



A Methodology of Discovering Comparable Models. The Case of Investing in Retirement Accounts when Considering Age, Main Residence and Education before 1989 vs. Globalization

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Abstract

This paper provides a way to discover strong individual influences on investments in retirement accounts. Data are from SHARE-ERIC (Wave7). Principal residences in ex-communist countries or not and full-time education before 1989 served as filters. Two particular models with good classification accuracy resulted based on data mining, variable selection methods, and logistic regressions. A statistical script generated tables with comparable coefficients (average marginal effects). Common influences from the same financial category as the outcome emerged (having life insurance or ever investing in mutual funds or stocks). The younger respondents, those with computer skills or exposed to high stress, are more likely to invest in retirement accounts regardless of the presence of the communist heritage. Specific influences (personality traits and life experiences) also resulted despite the increasing globalization, which, in the case of people over a certain age, was not able to erase some behavioral differences reflected until today.

Keywords: investing in retirement accounts; ex-communist vs. non ex-communist countries; data mining; binary logistic regressions with average marginal effects; statistical script for generating models' tables.

JEL classification: B23; C58; C8; D14.

1. INTRODUCTION

Retirement accounts are both a form of tax-favored saving accounts (Burman *et al.*, 1990) and indirect investment. The main concern of this paper is about the decision of Europeans aged 50 and over to invest in such accounts when considering their exposure or not to communism through their full-time education and dominant residence related living experience before 1989. The greatest advantage of this form of investment (Kitao, 2015) consists in the fact that unlike the contribution of workers in a pure pay-as-you-go regime,

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which is simultaneously transferred to retirees for their consumption, the contribution made to the IRA will be used as an input of production for many years (investment), leading to economic growth (e.g. more economic activities, higher wage, and consumption) and generating a relief of the state budget.

Now, let us consider some more or less noticeable differences in terms of financial decisions after 1989 between people from countries that never experienced communism and the ones from those who did. Previous studies emphasized the role of school-age education and emotional context (Laudenbach *et al.*, 2019, 2020) and the idea of persistence over generations until dilution and disappearance (Alesina and Fuchs-Schundeln, 2007) when it comes to socialist attitudes. In terms of consecrated investment behavior, during the communist regime, the stock exchanges were closed in all Eastern European countries. The first ones to open their stock markets after 1989 were Hungary and Poland in mid-1991 (Fedorova and Saleem, 2010). More, before the same turning point (1989), the former communist countries recorded considerably lower levels of income and wealth and, therefore, inferior standards of living. Other studies (Leff, 1969), indicated some demographic conditions as important factors generating increased savings ratios in Eastern European communist countries.

After the end of World War II, Europe was divided between a mostly capitalist Western part and a Central and Eastern one dominated by the communist doctrine until 1989, when the communist vs. capitalist debate began to evaporate with the fall of the Berlin Wall. The only system left after this point is the Market (Downing, 2016). This historical split together with well-documented differences in terms of education (Sahadev and Demirbag, 2010), educational philosophy (Ford, 2017), mechanisms for influencing the relationship between education and earnings (Flanagan, 1998) in communism vs. capitalism in the same period above seem to be crucial when investigating possible influences not only on the investment behavior.

After 1989, the ex-communist Central and Eastern European countries started their transition to capitalism with different velocities in terms of structural and systemic transformations, some of them facing blocked structural reforms at the time (Johnson *et al.*, 1997). Some authors (Brunello *et al.*, 2012; Fuchs-Schundeln and Masella, 2016; Falck *et al.*, 2017) found that the transition periods coupled with different therapies and action strategies had different influences on the investment behavior among ex-communist countries when considering their citizens' main residence and full-time education.

Laudenbach *et al.* (2020) found major differences between East and West Germans in terms of risk aversion and investment in capitalist corporations and financial institutions after reunification and even after movements from the former communist East Germany to the former West one.

