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FINANCIAL LITERACY AND RETIREMENT PLANNING IN VIEW OF A GROWING YOUTH DEMOGRAPHIC: THE RUSSIAN CASE

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Abstract:

Our study contributes to the financial literacy literature by examining its association with retirement planning in an interesting and novel context, *i.e.* that of a country with a relatively old and rapidly ageing population, large regional disparities and a rapidly emerging financial market. Even though consumer borrowing is increasing very rapidly in Russia, we find that only 36.3% of respondents in our sample know about the working of interest compounding and only half can answer a simple question about inflation. In a country with pervasive public pension provision, we find that financial literacy is significantly and positively related to retirement planning using private pension funds and schemes. Residents in rural areas are much more reliant on the public provision and invest less in private schemes and savings. The results of our study have a clear policy implication; along with encouraging the availability of private retirement plans and financial products, efforts to improve financial literacy can be pivotal to the expansion in the use of such schemes.

JEL Classification: D91; G11, G23

Keywords: Financial Literacy; Retirement Planning; Pensions; Russia

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1. Introduction

The primary feature of the Russian pension system has been the relatively generous eligibility rules for granting pensions, the exceptionally low retirement age (60 years for males, and 55 for females), and the privileged retirement plans for specific groups (almost a third of the retired in early 2000), *e.g.* those working in unfavourable conditions or territories (Gurvich, 2004). The declining fertility and increasing mortality rates in the last two decades, along with early retirements due to privatization, have left Russia's population disproportionately middle-aged, a demographic variation unique to Eastern transition economies (Kuhn and Stillman, 2004). The percentage of elderly people (aged 65+) in Russia reached 13.8% in 2005 (17.1% for 60+), with the standard definition considering a society very old when this fraction exceeds 8-10% (Gavrilova and Gavrilov, 2009). With 1.24 employees per pensioner today in Russia (compared to 2.2 in 1991), the population ageing trend is faster than almost any other country in Europe and the public pension fund deficit is also growing quickly (Terra Daily, 2011).

Following these considerations, the Russian Federation underwent a major systemic reform of its pension system in 2005[1]. It shifted from a publicly managed distributive system to one supplemented by privately managed mandatory funded component, *i.e.* from a defined benefit to a defined contribution public pension system (OECD, 2006). Hence, the pension system today is made up of: (a) a pay-as-you-go financed pillar that provides a basic pension and an earnings-related pension administered via notional individual accounts; (b) a mandatory funded part, occupational and defined contribution in design, financed with age-related contributions; and (c) voluntary occupational and personal funded pension plans (OECD, 2006, Sedash, 2006). Among the primary targets of the reform were to strengthen the security of long-term retirement savings and reduce the role of the state. However, despite cutting the unified social tax rate, the government still has to contribute greatly to the fund, with federal allocations making up 53.3% of the pension fund budget in 2007. The Russian pension expenditures make up 6% of the GDP (World Bank, 2007), with S&P predictions that this will have to be doubled and may rise up to 25.5% by 2050 if the retirement age is not raised (RIA Novosti, 2010).

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[1] Other pension reforms took place in 1990, 1995, 2002 (Fornero and Ferraresi, 2007), and 2010.

Hence, with the level of the average public pension being particularly low, and the pensioners being among the least well-off population groups[2], the need for creation of private pension funds to bridge the gaps between the needs of the elderly and tight national budgets is now more pronounced than ever (Hauner, 2008). HSBC (2008) reports results from a survey showing that this view is shared with an increasing fraction of the population. Only 38% of the working age and 48% of the retired population believe that the government will bear most of the financial costs of the pension system, with 32% (and 20% of the retired) favouring the enforcement of additional private savings. However, although the demand for private employee benefit plans in Russia is increasing, particularly that for long-term pension and life insurance, private benefit plans according to western standards are still not common (SwissLife, 2010).

Moreover, the recent literature has shown that apart from the availability of financial products, the timely and structured retirement planning also depends on individual-specific circumstances. Hence, in recent years, the development of greater financial responsibility to households has raised the importance of financial literacy and financial education. Numerous studies show that U.S. consumers display low levels of financial literacy, which is significantly related to personal finance and retirement planning decisions (*e.g.* Bernheim, 1995; Lusardi and Mitchell, 2006; 2007a; 2007b; and 2008a; *inter alia*)[3]. Furthermore, across multiple samples, retirement planning is found to be highly correlated with financial literacy and education, and the relationship remains strong even after controlling for wealth and other demographic factors. Moreover, in a recent quasi-experimental evaluation in the U.S., employees of a large university who were offered a cash incentive to attend a training session on retirement product were found significantly more likely to attend, and then enroll in a tax-deferred retirement account.

As Russia transitions to a market-based banking system, the fear is that financial education and basic financial literacy is lagging behind. The greater complexity of financial products targeted to consumers has also increased the importance of greater understanding of financial concepts and products[4]. It is likely that most young Russians did not have parents with bank accounts (*i.e.* learned financial skills at home), did not receive formal financial literacy courses in school (*i.e.* there is no curriculum requirement for financial education in Russia), or have long personal banking relationships or experience with other financial products[5]. Moreover, in the context of current events, this is likely the first financial crisis that most Russians are experiencing as borrowers. A fear is that the rapid growth of consumer credit combined with low levels of financial literacy – and the shock of the global financial crisis – might be a dangerous mix that can lead to consumer overindebtedness and financial distress[6].

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[2] The average accrued pension was 3,084 rubles per month in April 2007, compared with a living wage of 3,713 rubles and an average monthly wage of 12,744 rubles. The income-replacement ratio (average pension vs. average wage) is a miserly 24.2% (Terra Daily, 2007).

[3] This holds true across various age segments and is robust to other socio-demographic characteristics. For instance, a study shows that university and high school students in the US have inadequate knowledge on personal finance, and that students with low levels of financial knowledge tend to make poor financial decisions (Chen and Volpe, 1998, and Mandell, 2001). On the other end of the age spectrum, studies find that many older (50+) individuals and early Baby Boomers could not complete simple interest-rate calculations or answer correctly questions on inflation and risk diversification (Lusardi and Mitchell, 2006; 2007a; and 2008a).

It is within the unique context of the Russian economy that our survey instrument was designed to measure to what extent consumers are fully aware of their financial obligations, and able to plan financially for the future. Finally, apart from the unique circumstances with respect to retirement funding and credit provision, studying financial literacy in Russia is of great interest as there is known to be a widespread perception of ubiquitous unfairness in the economic process among the young, and a lack of trust in the rule of law and the institutions (Gächter and Herrman, 2006; EBRD, 2007).

Our paper extends the extant literature in a new direction, using a detailed survey of financial literacy in a nationally representative sample of some 1,400 Russian individuals. The

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[4] Consumers with lower financial literacy also systematically underestimate the returns to long-term saving (Stango and Zinman, 2008). Greater financial literacy can also be an important component to efforts to increase saving rates and lending to the poorest and most vulnerable consumers (Cole *et al.*, 2009). Earlier studies have found that lower financial literacy is linked to lower household savings and stock market participation, as well as higher reported over-indebtedness (Lusardi, 2008; 2009; Lusardi and Tufano, 2008; *inter alia*). The relationship between higher financial literacy and more prudent financial decisions has also been supported in other countries, such as the UK, Australia, Italy, the Netherlands, Japan, Korea, and Mexico (Chistelis, *et al.*, 2005; ANZ Banking Group, 2003; Fornero, *et al.*, 2008; van Rooij, et al., 2008; OECD, 2005 (Korea and Japan); and Hastings and Tejeda-Ashton, 2008; respectively). Furthermore, financial illiteracy appears to be particularly severe for key demographic groups: women; less educated; low income; ethnic minorities; and older respondents.

[5] Consumer debt was almost non-existent before 2001, but recently grew at an astonishing rate: Consumer loans (excluding mortgages) grew from about US $10 billion in 2003 to over US $170 billion in 2008 – accounting for over 10% of GDP in 2008 versus less than 1% in 2003.

[6] Within this weak business environment, there is also concern that the tremendous growth of credit will be associated with high rates of default. Bad consumer loans increased from US $3.5 billion in January 2006 to over US $5.8 billion in December 2007 (Central Bank of Russia, 2007). In May, 2009, Alexander Turbanov, chief of the Russian deposit insurance agency, stated that the share of non-performing loans may climb to 20 percent by the end of 2009, while Moody’s predicted that Russian banks may need about US $41.5 billion in recapitalization in 2009 (Reuters, 06/23/09).

surveys include questions on financial literacy, retirement planning, the use of various financial products, as well as detailed demographic and socioeconomic information. We address some novel questions: For instance, what is the level of financial literacy in a country without a legacy of consumer credit or a precedent of financial education? What is the level and composition of retirement planning in Russia, in view of the demographic situation, the fears for the future, and the recent pension reforms? Is financial literacy linked to the use of different types of pension funds, and importantly, are higher levels of financial literacy related to private individual pension plans? Finally, in a country with pronounced regional inequalities and gender gaps, it is of great interest to examine if there are significant differences between such population segments with respect to financial literacy and retirement planning.

