

Household income and financial decision-making analysis in regions of Slovakia

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Abstract – The presented paper deals with the financial decision-making of households in the regions of Slovak Republic. Households in the Slovakia are generally perceived as conservative in terms of investment behavior and are characterized by increased risk aversion from the perspective of both EU and OECD member countries, holding a significant amount of their financial resources in the form of deposits in bank accounts. The main objective of the paper is to estimate the differences between regions in the share of household participation in financial markets. Our hypothesis is that households with higher incomes are less risk averse and invest more funds in stocks that exhibit a higher degree of risk. Through statistical methods and data obtained from the Statistical Office of the Slovakia and the Household Finance and Consumption Survey (HFCS) from 2014, 2017 and 2021 conducted by the ECB with the assistance of the National Bank of Slovakia, we demonstrate, that the Bratislava region has the highest share of households investing in shares, which is due to the economic maturity of the region and higher incomes of the population, as there is a positive correlation and linear relationship between household income (expressed through regional GDP per capita, gross income of households, and disposable income of households) and the share of households investing in shares. The demonstrated results are therefore beneficial for economic policy makers and justify the need to mitigate regional disparities between regions to increase households' participation in the financial market and consequently increase economic growth in the future.

Keywords – Financial Decision-Making Process of Households, Investments, Regions, Risk Aversion, Shares

I. INTRODUCTION AND LITERATURE REVIEW

Households' financial decision-making is a complex process that primarily consists of choosing options for allocating capital to financial instruments that are characterized by different levels of risk. Slovak households, in terms of investment decision-making, belong mainly to the more conservative investors, as most of them have a higher risk aversion and refuse to invest in riskier instruments. For this reason, the composition of investment portfolios is also influenced primarily by the fact that a large amount of capital is held in the form of deposits. As Baláž, V. (2010) states, up to 96% of all assets in Slovakia are held in so-called interest-bearing assets (deposits, cash, and bond funds), while the OECD average is 80%. The author sees the reason for this as the low level of financial literacy, which reduces the investment returns of Slovak citizens in the future.

Similar results were also reached by Yang, H. (2024a, 2024b), who confirmed that over 60% of the financial portfolio is held by Slovak households in the form of deposits (however, this trend is decreasing, as the share of deposits accounted for 67% of the total household portfolio in 2015, while by 2022 this share will have decreased to 62%). In the observation period 2015-2022, we can see a slight increase in investment in investment funds by households, as well as investment in pension funds. In particular, the growth of Slovak households' exposure to pension funds will increase in the future. This is due to the automatic entry into Pillar II of the pension scheme for first-time pension holders in 2023. Slovak households are at the tail end of the European Union in terms of holdings of listed shares, with publicly traded shares accounting for only 1% of household financial assets (reference year 2022), 5 percentage points below the European Union average (6%) in that year.

Overall, it can be argued that the financial decision-making of households in the Slovak Republic is also changing and evolving over time. The pandemic period associated with the spread of the COVID-19 contagion associated with lockdowns and economic restrictions on the one hand, and the accelerated digitization of services on the other, which has not escaped the banking and investment services sector, is becoming a major turning point. Katrencik, I. & Zatrochova, M. (2022) examined the impact of the COVID-19 pandemic on household investment behavior, showing that the situation is changing. The COVID-19 pandemic implied a reduction in household spending due to the ongoing lockdown and hence an increase in the spare funds that could be invested. Increasing digitization in banking and investment services and the availability of investment apps helped to drive even conservative Slovak households to invest more in bonds, shares, and mutual funds, while the share of deposits held by households also declined and started to converge towards the European Union average. Despite this positive trend, the purchase of real estate is one of the most popular forms of investment for Slovak households.

The impact of the COVID-19 pandemic on changes in the financial behavior of households in Poland and Slovakia is discussed in Waliszewski, K. (2022). Based on empirical research, he demonstrated differences in the financial decision-making of Slovak and Polish households in the pandemic period regarding investment plans. As a result of that study, Polish households invested more during the COVID-19 pandemic than Slovak households (where these investments did not change). On the other hand, Slovak households declared that they would invest more in the post-pandemic period.

