



Are Indebted Households Poorer?¹

Tibor Zavadil
Národná banka Slovenska

This article analyses the impact of household indebtedness on household net wealth, using Slovak data from the first wave of the Household Finance and Consumption Survey (HFCS). We find two different effects of household indebtedness on wealth – a highly negative impact of non-mortgage debt and a neutral effect of mortgage debt. Furthermore, we find that households living in bigger municipalities and more developed regions are both wealthier and more indebted, which confirms the fact that higher net wealth tends to be associated with more debt and leverage.

1 This is an extract from Messner and Zavadil (2015). I would like to thank Martin Šuster and Pavel Gertler for valuable comments.

2 Growth was faster before the crisis and dropped below 10% between 2007 and 2011; see Brandmeir et al. (2012).

3 Source: Eurostat database, available online at <http://appsso.eurostat.ec.europa.eu>.

INTRODUCTION

Slovakia exhibits an interesting pattern of wealth, income and debt relationships. To understand their developments we need to look at the recent economic history, which dates back to 1989 – the year of the famous Velvet Revolution that caused a fall of communist regime in former Czechoslovakia. Since then Slovakia has undergone huge political and social changes, transforming from a centrally-planned to an open-market economy. During this period Slovak households have experienced a remarkable transition from a very limited private ownership and almost perfect equality to a market economy and significant wealth redistribution. The living standards of Slovak households have generally improved mainly thanks to the ongoing convergence process between transitional and advanced economies in Europe. New credit markets have facilitated borrowing to households and provided additional financial resources to allow investments and to finance extra consumption needs.

Since 2000 the net financial assets per capita have increased in Eastern Europe on average by almost 12% per year.² Likewise, household debt has also been increasing quickly over the last two decades, especially in the Central-Eastern European countries. In Slovakia, the household-debt-to-income ratio quadrupled over the past decade, increasing from approximately 9% in 2002 to 45% in 2012.³ Stefanides and Arady (2013) explain this fast expansion by a combination of supply and demand factors. On the supply side, they argue that the privatization of the largest banks in early 2000's by strong foreign retail banking groups associated with inflow of fresh capital enabled utilizing the consumer and mortgage lending potential in the country. On the demand side, it was fast income growth and a decline in interest rates that contributed to the credit boom. The observed common trend in the growth of private debt and wealth motivates us to analyse how household indebtedness influences household net wealth.

Due to different characteristics of loans, we distinguish between mortgage and non-mortgage debt. *Mortgage debt* refers to a collateralised debt that serves households mainly to purchase their housing residence, which is then used as collat-

eral. On the other hand, *non-mortgage debt* includes any kind of non-collateralised loan, such as credit line/overdraft, credit card debt, consumer loan, etc. While mortgages typically involve high principal amounts with long maturities and relatively low interest rates, non-mortgage loans are mostly short-term debts with low amounts and higher interest rates, usually aimed at buying consumable goods and services.

Consumer loans have been increasing faster than mortgage loans in Slovakia due to their greater flexibility and low principal amounts (see Rychtárik and Ličák, 2006). Indeed in 2010, 20% of Slovak households were exposed to non-mortgage debt, while the penetration of mortgage debt was less than 10% of households. In terms of debt volumes, however, over 80% of total household debt was concentrated in mortgage debt, while only 20% accounted for non-mortgage debt (see Messner and Zavadil, 2014, Table 3.1 and 3.2).

In comparison to other countries, the participation of Slovak households in mortgage market is one of the lowest in Europe. The reason is a structural change that dates back to early 1990's, when many households were offered to purchase their main residence (previously coop or state-owned flats), priced well under the market-clearing level. Thus, Slovak households yet still have a high homeownership rate and a relatively low debt. Compared to the euro-area average main-residence ownership at 60% and a 23% penetration of mortgage debt, these shares are 90% and 10%, respectively, in Slovakia (see HFCN, 2013, Table 2.1 and 3.1).