We find that even though consumer borrowing is increasing very rapidly in Russia, only 36.3% of respondents in our sample know about the working of interest compounding and half of the sample can answer a simple question about inflation. Only 12.8% can answer a question on risk diversification in asset investment. Financial literacy is higher among the younger and the higher-educated population, and lower in rural areas and among those living outside the major cities. Importantly, we find that financial literacy is significantly positively related to retirement planning and the use of private pension funds and products, with the financially literate individuals being somewhat 25-30% more likely to plan for retirement using private pension funds.

The paper proceeds as follows: *Section 2* describes our dataset, the main variables, and presents summary statistics. *Section 3* presents the empirical strategy and reports the results and *Section 4* concludes.

2. The Dataset

We use the information from the second wave of a dataset collected by face-to-face surveys[7] of some 1,400 individuals in June 2009. The sample[8] was designed to be nationally representative at the individual and the household level, and weighted by gender, age, education, 46 oblasts/administrative regions, and seven federal regions (excluding the North-Caucasian (Chechnya) federal district)[9]. This unique dataset provides rich demographic and socioeconomic information, and importantly, an insight into local financial penetration, vulnerability, literacy and financial planning. The primary respondents were the household heads, without an age limit. No specific financial incentives were offered to the respondents for completing the survey. The two panels of *Figure 1* show a clear picture of the 46 Russian oblasts, *i.e.* key administrative regions surveyed. The vast white areas without data are the sparsely populated areas of the Siberian and the Far-Eastern federal regions, along with areas outside the key administrative regions. Hence, the survey is representative at both the administrative and federal region level.

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[7] It is interesting to note that most comparable financial literacy surveys, such as those conducted in the U.S. and other developed countries, have been conducted by telephone. We speculate that this might affect responses, in particular, the rate of “Don’t know” answers.

[8] The Russia Financial Literacy diagnostic survey was undertaken as part of the preparation for the World Bank-supported Russia Financial Literacy and Financial Education program in 2008. The authors of the questionnaire are Prof. L. Mundell (primary author, consultant), A. Markov (ECSHD, WB) and I. Shulga (Moscow

[Insert Figure 1 about here]

The first column of *Table A1 in the Appendix* provides an insight into the individual demographic characteristics of our sample.[10] It consists of 42.2% male respondents, consistent with national census averages (Russia Census, 2002). The average age in the sample is around 46 years. Our age distribution (not shown) is fairly smooth, with about 70.6% of individuals between 25 and 65. Most individuals (62.3%) live in households with three of more individuals, while 24.2% live in households with two individuals, and 13.5% live alone. 27.1% of the individuals in our sample live in urban regions, defined as settlements with a population greater than 500,000 (14,2% in Moscow, St. Petersburg and their nearby areas). With respect to the detailed federal region breakdown, 25% of our respondents reside in the Central federal region, 9.3% in the North-

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office, WB). The survey was conducted by the National Agency for Financial Studies (NAFS) in 2008 by request of the World Bank. The national representative survey was aimed to provide information on the initial level of financial literacy (*i.e.* financial planning and managing debt, attitudes to/understanding of personal responsibilities and consumer rights in the area of financial services, knowledge of financial products/services, etc.). The survey asked basic questions on features of financial behavior, attitudes to and demand for financial education of the Russian population. The NAFS kept a detailed record of the individuals who were eligible to reply to the questionnaire, and could examine whether the sample obtained is representative of the population. Their analysis showed this is the case and they recommended that weighting is unnecessary.

[9] Since March 1, 2008 the Russian Federation consists of 83 federal subjects. Six types of federal subjects are distinguished: 21 republics, 9 krais, 46 oblasts, 2 federal cities, 1 autonomous oblast, and 4 autonomous okrugs.

[10] Summary statistics by gender, age, and education (% with secondary degrees) are very similar to those found in the "Russia Longitudinal Monitoring Survey (LSMS), 2002" as well as the "Russian National Census, 2002." Relative to the census data, however, our survey appears to under-represent individuals in the highest income bracket. This is likely the result of the 'gated-community' challenge, which makes it difficult to gain access to conduct face-to-face interviews with the highest income individuals.

western, 16% in the Southern federal region, 21.7% in the Volga, 8.4% in the Urals, 15.7% in the Siberian, and the remaining 4% in the Far-eastern federal region.

In our sample, 53.7% are employees (both skilled and unskilled), while 25% are retired. Among the employed group, 9.4% of the total sample works in skilled non-manual occupations, 27.6% in skilled manual, 13.4% in unskilled non-manual occupations, and 3.4% in unskilled manual labour. Only 2.6% of the sample identify themselves as 'entrepreneurs' or self-employed. The remaining individuals are unemployed (1%), and 17.6% define themselves to be in other inactive population categories, *e.g.* students, household work *etc*. The education level of individuals in our sample is higher than comparative emerging markets: only 8.4% of the sample has less than a secondary education; 31.6% have completed secondary school; an additional 37.3% completed a special vocational/ technical school; and 22.7% have initiated some (5.3%) or completed their higher education (17.4%).

The survey asks individuals to report their individual and household monthly income, but these values are missing for almost 40% of the sample (*i.e.* individuals that refused to answer). In our sample, mean personal monthly income is US $1,528, while median income is US $2,345. This compares with official statistics for 2005 of mean gross income of US $3,010, and suggests our survey might under-represent high-income individuals (Russian Statistics Office, 2008) – or that high-income individuals were less likely to report their income. Therefore, for our main regressions in the next section we interpolate missing income observations and include income brackets. The average imputed family income is 19,460 rubles[11]. The survey also includes a self-reported measure of wealth[12]. All main results are robust to the substitution of imputed income and imputed income brackets by the self-reported wealth measure. We also include a variable labeled "Income shock", if the individual responded "Yes" to the question, "*Did you (your family) experience an unexpected significant reduction of your income over the past 12 months (X%)*".

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[11] The corresponding figures for each of the quartiles of the imputed income distribution are the following: Bottom quartile (1st): monthly income<4,727 rubles ($196); 2nd quartile: 4,727 rubles ≤ monthly income < 8,000 rubles ($333). 3rd quartile: 8,000 rubles ≤ monthly income < 13,000 rubles ($541). 4th quartile: monthly income ≥ 13,000 rubles.

[12] This is a categorical variable: the first category (lowest wealth) is individuals that report that they do not have enough money, even for food (8,6%); the next category is individuals that report they can buy food, but cannot buy clothes (26.5%); the third category is individuals that report they can buy food and clothes, but not durable goods (e.g. a tv-set or refrigerator) (45.5%); individuals that report they can buy durable goods (16%); and individuals who can afford quite expensive things (e.g. apartment, dacha, and many other ones (1%).

The summary statistics in the *Appendix Table A1* show that 35.8% of the sample reported the experience of a negative income shock during the year prior to the s*u*rvey.

The variable of primary interest to this study is that related to retirement planning. Our "*Retirement Planning*" variable stems from a question in the questionnaire, asking individuals: "*What funds will you live on after you reach retirement age?*" A set of nine response options was offered to the respondents, allowing for multiple answers. These nine categories were: (1) Pension that you will receive from a publicly owned retirement fund; (2) Your own earnings (I will continue work after a retirement); (3) Income from leasing and selling property; (4) Support from children, relatives, acquaintances; (5) Additional pension or financial aid from an enterprise where you have been working; (6) Your own savings; (7) Support from church and charitable organizations; (8) Pension that you will receive from a privately owned retirement fund; (9) Other (what exactly?); (10) Don't know. We distinguish between three primary retirement planning strategies by individuals, based on the responses provided to the questions above: *(a)* *Private pension funds* are defined as responses (3), (5), (6), and (8), *i.e.* property income (1.6%), additional work pension (2%), own savings (14.6%), and pensions from privately-owned retirement funds (2.9%). The total number of respondents in this group is 259 (19%). *(b)* *Public pension funds* are defined by the response (1). A remarkable 82.4% of the respondents reply that they rely on public funds, which is indicative of the coverage of the public pension system in Russia, and its post-socialist attribute. 15.2% of the respondents have access to both public and private pension funds. These respondents are included in the former group (a) and hence, the remaining 67.2% of the sample (918 observations) is considered to only have access to public pension funds. (c) Categories (2), (4), (7), (9), and (10) are incorporated into a group of responses for 189 individuals who are considered *non-planners* (13.8%). The phenomenon of high fractions of pensioners continuing to work after retirement has been well-documented in Russia (Kolev and Pascal, 2002), and can be attributed to low retirement ages, low levels of pensions, and low levels of retirement planning in the past.

The next section introduces the empirical strategy and evidence with respect to the measurement of financial literacy and its relationship to retirement planning.

