THESIS SYNOPSIS

Zsuzsa Nagy-Kékesi

Financial savings and wealth of Hungarian households after the 2008–2009 crisis

Supervisor:

Péter Juhász, PhD, CFA
Habilitated Associate Professor

Budapest, 2021

Faculty of Investments and Corporate Finance

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CONTENTS

1. JUSTIFICATION OF THE RESEARCH TOPIC

Between 2008 and 2020, the net financial wealth of Hungarian households more than tripled, expanding by around HUF 40 trillion. Households' net financial wealth relative to GDP increased by over 55 percentage points, and this rise contributed significantly to improving the economy's external balance position and thus reducing reliance on external funds. While household indebtedness increased from the early 2000s, outstanding household debt declined sharply due to repayments after the 2008–2009 financial crisis. At the same time, the ratio of households' net financial assets to GDP also expanded substantially, rising by approximately 40 percentage points in 2008–2020 (Kékesi et al., 2015).

The line of thought in this thesis should be introduced by defining the main concepts. Households can spend their disposable income on consumption, investment and *net financial savings,* which refers to the 'unspent' portion of income. Taking a different approach, net financial savings is the difference between the accumulated financial assets and liabilities. In other words, net financial savings is a flow variable, showing how much households have saved in a particular period. Financial developments can lead to the build-up of large holdings (stock variables). Using a similar logic as with the flow variable, households' *net financial wealth* is financial assets less outstanding borrowing.

In the examination of wealth, the different forms of savings were classified into two groups, distinguishing between 'deposits' (bank deposits and pension savings) and so-called 'investments' (other financial investments: mutual fund shares, bonds, other equity, shares, managed accounts, private loans and other financial savings). According to the literature, pension savings can be considered investments, but – since these are long-term savings, and as employers' contributions are quite large in Hungary, making this less of a conscious decision – these savings were classified among deposits in the analysis. Based on the literature, among investments only shares and mutual fund shares are deemed risky assets, while other equity holdings are not usually seen as risky, despite the exposure. Only bank deposits were considered a liquid form of savings (Figure 1).

Figure 1: Classification of financial assets in the thesis
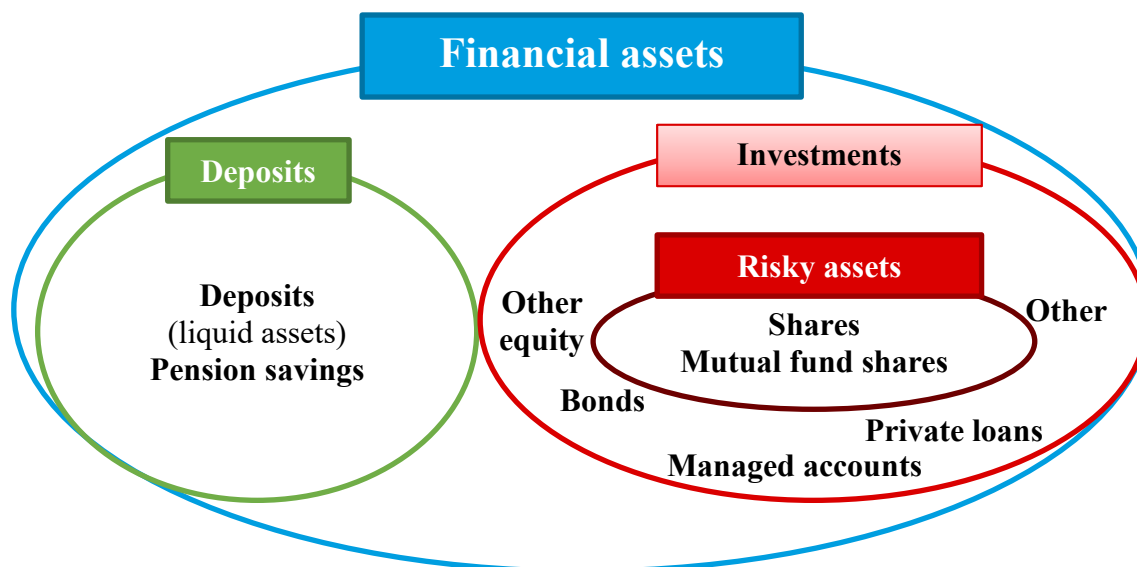
Source: Author's work

Developments in Hungary in the 2000s and several international examples have shown that the level of household savings and wealth can be crucial to balanced, sustainable convergence. This is partly due to the fact that the money saved by households can be used to finance corporate and government investments, which enable higher potential growth and faster convergence. Larger household savings typically go hand in hand with higher investment rates (e.g. Feldstein – Horioka, 1980, Prasad et al., 2007). On the other hand, if an economy's domestic sectors (primarily households) provide insufficient funds, external financing is needed for investment projects, which can lead to external imbalances (Antal, 2006).