We account for this structural change in the housing market by recognizing the households that acquired their main residence before 1990, i.e. during communism when no credit market existed yet. We will also distinguish total wealth from financial wealth that is unaffected by real-estate ownership and has been accumulated mainly after the communist era. *Total net wealth* is defined as the difference between total assets and total liabilities, while *financial net wealth* is defined as the sum of all financial assets (i.e. deposits, mutual funds, bonds, shares, non-self-employment business wealth and managed accounts) net of non-mortgage debt.



Our analysis shows that household indebtedness has two different effects on household net wealth. While non-mortgage debt impacts negatively on wealth, the effect of mortgage debt is neutral (insignificantly positive). This result confirms that households with non-mortgage debt are more financially vulnerable, which has already been shown by Albacete and Lindner (2013) in Austria or Cavalletti et al. (2014) in Italy. Furthermore, we find that households living in larger municipalities and more developed regions are both wealthier and more indebted, which supports the convergence pattern discussed earlier. Finally, we confirm the findings of the previous literature that household wealth is mainly determined by income, home ownership, inheritance, household composition, the main characteristics of the household head, and by demographic and economic conditions in the region where households live.

DATA

We use data from the first wave of the Slovak Household Finance and Consumption Survey (HFCS) that were collected in the last quarter of 2010. These data provide detailed information on household assets, liabilities, income and consumption on a sample of 2,057 households proportionally distributed across all regions in Slovakia.⁴ We match these household-level data with the demographic and economic data on Slovak regions that are available from the Regional Statistics Database of the Statistical Office of the Slovak republic (see Messner and Zavadil, 2015, Table 1). Combining these two types of data allows us to identify the impact of regional characteristics on household indebtedness and wealth.⁵

For the purpose of our analysis we will use a wide range of *explanatory variables* (denoted by X_i in the next section), which we split for convenience into the following three groups:

1. Household characteristics: household total income, way of acquiring the household main residence (HMR), and household composition (number of adults and children);
2. Characteristics of the reference person (RP)⁶: age, working status and education;
3. Regional characteristics: size of municipality, regional GDP per capita, unemployment rate, population and area of the region, and average living area of residences in the region.

Besides that we will also use the following three *instrumental variables* (denoted by Z_i in the next section): i) income expectations, ii) savings-to-income ratio and iii) the indicator of whether the HMR was acquired after 1990. All these variables are described in detail in Messner and Zavadil (2015, Table 8).

For each *categorical variable*, namely the way of acquiring the HMR, income expectations, all variables characterising the household's RP, and the size of municipality, we choose a *reference group* (RG) that represents a typical household in Slovakia. Our RG household purchased its HMR, has neutral income expectations, lives in a large ag-

glomeration (with more than 100,000 inhabitants), its reference person is middle aged (between 35 and 44 years old), employed and achieved secondary education. We will compare all other types of households to this RG household.

MODEL

We model household total and financial net wealth independently, using the following equation:

$$W_i = \alpha + \beta X_i + \gamma D_i + \varepsilon_i, \quad (W)$$

where $i = 1, \dots, N$ denotes households, W_i is net wealth (either total or financial) of a household i , X_i is a set of its exogenous characteristics (including the regional ones), D_i is the indicator of whether the household i has a debt ($D_i = 1$) or not ($D_i = 0$), distinguishing mortgage and non-mortgage debt, and ε_i is a zero-mean error.

Household indebtedness and wealth are interconnected by nature since wealthy households can afford to take on more debt. Therefore, the debt indicator D_i (for both mortgage and non-mortgage debt) is endogenous in the above-mentioned wealth model (W).⁷ Hence, we cannot estimate this model by the standard OLS method, because the estimated coefficients would be biased. The underlying endogeneity problem can be resolved by using a *three-step instrumental-variable (IV) approach* proposed by Wooldridge (2002), which consists of the following three steps. First we model the incidence of debt (independently for mortgage and non-mortgage debt) by a probit model, which takes the following form:

$$\Pr(D_i = 1 | X_i, Z_i) = \Phi(a + bX_i + cZ_i + u_i), \quad (D)$$

where Z_i is a set of instrumental variables,⁸ u_i is a standard normal error, and Φ is the cumulative distribution function of the standard normal distribution. In the first step, we estimate this model by the maximum likelihood method and obtain the fitted probabilities $\hat{D}_i = \Phi(\hat{a} + \hat{b}X_i + \hat{c}Z_i)$. Then, in the second step, we estimate an auxiliary model $D_i = d + eX_i + f\hat{D}_i + v_i$ by OLS and obtain the predicted values $\tilde{D}_i = \hat{d} + \hat{e}X_i + \hat{f}\hat{D}_i$. Finally, in the third step, we substitute D_i in the wealth model (W) with the predicted values \tilde{D}_i and estimate it by OLS.

This estimation procedure has two main advantages. First, it is asymptotically efficient (under the assumption of error homoscedasticity). Second, it allows us to analyse the determinants of household indebtedness and wealth at the same time.

DETERMINANTS OF HOUSEHOLD INDEBTEDNESS

First three columns in Table 1 report the estimated coefficients of the probit model (D) for both mortgage and non-mortgage debt. The first section of the table reports the estimates for household characteristics, starting with the instrumental variables. The results show that the household decision whether to take out a loan is

- 4 More information about the Household Finance and Consumption Survey (HFCS) is available at http://www.ecb.europa.eu/home/html/researcher_hfccn.en.html. Results from the first wave of the HFCS in Slovakia are described in Senaj and Zavadil (2012).
- 5 A detailed descriptive analysis of the differences in household indebtedness and wealth across Slovak regions is provided by Messner and Zavadil (2014).
- 6 The household reference person (RP) is chosen according to the international standards of the so-called Canberra Group, which uses the following sequential steps to determine a unique reference person in the household: i) a lone parent with dependent children or one of the partners in a registered or de facto marriage (with or without dependent children); ii) the person with the highest income; iii) the eldest person.
- 7 The endogeneity of D_i is confirmed also statistically by the Durbin-Wu-Hausman test (see Messner and Zavadil, 2015, Table 2).
- 8 The validity of the selected instruments (specified in the previous section) is supported by the Sargan test (see Messner and Zavadil, 2015, Section 4).



influenced by its income expectations. Households expecting their income to rise more than prices are more willing to take out a mortgage, but less willing to take on a non-mortgage debt. Also the accumulation of savings decreases the probability of non-mortgage debt since savings are liquid assets that facilitate purchases of non-durable goods without any necessity to take out a loan. On the other hand, savings have no impact on the household decision to take out a mortgage since the purchase of real estate usually cannot be financed only from savings. Finally, as expected, the households that acquired their HMR after 1990 are much more likely to be indebted, since the emergence of credit market allowed households to take out loans.

Another important determinant of household indebtedness is the way of acquiring the household main residence (HMR). Unsurprisingly, the probability of having a mortgage decreases significantly when the household inherited its HMR, obtained it as a gift or does not own the HMR (i.e. is a renter or a free user), compared to the reference group of households that purchased their HMR. On the other hand, the way of acquiring the HMR does not influence the household decision to take on non-mortgage debt.

Household structure also influences indebtedness. Households with more adults are less exposed to mortgage debt (since they represent multigenerational households), but have a higher chance of non-mortgage debt. On the other hand, households with more children are more likely to have a mortgage.

The second panel of Table 1 shows the impact of household head characteristics on the incidence of household debt. Looking at the age of the reference person we observe a typical hump-shaped profile for mortgage debt, suggesting that middle-aged households are more likely to take out a mortgage than young or old households. On the other hand, the incidence of non-mortgage debt is almost constant (i.e. with no significant differences) among all age groups of households, except for the oldest one (with the reference person 55+ years old), where it is significantly lower. The working status and education of the reference person has a limited impact on the incidence of debt. The only significant results are that the households with a retired reference person are less likely to be indebted, and that the households with a primary educated reference person are less likely to have non-mortgage debt.