According to some opinions (Tekce *et al.*, 2016), when it comes to choosing investment instruments, the more experienced individuals are, the more prone they are to sophistication. Still, older and wealthier investors usually prefer a portfolio composition favoring especially direct investments in shares rather than other new investment methods (Keloharju *et al.*, 2012). Besides, older investors have higher expectations of their financial gains when compared with the younger ones due to a considerably lower appetite for risk (Gomes and Michaelides, 2005). Moreover, besides a large specific experience, this type of investor accumulate and use financial education, knowledge, and wisdom (Korniotis and Kumar, 2011).

In terms of moments of social and economic shocks and periods of stress able to influence individual behaviors and attitudes, [Malmendier and Nagel \(2011\)](#) found that after experiencing different periods of economic fluctuations, the individuals changed their decisions that involve taking risks.

In terms of values specific to free and open human societies, [Weber \(2005\)](#) first emphasized in 1930 that the natural pursuit of an individual to make money is the essence of any capitalist regime. Once unleashed, capitalist interests ([Love, 1986](#)) quickly came to dominate economic life and social affairs generally. [Sparkes \(2008\)](#) considers that a so-called code of ethics for financial investments is hard to establish in a pluralistic and liberal society. [Olsen \(2012\)](#) empirically found and emphasized trust as important in situations where investors feel less knowledgeable and where investment analysis is more complex.

Starting from the literature above, the main assumption of this study states that individuals with the main residence and educated in ex-communist countries are still less predisposed to invest in retirement accounts than those from non-ex-communist ones, despite the phenomenon of globalization that manifested itself strongly after 1989. More, both common and particular influences corresponding to these two profiles can be identified.

Regarding the paper's structure, the [next section](#) is dedicated to the presentation of the research design with a description of data and methodology. [Another one](#) is focused on the main analysis results and interpretation of findings. The [conclusion section](#) synthesizes discoveries and implications.

2. DATA AND METHODS

The analysis was started from the questions formulated by SHARE-ERIC (Survey of Health, Ageing, and Retirement in Europe - European Research Infrastructure Consortium), Wave 7 (2017). Initially, 37 variable categories were considered from all 42 available (all except for CV_R, Drop_Off, GV_Exrates, GV_imputations, and XT), meaning more than 6000 variables.

Next, successive filters have been applied. First, from the initial set of 76.520 records, the first selection considered only respondents aged 50 or more in 2017 (75.674 results after using *dn003_* as birth year ≥ 1967). Besides, the year of finishing the full-time education (*re002_* ≤ 1989) served as a filter (58.732 results, by excluding DK/NA). The next selection relied on the year of moving to the first residence (*ra006_1* ≤ 1989) and generated 58.635 results. Then, the last non-empty year of changing the residence (last residence) was found by using a sequence of imbricated IFs and filtered using it (*ra006_* ≤ 1989). 37.277 results were obtained. Based on the latter, the period in years for each region of residence was further determined starting from the remaining interval (just *ra015c_1* ... *ra015c_20*, after excluding the columns with DK/NA). Next, the largest value (MAX function for 37.031 valid results when removing missing values for years) of those 20 remaining ones, was computed for each response and also the corresponding column rank (INDEX, SUMPRODUCT, and COLUMN functions). Finally, the dominant residence was obtained (INDIRECT, ADDRESS, and ROW functions). The resulting dataset had 35.182 observations which are valid after removing those generating errors (1812) because of existing years (each for a new residence to which the respondent moved at) but not specified corresponding residencies and 37 records for DE-Berlin as the main residence (hard to split between its ex-communist or not communist part because of the lack of additional details).

Finally, based on this last derived field (dominant region of residence), together with the one (country) corresponding to the country of the current residence (alone not enough because Germany has been divided into FRG and GDR), a new one depending on the type of country (ex-communist or not) was generated. Finally, after dropping Switzerland and Israel (both are not officially part of the EU), a set of 33.830 records was obtained. The latter consists of 19.246 responses for individuals from ex-communist countries who were interviewed and 14.584 for individuals who resided in several non-ex-communist ones before '89.