In my research presented in the thesis, I focus primarily on savings processes between the end of the 2008–2009 financial crisis and 2020. This period was chosen for two main reasons. First, no comprehensive analysis of Hungarian data has been carried out in the new millennium, and the development of Hungarian savings has not been presented from this aspect since 2000 (Árvai – Menczel, 2000). Second, households' savings behaviour changed so significantly in the wake of the crisis that it could be analysed in several separate studies. My thesis seeks to establish the reasons that contributed at the macro level to the significant rise in savings and the changes in the portfolio composition of Hungarian households after the 2008–2009 crisis. Micro-level factors that may determine the size and composition of Hungarian households' financial wealth are also examined.

2. DATABASES AND METHODS USED

Descriptive analysis (Chapter 3) is used to answer the first research question, namely how Hungarian households' savings evolved in the 2000s, and in particular during the period following the 2008–2009 crisis. The factors behind the development of Hungarian savings are explored, and the composition of households' financial wealth following the 2008–2009 crisis is investigated, along with the changes in the composition of Hungarian households' financial portfolio. The findings and figures of the descriptive analysis are based on Hungarian macro-level databases. Among the sources used, the Magyar Nemzeti Bank's (MNB) 'Financial accounts' deserves special mention as a key basis for the analysis. I also used other, publicly available data from the MNB and the databases of the Hungarian Central Statistical Office (HCSO).

The second question in the thesis concerns the factors that determine the size and composition of Hungarian households' gross financial wealth: this question was answered with the help of the Household Finance and Consumption Survey (HFCS), a relatively new micro database available since 2015, using the data from the 2014 and 2017 waves. Chapter 4 formulates the findings and hypotheses relating to Hungarian households' financial wealth and its composition, which are tested using statistical methods.

Among the methods used in the chapter (statistical tests, logistic regression, Heckman selection model), the Heckman selection model deserves special mention, as this approach used for the findings of Hypothesis H4 (concerning the factors that influence the level of Hungarian households' financial wealth) is a novel application in the analysis of this topic. The equations of the Heckman selection model for households' savings decisions can be written as follows:

1. **Selection equation**

$$savings_i^* = \alpha_o + \alpha_1\,log_{income} + \alpha_2\,educ_1 + \alpha_3 educ_2 + \alpha_4 age_1 + \alpha_5 age_2 +$$
$$\alpha_6 female + \alpha_7 haspartner + \alpha_8 child + \alpha_9 time + \alpha_{10}\,notrisk + \alpha_{11} log_{HMR} +$$
$$\alpha_{12} motive + \alpha_{13} inherit + u_i \qquad\qquad (1)$$

$$savings_i = 1\ if\ savings_i^* > 0, otherwise\ 0. \qquad\qquad (2)$$

$$Prob\ (Z_i = 1|\mathbf{w_i}) = \phi\ (\mathbf{w_i'}\boldsymbol{\alpha})\ and\ Prob\ (Z_i = 0|\mathbf{w_i}) = 1 - \phi\ (\mathbf{w_i'}\boldsymbol{\alpha}) \qquad\qquad (3)$$

where $savings_i^*$ is the continuous variable of the selection,

$savings_i$ is the binary selection variable for the ith observation – whether households have financial wealth exceeding their three-month cost of living (Z_i),

log_{income}, $educ_1$, $educ_2$, age_1, age_2, *female, haspartner, child, time, notrisk,* log_{HMR}, *motive, inherit* are the explanatory variables of the selection equation (**w$_i$**),

α_i are the coefficients of the selection equation's variables,

u_i is an unobservable factor influencing the selection,

w_i is the vector of the variables influencing the selection and belonging to the observation, and

ϕ is the distribution function of the standard normal distribution.

2. Regression equation

$$log_{savings} = \beta_0 + \beta_1 log_{income} + \beta_2 educ_1 + \beta_3 educ_2 + \beta_4 age_1 + \beta_5 age_2 +$$
$$\beta_6 female + \beta_7 haspartner + \beta_8 child + \beta_9 time + \beta_{10} notrisk +$$
$$\beta_{11} log_{HMR} + \varepsilon_i \tag{4}$$
$$if\ savings_i = 1 \tag{5}$$

where

$log_{savings}$ is the dependent variable of the regression equation,

log_{income}, $educ_1$, $educ_2$, age_1, age_2, *female, haspartner, child, time, notrisk,* log_{HMR} are the explanatory variables of the regression equation,

β_i are the coefficients of the regression equation's variables, and

ε_i a $log_{savings}$ is an unobservable factor influencing the dependent variable.