3. Empirical Evidence

3.1 The Measurement of Financial Literacy in Russia

Our survey includes three specific financial literacy questions, which are similar to those originally developed for the US Health and Retirement Study. The questions in our survey examine: (a) *Understanding of Interest Rate (Numeracy)*; (b) *Understanding of Inflation*; (c) *Understanding of Risk and Diversification*. The exact questions are reported in Tables 1a, 1b, and 1c, along with the frequencies for each response category for the whole sample, and the sample of individuals aged between 25 and 65.

[Insert Table 1a about here]

Table 1a introduces the interest rate question, along with the four response options. Interestingly, 36.3% of the individuals in the whole sample (39% of those aged 25-65) gave the correct response to the interest compounding question, with another 32.9% (26.5% aged 25-65) replying that they cannot even roughly provide an answer. *Table 1b* presents the specifics of the inflation question, along with the figures for each response category. It is worth noting that the inflation question implemented in the Russian survey differs from that of the US Health and Retirement Study[13]. While the essence of the two questions is the same, and the task addressed by both is objectively easy, it is worth noting their difference, in view of potential differences in the successful responses between Russia and other countries. 50.8% of the individuals in the sample respond correctly to the inflation question (53.9% of those aged 25-65). The figures for those who could not provide any response at all are 26.1% and 22.5% respectively.

[Insert Table 1b about here]

Table 1c presents the risk/diversification question and the response frequencies. It is worth noting that this question also involves a discrepancy from the one in the US Health and Retirement Study. Hence, while the latter was more of a true/false question, the question in the Russian survey uses a different format to ask exactly the same question. In addition, the false options offered for the riskier asset to invest in were two instead of one, *i.e.* “shares in a unit fund”, and “both risks in a single company stock and a unit fund are identical”. Hence, although the question is the same, it is worth noting that the extra option may complicate things for respondents and it can be expected that more false responses will be obtained for this question in Russia, compared to other countries which use the exact US Health and Retirement Study format[14]. Indeed, a remarkable 12.8% of the respondents (24.7% of those aged 25-65) provide the correct response. 6.7% (6.8%) believe that shares in a unit fund are riskier than those of a single company stick, 45% (48%) believe that the risks are identical in both cases, and 35.4% (30.5%) respond that they do not know. Hence, the category with the highest frequency is the extra option offered, and this caveat for Russia should be noted.

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[13] The US Health and Retirement Study asks: “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account? Do not know, refuse to answer”.

[Insert Table 1c about here]

As shown in *Table 1d*, a very small numbers of individuals answer correctly in all three questions, *i.e.* 3.1% of the individuals (3.4% of those aged 25-65). 21.8% respond correctly to the interest and inflation questions (23.9% aged 25-65). This lather figure can be compared to 72% that correctly answered questions on interest compounding and inflation in the United States, 79% in the Netherlands, 52% in Indonesia, and 34% in Rural India (Lusardi and Mitchell, 2007a; van Rooij, *et al.*; 2007, Cole *et al.*, 2009; respectively). Furthermore, in our Russian survey, 31.8% give all incorrect responses (28% aged 25-65), and 12.5% (9% aged 25-65) reply “I don’t know” to every question. A remarkable 53.7% of the respondents replied “I don’t know” to at least one question (48.2% aged 25-65).

[Insert Table 1d about here]

In the analysis of the next section, we also use the number of correct responses in the financial literacy questions, and both “all three correct” and “interest and inflation correct” options, taking into account the extra difficulty imposed in the risk/diversification question for Russia. Given these interesting preliminary observations, the next sections provide a descriptive analysis of the demographics of financial literacy in Russia, and then proceed to examine the relationship between retirement planning and financial literacy using regression analysis.

3.2 The Demographics of Financial Literacy in Russia

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[14] The US Health and Retirement Study asks: “Do you think that the following statement is true or false? “Buying a single company stock usually provides a safer return than a stock mutual fund. True; False; Do not know; Refuse to answer”.

Table 2 presents the descriptive analysis of the demographics of financial literacy in Russia, in terms of disaggregated frequencies of correct responses and "don't know" answers for each of the three questions and then overall. The first panel distinguishes between the four main age groups, *i.e.* those aged less than 35, those between 36-50, those aged 51-65, and those older than 65. In short, the analysis shows that the younger groups are more likely to provide correct responses in all three questions, compared to the older groups. They are also less likely to reply: "I don't know". For instance, out of those aged less than 35, 47.4% respond correctly to the interest question, 56.2% to the inflation question, and 19.3% to the risk question. The respective figures for the oldest group (65+) are: 13.5% for the interest question, 34.1% for the inflation question, and 3.9% for the risk question. Moreover, the figure for those replying correctly to all three questions is 5.4% for the youngest group, compared to only 0.9% for the oldest group. 42.4% of the young provide at least one "don't know" response, compared to 84.7% of the old. Hence, financial literacy appears to be clearly negatively related to age.

[Insert Table 2 about here]

The second panel of *Table 2* presents the same figures disaggregated by gender. Evidently, while the figures for correct responses do not differ dramatically by gender, with men having slightly higher figures, there are pronounced differences between genders in the number of "don't know" responses. Men are less likely to state that they do not know what the answer is. Given the fact that they are not significantly more likely to provide the correct response, this is a pattern that can be attributed to male overconfidence that has been documented in competitive environments, particularly when it comes to the self-assessment of own skills and knowledge (Barber and Odean, 2001; Croson, 2009). This pattern is also confirmed in the analysis of mean differences using t-tests in *Table A1 in the Appendix*.

Distinguishing between groups based on the level of education, the figures in *Table 2* show that the higher educated exhibit higher levels of financial literacy, with respect to all three questions and the number of correct responses overall. They are also less likely to respond that they do not know the answer. Finally, the distinction based on the labour force classification suggests that the groups comprising of workers, and those not employed exhibit higher levels of financial literacy, as it is assessed using the interest and inflation questions. The self-employed group ranks third, and the retired group ranks fourth and last. However, and interestingly, when it comes to the assessment of the risk/diversification question, the self-employed group performs better, with 16.7% if the self-employed providing the correct answer (25% ‘don’t know’), compared to 14.2% of workers (28.8% ‘don’t know’), 14.9% of the non-employed (31.2% ‘don’t know’), and 7.9% among the retired (54% ‘don’t know’).

3.3 Differences between Urban and Rural Regions

Following the long transition path, Russia emerged as a country with very high rates of inequality, large pay gaps between the genders and regional disparities (Breinerd, 1998; Ogloblin, 1999; Blau and Kahn, 2003; *inter alia*). Due to several developmental lags inherited from the past, the gap between urban and rural areas is huge in Russia (Fitzpatrick, 1994; Spulber, 2003). The rural areas were particularly strongly shaped by collectivism, because economic and social life was dominated by monopolist collective farms (Gächther and Herrman, 2006). More recently, job-to-job mobility in rural areas is low (Earle and Sabirianova, 2002) and so is migration from the rural to the urban regions, with more than a third of the Russian regions “locked into poverty traps” (Andrienko, 2004).

[Insert Table 3 about here]

Table 3 facilitates the inspection of financial literacy across rural and urban regions of the sample. Moreover, it provides an additional distinction between (a) urban regions other than Moscow and St. Petersburg (242 observations); (b) Moscow and its near regions (140 observations); (c) St. Petersburg and its near regions (54 observations), and (d) Rural regions, defined as settlements with less than 500,000 habitants. Moreover, significance levels from t-tests are provided for all groups (a), (b), and (c), with (d) rural regions being the comparison group. The inspection of the table shows that urban area residents are more likely to respond correctly to the interest rate question (45.5% compared to 24.4% in rural areas). They are also significantly less likely to reply, “I don’t know” to that question. Moreover, urban region residents are less likely to respond incorrectly to all three questions (27.7%, compared to 35.1% in rural areas). In addition, near Moscow residents are less likely to respond that they do not know the answer, in all three questions. They are more likely to respond correctly to the inflation and risk questions (72.9% and 22.1% respectively), compared to rural area residents. These patterns are also confirmed by the analysis of the overall figures at the bottom of the table. The differences between near St.

Petersburg residents and the remaining population are not statistically significant at conventional levels.

These results are also confirmed in the summary statistics of the *Appendix Table A1*, where it is also shown that rural area residents are more likely to be older on average, less educated, poorer, less likely to be employed workers and more likely to be retired. Importantly, for the analysis in the next section, they are less likely to invest in private pension funds (15.2%, compared to 27.1% in urban areas), and more likely to expect to live based on public pension funds after retirement (72% compared to 56.9% in urban areas). These differences are statistically significant at the 1% level.

Finally, the two panels of *Figure 1* present the mappings of financial literacy and retirement planning in the 46 administrative regions of Russia in our survey. With darker figures illustrating higher levels of financial literacy (the percentage of correct responses in the interest and inflation questions in panel A) and retirement planning (the percentage of individuals with private pension funds in panel B), it is clearly shown that financial literacy and retirement planning rank relatively higher in regions within and nearby the Central federal region (the analysis by federal region is available upon request). The regions ranking the highest with respect to financial literacy are: Karachay-Cherkessia, Altai Krai, Primorye, Nizhniy Novgorod, Rostov, Tuymen, Bashkortostan, Bryansk, and near Moscow. The regions ranking the highest with respect to private pension planning are: Kemerovo, Khanty-Mansi Autonomous District (Ugra), Moscow and the near Moscow region.