For data cleansing and performing additional processing (mostly derivations), powerful built-in filters, auto-fill facilities, and spreadsheet functions with immediate visual feedback were used. When processing the data, the emphasis was on clear and reliable answers, especially because of being aware of the traditional treatment procedures for missing values and their effect on the accuracy of the classifiers (Acuña and Rodríguez, 2004). Therefore, in the case of questions likely to be transformed into dummy variables, only the clear conviction (Yes: 1; and No: 0) was considered. In the case of other values of the DK/NA type (undecided states or some indicating the lack of willingness to respond), they were all assimilated to missing values. The same approach was used for those questions more likely to generate some scales.

Before statistically analyzing the determinants of the chosen outcome, they were selected from a list of 6400 possible predictors in two rounds. First, three models were generated using the Naive Bayes technique and the Microsoft's Data Mining add-in for spreadsheet tools working with SQL Server Analysis Services (1st round data mining) for all three subsets with raw text data (the overall one - 33.830 observations; 19.246 for those respondents with dominant residencies inside ex-communist countries and 14.584 for observations for those inside former non-communist ones). Three corresponding dependency networks between the chosen outcome (fs006 - ever had a retirement account, transformed into a dummy field) and possible predictors have been also obtained and acted as a sort of field pre-selection. Next (2nd round data mining), the LASSO (Tibshirani, 2011) variable selection package was used in Stata 16 MP in three forms (a rigorous and penalizing one to control overfitting - rlasso, a time-consuming cross-validation-based one using a variable number of randomly extracted subsamples - cvlasso and, finally, another one focused on information criteria - lasso2) on previously selected and processed fields (e.g. after generation of scales and DK/NA treatment).

In terms of statistical analysis, first of all, a T-test was performed for the outcome (*ev_ret_acc*) in the same version of Stata on the overall subset. This test showed statistically significant differences (significance level of 1‰) in the means of the two groups obtained when considering the variable indicating education and main residence in former communist countries (*form_comm_before89*).

The extended list of explanatory variables (Tables no. 1 and no. 2) together with corresponding source questions (where applicable – Table no. 1) was considered starting from both the existing scientific literature and the results of those two aforementioned data mining rounds.

From the very beginning, both study sites (central and right side of Table no. 2, ex-communist vs. non-ex-communist countries) reveal noticeable differences in terms of the average intensity of both the outcome (ever investing in retirement accounts - 11.18% vs. 21.8%) and expected predictors.

