)
Nr. of dependent children (base Childless)						
1	1.67** (0.3677)	0.09** (0.0418)	1.91** (0.4936)	0.08** (0.0350)	0.90 (0.3009)	–0.01 (0.0348)
2	1.64** (0.3606)	0.09** (0.0418)	1.85*** (0.4380)	0.08** (0.0318)	1.13 (0.3059)	0.01 (0.0312)
3 and more	1.38 (0.4430)	0.06 (0.0594)	1.88 (0.7756)	0.08 (0.0576)	0.66 (0.3220)	–0.04 (0.0415)
Gender of Reference Person (base Male)						
Female	0.80 (0.1388)	–0.04 (0.0305)	0.54*** (0.1209)	–0.07*** (0.0261)	1.24 (0.2848)	0.02 (0.0258)
Education of Reference Person (base Primary)						
Secondary	0.65 (0.2708)	–0.07 (0.0720)	1.48 (1.4173)	0.05 (0.1041)	0.66 (0.2613)	–0.05 (0.0556)
Tertiary	0.66 (0.3014)	–0.07 (0.0788)	1.80 (1.7708)	0.07 (0.1078)	0.48 (0.2214)	–0.08 (0.0591)
Main labour status of Reference Person (base Employee)						
Self-employed	0.99 (0.2440)	–0.00 (0.0482)	0.90 (0.2279)	–0.01 (0.0319)	1.36 (0.4189)	0.05 (0.0484)
Unemployed	0.37* (0.2223)	–0.18* (0.0964)	0.06*** (0.0675)	–0.19*** (0.0288)	1.22 (0.8431)	0.03 (0.1039)
Retired	0.41* (0.2175)	–0.16* (0.0964)	0.96 (0.8793)	–0.00 (0.1164)	0.20*** (0.1227)	–0.13*** (0.0434)
Other	0.60 (0.5381)	–0.10 (0.1639)	1.75 (1.1947)	0.08 (0.0981)	0.36 (0.3276)	–0.10 (0.0660)
Gross Income Quintiles (base I quintile)						
II quintile	0.98 (0.2656)	–0.00 (0.0473)	0.94 (0.3333)	–0.01 (0.0444)	1.50 (0.4821)	0.04 (0.0283)
III quintile	1.54 (0.4336)	0.08 (0.0509)	1.14 (0.4131)	0.02 (0.0463)	1.64 (0.6128)	0.04 (0.0343)
IV quintile	1.12 (0.3288)	0.02 (0.0520)	0.78 (0.2849)	–0.03 (0.0447)	2.18** (0.8547)	0.08* (0.0402)
V quintile	1.82* (0.6303)	0.11* (0.0635)	1.31 (0.5366)	0.03 (0.0534)	2.23* (0.9406)	0.08* (0.0446)

Gross Wealth Quintiles (base I quintile)						
II quintile	1.28 (0.3511)	0.04 (0.0473)	2.92*** (1.1436)	0.10*** (0.0344)	0.50** (0.1450)	–0.11** (0.0460)
III quintile	1.49 (0.4115)	0.07 (0.0478)	4.52*** (1.6978)	0.16*** (0.0357)	0.33*** (0.1142)	–0.15*** (0.0474)
IV quintile	1.73* (0.4963)	0.10* (0.0501)	5.29*** (1.9859)	0.18*** (0.0367)	0.33*** (0.1093)	–0.15*** (0.0467)
V quintile	1.50 (0.4539)	0.07 (0.0526)	6.36*** (2.5485)	0.21*** (0.0402)	0.16*** (0.0630)	–0.20*** (0.0463)
Constant	1.28 (0.5880)		0.10** (0.1007)		0.29** (0.1607)	
Observations	2,174	2,174	2,174	2,174	2,174	2,174

Note: Odds ratio and average marginal effects (AME) are reported, standard errors are in parentheses (calculated with bootstrap, 1.000 replications). Logistic regression estimates using multiply imputed data of five implicate. ***p < 0.01, **p < 0.05, *p < 0.1.

Source: HFCS; National Bank of Slovakia; own calculation.