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FINANCIAL LITERACY AND THE FINANCIAL CRISIS

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ABSTRACT

The ability of consumers to make informed financial decisions improves their ability to develop sound personal finance. This paper uses a panel dataset from Russia, an economy in which consumer loans grew at an astounding rate - from about US$10 billion in 2003 to over US$170 billion in 2008 - to examine the importance of financial literacy and its effects on behavior. The survey contains questions on financial literacy, consumer borrowing (formal and informal), saving and spending behavior. The paper studies both the financial consequences and the real consequences of financial illiteracy. Even though consumer borrowing increased very rapidly in Russia, the authors find that only 41% of respondents demonstrate understanding of the workings of interest compounding and only 46% can answer a simple question about inflation. Financial literacy is positively related to participation in financial markets and negatively related to the use of informal sources of borrowing. Moreover, individuals with higher financial literacy are significantly more likely to report having greater availability of unspent income and higher spending capacity. The relationship between financial literacy and availability of unspent income is higher during the financial crisis, suggesting that financial literacy may better equip individuals to deal with macroeconomic shocks.

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1.   Introduction

The 2008 financial crisis, characterized in part by mounting losses for individuals, has generated interest in better understanding how to promote savvier saving and borrowing behavior. The ability of individuals to make informed financial decisions is critical to developing sound personal finance, which can contribute to more efficient allocation of financial resources and to greater financial stability at both the micro and macro level (see, e.g., Lusardi, 2008; Lusardi and Tufano, 2009a,b). Efforts to improve financial literacy can also be an important component of efforts to increase saving rates and lending to the poorest and most vulnerable consumers (Cole, Sampson and Zia, 2011).

Our paper extends the existing literature in a new direction, using a panel survey of financial literacy administered to a nationally representative sample of over 1,000 Russian individuals prior to and during the 2008 financial crisis. Russia is a particularly important country to study given the large increase in consumer credit it has recently experienced: Consumer loans (excluding mortgages) in Russia grew at an astonishing rate: 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 (World Development Indicators, 2010). This is one of the few panel data sets on financial literacy, and with it we are able to address some novel questions, such as What is the level of financial literacy in a country without a legacy of consumer credit and financial education? Are there not only financial but also real consequences of low financial literacy? Are lower levels of financial literacy related to greater financial vulnerability during a crisis, i.e., are less financially literate individuals less able to deal with financial crises?

Assessing the direction of causality between financial literacy and financial decision making or consumption and saving behavior has been a challenge in previous work, as financial literacy is potentially an endogenous variable. However, this assessment in a country like Russia may suffer less from the endogeneity problem, as financial markets are not well developed and there are few financial education programs in place. In our empirical work we are able to address this problem by relying on instrumental variables (IV) estimation and using a new set of instruments, i.e., the number of newspapers and the number of universities across regions, to measure exposure to financial information or to peers with higher financial knowledge. Importantly, because we have a panel data set, we are also able to account for unobservable variables, such as intelligence, ability, and interest in financial matters, which can also affect the relationship between financial literacy and financial or real outcomes.

We find that even though consumer borrowing increased very rapidly in Russia between 2003 and 2008, only 41% of respondents in our sample have an understanding of the workings of interest compounding and only 46% can answer a simple question about inflation. Financial literacy is not only low in the general population, but is particularly severe among specific groups, such as women, those with low income and low educational attainment, and those living in rural areas. Most importantly, we find that financial literacy in Russia is significantly related to the use of formal banking and borrowing and negatively related to the use of informal borrowing. Financial literacy has real as well as financial consequences: Even after accounting for many characteristics and income, individuals with greater financial literacy are significantly more likely to report

having higher availability of unspent income and less likely to report having experienced lower spending capacity. In addition, the relationship between financial literacy and availability of unspent income is stronger in 2009 versus 2008, showing that financial literacy may better equip individuals to deal with macroeconomic shocks.