3. THESIS RESULTS

The second chapter of the thesis looks at and summarises the theories and literature on households' financial savings. The classification used here is new in that it examines the empirical literature based on micro- and macro-level data separately. In addition to papers on the level of financial savings (wealth), studies on the factors influencing the composition of savings are also described. The grouping employed for the literature is used throughout the thesis.

The third chapter looks at macro-level data using a descriptive analysis to examine how Hungarian households' savings evolved after the 2008–2009 crisis and which factors may have influenced the development of savings in Hungary. Changes in the composition of Hungarian households' financial portfolio are then also analysed. The most important new results of the chapter are described below.

Hungarian households' savings rose considerably after the crisis due to precautionary motives that gained prominence due to *cyclical factors*. Such cyclical factors included rising unemployment and household indebtedness (sharp increases in repayment instalments on FX loans). These motives may have been tempered since 2017, as unemployment declined, FX loans were converted into forint, and outstanding household borrowing diminished.

Along with cyclical elements, *structural factors* were also increasingly key in shaping Hungarian households' savings. For instance, such factors include wage growth, the income-boosting effect of tax reforms, debt cap rules and the government's incentives supporting long-term savings. The fall in yields from 2012 in Hungary did not entail a drop in savings, similar to most European countries, which was probably heavily influenced by strong precautionary motives and the above-mentioned structural factors.

**Figure 2: Hungarian households' net financial savings
as a percentage of GDP***
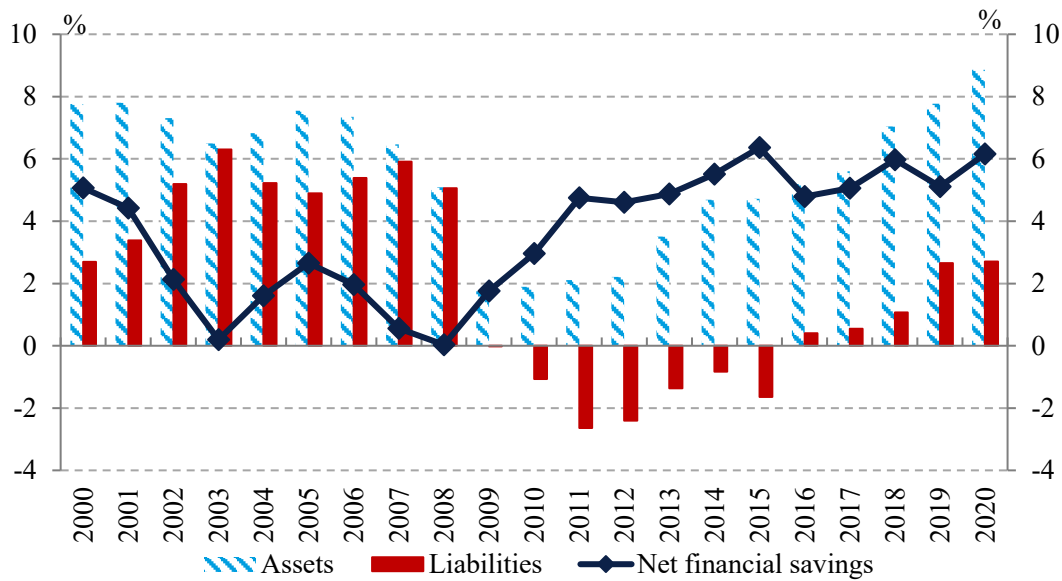
* Underlying trends adjusted for one-off effects
(pension fund reform, early repayment scheme, forint conversion)
Source: MNB, author's work

The rise in net financial savings was reflected in the expansion of households' net financial wealth. Hungarian households' net financial wealth stood at 116 per cent of GDP by the end of 2020, which is considerably higher than the figures typical for the CEE region (author's calculation). The growth in financial assets was assisted not only by the accumulation of financial assets, but also by a major revaluation. As regards financial liabilities, the structure of outstanding loans changed fundamentally due to the forint conversion, and households' FX exposure fell significantly. The majority of the growth in net financial wealth (55 per cent) is linked to new household savings, suggesting a rise in the propensity to save (author's calculation based on the financial accounts). The second biggest effect was exerted by the revaluation of holdings, which contributed to almost 35 per cent of the growth. Government measures related to household FX loans (early repayment scheme, settlement and forint conversion) and other variation in stocks accounted for another 5 per cent each.