3.4 Retirement Planning: Does Financial Literacy Matter?

The relationship of primary interest to this study is the association between financial literacy and retirement planning. *Table 4* presents the association between the two variables, presenting the financial literacy figures for individuals with: (1) private pension funds, (2) public pension funds only, and (3) non-planners. T-tests and their significance levels are also shown for comparisons between (1) vs. (2), (1) vs. (3), and (2) vs. (3). It is shown that individuals with private pension funds are significantly more likely to respond correctly to all three financial literacy question, compared to both individuals with public pension funds only, and the non-planners. Moreover, they are also less likely to respond ‘I don’t know’ to any of the three questions, compared to both groups of non-planners. The figures are: 46.7% of the private planners respond correctly to the interest rate question, compared to 33.1% of the individuals with public pensions. 57.5% of the private pension planners respond correctly to the inflation question, compared to 49% of the individuals with public funds. 26.3% of the former group replies correctly to the risk/diversification question, compared to only 9.5% of the latter group. Finally, 7.7% among the private planners respond correctly to all three questions, compared to 1.9% of the individuals with public pensions, and 2.7% of the non-planners.

[Insert Table 4 about here]

The correlation matrix between the financial literacy variables and each of the detailed retirement planning responses is presented in *Table A2* in the Appendix. The data show a significant and positive association between savings for retirement and all financial literacy measures. Moreover, the participation in private pension funds is positively correlated with correct responses to the risk/diversification question and overall correct responses. Paradoxically, continuing to work after retirement is also positively correlated to correct financial literacy responses.

We next examine whether the positive association between financial literacy and retirement planning persists in regression analysis. *Table 5* presents marginal effects and robust standard errors from probit regressions, with private pension funding as the dependent variable equal to 1. This variable takes the value 0 if the individual relies on public pension funds only or if he/she is a non-planner. The set of explanatory variables includes: financial literacy (inflation and interest correct, all three responses correct, and the number of correct responses), age and age squared divided by 1,000, and gender (female). Although we do not have information on marital status, we include a dummy variable for individuals that live alone (13.5%) and a continuous variable for the number of household members. Moreover, we incorporate dummy variables for the level of education (5), family income quartiles (4), the experience of an income shock during the last year, and occupation groups (4).

[Insert Table 5 about here]

The first three columns of *Table 5* present the baseline private retirement planning estimates, with each of the three financial literacy measures incorporated in the regressions, one at a time, *i.e.* the dummy variable for correct response to the inflation and interest questions, the dummy variable for correct response to all three questions, and the number of correct responses, respectively. All three variables exert a significantly large positive impact on the likelihood to plan for retirement using private pension funds. The marginal effects estimated reveal that those responding correctly to the interest and inflation questions are 32.5% more likely to be retirement planners. Individuals responding correctly to all three questions are more than twice as likely to own private pension funds. Finally, an increase in the number of correct responses from ½ standard deviation below to ½ standard deviation above the average raises the likelihood of being affiliated with private pension funds by 28.8% depending on the measure used (and given the predicted probability of the model, shown at the bottom of the table).

The last three columns of the table report the results from the same exercise, excluding the individuals who are already retired. The results are robust to the exclusion of that sub-sample, and the magnitude of the effects remains virtually unaffected, given the predicted probabilities of the models. With respect to the remaining results, all six specifications show that rural region area residents are significantly less likely to own private retirement funds. The magnitude of the effect is close to 50%, indicating that rural area residents are 50% less likely to privately plan for retirement, compared to urban area residents. The higher educated appear more likely to plan for retirement, and so do the wealthier, and individuals who experienced a negative income shock during the last year. Finally, the unemployed appear to be significantly less likely to plan for retirement using private funds, compared to workers and the self-employed.

Our second set of estimates, presented in *Table 6*, allows for the more detailed distinction between the three retirement fund groups, *i.e.* the private fund planners, the public fund holders, and the non-planners. The estimation method is the multinomial probit model, and marginal effects for all three categories, along with robust standard errors are presented throughout. The results confirm that financial literacy exerts a positive impact on private retirement planning, and a negative impact to non-planning. In the first and the last three sets of columns it is shown that financially literate individuals are some 30% more likely to own private pension funds, and some 30% less likely to own no funds at all. The magnitude of the effects is much higher for the few individuals getting all three financial literacy responses correct. They are more than twice as likely to own private funds and 27% less likely to rely on public pension funds only. The remaining results confirm that rural region residents are some 50% less likely to participate in private pension schemes, and some 16% more likely to rely on public pension funds only. The more educated are significantly less likely to rely only on public pensions, and so are the wealthier. The latter group and those who experienced a negative income shock in the last year are more likely to participate in private pension schemes.

[Insert Table 6 about here]

The previous sections have shown some interesting patterns with respect to the impact of financial literacy on private retirement planning. However, in the absence of a (quasi)experimental setting any causal inference claim cannot be adequately supported. Hence, this section attempts to mitigate this concern via the use of instrumental variable techniques to identify the impact of financial literacy on private retirement planning. The endogenous variable is financial literacy (in each of its three forms shown in Tables 5 and 6). Two instrumental variables for the year 2007 are used in the first stage regressions for financial literacy: (a) the total number of newspapers in circulation in every administrative region, and (b) the number of bank branches per 1,000 habitants in every administrative region. The two variables can intuitively be expected to be positively correlated with financial literacy, and uncorrelated with the unobserved determinants of private pension planning. This is indeed the case. The average total number of newspapers is 55 (that for local newspapers is 15), and the average number of bank branches is 58 (0.0248 per thousand habitants)[15]. Although Russia spreads over 11 time zones and 89 regions, there is a very high concentration of banking assets. For instance, the Moscow region accounted for almost half of all deposits in 2007 (Camara and Montes-Negreti, 2006) and 8% of total national bank branches. Yet, a feature of the predominately state-owned banking network is that bank branches are more widespread across the country: for instance, only 11% of bank branches are located in Moscow, while the Southern Federal District includes 16% of branches, but only 7% of household deposits.

In our last set of estimates , we utilise instrumental variable techniques to examine the impact of financial literacy on retirement planning. The first stage regressions are shown in the *Appendix Table A3*. There, the instrumental variables are shown to exert a positive statistically significant impact on financial literacy. They are statistically significant in predicting all three financial literacy measures, in terms of both their individual and joint impact. Both the F-statistics from the tests of joint significance and the LM tests of omitted variables shown at the bottom of the *Appendix Table A3* strongly reject the null hypotheses of joint insignificance and "insignificant improvement" to the model.

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[15] In maps available upon request, it can be seen that the ranking of federal regions with respect to the number of bank branches per thousand habitants, goes as follows (starting from the highest): Urals, Volga, North-Western, Central, Siberian, Far-Eastern, Southern. The ranking with respect to the total number of newspapers in circulation is: Central, Southern, Volga, Siberian, Far-Eastern, North-Western, Urals. The data sources are: Bank branches: Central Bank of Russia (2007); Number of newspapers: East View Information Services (2008), http://www.eastview.com/Online/DBtitlelists.aspx. The map coordinates for the Russian administrative regions, along with map platforms are available at: http://www.diva-gis.org/gData.

The second stage estimates are reported in *Table 7*. Marginal effects and robust standard errors from IV probit models are presented for private pension planning (the variable takes the value 0 for individuals with public pension funds only and the non-planners). The three columns of the table correspond to the first three columns of Table 5. The exogeneity test is rejected in all three columns, indicating that the probit estimates are not likely to differ significantly from the IV probit estimates. The Hensen J statistic of overidentifying restriction at the bottom of the Table accepts the null hypothesis that the instruments are valid. The Kleibergen-Paap LM and Wald statistics reject the null hypothesis that the equations are underidentified or weakly identified. The weak-instrument-robust inference tests[16] accept the null hypothesis that the coefficients of the excluded instruments are jointly equal to zero. Hence, the instruments are valid, and the results confirm the positive significant association between financial literacy and retirement planning.

Specifically, all three measures of financial literacy are shown to exert a positive impact on private retirement planning. The magnitude of the estimated effect is 3 times higher than that of the baseline probit model in Column 1, and more than 4 times higher in Column 2. Hence, some caution may be needed in the interpretation of the effect, particularly in the second column, where the number of individuals getting all three financial literacy responses correct is also very small. However, the estimate of the effect of the number of correct responses on private pension planning in Column 3 is very similar in magnitude to the effect estimated in the probit model of Table 5. Hence, the IV estimates largely confirm the validity of the estimates presented in Table 5.