Table no. 1 – Questionnaire items used in this study

VARIABLES' ORIGINAL NAMES	VARIABLES' NAMES AFTER PROCESSING	SURVEY ITEM	CODING
		individual level variables	
f5002	ev_st_sh	Ever had any stocks or shares? (DK/NA as blanks)	Yes:1, No:0
f5004	ev_mut_f	Ever had mutual funds? (DK/NA as blanks)	Yes:1, No:0
f5006	ev_ret_acc (OUTCOME)	Ever had an retirement account? (DK/NA as blanks)	Yes:1, No:0
f5008	ev_li	Ever had a life insurance policy? (DK/NA as blanks)	Yes:1, No:0
re014_1_re014_20	no_jobs (derivation after counting non-blanks using COUNTA)	How many jobs did you have? (blanks not summed)	1-20 scale
re038_1	paid_job_oft_retir	Did you have a paid job after retirement? (DK/NA as blanks)	Yes:1, No:0
re701	ev_usd_comp_wrk	Ever used computer at work? (DK/NA as blanks)	Yes:1, No:0
ac012	how_satisf_life	How satisfied are you with your life? (on a scale from 0 to 10, completely dissatisfied:0, completely satisfied:10; DK/NA as blanks)	0-10 scale
ac017	do_things_u_want	How often do you feel that you can't do anything you want? (Often:3; Sometimes:2; Rarely:1; Never:0; DK/NA as blanks)	0-3 scale
ac702	trust	Do you see yourself as someone who is generally trusting? (Agree strongly:4; Agree a little:3; Neither agree nor disagree:2; Disagree a little:1; Disagree strongly:0; DK/NA as blanks)	0-4 scale
ac704	relaxed	Do you see yourself as someone who is relaxed, handles stress well? (same scale as trust)	0-4 scale
ac706	sociable	You consider yourself a sociable person? (same scale as trust)	0-4 scale
ac707	critical_spirit	You consider yourself as a person who tends to criticize other people? (same scale as trust)	0-4 scale
ac708	thorough	Do you see yourself as someone who does a thorough job? (same scale as trust)	0-4 scale
ac709	nervous	Do you consider yourself as someone who gets nervous easily? (same scale as trust)	0-4 scale
ac710	imaginative	Do you consider yourself as someone who has an active imagination? (same scale as trust)	0-4 scale
ac711	kind	Do you see yourself as someone who is considerate and kind to almost everyone? (same scale as trust)	0-4 scale
iscde2011_f	grad_high_sch	Have you graduated the high school based on your highest educational degree converted into a number of graduated classes? (ISCDE2011>=3:1; ISCDE2011<3:0; DK/NA as blanks)	Yes:1, No:0
dn003	age89	Derivation as difference between 1989 and the birth year	Years
dn034	ev_had_sibl	Have you ever had siblings? (DK/NA as blanks)	Yes:1, No:0
dn036	how_many_broth_alive	How many brothers alive? (DK/NA as blanks)	0-6 scale
dn042	male	Is your gender male?	Yes:1, No:0
gi002	per_happy	Have you ever overpassed a period of happiness? (DK/NA as blanks)	Yes:1, No:0
gi005	per_stress	Have you ever overpassed a period of stress? (DK/NA as blanks)	Yes:1, No:0
gi011	per_fin_hard	Have you ever overpassed a period of financial hardship? (DK/NA as blanks)	Yes:1, No:0
gi014	per_hunger	Have you ever overpassed a period of financial hunger? (DK/NA as blanks)	Yes:1, No:0
gi022	discrim	Have you ever been discriminated against in any form? (DK/NA as blanks)	Yes:1, No:0
gi031	persecu2dispossession	Have you ever been dispossessed because of reason for persecution? (DK/NA as blanks)	Yes:1, No:0
country_re002	form_comm_before89 (derivation after fitting on the year of finishing full-time education, residences and years when started living there)	Was your main location of residence before '90 inside a former communist country?	Yes:1, No:0
ra015_1_ra015_20			
and ra006_1_ra006_20			

Table no. 2 – Summary statistics for the entire dataset and subsets depending on full-time education and main residence in ex-communist / non-ex-communist countries until 1989