Since 2014, households' financial wealth increased along with their real estate holdings, with the latter significantly exceeding net financial wealth. I prepared my own estimate for real estate holdings based on the HCSO's data on residential properties from the 2011 census and the MNB's housing market index. While financial wealth was boosted more by transactions, in the case of real estate most of the expansion was due to revaluation.

Figure 3: Households' net financial wealth and real estate holdings relative to GDP*
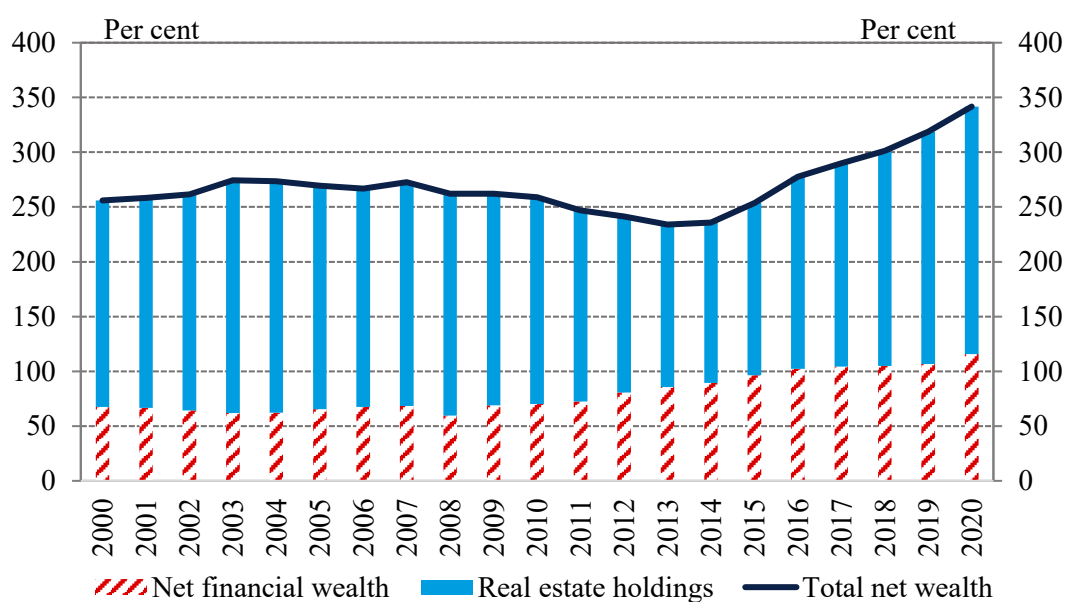
* The value of the real estate holdings is the author's estimate based on HCSO data and the MNB housing market index.

Source: MNB, HCSO, author's work

There has been a major shift in the structure of households' financial assets in recent years, and the fundamental reason for the increasing share of securities is the changing yield environment. In the first years following the 2008–2009 crisis, households placed their new savings in bank deposits, which was probably the result of rising deposit yields as well as households' risk-averse behaviour. Starting from early 2012, households reduced the share of their bank deposits and increased their savings held in securities, primarily in the form of government securities. The rise in households' funding of the government was attributable to the supportive government strategy and the outstanding yield spread. Consequently, government securities held directly by households amounted to over HUF 9,100 billion by the end of 2020. While in 2011 government securities represented merely 2 per cent within households' financial assets, by late 2020 the figure had risen to 14 per cent, a high figure even by international standards. The amount of government securities held by households expanded in all quintiles, especially in the top one, between 2014 and 2017.

Long-term financial assets account for a smaller share within Hungarian households' wealth. According to financial accounts data, Hungarian households do not like to make long-term commitments. Although they generally prefer short-term savings, government incentives (e.g. long-term investment accounts) may divert investments towards longer-term savings. The analysis of micro-level data also showed that if a household has more

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liquid financial assets than investments, this is related to its attitude to risk (households claiming to be risk-seeking hold fewer liquid assets). In other words, familiarity with risks and the enhancement of financial literacy may also point towards growing investments.