[Insert Table 7 about here]

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[16] These additional reported tests are from GMM linear probability models examining instrument validity. The full list of results is available upon request. The weak-instrument-robust inference tests examine the null hypothesis that the coefficients of the endogenous regressors in the structural equation are jointly equal to zero and that the overidentifying restrictions are valid. Both tests are robust to the presence of weak instruments. The tests are equivalent to estimating the reduced form of the equation (with the full set of instruments as regressors) and testing that the coefficients of the excluded instruments are jointly equal to zero.

4 Conclusion

With only limited empirical evidence, policymakers around the world have advocated increased expenditure on literacy education, in hopes of increasing household savings and improve retirement planning, with the ultimate goal of reducing poverty, improving welfare, and increasing financial stability. Our study contributes to the financial literacy literature by examining its association with retirement preparedness in a relatively understudied and interesting context, *i.e.* that of a country with relatively old and rapidly ageing population, large regional disparities and a rapidly emerging financial market. Even though consumer borrowing is increasing very rapidly in Russia, we find that only 36.3% of respondents in our sample know about the working of interest compounding and only half can answer a simple question about inflation. In a country with pervasive public pension provision, we find that financial literacy is significantly positively related to retirement planning using private pension funds and schemes. Residents in rural areas are much more reliant on the public provision, investing less on private schemes and savings.

The growing youth demographic in Eastern Europe has generated interest in how to promote more responsible retirement planning with lower government intervention, and the current financial crisis has generated interest in better understanding how to promote more responsible and prudent individual saving behavior. The results of our study have a clear policy implication; along with encouraging the availability of private retirement plans and financial products, efforts to improve financial literacy can also be pivotal to the expansion in the use of such schemes.

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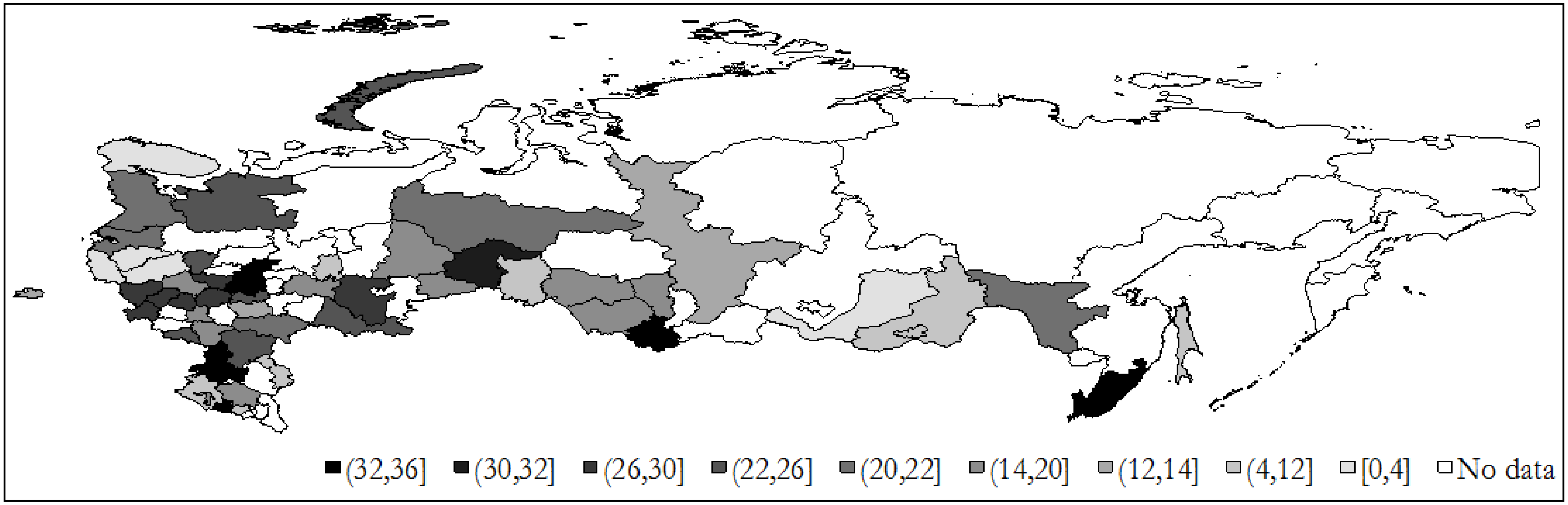
Figure 1: Financial Literacy and Retirement Planning by 2-digit region

Panel A: % inflation & interest correct


(32,36]
(30,32]
(26,30]
(22,26]
(20,22]
(14,20]
(12,14]
(4,12]
[0,4]
No data

Panel B: % private pension funds

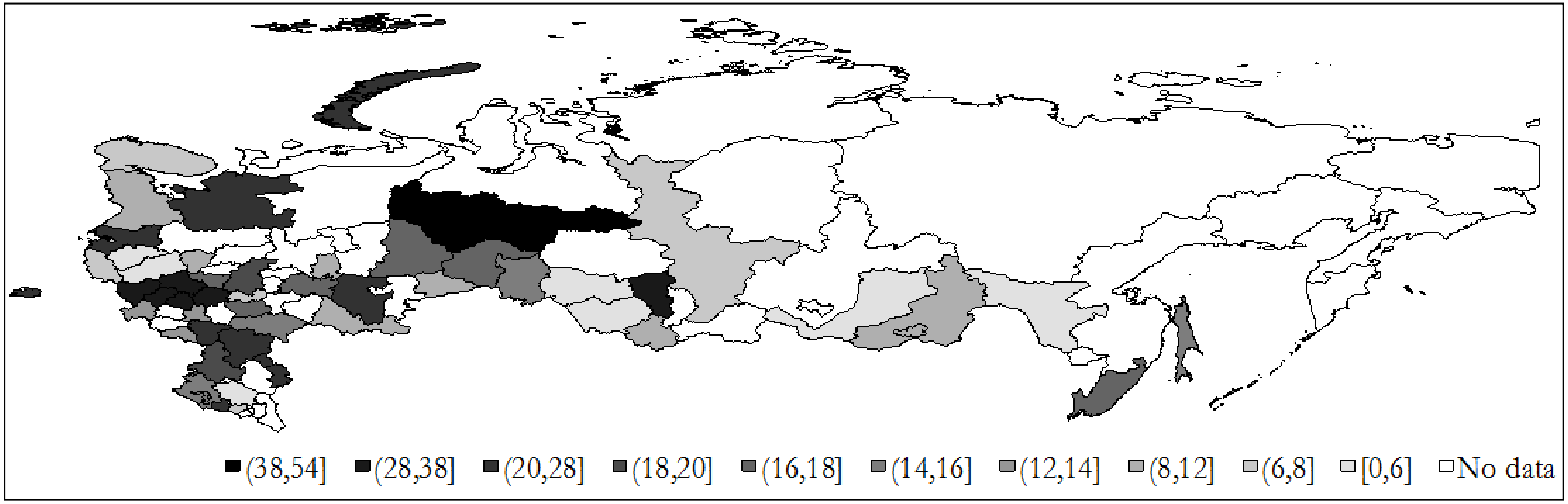

(38,54]
(28,38]
(20,28]
(18,20]
(16,18]
(14,16]
(12,14]
(8,12]
(6,8]
[0,6]
No data

Table 1a: Interest Question

"*Let's assume that you deposited 100,000 rubles in a bank account for 5 years at 10% interest rate. The interest will be earned at the end of each year and will be added to the principal. How much money will you have in your account in 5 years if you do not withdraw either the principal or the interest?*"

	Whole sample	Age 25-65
More than 150k rubles	36.31%	38.96%
Exactly 150k rubles	24.08%	26.42%
Less than $150k rubles	6.73%	8.08%
I can not estimate it even roughly	32.87%	26.53%
N. of obs.	1,366	965

Table 1b: Inflation Question

"*Let's assume that in 2010 your income is twice as now, and the consumer prices also grow twofold. Do you think that in 2010 you will be able to buy more, less, or the same amount of goods and services as today?*"

	Whole sample	Age 25-65
More than today	4.39%	4.25%
Exactly the same	50.81%	53.89%
Less than today	18.67%	19.38%
I can not estimate it even roughly	26.13%	22.49%
N. of obs.	1,366	965

Table 1c: Risk Question

"*Which is the riskier asset to invest in?*"

	Whole sample	Age 25-65
Shares in a single company stock	12.81%	14.72%
Shares in a unit fund	6.73%	6.84%
Risks are identical in both cases	45.02%	47.98%
Don't know	35.43%	30.47%
N. of obs	1,366	965

Table 1d: Answers across questions

	Whole sample	Age 25-65
Interest & inflation	21.82%	23.94%
All correct	3.07%	3.42%
No correct	31.84%	27.98%
At least 1 DK	53.73%	48.19%
All DKs	12.52%	9.02%
N. of obs.	1,366	965