Variables	Main residence and full-time education before '89						Main residence and full-time education in ex-communist countries before '89						Main residence and full-time education in capitalist countries before '89					
	Obs.	Median	Yes (I) share / Mean	Std. Dev.	Min	Max	Obs.	Median	Yes (I) share / Mean	Std. Dev.	Min	Max	Obs.	Median	Yes (I) share / Mean	Std. Dev.	Min	Max
ev_st_sh	33,614		18.14%				19,171		12.92%				14,443		25.08%			
ev_mut_f	33,581		12.29%				19,162		5.53%				14,419		21.28%			
ev_ret_acc (OUTCOME)																		
ev_li	33,632		15.75%				19,154		11.18%				14,478		21.80%			
no_jobs	33,615		28.84%				19,147		25.36%				14,468		33.44%			
paid_job_aft_retr	31,529	2	2.35	1.57	1	20	18,402	2	2.37	1.56	1	20	13,157	2	2.31	1.57	1	18
ev_usd_comp_wrk	24,318		8.80%				14,050		9.80%				10,268		7.43%			
ev_usd_comp_wrk	30,750		34.74%				18,003		29.06%				12,747		42.76%			
how_satisf_life	33,024	8	7.47	1.94	0	10	18,802	7	7.12	2.06	0	10	14,222	8	7.93	1.66	0	10
ev_usd_comp_wrk	33,064	2	2.12	0.91	0	5	18,831	2	2.04	0.92	0	5	14,253	2	2.24	0.87	0	5
do_things_u_want	33,149	3	2.61	1.09	0	4	18,875	3	2.60	1.06	0	4	14,274	3	2.61	1.13	0	4
relaxed	33,130	3	2.43	1.15	0	4	18,864	3	2.44	1.10	0	4	14,266	3	2.42	1.20	0	4
sociable	33,151	3	2.91	1.04	0	4	18,878	3	2.90	1.04	0	4	14,273	3	2.92	1.03	0	4
critical_spirit	33,119	1	1.37	1.17	0	4	18,859	1	1.47	1.16	0	4	14,260	1	1.25	1.16	0	4
thorough	33,121	3	3.20	0.90	0	4	18,873	3	3.18	0.91	0	4	14,248	3	3.23	0.90	0	4
nervous	33,148	2	1.80	1.25	0	4	18,871	2	1.85	1.22	0	4	14,277	2	1.73	1.30	0	4
imaginative	33,061	2	2.34	1.17	0	4	18,826	2	2.32	1.14	0	4	14,235	3	2.37	1.20	0	4
kind	33,140	3	3.10	0.86	0	4	18,867	3	3.02	0.87	0	4	14,273	3	3.22	0.82	0	4
grad_high_sch	21,460		65.13%				12,865		70.65%				8,595		56.87%			
age89	33,830	40	40.93	9.55	22	75	19,246	39	40.27	9.57	22	75	14,584	41	41.79	9.45	22	74
ev_had_sibl	17,370		80.94%				11,845		83.07%				5,525		76.38%			
how_many_broth_alive	30,405	1	0.98	1.14	0	20	17,176	1	0.82	0.99	0	20	13,229	1	1.19	1.28	0	15
male	33,830		43.18%				19,246		41.59%				14,584		45.29%			
per_happy	32,931		44.51%				18,751		44.39%				14,180		44.65%			
per_stress	33,051		43.22%				18,831		39.99%				14,220		47.48%			
per_fin_hard	33,184		27.16%				18,897		27.26%				14,287		27.02%			
per_hunger	33,241		4.57%				18,925		5.05%				14,316		3.94%			
discrim	33,717		4.27%				19,184		4.97%				14,533		3.34%			
persecut2dispossession	33,688		7.07%				19,161		9.12%				14,527		4.37%			
form_comm_before89	33,830		56.89%				19,246		100%				14,584		0%			

Source: Own calculations in Stata 16

To analyze the determinant factors that influence the probability of investing in retirement accounts in the proposed models, it was started from two well-known econometric models, namely the binary logistic one as a particular case of the multinomial regression model (De Bortoli *et al.*, 2019; Pertiwi *et al.*, 2019), both used in the same 16 MP version of Stata. The binary logistic regressions have been performed for the overall subset and the two subparts of it, corresponding to the main residence in former communist and non-ex-communist countries. The resulting influences were retained only if they met the selection rules, namely: low p-values; Variance Inflation Factor (VIF) with values less than 10 (Salmeron *et al.*, 2018) and coefficients in the predictors' correlation matrix with values less than 0.5 which indicate negligible or low correlation (Mukaka, 2012); bigger values for the Area Under the Curve of Receiver Operating Characteristic – AUCROC (Jimenez-Valverde, 2012) for better models and larger R-squared (Miles, 2005) for a better explaining power of the models. Next, post-estimations were made and average marginal effects were reported to ensure support for comparability when the magnitude was concerned for both intra- and inter-scenarios / models' comparisons. Moreover, to correct for any form of heteroskedasticity, robust standard errors have been calculated.

As significance (p-value), it was additionally considered the level of 1‰ starting from the fact that in very large samples, p-values go quickly to zero (Lin *et al.*, 2013) because of a very simple principle according to which errors tend to decrease as the number of observations increases.

Also, a hierarchical approach with successive models, each adding more predictors, was considered for performing robustness checks (Figure no. 1 and Tables no. 3 and no. 4).