Concerning the regional characteristics, the size of municipality has no impact on the incidence of mortgage debt, but non-mortgage debt is much more prevalent in big cities. This is caused by a higher concentration of companies supplying credit as well as by a more stimulated demand coming from a constant pressure of shop windows and commercials. Also households in more developed regions (with a higher GDP per capita and lower unemployment) are more indebted. Likewise, demographic characteristics of the re-

gion influence household indebtedness, especially the incidence of non-mortgage debt, which is more prevalent in larger and more populated regions with larger residences.

A summary of the above-mentioned results is provided in Table 2 that describes a prototype of indebted household in Slovakia. A typical indebted household acquired its HMR after 1990, has a reference person that is not retired, and lives in a large region with a high GDP per capita, low unemployment and larger residences. These are the factors that influence the incidence of both mortgage and non-mortgage debt. A typical household with only mortgage debt has positive income expectations, purchased or self-constructed its HMR, consists of fewer adults and more children, and its reference person is rather young (aged between 25 and 34 years). On the other hand, a typical household with only non-mortgage debt has neutral or negative income expectations, has few savings (relative to the total income), consists of more adults, its reference person is below 55 years old and has at least secondary education, and lives in a big city in a more populated region.

DETERMINANTS OF HOUSEHOLD WEALTH

The estimation results of the main model (W) for both total and financial net wealth are presented in the last two columns of Table 1. The first two coefficients show the impact of household indebtedness on wealth. We can see that while the incidence of mortgage debt has a positive, though insignificant, effect on net wealth, the incidence of non-mortgage debt has a significantly negative impact on both total and financial net wealth. The estimated coefficients suggest that a 1% higher probability of non-mortgage debt is associated with a decrease in household total net wealth by EUR 1,700 and in financial net wealth by EUR 700.

Other important determinants of household net wealth are total income and the possession of the household main residence (HMR). Households that do not own their HMR are significantly poorer than the owners. Even among the owners there are significant differences in wealth; the households that self-constructed or inherited their HMR are richer than the households that purchased it. On the other hand, the households that self-constructed their HMR have lower financial net wealth.

The household composition also affects wealth. While a higher number of adults increases household wealth, the effect of having children is opposite (though insignificant for total wealth). This result is quite intuitive regarding that child upbringing and education is costly and therefore consumes household liquid assets. On the other hand, adults help accumulate financial assets by receiving regular income.

We also observe that young households are poorer than other households. While total net wealth does not decrease among older households (compared to the middle-aged ones),



Table 1 Determinants of mortgage/non-mortgage debt and total/financial net wealth

	Mortgage debt	Non-mortgage debt	Total net wealth	Financial net wealth
Household characteristics				
Income expectations (RG = Neutral)				
Pessimistic	0.049	0.032		
Optimistic	0.346**	-0.345**		
Savings to income ratio	-0.194	-0.809***		
HMR acquired after 1990	1.074***	0.285**		
Probability of mortgage debt (in %)			362	1,078
Probability of non-mortgage debt (in %)			-1,692***	-700***
Log(income)	0.005	0.041	18,731***	3,512***
Way of acquisition of the HMR (RG = Purchased)				
Self-construction	0.147	-0.117	46,131***	-4,113***
Inheritance	-1.038***	0.021	20,595***	-1,278
Gift	-0.779**	0.073	4,774	2,884
Does not own HMR	-1.913***	-0.009	-47,729***	134
Number of adult members (16+ years)	-0.116*	0.163**	11,481***	3,440***
Number of children in household	0.127*	-0.104	-4,199	-1,905***
Characteristics of the household reference person				
Age (RG = 35 – 44 years)				
16 – 24 years	-0.129	-0.156	-15,468*	-3,877*
25 – 34 years	0.328**	0.063	-15,625**	715
45 – 54 years	-0.366**	-0.004	-5,172	-491
55+ years	-0.494**	-0.326*	-3,750	-5,515***
Working status (RG = Employed)				
Self-employed	0.172	0.150	55,092***	8,448***
Unemployed	0.165	0.420	77,717***	11,738***
Retired	-1.134**	-0.358*	-17,192**	-2,781*
Other not working	-0.325	0.007	4,602	1,426
Education (RG = Secondary)				
Primary	-0.398	-0.650**	-19,657**	-8,530***
Tertiary	0.070	-0.074	18,931***	-1,345
Regional characteristics				
Size of municipality (RG = 100,000+ inhabitants)				
20,001 – 100,000	-0.315	-0.490**	-31,211***	-5,233***
2,001 – 20,000	-0.082	-0.522***	-49,099***	-6,824***
less than 2,000	0.079	-0.437*	-59,957***	-5,011***
GDP per capita (in 1,000 EUR)	0.067*	0.231***	9,066***	3,401***
Unemployment rate (in %)	-0.266**	-0.806***	-28,717***	-11,830***
Log(population)	0.551	2.171***	149,628***	38,191***
Area (1,000 km²)	0.246*	0.888***	27,922***	12,726***
Average living area of residences (in m²)	0.043*	0.107***	969	1,297***
Constant	-13.572	-44.068***	-2,351,325***	-707,103***