Table 2: Distribution of Financial Literacy across Demographics

	interest		inflation		risk		Overall	
	correct in percent	dk in percent	correct in percent	dk in percent	correct In percent	dk in percent	3 correct in percent	at l. 1 dk in percent
Age								
35 and younger	47.39%	18.82%	56.24%	18.59%	19.27%	28.80%	5.44%	42.40%
36 to 50	42.59%	20.63%	52.65%	20.11%	13.23%	26.72%	2.38%	43.65%
51 to 65	29.87%	39.94%	53.14%	29.25%	9.75%	35.22%	2.20%	59.12%
Older than 65	13.54%	70.31%	34.06%	46.29%	3.93%	62.88%	0.87%	84.72%
Gender								
Male	36.81%	28.99%	52.43%	21.88%	14.41%	29.86%	3.82%	47.22%
Female	35.95%	35.70%	49.62%	29.24%	11.65%	39.49%	2.53%	58.48%
Education								
Less than HS	19.13%	62.61%	35.65%	39.13%	8.70%	58.26%	1.74%	77.39%
High school	35.27%	34.57%	49.42%	27.84%	12.99%	32.95%	3.71%	54.99%
Technical	34.18%	32.02%	51.28%	26.33%	12.57%	36.54%	1.96%	54.81%
Some college	53.42%	23.29%	49.32%	24.66%	12.33%	32.88%	4.11%	47.95%
Higher education	45.80%	20.17%	60.08%	16.81%	15.13%	27.31%	4.62%	39.50%
Self-employed, non-employed, and workers								
Self-employed	30.56%	30.56%	47.22%	19.44%	16.67%	25.00%	0.00%	47.22%
Workers	41.42%	24.11%	52.59%	20.84%	14.17%	28.75%	3.27%	45.64%
Non-employed	42.35%	27.45%	55.29%	26.67%	14.90%	31.37%	3.14%	51.76%
Retired	21.41%	56.01%	43.99%	37.83%	7.92%	53.96%	2.93%	73.31%

Table 3: Financial Literacy Across Rural-Urban areas

	(1) Urban	(2) Near Moscow	(3) Near St. Petersburg	(4) Rural
Number of Observations	*242*	*140*	*54*	*930*
		Interest rate question		
Correct	45.45%[a]	34.29%	33.33%	34.41%
Do not know	26.03%[-a]	27.14%[-c]	38.89%	35.16%
		Inflation question		
Correct	48.35%	72.86%[a]	38.89%	48.82%
Do not know	28.51%	12.14%[-a]	33.33%	27.20%
		Risk question		
Correct	12.81%	22.14%[a]	14.81%	11.29%
Do not know	39.26%	26.43%[-a]	42.59%	35.38%
		Overall		
Interest & inflation correct	25.21%	27.14%[c]	12.96%	20.65%
All correct	2.07%	5.00%	3.70%	3.01%
No correct	27.69%[-b]	16.43%[-a]	35.19%	35.05%
Number of correct answers	1.07[b]	1.29[a]	0.87	0.95
At least 1 DK	52.89%	41.43%[-a]	62.96%	55.27%
All DKs	12.81%	4.29%[-a]	12.96%	13.66%

Notes:
* [c]<0.10, ** [b]<0.05, *** [a]<0.01: From a t-test of mean differences between (1) vs. (4), (2) vs. (4), and (3) vs. 4, respectively. Urban regions in Column 1 exclude Moscow & St. Petersburg.

Table 4: Financial Literacy by Retirement Planning

	(1) Private funds	(2) Public funds	(3) Non-planners	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)
Number of Observations	259	918	189			
			Interest rate question			
Correct	46.72%	33.12%	37.57%	4.05 ***	1.94 *	-1.18
Do not know	21.24%	36.82%	29.63%	-4.74 ***	-2.04 **	1.88 *
			Inflation question			
Correct	57.53%	49.02%	50.26%	2.42 **	1.53	-0.31
Do not know	14.67%	29.19%	26.98%	-4.75 ***	-3.26 ***	0.61
			Risk question			
Correct	26.25%	9.48%	10.58%	7.2 ***	4.19 ***	-0.47
Do not know	27.03%	36.71%	40.74%	-2.9 ***	-3.08 ***	-1.04
			Overall			
Interest & inflation correct	29.34%	20.04%	20.11%	3.2 ***	2.22 **	-0.02
All correct	7.72%	1.85%	2.65%	4.82 ***	2.32 **	-0.71
Number of correct answers	1.305	0.9161	0.9841	6.7 ***	3.99 ***	-1.05

Notes:
* p<0.10, ** p<0.05, *** p<0.01: From a t-test of mean differences. Public pension is defined as: “Pension that you will receive from a publicly owned retirement fund”. Private pension is defined as: “Your own savings” or “Pension that you will receive from a privately owned retirement fund”, or “Additional pension or financial aid from an enterprise where you have been working” or “Income from leasing and selling property”.

Table 5: Dependent variable: Private Pension Funds (1/0)

(Marginal effects from probit models)

	(1)	(2)	(3)	(4)	(5)	(6)
Inflation & interest correct	0.052**	-	-	0.064*	-	-
	[0.026]			[0.036]		
All 3 responses correct	-	0.223***	-	-	0.256**	-
		[0.077]			[0.107]	
Number of correct responses	-	-	0.046***	-	-	0.054***
			[0.013]			[0.018]
Age	-0.001	-0.001	-0.001	-0.018	-0.018	-0.017
	[0.003]	[0.003]	[0.003]	[0.011]	[0.011]	[0.011]
Age squared/1,000	-0.026	-0.026	-0.018	0.192	0.192	0.188
	[0.036]	[0.036]	[0.036]	[0.132]	[0.132]	[0.132]
Female	-0.013	-0.010	-0.014	-0.015	-0.010	-0.017
	[0.021]	[0.021]	[0.021]	[0.029]	[0.030]	[0.029]
Single-person household	-0.037	-0.04	-0.031	-0.005	-0.012	0.001
	[0.036]	[0.036]	[0.036]	[0.058]	[0.058]	[0.059]
Number of household members	0.006	0.007	0.007	-0.002	-0.001	-0.002
	[0.010]	[0.010]	[0.010]	[0.014]	[0.014]	[0.014]
Rural region	-0.081***	-0.083***	-0.077***	-0.062*	-0.060*	-0.056*
	[0.024]	[0.024]	[0.024]	[0.032]	[0.032]	[0.032]
Education (*Ref.: Less than HS*)						
High-school	0.085	0.089	0.089	0.102	0.095	0.112
	[0.061]	[0.061]	[0.061]	[0.107]	[0.107]	[0.107]
Technical	0.108*	0.116*	0.113*	0.132	0.131	0.143
	[0.060]	[0.061]	[0.060]	[0.100]	[0.100]	[0.099]
Some college	0.107	0.113	0.109	0.137	0.145	0.148
	[0.090]	[0.091]	[0.090]	[0.150]	[0.151]	[0.149]
College	0.118	0.128*	0.120*	0.155	0.157	0.167
	[0.072]	[0.074]	[0.072]	[0.117]	[0.117]	[0.116]
Family income (*Ref.: 1st quartile*)						
2nd quartile	-0.010	-0.008	-0.011	-0.013	-0.012	-0.012
	[0.033]	[0.033]	[0.033]	[0.048]	[0.048]	[0.048]
3rd quartile	0.017	0.014	0.008	0.033	0.023	0.021
	[0.035]	[0.035]	[0.034]	[0.050]	[0.049]	[0.049]
4th quartile (highest)	0.118***	0.112***	0.104***	0.160***	0.153***	0.146***
	[0.041]	[0.041]	[0.040]	[0.054]	[0.054]	[0.054]
Has experienced income shock in the last year	0.065***	0.060***	0.059***	0.116***	0.111***	0.110***
	[0.022]	[0.022]	[0.022]	[0.030]	[0.030]	[0.030]
Occupation (*Ref.: Workers*)						
Self-Employed	0.043	0.042	0.043	0.067	0.067	0.062
	[0.064]	[0.064]	[0.063]	[0.078]	[0.078]	[0.077]
Non-employed	-0.035	-0.032	-0.036	-0.086***	-0.084**	-0.089***
	[0.026]	[0.026]	[0.025]	[0.033]	[0.033]	[0.032]
Retired	0.007	-0.001	0.002	-	-	-
	[0.037]	[0.036]	[0.036]			
Predicted Probability	0.1599	0.1599	0.1582	0.2012	0.2015	0.1995
Observed Probability	0.1896	0.1896	0.1896	0.2199	0.2199	0.2199
No. of Observations	1,366	1,366	1,366	814	814	814
Pseudo R^2	0.104	0.109	0.111	0.077	0.083	0.084
Log-Likelihood	-594.4	-590.9	-589.9	-395.6	-393.3	-392.7
LR χ^2	129.65***	134.11***	133.77***	66.49***	66.31***	69.63***

Notes: * p<0.10, ** p<0.05, *** p<0.01. Columns (4), (5), and (6) include the sample aged between 25 and 65 who are not retired