Figure 4: Households' financial asset holdings and the distribution of financial assets
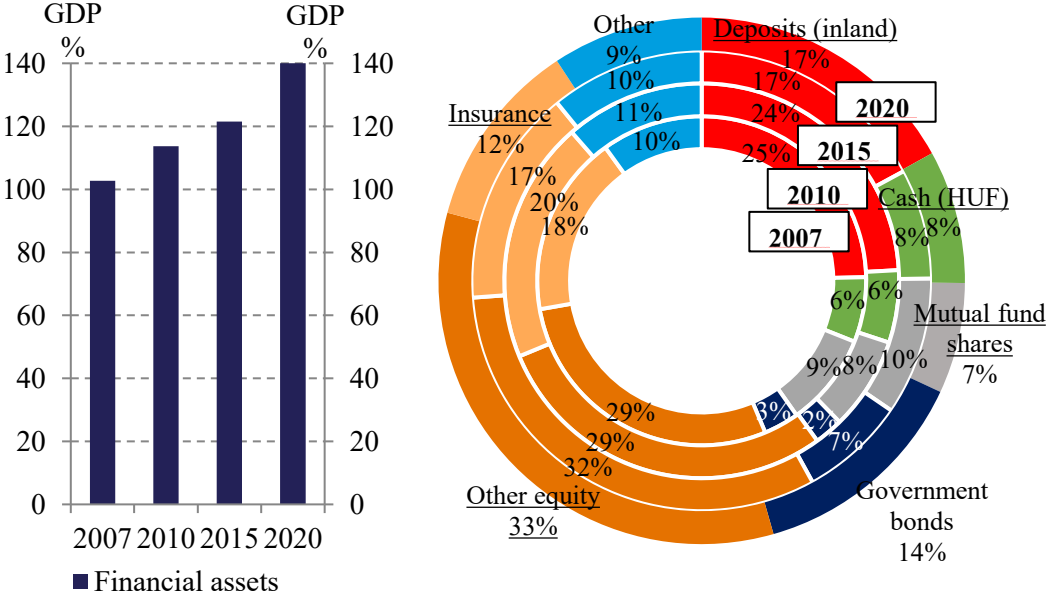
Note: * Other receivables from the general government as a result of the pension system reform were recorded as part of household insurance.

Source: Author's work based on MNB, Kékesi et al. (2015)

Taking into account securities held indirectly (via financial intermediaries), households' financing of the government amounts to around 25 per cent of GDP. Ultimately, households finance the main sectors (general government, corporations and non-residents) through their asset allocation decisions. Households finance the main domestic sectors not only directly, but also through other financial intermediaries such as mutual funds, insurers and pension funds (indirect financing). According to my calculations, Hungarian households' total government securities holdings amount to around 25 per cent of GDP, well in excess of direct holdings (19 per cent of GDP). This is exceptionally high compared to other European countries. Besides Hungary, only households in Portugal (17 per cent), Italy (11 per cent) and Malta (10 per cent) hold government securities wealth over 10 per cent of GDP (the European average is quite low, at merely 2.8 per cent of GDP).

Based on the available macro data, the expansion in Hungarian households' net financial savings and wealth contributed significantly to the rise in the economy's net lending. In addition, Hungarian households also strengthened the capacity of the country to withstand

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shocks by investing an increasing portion of their higher savings in Hungarian government securities, thus providing internal funds to the state. However, household financing can also entail risks: the short-term portfolio could pose rollover risks for the government, households have a greater exposure to inflation on account of the fixed-rate papers, and the banking system also has fewer available funds (although banks did not feel this constraint during my research).

After the 2008–2009 crisis, the borrowing attitude changed, but the tepid rise in consumption and the issues with loan repayments showed that the aggregate data for the individual sectors do not provide enough information for understanding economic trends. After the crisis hit, Hungarian households' net financial wealth surged, although this does not necessarily mean that it increased for all households. There were widespread calls to create a uniform database on Hungarian households' income, consumption and wealth position. Accordingly, in Chapter 4, Hungarian households' savings are examined empirically using the euro area Household Finance and Consumption Survey (HFCS). The hypotheses and main conclusions of the empirical analysis are shown in Table 1.

Table 1: Overview of the analysis

	Hypothesis	Analysis	Results	
Level of financial wealth	**H1:** As income and educational attainment increase, gross financial savings gradually grow, and more and more households have investments.	Descriptive statistics	For both factors, financial wealth expands, but in order to prove that they have a positive effect on net financial savings, the data must be adjusted for the impact of the variables on each other.	√
	H2: Hungarian households' real estate holdings are greater than financial wealth, irrespective of income.	Descriptive statistics	The median of real estate holdings is higher than financial wealth in all income quintiles. But having more financial assets than real estate holdings is not independent of the income quintile the households belong to. In higher income quintiles, more households have greater financial wealth than real estate holdings.	X