Abbreviations: HMR = household main residence, RG = reference group.
Significance: * = 10%, ** = 5%, *** = 1%.

financial net wealth exhibits a typical hump-shaped pattern over the age of the RP. This relates to consumption smoothing over the life cycle – while young households just begin to accumulate financial assets; old households spend them to compensate for a reduction in their income.

The working status of RP also affects household wealth. Self-employed households are significantly richer than the employed ones, since entrepreneurs have usually higher income than employees, which allows them to accumulate more assets. Moreover, entrepreneurs experience





9 The average total (resp. financial) net wealth of unemployed households is below EUR 50,000 (resp. around EUR 1,300), while it is above EUR 60,000 (resp. around EUR 4,400) for employed ones.

Table 2 Description of a typical indebted household in Slovakia

MORTGAGE DEBT	NON-MORTGAGE DEBT
A typical indebted household ...	
has positive income expectations	has neutral or negative income expectations
purchased or self-constructed its main residence	has few savings (relative to income)
acquired its main residence after 1990	
consists of fewer adults and more children	consists of more adults
... has a reference person that ...	
is between 25 – 34 years old	is below 55 years old
is not retired	
	has at least secondary education
... and lives in ...	
	a big municipality
a region with high GDP per capita	
a region with low unemployment	
	a more populated region
a large region	
a region with larger residences	

a higher income volatility, which motivates them to build up bigger precautionary savings. Surprisingly, the estimated coefficient for households with unemployed RP is significantly positive, suggesting at the first sight that unemployed households should be wealthier than employed ones. This is, however, not true;⁹ therefore we have to interpret the estimated coefficient conditionally on other variables, particularly on income: if two households – one employed and the other unemployed – have the same income, then the unemployed household must be richer than the employed one, because it must have some non-labour income from additional capital that the employed household does not own. Finally, households with a retired RP have significantly lower net wealth than households with an employed RP. Besides the already-mentioned life-cycle consumption smoothing, this result may be related also to inter-generational transfers. In Slovakia it is quite common that elderly parents give a part of their property to their adult children to help them become independent.

Table 1 also demonstrates that households with a more educated RP are wealthier. One could argue that it is because wealthier households can afford better education, but this is not the case in Slovakia, where education has since long been provided mostly free of charge, and thus affordable for almost everyone.

Households living in smaller towns and villages are significantly less wealthy, which is caused mainly by higher property prices and better employment opportunities in large cities. This is also reflected in the estimation of other regional coefficients. Households are wealthier in larger and more

populated regions with a higher GDP per capita, lower unemployment and larger residences.

Most of the presented findings may be summarized as follows. Since more educated households reside in larger agglomerations that are more developed and have lower unemployment, households living there are rewarded with higher income. Moreover, due to the Slovak specifics of the very high HMR ownership, higher real estate prices in bigger cities and more developed regions made these households also wealthier.