One possible explanation for how households make financial decisions and what their risk aversion is, and which we focus on in this paper, is the amount of household income. Inherently, shares are considered a riskier financial instrument than bonds and this is due to the higher volatility of returns under the influence of the macroeconomic situation in the country and the world. Thus, if shares account for a higher share of a household's financial portfolio, we can argue that the household has a lower risk aversion. Stock ownership is significantly correlated with several demographic variables, among which we can include the level of household income (Gallup, 2023). Hanna, S., Chang, Y. R., & Fan, J. X. (1995) confirmed that the amount of money held in financial instruments increases as income increases. Zumbrun (2014) reconfirmed that ownership of financial assets is directly proportional to income. Wookjae Heo & John E. Grable & Barbara O'Neill (2017), using data from the U.S., showed that the percentage of households owning stocks in a particular income group increases as income increases. Based on the results of the previous paragraphs, we can confirm that income plays an indispensable role in shaping households' financial decision making.

The present paper deals with households' financial decision-making in the regions of the Slovak Republic. The aim of the paper is to demonstrate regional differences in the investment behaviour of Slovak households and to justify them by the level of household income. Our hypothesis is that stock ownership by Slovak households is positively correlated with income level. The structure of the article is as follows, the first part deals with the introduction, the review of the literature and a theoretical definition of the problem. The second section discusses the working procedure and methodology, through which we test our assumptions and hypothesis. The last section presents the achieved results of empirical research, which are then conceived into conclusions.

II. MATERIALS AND METHOD

In the present paper, we use aggregated data for the regions of the Slovak Republic from the Household Finance and Consumption Survey (HFCS), which is conducted by the European Central Bank in cooperation with the central banks of the individual member states of the European Union. We focused on statistics on shares ownership by households, i.e. what percentage of households in a given region own a particular financial instrument (in our case, publicly traded shares). In addition, we used data from the Statistical Office of the Slovak Republic, namely regional GDP p.c., gross income of households and disposable income of households. The data come from 2014, 2017 and 2021. The data on the variables can be found in the Table 1 below.

Table 1. Overview of variables

Variable	Abbreviation	Definition	Source
Shares, publicly traded	SHARES	Financial assets - participation rates (% of households)	a)
Regional GDP p. c.	RegGDPpc	Regional GDP p.c. in current prices	b)
Gross income of households	GROSS	Gross income of households	b)
Disposable income of households	DIS	Disposable income of households	b)

Source: a) HFCS (2014, 2017, 2021).; b) Statistical office of Slovak republic

Summary and descriptive statistics is given in Table 2.

Table 2. Summary and descriptive statistics

Variable	Mean	Median	Minimum	Maximum
SHARES	1,9560	1,2816	0,17004	7,2642
RegGDPpc	16273,	13289,	8374,3	38957,
GROSS	1472,5	1426,0	1172,0	1896,0
DIS	1227,7	1180,0	1026,0	1515,0
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
SHARES	1,9490	0,99644	1,7311	2,2614
RegGDPpc	8467,1	0,52032	1,8844	2,2623
GROSS	196,35	0,13334	0,41975	-0,79759
DIS	139,78	0,11386	0,41134	-0,92481
Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
SHARES	0,17004	7,2642	1,7170	0
RegGDPpc	8620,7	38618,	4685,6	0
GROSS	1183,5	1867,0	299,75	0
DIS	1030,0	1500,5	233,50	0

Source: own calculations

To verify and achieve the main objective of our paper, we used quantitative methods, namely analysis of variance (ANOVA) and Pearson's correlation coefficient. ANOVA is used as a statistical tool for estimating differences in means between or within groups. In the present paper it is used to estimate differences between regions of the Slovak Republic in the percentage of households that own shares in their investment portfolio. If there are significant differences between the investment portfolios of households from different regions, we then examine the existence of a correlation between the proportion of households owning shares and the level of income expressed through three variables, namely regional GDP p.c., gross household income and household disposable income. For this purpose, we will use Pearson's correlation coefficient, which will determine the strength and direction of the correlation and test our hypothesis that there is a directly proportional relationship between the share of households owning shares and the level of income. In other words, that higher income groups of the population are less risk averse by including shares in their investment portfolio, which are riskier financial instruments than, for example, deposits placed in banks or

bonds. Finally, using scatter plots we performed a deterministic linear regression between the share of households investing in shares and the level of household income.