Our findings suggest that rapid growth of consumer credit combined with low levels of financial literacy—and the shock of the global financial crisis—might end up being a dangerous mix. As Russia transitions quickly to a market-based banking system, financial education and basic financial literacy are still lagging. Many young Russians have parents who did not have experience with bank loans (i.e., they did not have an opportunity to receive financial education at home)[1] and did not receive formal financial literacy courses in school (i.e., there is no curriculum requirement for financial education in Russia). Furthermore, consumer debt was almost non-existent before 2001, so few individuals are likely to have long personal banking relationships or experience with formal debt contracts and other financial products. In the context of current events, this is likely to be the first financial crisis that most Russians are experiencing as borrowers.

The paper is organized as follows: Section 2 reviews the existing literature on financial literacy and its effects on financial decision-making; Section 3 reviews the environment for consumer finance in Russia; Section 4 describes our data, variables, and summary statistics; and Section 5 presents our empirical strategy and reports our results. Section 6 concludes.

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[1] Although state banks existed in Soviet times, their main role was to serve state-owned enterprises. There were no credit-reporting bureaus and the availability of credit to private firms and individuals was limited (McMillan and Woodruff, 2002). For the correlation between financial literacy of the young and parental background, see Lusardi, Mitchell, and Curto (2010).

2. Review of existing literature

Many papers have documented a strong correlation between financial literacy and a set of behaviors. Bernheim (1995, 1998) showed that most households lack basic financial knowledge and cannot perform very simple calculations, and that the saving behavior of many households is dominated by crude rules of thumb. Hilgert, Hogarth, and Beverly (2003) find a strong link between financial literacy and day-to-day financial management. Financial literacy has also been linked to a set of behaviors related to saving, wealth, and portfolio choice. For example, several papers have shown that individuals with greater numeracy and financial literacy are more likely to participate in financial markets and to invest in stocks (Christelis, Jappelli, and Padula, 2010; Yoong, 2011; Almenberg and Dreber, 2001; Almenberg and Widmark, 2011; Van Rooij, Lusardi, and Alessie, 2011). Moreover, more literate individuals are more likely to choose mutual funds with lower fees (Hastings and Tejeda-Ashton, 2008; Hastings and Mitchell, 2011).

Similarly, Lusardi and Mitchell (2007a, 2011d) show that those who display high levels of literacy are more likely to plan for retirement and, as a result, accumulate much more wealth, a finding reproduced in many of the countries that are part of an international comparison of financial literacy, which includes Russia (Lusardi and Mitchell, 2011c). Financial literacy is found to affect not only the assets side but also the liability side of households' balance sheet. Moore (2003) was one of the first to report that respondents with lower levels of financial literacy are more likely to have costly mortgages. More recently, Gerardi, Goette, and Meier (2010) report that those with low literacy are more likely to default on sub-prime mortgage or have problems with them. Stango and Zinman (2009) find that those who are not able to correctly calculate interest

rates out of a stream of payments end up borrowing more and accumulating lower amounts of wealth. Campbell (2006) shows that individuals with lower incomes and lower education levels—characteristics that are strongly related to financial literacy—are less likely to refinance their mortgages during a period of falling interest rates. Lusardi and Tufano (2009a,b) report that individuals with lower levels of financial literacy tend to transact in high-cost manners, incurring higher fees and using high-cost methods of borrowing. The less knowledgeable also report that their debt loads are excessive or that they are unable to judge their debt position. Similar findings are reported in the UK (Disney and Gathergood, 2011).

In addition to greater susceptibility to fraud and abuse, lack of financial literacy might lead to borrower behavior that increases financial fragility (i.e., greater loan losses). Informed consumers may also exercise innovation-enhancing demand on the financial sector and play an important monitoring role in the market that can help improve transparency and honesty in financial institutions. Furthermore, financial illiteracy appears to be particularly severe for key demographic groups: women; the less educated; those with low income; ethnic minorities; and older respondents (e.g., Bernheim, 1995; Lusardi and Mitchell, 2007a, 2007b, 2008, 2011b; Lusardi and Tufano, 2009a,b; *inter alia*).