	Hypothesis	Analysis	Result	
Level of financial wealth	**H3:** Does a household's income position, and the educational attainment, age and risk profile of the head of household, and the family structure influence whether or not a household has financial assets amounting to more than its three-month cost of living?	Logistic regression	Income, wealth and the 'dual-earner' family model have a positive influence on the accumulation of financial assets, while older heads of household and risk aversion have a negative impact.	√
	H4: The amount of households' financial wealth is influenced by their income position, and the educational attainment, age and risk profile of the head of household, along with the family structure.	Heckman selection model	In addition to income, educational attainment is a strong determinant in the existence and size of financial wealth.	√
Composition of financial wealth	**H5:** Irrespective of their attitude to risks, Hungarian households hold more liquid financial assets than investments.	Descriptive statistics	The crosstabs analysis showed that if a household has more liquid financial assets than investments, this is related to its attitude to risk.	X
	H6: As households' income rises, the wealth held in different types of assets becomes more diversified (less concentrated).	Descriptive statistics	Depending on income position, the share of financial assets in households' total wealth varies, with the highest concentration found in the first income quintile, and the lowest in the fifth.	√
	H7: Risky asset holding depends mostly on the wealth and income of households.	Logistic regression	Along with income and wealth, the perceived underlying risks, liquidity constraints, demographic features and informational constraints also influence risky asset holding.	√

All in all, the results of the empirical analysis confirm the situation outlined in the literature, although there are some notable differences.

1. **As expected, income and education have a positive effect on whether Hungarian households have more financial wealth than their three-month cost of living.**

The examination of micro-level data showed that households' financial wealth increases along with income (H1). The value of financial assets held by households expands steadily as income increases: while in the lowest income quintile merely 6.5 per cent of households have financial savings, in the top quintile 25 per cent do so.

When examining households based on education, the results are basically the same: those with basic education typically have very little financial savings, while those with a head of household who has higher qualifications have more sizeable financial savings.

Consistent with the results obtained while examining Hypothesis 1, more and more households have a liquidity buffer as their income increases (providing adequate financial reserves for a potential loss of job). Nevertheless, close to 40 per cent of Hungarian households do not have enough financial wealth to cover their cost of living for three months (H3). The amount of financial wealth does not exhibit a gradual rise across income categories, which suggests that in the long run large financial wealth can be accumulated by only those who have the highest income. Similar results were obtained on Hungarian data by Bukodi and Róbert (2000), who registered the outstanding wealth position of the highest earners.

The descriptive analysis cannot address partial effects, and therefore a model-based approach (logistic regression) was used for Hypothesis 3. In modelling financial wealth in excess of the liquidity buffer, households' income position and education as well as demographic factors were examined, along with whether the effect of the head of household's attitude to risk can be shown in investments, and whether the results are influenced by the value of the property owned by households. The analysis built on the Hungarian database of the HFCS.

Whether households have more savings than their three-month cost of living is influenced positively by their *income* and the *educational attainment* of the head of household. When increasing income by one unit on the logarithmic scale (in other words multiplying it by 2.7), the probability of holding financial assets rises by 8.8 percentage points. Secondary school qualifications increase the likelihood of holding by 13.6 percentage points, while a higher education degree does so by 27.7 percentage points.

Compared to the young generations, *the old* (those aged over 70) exhibited an almost 7-percentage point decline, meaning that older households are less likely to hold financial assets

in excess of their three-month cost of living. The obtained result confirms the life-cycle hypothesis, i.e. that older generations are less inclined to hold financial assets.

Among the variables of family structure, the *'dual-earner' family model* has a positive effect on the probability of holding financial assets. The gender of the head of household (female head of household) and having children does not influence the likelihood of financial asset holding. Accordingly, contrary to expectations, women are not more cautious and are not more likely to accumulate reserves than men, and the situation of families with children does not differ from similar families without a child.

All in all, the results obtained basically confirm the correlations expected based on the literature: income, wealth and the 'dual-earner' family model have a positive influence on the accumulation of financial assets, while older heads of household have a negative impact (H3).

2. Hungarian households' main asset is their main residence.

Not only macro- but also micro-level data show that obtaining property is crucial for Hungarian households. In Hungary, this is reflected in the fact that 83 per cent of households live in a property they own (partly or wholly). As income rises, the value of the main residence gradually grows (as does the participation rate), in other words higher income entails higher value homes. The importance of holding wealth in real estate is also supported by the fact that for 80 per cent of households, real estate holdings exceed financial assets.

This is not necessarily a 'novelty': owner-occupied homes represent the largest proportion of households' wealth in European Union countries. On average, around 60 per cent of the households in the countries that participated in the HFCS wave own their main residence. Nonetheless, the actual figures vary considerably across countries: while in Germany and Austria less than half of all households live in their property, this ratio is over 80 per cent in Spain, Slovakia and Slovenia (Arrondel et al., 2014). Still, the share of Hungarian households owning their main residence is high by European standards, and in fact, it is the second highest after Slovakia (Boldizsár et al., 2015).