III. RESULTS AND DISCUSSION

In the first step of our empirical research, we use ANOVA to determine whether there are differences in risk aversion between households from different regions of the Slovak Republic. In other words, whether any region has a higher proportion of households that invest in shares. We assume that there are significant economic differences between regions in the Slovak Republic, i.e. some regions are more economically advanced than others. We present the ANOVA results in the Table 3 below:

Table 3. Results of One-Way ANOVA

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Region	7	77,797	11,1139	18,58	0,000
Error	16	9,572	0,5982		
Total	23	87,369			

Source: own calculations

The null hypothesis under ANOVA states that all means are equal. In our case, however, p-value < 0.05 and therefore we reject the null hypothesis, which means that means are not equal and there are differences between regions in the Slovak Republic in terms of the percentage of households investing in shares.

As we can see from the graph below, the BA region (where Bratislava, the capital of the Slovak Republic and the flagship of the Slovak economy, is located) also has the highest proportion of households investing in shares.

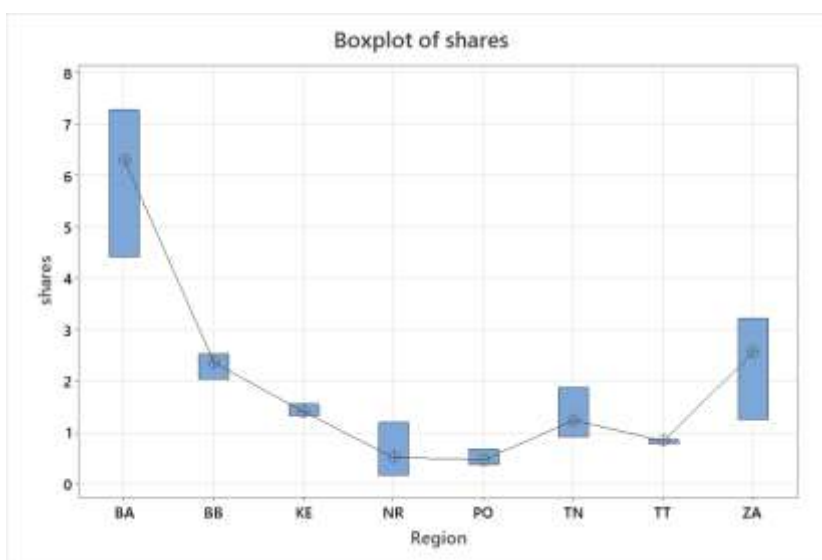


Fig. 1 Household differences between regions

After demonstrating the differences between regions, we proceed to the correlation analysis, the results of which are presented in the Table 4 below.

Table 4. Correlation matrix

	SHARES
RegGDPpc	0,8151
GROSS	0,4039
DIS	0,426

Source: own calculations

The correlation coefficient can take values in the interval <-1; +1>, with -1 representing a strong negative correlation and +1 representing a strong positive correlation. A value of 0 indicates that the variables are indifferent to each other and there is no correlation between them. In our case, we can say that there is a

positive correlation between the variables (the strongest is between the share of households investing in shares and regional GDP p.c.), thus confirming our hypothesis that households with higher income are less risk averse and invest more in shares.

In the following graphs, you can see the relationship in the form of a deterministic linear regression between these variables.