3. DISCUSSION OF RESULTS

After applying logistic regressions (the statistical script in Figure no. 1), the results obtained this way (Tables no. 3 and no. 4) reveal:

- The clear influence of the variable *form_comm_before89* identified in the overall model is a negative one (Tables no. 3 and no. 4 – third model), indicating that, before the collapse of socialist regimes, those people educated and living in former communist countries are less inclined to invest in retirement accounts in comparison with their counterparts from the non-ex-communist ones. This is a confirmation of the central hypothesis, and it is in line with the existing literature (Bastian, 1998).
- A set of six variables common to the two particular models (Tables no. 3 and no. 4 – fifth and seventh models) and corresponding to the following influences: *ev_st_sh*, *ev_mut_f*, *ev_li*, *ev_usd_comp_wrk*, *age89*, and *per_stress*, with the observation, that all of them act similarly (same sign) in these two models;
 - Other three variables which are specific to the first particular model – ex-communist (Tables no. 3 and no. 4 – the fifth model), namely: *how_satisf_life*, *grad_high_sch*, and *discrim*;
 - Other three ones, which are particular to the second specific model – non-ex-communist (Tables no. 3 and no. 4 – the seventh model), namely: *do_things_u_want*, *trust*, and *relaxed*.

All six aforementioned influences (Tables no. 3 and no. 4 – fifth and seventh models) are common to both particular models and suggest that individuals with main residence and full-time education before 1989, who owned shares, mutual funds, a life insurance policy, who used computers at work, who are younger and have gone through a period of stress at least once in life, are more likely to manifest this behavior of investing in retirement accounts.

These results show that the influence of the variable *ev_mut_f* (meaning the respondent ever had access to professionally managed investment instruments such as mutual funds) on the decision to invest in retirement accounts seems to be the most powerful one as magnitude when compared to the other two financial ones, namely *ev_li* (ever took out a life insurance policy) and *ev_st_sh* (ever had stocks/shares), both for respondents belonging to former communist and non-ex-communist countries.

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*****Data import*****
import excel "C:\Users\LIVES4BIT\Desktop\ev_ret_acc34K.xlsx", sheet("34k") firstrow
*****Overall regressions (ALL)*****
***Scenario1***
eststo LogALL1: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li, vce(robust)
correlate ev_st_sh ev_mut_f ev_li
vif, uncentered
lroc, nograph
eststo mLogALL1: margins, dydx(*) post
***Scenario2***
eststo LogALL2: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk age89 per_stress, vce(robust)
correlate ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk age89 per_stress
vif, uncentered
lroc, nograph
eststo mLogALL2: margins, dydx(*) post
***Scenario3***
eststo LogALL3: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk age89 per_stress form_comm_before89, vce(robust)
correlate ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk age89 per_stress form_comm_before89
vif, uncentered
lroc, nograph
eststo mLogALL3: margins, dydx(*) post
*****Ex-Comm regressions (EC)*****
***Scenario1***
eststo LogEC1: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li if (form_comm_before89 == 1), vce(robust)
correlate ev_st_sh ev_mut_f ev_li if (form_comm_before89 == 1)
vif, uncentered
lroc, nograph
eststo mLogEC1: margins, dydx(*) post
***Scenario2***
eststo LogEC2: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk how_satisf_life grad_high_sch age89 per_stress discrim if
(form_comm_before89 == 1), vce(robust)
correlate ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk how_satisf_life grad_high_sch age89 per_stress discrim if (form_comm_before89 == 1)
vif, uncentered
lroc, nograph
eststo mLogEC2: margins, dydx(*) post
*****Non-Ex-Comm regressions (NEC)*****
***Scenario1***
eststo LogNEC1: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li if (form_comm_before89 == 0), vce(robust)
correlate ev_st_sh ev_mut_f ev_li if (form_comm_before89 == 0)
vif, uncentered
lroc, nograph
eststo mLogNEC1: margins, dydx(*) post
***Scenario2***
eststo LogNEC2: quietly logit ev_ret_acc ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk do_things_u_want trust relaxed age89 per_stress if
(form_comm_before89 == 0), vce(robust)
correlate ev_st_sh ev_mut_f ev_li ev_usd_comp_wrk do_things_u_want trust relaxed age89 per_stress if (form_comm_before89 == 0)
vif, uncentered
lroc, nograph
eststo mLogNEC2: margins, dydx(*) post
*****Generate tables with results*****
estout Log*, stats(N chi2 p r2_p aic bic) cells(b (star fmt(4))) se(par fmt(4))) starlevels(* 0.1 ** 0.05 *** 0.01 **** 0.001)
estout mLog*, stats(N) cells(b (star fmt(4))) se(par fmt(4))) starlevels(* 0.1 ** 0.05 *** 0.01 **** 0.001)