The examination of Hypothesis 2 shows that even in the top income quintile, the median of the financial assets held by households does not come close to the median value of their main residence. At the same time, the tests performed demonstrate that income influences whether households have more financial assets than real estate holdings.

3. **As expected, income and education have a positive influence on Hungarian households' accumulation of financial assets.**

The modelling approach used for the conclusion (Heckman selection model) is a novelty in analysing the topic (H4). The results produced by the Heckman selection model confirm that, besides income, educational attainment is a major determinant in the existence and size of financial wealth: in other words, education not only has cross-effects (higher educational attainment, higher income), it also exerts a direct impact.

Along with income and education, age is also an essential factor in the level of savings. Older households above the age of 70 are less likely to hold financial assets in excess of their three-month cost of living. However, for the old households that do have financial wealth, it is larger than that of younger generations. This suggests that in contrast to other countries, Hungary has a highly heterogeneous old generation: relatively few old households have financial wealth, but those that do, have considerable wealth. This somewhat contradicts the claim of the life-cycle hypothesis that older households 'use up' their savings, which could be attributable to the *bequest motive:* old households seek to provide the necessary funds to the next generations, so they are less likely to have financial wealth. Accordingly, there is an even wider gap within older generations than within younger ones.

Among the variables affecting the level of savings, one should also mention the 'dual-earner' family model, which has a positive effect on the probability of holding financial assets but does not influence the amount of financial wealth. A peculiar finding from the analysis of Hungarian data is that the gender of the head of household does not impact the probability of financial asset holding but having a female head of household exerts a negative effect on the size of financial wealth. Another observation is that having children does not have bearing on the existence or size of financial wealth.

4. **Similar to other countries, the risky asset holding of Hungarian households is fundamentally influenced by their income and wealth position.**

The value of financial assets (mostly risky ones) other than bank deposits owned by Hungarian households gradually increases as income grows. In the low-income category, households usually hold less risky assets such as bank deposits, while the share of investment (mutual fund shares, bonds, other equity, shares, managed accounts, private loans and other financial savings) is higher within financial assets among those with higher income (H1).

The overwhelming majority of investments, over 50 per cent, is owned by the top income quintile. Furthermore, fewer households hold deposits in the higher income category, and they typically prefer riskier forms of investment (such as securities). The subdued risk appetite of Hungarian households is attested by the fact that although the participation rate was the highest in this category, only one quarter of households have this type of savings (H1).

For Hypothesis 7, a model-based approach was used to explore how the factors analysed in the descriptive section and derived from the theory affect households' risky asset holding, adjusting for their effects on each other.

It can be concluded from the composition of households' portfolio that households' risky asset holding is mainly determined by their income and wealth position. Based on the literature, only shares and mutual fund shares are deemed risky assets, but despite the exposure, other equity holdings are not usually seen as risky.

As *income* increases, the likelihood of risky asset holding grows: multiplying income by 2.7 raises the probability of having risky assets by close to 3 percentage points. Greater *wealth* also increases the chances of holding risky assets: belonging to the top wealth group increases the likelihood of risky asset holding by over 13 percentage points on average.

The *absence of informational constraints* (higher educational attainment and employment in financial sectors) also has a highly positive effect on the probability of risky asset holding. In addition, households' self-assessed *investment attitude* is also an important factor in making investment decisions: risk-seeking households are more inclined to invest in risky assets.

Among risks, *liquidity constraints, real estate market exposure* and *entrepreneurial risk* have a negative impact on Hungarian households' risky asset holding. Contrary to the findings in the international literature, demographic characteristics (number of children, marital status, age) do not play an observable role in risky asset holding. According to Hungarian data, the labour market exposure[1] variable is also not significant.

We obtained similar results while analysing international data with my colleagues (Balogh et al., 2019). Only a few demographic factors (female head of household, number of children), employment in the financial sector and labour market exposure were significant according to the HFCS data on participating European countries.

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[1] Households are deemed to be exposed to income risk if all their income comes from employment.

4. CONCLUSION AND PROPOSALS

Households' savings may be one of the most important factors in economic growth, due to its role in investments. However, even experts are highly divided on the factors that determine the level and composition of household savings. My thesis examined this link in Hungary after the turn of the millennium, in particular in the period since the 2008–2009 crisis.