Table 6: Dependent variable: Retirement Planning

(Marginal effects from multinomial probit models)

	(1) Private	(2) Public	(3) Other	(1) Private	(2) Public	(3) Other	(1) Private	(2) Public	(3) Other
Inflation & Interest correct	0.049*	-0.008	-0.041**	-	-	-	-	-	-
	[0.027]	[0.031]	[0.019]						
All 3 responses correct	-	-	-	0.229***	-0.192**	-0.037	-	-	-
				[0.078]	[0.080]	[0.039]			
Number of correct responses	-	-	-	-	-	-	0.045***	-0.019	-0.026**
							[0.013]	[0.016]	[0.011]
Age	-0.003	0.010**	-0.007**	-0.003	0.010**	-0.007**	-0.003	0.010**	-0.007**
	[0.003]	[0.004]	[0.003]	[0.003]	[0.004]	[0.003]	[0.003]	[0.004]	[0.003]
Age squared/1,000	-0.008	-0.022	0.03	-0.008	-0.025	0.033	-0.001	-0.027	0.027
	[0.037]	[0.047]	[0.037]	[0.037]	[0.047]	[0.037]	[0.037]	[0.048]	[0.038]
Female	-0.016	0.053*	-0.037*	-0.014	0.050*	-0.037*	-0.017	0.053*	-0.035*
	[0.022]	[0.027]	[0.019]	[0.022]	[0.027]	[0.019]	[0.022]	[0.027]	[0.019]
Single-person Household	-0.038	-0.014	0.052	-0.04	-0.013	0.053	-0.032	-0.017	0.049
	[0.037]	[0.052]	[0.044]	[0.038]	[0.052]	[0.044]	[0.038]	[0.052]	[0.044]
Number of household members	0.008	-0.025**	0.017**	0.009	-0.025**	0.016*	0.009	-0.025**	0.016*
	[0.010]	[0.013]	[0.008]	[0.010]	[0.013]	[0.008]	[0.010]	[0.013]	[0.008]
Rural region	-0.087***	0.116***	-0.029	-0.089***	0.117***	-0.029	-0.082***	0.114***	-0.032
	[0.025]	[0.029]	[0.020]	[0.025]	[0.029]	[0.020]	[0.024]	[0.029]	[0.020]
Education (*Ref.: Less than HS*)									
High School	0.088	-0.124*	0.036	0.092	-0.125*	0.033	0.094	-0.124*	0.03
	[0.064]	[0.069]	[0.051]	[0.064]	[0.069]	[0.051]	[0.064]	[0.069]	[0.050]
Technical	0.110*	-0.159**	0.049	0.118*	-0.162**	0.044	0.118*	-0.160**	0.042
	[0.063]	[0.068]	[0.051]	[0.064]	[0.068]	[0.051]	[0.063]	[0.068]	[0.050]
Some college	0.111	-0.212**	0.101	0.118	-0.212**	0.094	0.117	-0.210**	0.093
	[0.094]	[0.096]	[0.081]	[0.095]	[0.096]	[0.080]	[0.095]	[0.096]	[0.080]
College	0.121	-0.183**	0.063	0.131*	-0.185**	0.055	0.126*	-0.181**	0.056
	[0.076]	[0.078]	[0.061]	[0.077]	[0.079]	[0.061]	[0.076]	[0.078]	[0.061]
Family income (*Ref.: 1st quartile*)									
2nd quartile	-0.010	0.059	-0.049**	-0.008	0.058	-0.049*	-0.011	0.059	-0.048*
	[0.034]	[0.040]	[0.025]	[0.034]	[0.040]	[0.025]	[0.034]	[0.040]	[0.025]
3rd quartile	0.02	0.007	-0.026	0.016	0.011	-0.026	0.01	0.012	-0.022
	[0.036]	[0.043]	[0.026]	[0.036]	[0.043]	[0.026]	[0.036]	[0.042]	[0.027]
4th quartile	0.117***	-0.054	-0.063***	0.111***	-0.048	-0.063***	0.104**	-0.046	-0.058**
	[0.042]	[0.046]	[0.024]	[0.042]	[0.046]	[0.024]	[0.041]	[0.046]	[0.024]
Has experienced income shock	0.068***	-0.070**	0.001	0.062***	-0.068**	0.006	0.061***	-0.069**	0.007
in the last year	[0.023]	[0.027]	[0.019]	[0.023]	[0.027]	[0.019]	[0.022]	[0.027]	[0.019]
Occupation (*Ref.: Workers*)									
Self-Employed	0.042	-0.009	-0.033	0.041	-0.014	-0.027	0.042	-0.01	-0.032
	[0.065]	[0.074]	[0.043]	[0.065]	[0.074]	[0.046]	[0.064]	[0.074]	[0.044]
Non-employed	-0.033	0.005	0.028	-0.03	0.003	0.027	-0.034	0.006	0.029
	[0.027]	[0.035]	[0.026]	[0.027]	[0.035]	[0.026]	[0.026]	[0.035]	[0.026]
Retired	0.011	0.03	-0.041	0.002	0.04	-0.041	0.006	0.034	-0.04
	[0.038]	[0.044]	[0.029]	[0.038]	[0.044]	[0.029]	[0.038]	[0.044]	[0.029]
Predicted Probability	0.1681	0.7119	0.1200	0.1679	0.7113	0.1208	0.1664	0.7133	0.1203
Observed Probability	0.1896	0.6720	0.1384	0.1896	0.6720	0.1384	0.1896	0.6720	0.1384
No. of Observations		1,366			1,366			1,366	
Log-Likelihood		-1,028.3			-1,026.1			-1,023.9	
LR χ^2		253.44***			257.87***			255.15***	

Notes: * p<0.10, ** p<0.05, *** p<0.01

Table 7: Dependent variable: Private Pension Planning (1/0)
(Marginal effects from IV probit models)

	(1)	(2)	(3)
Inflation & Interest correct	0.167**	-	-
	[0.080]		
All 3 responses correct	-	0.995*	-
		[0.582]	
Number of correct responses	-	-	0.039**
			[0.019]
Age	-0.001	-0.001	-0.001
	[0.003]	[0.003]	[0.003]
Age squared/1,000	-0.019	-0.013	-0.019
	[0.036]	[0.033]	[0.036]
Female	-0.014	0.002	-0.014
	[0.021]	[0.022]	[0.021]
Single-person Household	-0.034	-0.044	-0.033
	[0.039]	[0.038]	[0.040]
Number of household members	0.005	0.002	0.007
	[0.009]	[0.009]	[0.010]
Rural region	-0.072***	-0.066***	-0.073***
	[0.021]	[0.022]	[0.021]
Family income (*Ref.: 1^{st} quartile - lowest*)			
2nd quartile	-0.012	0.001	-0.011
	[0.033]	[0.031]	[0.033]
3rd quartile	0.011	-0.008	0.009
	[0.033]	[0.035]	[0.034]
4th quartile	0.102***	0.059	0.096***
	[0.033]	[0.048]	[0.034]
Has experienced income shock in the last year	0.066***	0.034	0.057***
	[0.020]	[0.026]	[0.020]
Occupation (*Ref.: Workers*)			
Self-Employed	0.061	0.071	0.038
	[0.057]	[0.051]	[0.055]
Non-employed	-0.037	-0.019	-0.037
	[0.027]	[0.030]	[0.028]
Retired	-0.001	-0.041	0.003
	[0.036]	[0.042]	[0.036]
Wald χ^2 test of exogeneity	2.16	1.54	0.17
Partial R^2 of excluded instruments:	0.0873	0.0076	0.4384
Test of excluded instruments F(2, 1050)	77.44***	9.45***	663.64***
(a) Kleibergen-Paap rk LM statistic $\chi^2(2)$	129.9***	18.87***	475.84***
(a) Kleibergen-Paap rk Wald statistic $\chi^2(2)$	157.18***	19.18***	1,346.99***
(b) Kleibergen-Paap Wald rk F-statistic	77.44***	9.45***	663.64***
(c) Anderson-Rubin Wald test: F(2,1050)	1.55	1.55	1.55
(c) Anderson-Rubin Wald test: $\chi^2(2)$	3.16	3.16	3.16
(c) Stock-Wright LM S-statistic: $\chi^2(2)$	3.13	3.13	3.13
(d) Hansen J statistic $\chi^2(1)$	1.876	3.090*	2.151
No. of Observations	1,366	1,366	1,366
Log-Likelihood	-1,223.8	-107.2	-1,801.3
Wald χ^2	138.6***	239.3***	126.7***

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. The specification also includes education dummy variables. The tests at the bottom are from IV GMM models. (a) denotes underidentification tests, (b) weak identification, (c) weak-instrument-robust inference (tests of joint significance of the endogenous regressors in the main equation), and (d) overidentification tests.