Correlation between financial literacy and behavior does not mean causation, and it is important to establish a causal link. Nevertheless, obtaining an exogenous source of variation in financial literacy has been challenging. For example, it may be the desire to invest in stocks or plan for retirement that causes individuals to invest in financial literacy rather than the other way around. There also may be some omitted variables, such as

ability or patience, that affect both financial literacy and financial behavior. One way around this problem is to look at financial mistakes and assess whether they are correlated with financial literacy, as it is harder to argue that the causality goes from mistakes to financial literacy. Interestingly, Agarwal et al. (2009) show that financial mistakes are prevalent among the young and the elderly, which are the groups that display the lowest levels of financial knowledge. Calvet, Campbell, and Sodini (2007, 2009) examine data from Sweden and look at actions of investors that can be classified as mistakes. They find that poorer, less educated, and immigrant households—demographic characteristics that are strongly associated with low financial literacy—are more likely to make financial mistakes.

Another strategy has been to rely on instrumental variable (IV) estimation. Several instruments have been used. For example, Lusardi and Mitchell (2009, 2011d) follow Bernheim and Garrett (2001) in using high school financial literacy mandates in different states and time periods in the United States. Van Rooij, Lusardi, and Alessie (2011) have used the financial literacy of others, such as siblings and parents. Behrman et al. (2010) use data from the Chilean Social Protection Survey and a set of plausibly exogenous instrumental variables that satisfy critical diagnostic tests to isolate the causal effects of financial literacy on wealth. All these studies show that financial literacy is positively associated with a set of financial outcomes. Moreover, the IV estimates indicate even more potent effects of financial literacy than suggested by OLS models.

Financial literacy also appears to be correlated with economic development; for instance, the percentage of individuals in the United States that correctly answered questions on interest compounding and inflation was 72% versus 79% in the Netherlands,

52% in Indonesia, 46% in Russia, and 34% in rural India (Figure 1).[2] These findings have been supported in recent studies using randomized control trials to explore the causal impact of financial literacy on financial outcomes. For instance, in Indonesia, a randomly selected set of unbanked individuals were offered financial literacy training sessions, which were found to increase the demand for banking services among those with low initial levels of financial literacy and low levels of education (Cole et al., 2011).

[Insert Figure 1 about here]

3.   The Russian Banking System

This paper focuses on Russia, an economy that grew at a brisk rate in the past decade and experienced a very sharp increase in consumer borrowing, as will be described below. This setting provides a unique opportunity to examine the importance and effects of financial literacy.

The Russian economy grew, on average, by almost 7% annually from 2001 to 2009, while annual per capita income grew from US$ 2,101 in 2001 to US$ 8,676 in 2009, an increase of over 400% (Figure 2). This rapid increase in purchasing power was associated with an increase in demand for consumer credit, particularly for the purchase of household appliances and other durable goods (Presniakova, 2006).[3] Within this same time period, as mentioned earlier, consumer loans grew at a very fast rate, reaching US$ 170 billion in 2008 (preceding a decline to about US$ 120 billion in 2009). This accounted for about 10% of GDP in 2009 versus about 2% in 2003.

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[2] Lusardi and Mitchell (2011a) for the U.S. and Cole et al. (2011) for Indonesia and India. The figure for Russia is calculated by the authors.
[3] It is possible that Russians are more comfortable borrowing for durable goods, as buying goods on installment was quite popular in Soviet times.

[Insert Figure 2 about here]

In aggregate, the Russian banking system grew at a rate of over 40% between 2003 and 2008, with almost a trillion US$ in assets in 2008. Yet, despite this recent growth, the Russian banking system remains small by international standards; domestic credit to the private sector was 41% of GDP in 2008, relative to other markets such as Brazil (54%), India (49%), and China (104%). In addition, the proportion of household loans as a percentage of GDP in 2007 is below 10%, lower than the rate in many developing Eastern European states (15%) and developed Western European states (above 50%) (Oxford Analytica, 2007b). Furthermore, in 2006, close to 60 million Russians (42% of the population) were estimated to not be part of the formal banking system (Rohland, 2008).

Banks in Russia generally face an unfavorable investment climate, as indicated by Russia's ranking of 123rd out of 181 countries in the World Bank's Ease of Doing Business ranking (where 1 indicates the most favorable business environment) (Doing Business, 2011). In this measure, Russia is ranked 89th in "getting credit," which takes into account creditor protection and the credit information sharing infrastructure.

Within this weak business environment, there is concern that the tremendous growth of credit will be associated with high rates of default, in particular if rapid growth in consumer credit is combined with low levels of financial literacy among borrowers. The share of bad consumer loans was a sizeable 12.25% in 2010 (Central Bank of Russia, 2011). It is within this rather unique context that our survey instrument was designed.