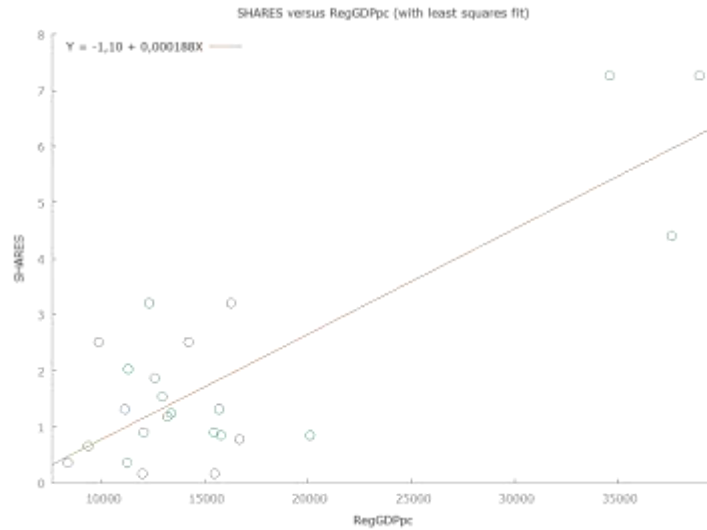


Fig. 2 Linear relationship between share of households investing in shares and regional GDP per capita

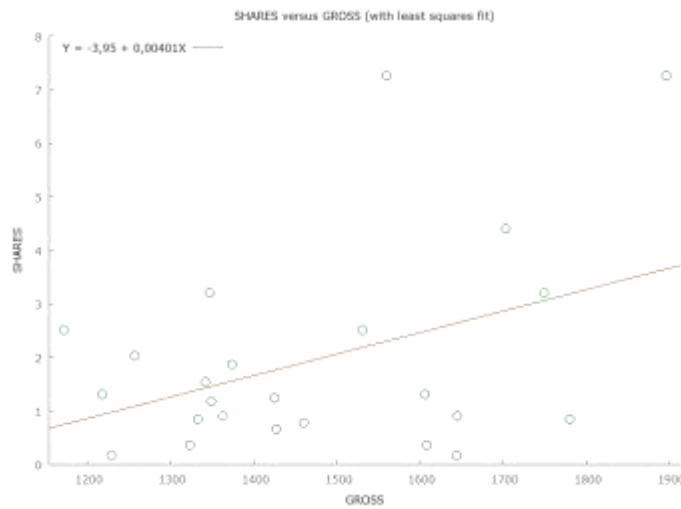


Fig. 3 Linear relationship between share of households investing in shares and gross households' income

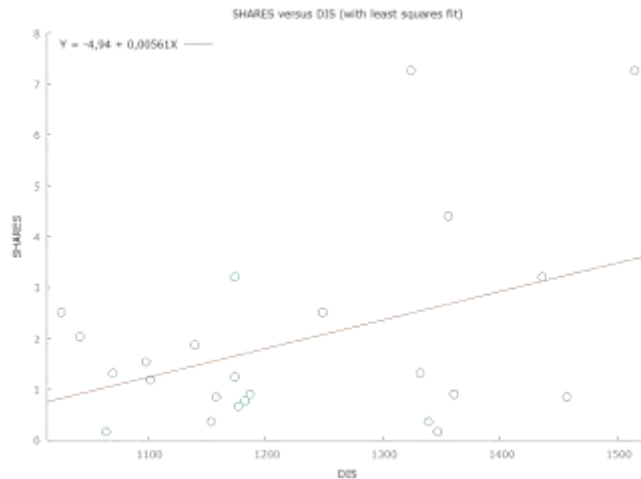


Fig. 4 Linear relationship between share of households investing in shares and households' disposable income

As we can see in the graphs, there is a positive relationship between all variables, so we can say that the amount of income determines the risk aversion of households, and with higher household income their participation in financial markets in the form of stock purchases increases. These findings are consistent with those of other authors such as Zumbun (2014).

IV. CONCLUSION

The paper dealt with the regional aspect of household financial decision-making in the Slovak Republic. Through statistical methods (ANOVA, correlation coefficient and deterministic linear regression) we have shown that there are differences in risk aversion of households in the form of their participation in financial markets and stock purchases between different regions of the Slovak Republic. The highest level of household participation in the financial market is in the Bratislava region, which has the highest GDP per capita and where households have the highest incomes. This opens space for them to purchase investment instruments. For this reason, we have also focused on household income as one of the determinants of households' financial decision-making and their involvement in financial markets, showing that the share of households investing in shares increases with increasing income. We therefore conclude with a recommendation for economic practitioners and policy makers, namely that it is essential to close the economic gap between regions to encourage wealth and capital formation by households, which would also benefit the state in the long run in the form of increased tax revenues and economic growth.

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