Appendix:

Table A1: Summary statistics and mean differences

	Pooled sample	*Urban region*	*Rural region*	*Male*	*Female*
Number of observations	*1,366*	*436*	*930*	*576*	*790*
Retirement planning					
Private pension funds	19.0%	27.1%***	15.2%	21.2%*	17.3%
Public pension funds only	67.2%	56.9%	72.0%***	62.3%	70.8%***
No funds	13.8%	16.1%	12.8%	16.5%**	11.9%
Financial literacy					
Interest rate: Correct	36.3%	40.4%**	34.4%	36.8%	36.0%
Interest rate: Don't know	32.9%	28.0%	35.2%***	29.0%	35.7%***
Inflation: Correct	50.8%	55.1%**	48.8%	52.4%	49.6%
Inflation: Don't know	26.1%	23.9%	27.2%	21.9%	29.2%***
Risk: Correct	12.8%	16.1%**	11.3%	14.4%	11.7%
Risk: Don't know	35.4%	35.6%	35.4%	29.9%	39.5%***
Inflation & Interest correct	21.8%	24.3%	20.7%	22.2%	21.5%
All 3 responses correct	3.1%	3.2%	3.0%	3.8%	2.5%
All 3 responses wrong	31.8%	25.0%	35.1%***	29.7%	33.4%
At least one "Don't know"	53.7%	50.5%	55.3%*	47.2%	58.5%***
All three "Don't know"	12.5%	10.1%	13.7%*	9.0%	15.1%***
Number of correct responses	1.00	1.11***	0.95	1.04	0.97
Age	46.04	44.48	46.78**	43.77	47.70***
Female	57.8%	57.1%	58.2%	0.0%	100.0%
Single-person Household	13.5%	15.4%	12.7%	10.1%	16.1%***
Number of household members	2.95	2.90	2.97	3.03**	2.89
Rural region	68.1%	0.0%	100.0%	67.5%	68.5%
Education					
Less than high-school	8.4%	4.6%	10.2%***	7.1%	9.4%
High School	31.6%	27.1%	33.7%**	36.6%***	27.9%
Technical	37.3%	38.5%	36.7%	35.6%	38.5%
Some college	5.3%	5.7%	5.2%	5.2%	5.4%
College	17.4%	24.1%***	14.3%	15.5%	18.9%
Family income					
1st quartile	25.0%	15.4%	29.6%***	18.8%	29.6%***
2nd quartile	25.0%	19.0%	27.7%***	22.4%	26.8%*
3rd quartile	25.0%	28.0%*	23.7%	30.2%***	21.3%
4th quartile	25.0%	37.6%***	19.0%	28.7%***	22.3%
Has experienced income shock	35.8%	37.2%	35.2%	36.5%	35.3%
Occupation					
Self-Employed	2.6%	2.8%	2.6%	4.2%***	1.5%
Worker	53.7%	58.0%**	51.7%	61.5%***	48.1%
Non-employed	18.7%	19.3%	18.4%	16.5%	20.3%*
Retired	25.0%	20.0%	27.3%***	17.9%	30.1%***

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$: From a t-test of mean differences

Table A2: Correlation Matrix between Financial Literacy and Retirement Planning

	Interest	Inflation	Risk	#Correct	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interest correct	1.00													
Inflation correct	0.14***	1.00												
Risk correct	-0.02	0.13***	1.00											
# correct responses	0.65***	0.73***	0.48***	1.00										
1. Pension from a publicly owned retirement fund	-0.01	-0.02	-0.02	-0.03	1.00									
2. Your own earnings (continue work after a retirement)	0.12***	0.09***	0.02	0.13***	0.07**	1.00								
3. Income from leasing and selling property	0.01	-0.01	0.01	0.01	0.06**	-0.05*	1.00							
4. Support from children, relatives, acquaintances	-0.01	0.02	0.07**	0.04	0.09***	-0.03	0.06**	1.00						
5. Additional pension or financial aid from enterprise where I have been working	0.01	0.03	0.02	0.04	0.05*	0.01	0.07**	0.05*	1.00					
6. Your own savings	0.12***	0.07***	0.18***	0.18***	-0.06**	0.01	0.10***	0.07**	0.08***	1.00				
7. Support from church & charity	-0.03	-0.01	0.04	0.00	0.02	-0.03	-0.01	0.04	-0.01	0.04	1.00			
8. Pension from a privately owned retirement fund	-0.01	0.01	0.12***	0.05*	-0.01	0.07**	0.05*	0.08***	0.01	0.02	-0.01	1.00		
9. Other	-0.05*	-0.05*	-0.01	-0.06**	0.06**	-0.08***	-0.02	-0.03	-0.02	-0.07***	-0.01	-0.03	1.00	
10. Don’t know	0.02	-0.01	-0.03	-0.01	-0.70***	-0.22***	-0.04	-0.12***	-0.05*	-0.13***	-0.01	-0.06**	-0.06**	1.00

Table A3: IV first-stage regressions

Dependent variable:	Inflation & Interest correct		All 3 responses correct		Number of correct responses	
Age	0.002	0.001	0.001	-0.001	0.010	0.006
	[0.003]	[0.003]	[0.001]	[0.001]	[0.007]	[0.005]
Age squared/1,000	-0.052	-0.035	-0.007	-0.004	-0.200***	-0.123***
	[0.033]	[0.032]	[0.013]	[0.013]	[0.067]	[0.047]
Female	0.003	0.005	-0.01	-0.01	-0.004	0.009
	[0.023]	[0.022]	[0.010]	[0.010]	[0.045]	[0.033]
Single-person Household	-0.039	-0.037	0.009	0.01	-0.139*	-0.128**
	[0.037]	[0.035]	[0.015]	[0.015]	[0.078]	[0.053]
Number of household members	0.010	0.004	0.003	0.002	0.002	-0.025
	[0.012]	[0.011]	[0.005]	[0.004]	[0.022]	[0.015]
Rural region	-0.018	0.022	0.004	0.005	-0.088*	0.071*
	[0.025]	[0.027]	[0.010]	[0.010]	[0.047]	[0.040]
Education (*Ref.: Less than High-school*)						
High School	0.046	0.038	0.011	0.010	0.101	0.066
	[0.035]	[0.034]	[0.016]	[0.016]	[0.078]	[0.054]
Technical	0.049	0.035	-0.004	-0.006	0.086	0.023
	[0.035]	[0.034]	[0.014]	[0.014]	[0.077]	[0.053]
Some college	0.089	0.072	0.013	0.011	0.169	0.094
	[0.062]	[0.058]	[0.029]	[0.028]	[0.117]	[0.094]
College	0.155***	0.125***	0.021	0.017	0.273***	0.143**
	[0.045]	[0.043]	[0.019]	[0.019]	[0.092]	[0.065]
Family income (*Ref.: 1st quartile*)						
2nd quartile	0.015	-0.004	-0.008	-0.011	0.030	-0.053
	[0.032]	[0.030]	[0.011]	[0.011]	[0.066]	[0.045]
3rd quartile	0.046	0.023	0.018	0.016	0.185**	0.089*
	[0.035]	[0.034]	[0.015]	[0.015]	[0.073]	[0.053]
4th quartile (highest)	0.017	-0.026	0.021	0.018	0.246***	0.07
	[0.038]	[0.037]	[0.017]	[0.017]	[0.076]	[0.057]
Has experienced income shock in the last year	-0.044*	-0.063***	0.011	0.01	0.071	-0.008
	[0.024]	[0.023]	[0.010]	[0.010]	[0.046]	[0.035]
Occupation (*Ref.: Workers*)						
Self-Employed	-0.181***	-0.195***	-0.039***	-0.042***	-0.181	-0.245***
	[0.052]	[0.050]	[0.009]	[0.009]	[0.122]	[0.075]
Non-employed	0.003	-0.011	-0.008	-0.010	0.031	-0.029
	[0.033]	[0.031]	[0.014]	[0.014]	[0.060]	[0.048]
Retired	0.041	0.026	0.038**	0.036**	0.106	0.039
	[0.034]	[0.032]	[0.017]	[0.016]	[0.070]	[0.048]
Instruments (by 2-digit region)						
Number of newspapers	-	0.017***	-	0.002***	-	0.075***
		[0.001]		[0.001]		[0.002]
Number of bank branches/1,000 population	-	0.005*	-	0.001	-	0.015***
		[0.003]		[0.001]		[0.005]
Constant term	0.186*	-0.673***	0.035	-0.066	0.832***	-2.908***
	[0.105]	[0.126]	[0.044]	[0.055]	[0.199]	[0.196]
IV: Test of joint significance:	-	77.44***	-	9.45***	-	663.64***
IV: Test of omitted variables:	168.92***	-	56.02***	-	759.57***	-
No. of Observations	1,366	1,366	1,366	1,366	1,366	1,366
R^2	0.053	0.136	0.023	0.031	0.119	0.505
Log-Likelihood	-692.9	-630.6	477.4	482.6	-1,605.5	-1,211.5
F-statistic	6.87***	14.17***	2.11***	2.08***	15.22***	110.69***

Notes: * p<0.10, ** p<0.05, *** p<0.01

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