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Note: *, **, *** and **** indicate significance at 10%, 5%, 1% and 1%.

Figure no. 1 – Investing in retirement accounts – statistical script (Stata 16) for obtaining models using binary logistic regressions both with raw coefficients (non-comparable models) and average marginal effects (comparable ones)

Table no. 3 – Investing in retirement accounts – non-comparable models based on logit regressions (raw coefficients)

Variables / Models	mLogALL1	mLogALL2	mLogALL3	mLogEC1	mLogEC2	mLogNEC1	mLogNEC2
ev_st_sh	0.6633 (0.0412)	0.5378 (0.0430)	0.509 (0.0434)	0.6803 (0.0644)	0.4694 (0.0985)	0.6159 (0.0535)	0.4546 (0.0558)
ev_mut_f	1.5162 (0.0433)	1.2768 (0.0464)	1.1767 (0.0477)	1.7363 (0.0774)	1.2569 (0.1192)	1.2734 (0.0540)	1.0273 (0.0575)
ev_li	0.9619 (0.0346)	0.7314 (0.0368)	0.72 (0.0370)	1.003 (0.0515)	0.8838 (0.0799)	0.9155 (0.0467)	0.6244 (0.0505)
ev_usd_comp_wrk		0.8487 (0.0374)	0.8134 (0.0377)		0.7274 (0.0820)		0.6772 (0.0527)
age89		-0.0242 (0.0021)	-0.0265 (0.0021)		-0.0296 (0.0049)		-0.0343 (0.0030)
per_stress		0.3246 (0.0352)	0.3037 (0.0353)		0.3546 (0.0779)		0.2636 (0.0486)
form_comm_before89			-0.3972 (0.0369)				
how_satisf_life					0.0725 (0.0199)		
grad_high_sch					1.0786 (0.1460)		
discrim					0.8072 (0.1571)		
do_things_u_want							0.1436 (0.0323)
trust							0.123 (0.0219)
relaxed							0.078 (0.0209)
_cons	-2.5172 (0.0231)	-1.8899 (0.0881)	-1.5327 (0.0944)	-2.7399 (0.0331)	-3.8786 (0.2728)	-2.226 (0.0327)	-1.8765 (0.1562)
N	33434	29835	29835	19090	11765	14344	12207
Chi^2	3972.8945	4106.5039	4194.8800	1456.1722	941.8084	2026.3549	1961.9801
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1463	0.1743	0.1787	0.1148	0.1666	0.1453	0.1742
MaxAbsCorrelCoeff (PredMatrix)	0.4162	0.4103	0.4103	0.2790	0.3102	0.4697	0.4568
MaxVIF(uncentered)	1.4416	2.1107	3.4860	1.2125	9.3870	1.6669	8.6778
AUCROC	0.7567	0.7912	0.7945	0.7276	0.8031	0.7586	0.7826
AIC	24773.3597	22098.2188	21981.3830	11803.7948	5321.3525	12827.9437	11072.2183
BIC	24807.0290	22156.3429	22047.8105	11835.2225	5395.0814	12858.2281	11146.3160

Source: Own calculations in Stata 16

Notes: Robust standard errors are presented in parentheses. All coefficients are significant at 1%.