It was shown that the size of household savings is influenced by various factors, which makes it difficult to analyse and forecast such savings. However, projections of the level and composition of savings may provide crucial information for several economic agents (government, banks, financial service providers).

The results obtained from micro-level data basically confirm the correlations expected based on the literature: income, wealth and the 'dual-earner' family model have a positive influence on the accumulation of financial assets, while older heads of household have a negative impact. Contrary to expectations, female heads of household are not more cautious and are not more likely to accumulate reserves, and the situation of families with children does not differ from similar families without a child.

The results also show that, besides income, educational attainment is a central determinant of Hungarian households' financial wealth. Age also plays an important role in savings, but the Hungarian results diverge from what could be expected based on the international literature. Even though older households are less likely to hold financial assets in excess of their three-month cost of living, for the old households that do have financial wealth, it is larger than that of younger generations. This suggests that – in contrast to other countries – Hungary has a highly heterogeneous old generation.

It can be concluded from the composition of households' portfolio that households' risky asset holding is mainly determined by their income and wealth position, just as in other European countries. Employment in the financial sector and labour market exposure bear no relevance to Hungarian households' risky asset holding.

The trends in households' financial savings are crucial from the perspective of economies' level of development and external vulnerability. This is particularly true of less developed countries, as internal funding is key in successful convergence and higher economic growth (Prasad et al., 2007). If internal funds are permanently insufficient, it has a negative effect on all sectors, potentially leading to reduced investor confidence, exchange rate volatility and depreciation, as well as rising interest rate spreads.

If households have substantial financial savings (wealth), the financial sector's chances to obtain funds improve, which enhances the opportunities for financing investments in the long run. As household savings increase (and the household portfolio is realigned), the government can rely more on financing from domestic agents, which contributes to a more stable debt profile.

The findings of the thesis show that Hungary has a very heterogeneous old generation, and the gap within it is even wider than within younger generations as regards financial wealth. After understanding the differences in more detail, the options for mitigating them should be reviewed. First, I argue that old-age differences could be reduced by providing government incentives for long-term savings (mainly pension savings). This would also exert a positive impact on old households' resilience to crises. Second, providing direct subsidies to this generation should be considered (perhaps the minimum amount of the old-age pension should be reviewed).

The results also point out the economic policy tools that can influence for example households' risky asset holding. First, as the level of economic development (GDP, income) increases along with the rise in households' financial wealth, the amount of their investments in risky financial assets will probably grow as well. Second, other factors (e.g. education, financial literacy) also influence risky asset holding. Higher educational attainment promotes the diversification of financial assets, which may be due to improved financial literacy as well as the greater risk appetite of such households. Therefore, targeted economic policy measures, such as the development of financial literacy and raising the average level of education, could facilitate the development of the Hungarian capital market and financial intermediary system.

The findings also indicate avenues for further research. First, the investigation that has been started could be continued with macro-level data: household savings can be modelled using several methodologies, but one of the most often used approaches assumes a long-term co-movement (a cointegration relationship) of income and savings. This estimation process uses different equations for long-term and short-term scenarios, with the former used for the levels and the latter for the changes, so that it can be determined separately which variables have a short-term and which have a long-term effect. The advantage of this is that it provides a reliable estimate for household savings (Palenzuela et al., 2016). So far, modelling has been hampered by the fact that Hungarian savings were influenced by several idiosyncratic factors (payment of real returns, early repayment scheme, forint conversion), and therefore the results produced by the model up until now were not necessarily reliable.

Second, micro-level data provide a way to examine a factor concealed by macro-level data, namely the concentration of household wealth. Although international data show that by international standards Hungarian households have substantial financial wealth relative to the country's level of economic development, Hungarian surveys suggest – as often cited in the press – that many households do not have savings.

In a study published in cooperation with my colleagues, it was demonstrated that, according to 2014 survey data, Hungarian households' financial assets are highly concentrated, just as in other countries. If – in addition to net financial wealth – Hungarian households' real estate holdings are also taken into account, much greater wealth equality can be observed, although around one half of all households still control merely 10 per cent of total wealth (Boldizsár et al., 2015).

In addition to a further examination of concentration, the reason behind the factors causing the inequality should also be explored, namely the individual contributions of the factors to the Gini coefficient. This can be done, for instance, with the Shapley value.

All in all, I believe that my thesis contributes to a better understanding of the factors shaping Hungarian households' savings and the identification of (1) the factors that influenced the post-crisis adjustment and the development of savings after the 2008–2009 crisis based on macro-level data, as well as of (2) the factors that affected the level and composition of households' financial wealth based on micro-level data.

5. RELEVANT PUBLICATIONS OF THE AUTHOR

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