A summary of these results is provided in Table 3 that describes a regular wealthy household in Slovakia. A typical wealthy household does not have any non-mortgage debt, has high income and consist of more adults; its RP is middle-aged, self-employed, not retired, and well educated. Such a household lives in a big municipality in a large or highly populated region with a high GDP per capita and low unemployment. These factors influence both total and financial net wealth. Concerning only total net wealth, wealthier households own their HMR, which they did not purchase, but rather self-constructed or inherited; their RP is at least 35 years old and has tertiary education. Finally, households with high financial net wealth did not self-construct their HMR, consist of few children and live in a region with larger residences.

CONCLUSION

We found two effects of household indebtedness on household net wealth – a highly negative effect of non-mortgage debt, and a neutral effect of mortgage debt. We rationalise this finding by the fact that while the mortgage debt is a long-term



Table 3 Description of a typical wealthy household in Slovakia

TOTAL NET WEALTH	FINANCIAL NET WEALTH
A typical wealthy household ...	
does not have non-mortgage debt	
has high income	
owns its main residence that was self-constructed or inherited	did not self-construct its main residence
consists of more adults	
consists of few children	
... has a reference person that ...	
is 35+ years old	is middle-aged
is self-employed	
is not retired	
has tertiary education	has at least secondary education
... and lives in ...	
a big municipality	
a region with high GDP per capita	
a region with low unemployment	
a large region	
a highly populated region	
a region with larger residences	

investment leading to the ownership of a (valuable) property, non-mortgage debt only covers short-term liquidity shortages to finance goods and services that satisfy immediate consumption needs, but do not contribute to household wealth. Moreover, some types of non-mortgage debt, such as credit-card debt or instalment loans, may have an adverse impact on household finances due to higher interest rates. Hence, our results support the findings of the previous literature that non-mortgage debt increases the financial vulnerability of households. Households should therefore be prudent in taking out (unnecessary) consumer loans.

We did not find any significant effect of mortgage debt on household net wealth. Our re-

sults, however, show that the households who own their main residence (HMR) are significantly wealthier than the households who rent their home residence, even when the HMR ownership is financed by a mortgage. Thus, it seems that taking out a mortgage to purchase a home residence is a good long-term investment.

Finally, we also provide evidence that households living in big cities, situated in larger and more populated regions with a higher GDP per capita and lower unemployment, are not only wealthier, but also more indebted. This confirms the fact that higher net wealth tends to be associated with more debt and leverage.

References

- Albacete, N. and Lindner, P. (2013): "Household vulnerability in Austria – A microeconomic analysis based on the Household Finance and Consumption Survey", Financial Stability Report 25 – June 2013, Austrian National Bank, pages 57-73.
- Brandmeir, K., Grimm, M., Heise, M., Holzhausen, A. and Steck, G. (2012): "Global Wealth Report", Economic Research & Corporate Development, Allianz SE.
- Cavalletti, B., Lagazio, C., Vandone, D. and Lagomarsino, E. (2014): "Consumer debt and financial fragility in Italy", Working Paper 2014-08, Università degli studi di Milano.
- HFCN (2013): "The Eurosystem Household Finance and Consumption Survey – Results from the first wave", Statistics Paper 2, European Central Bank.
- Messner, T. and Zavadil, T. (2015): "Are indebted households poorer? Evidence from Slovakia", Working Paper 2/2015, National Bank of Slovakia.
- Messner, T. and Zavadil, T. (2014): "Regional differences in household wealth across Slovakia", Occasional Paper 1/2014, National Bank of Slovakia.
- Rychtárik, S. and Ličák, M. (2006): "Household credit growth in Slovakia", the banking journal BIATEC 8/2006, National Bank of Slovakia, pp. 8-15.
- Senaj, M. and Zavadil, T. (2012): "Results from the survey on the financial situation of Slovak households (in Slovak: Výsledky prieskumu finančnej situácie slovenských domácností)", Occasional Paper 1 / 2012, National Bank of Slovakia.
- Štefanides, Z. and Arady, A. (2013): "Some thoughts on Slovak household debt", Corporate Strategy & Economic Research, VÚB banka, Slovakia.
- Wooldridge, J. M. (2002): "Econometric analysis of cross section and panel data", The MIT Press, Cambridge, Massachusetts, London, England.