Although not reported here because of space-saving reasons, the predictors' correlation matrices indicated negligible or low maximum absolute values for both models (<0.5) and, therefore, they suggest negligible to low multicollinearity. More the VIF values in the same most comprehensive scenarios were all below the threshold of 10 in both cases, which reinforces the previous statement regarding the multicollinearity. Besides, the AUCROC values of both particular models indicate fair to good (0.7826 – the non-ex-communist model) and even good accuracy of classification (0.8031 - the ex-communist model) as resulting from the statistical script in Figure no. 1. Moreover, smaller values (Tables no. 3 and no. 4) of AIC-Akaike Information Criterion (Zamani *et al.*, 2020) and BIC-Bayesian Information Criterion

(Dziak *et al.*, 2020) translates into better fitting as in the case of most comprehensive scenarios when following the hierarchical approach of performing regressions.

Table no. 4 – Investing in retirement accounts - comparable models based on logit regressions (average marginal effects)

Variables Models	/	mLogAL L1	mLogAL L2	mLogAL L3	mLogE C1	mLogE C2	mLogN EC1	mLogNE C2
ev_st_sh		0.0736 (0.0046)	0.0604 (0.0048)	0.0569 (0.0048)	0.0595 (0.0057)	0.0289 (0.0061)	0.087 (0.0075)	0.0661 (0.0080)
ev_mut_f		0.1682 (0.0045)	0.1435 (0.0049)	0.1315 (0.0051)	0.1519 (0.0065)	0.0775 (0.0073)	0.1799 (0.0071)	0.1493 (0.0079)
ev_li		0.1067 (0.0038)	0.0822 (0.0041)	0.0805 (0.0041)	0.0878 (0.0046)	0.0545 (0.0051)	0.1293 (0.0065)	0.0907 (0.0073)
ev_usd_comp_wrk			0.0954 (0.0042)	0.0909 (0.0042)		0.0448 (0.0051)		0.0984 (0.0075)
age89			-0.0027 (0.0002)	-0.003 (0.0002)		-0.0018 (0.0003)		-0.005 (0.0004)
per_stress			0.0365 (0.0039)	0.0339 (0.0039)		0.0219 (0.0048)		0.0383 (0.0070)
form_comm_befor e89				-0.0444 (0.0041)				
how_satisf_life						0.0045 (0.0012)		
grad_high_sch						0.0665 (0.0091)		
discrim						0.0498 (0.0097)		
do_things_u_want								0.0209 (0.0047)
trust								0.0179 (0.0032)
relaxed								0.0113 (0.0030)
N		33434	29835	29835	19090	11765	14344	12207

Source: Own calculations in Stata 16.

Notes: Robust standard errors are presented in parentheses. All coefficients are significant at 1%.

All these results above (Tables no. 3 and no. 4) strongly validate the main hypothesis of this paper. In future researches, the author intends to explore the investment and some other types of behaviors starting from various types of variables to analyze, including aggregate regional ones. Moreover, cross-validations using age, sex, wave, and country-level mixed-effects are taken into account. Additionally, specific post-pandemic behavior will be considered.

4. CONCLUSIONS

This paper found that investing in retirement accounts, which usually depends on the rational wish to gain incomes at different moments in time, seems to be influenced by other financial decisions (e.g. investments in life insurance policies, mutual funds, and stocks or shares).

Besides these strong common influences above, this paper indicates: (a) other common individual-level predictors from non-financial categories such as age, computer skills, and exposure to high stress; (b) particular individual-level ones depending on being educated and mostly living or not in communist countries before 1989 such as certain personality traits specific to free and open human societies (trust, individual freedom, being relaxed – the non-ex-communist model) and some related to life satisfaction, education and previously being subject of discrimination (the ex-communist one).

All this shows that despite the explosion of the phenomenon of globalization after 1989, this was not able to erase certain historical differences that are reflected today in the behavior and current choices of individuals who lived in those times.

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