4.   Data and Summary Statistics

We use a panel dataset of Russian individuals in May/June 2008 and in June 2009. The 2008 sample was designed to be nationally representative at the individual level, and weighted by gender, age, education, 46 oblasts (i.e., administrative regions), and 7 federal region[4] for a total of 1,600 individuals interviewed face-to-face.[5] This is one of the very few panel surveys measuring financial literacy and other key variables over time. In 2009, 22% of individuals from the original sample either no longer resided at the same location or refused to answer the follow-up survey. However, analysis of the data between the two years does not show evidence of significant selection bias across the covariates used in the empirical work (available upon request).

These surveys collected information on individual levels of financial literacy (i.e., numeracy, knowledge of interest compounding, understanding of inflation), as well as use of financial services (e.g., the use of bank accounts and formal credit). The dataset also provides rich demographic and socioeconomic information, and measures of financial vulnerability. The primary respondent was the household head, without an age limit.

[Insert Table 1 about here]

4.1   *Demographic Information*

Table 1 provides summary statistics of the pooled sample (2008 and 2009). The percentage of male respondents is 43.9%, consistent with national census averages

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[4] 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. We exclude the North-Caucasian (Chechnya) district because civil unrest prohibited surveying.
[5] Summary statistics by gender, age, and education (% with secondary degrees) are very similar to those found in the 2002 Russia Longitudinal Monitoring Survey (LSMS), as well as the 2002 Russian National Census. Relative to the census data, however, our survey appears to under-represent individuals in the highest income bracket. This is likely the result of difficulty gaining access to the highest income individuals, many of whom live in gated housing communities, in order to conduct face-to-face interviews.

(Russian National Census, 2002). The average age in the pooled sample is around 45. Most individuals (66%) live in households with three or more individuals, and 28.2% of individuals live in urban regions, defined as settlements with a population greater than 500,000.

With respect to employment, 52.5% are employees (both skilled and unskilled), while 25.5% are retirees. The education level of individuals in our sample is relatively high: only 8.4% of the sample has less than a secondary education, 29.9% completed secondary school, and 61.8% completed a special vocational/ technical school or initiated or completed their higher education, a characteristic that sets Russia apart from other emerging markets and makes it a particularly useful country to study.

The survey asks individuals to report their personal and household monthly income, but these values are missing for almost 30% of the sample, i.e., individuals who refused to answer.[6] For our main regressions in the next section we impute missing income observations and include dummies for brackets of family income rather than using income values.[7]

The survey also includes a self-reported measure of income shocks.[8] Individuals are asked, "*Did you (your family) experience an unexpected significant reduction of your*

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[6] In our sample, mean personal monthly income for 2008 is US$ 762 (US$ 2,345 median income), while average family monthly income is US$ 1,494 (US$ 12,500 median). This compares closely with official statistics for 2008 of average per capita monthly income of US$ 1,404. Source: Russian Federation Federal State Statistics Service: http://www.gks.ru/bgd/regl/b10_06/IssWWW.exe/Stg/1/17-01.htm

[7] The imputation methodology is based on regressions of family income on federal regions, gender, age, education categories, and self-assessed economic classification groups. The corresponding figures for each of the quartiles of the imputed income distribution are the following: Bottom quartile (1st): monthly income < US$833; 2nd quartile: $833 ≤ monthly income < $1,433; 3rd quartile: $1,433 ≤ monthly income < $2,084; 4th quartile: monthly income ≥ $ 2,084.

[8] This is a categorical variable: the first category is individuals who report that they do not have enough money, even for food (7%); the next category is individuals who report they can buy food, but cannot buy clothes (23%); the third category is individuals who report they can buy food and clothes, but not durable goods (e.g., a television or refrigerator) (52%); finally, individuals who report they can buy durable goods (16%).

income over the past 12 months," and we define a dummy "Income shocks" for those who answer yes to this question. The summary statistics in Table 1 show that 35.9% of the sample reported the experience of a negative income shock during 2009, showing that the crisis and associated decline in income affected a large share of the Russian population.

[Insert Table 2 about here]

4.2   *Use of Formal and Informal Credit*

Our next set of variables measures financial inclusion, which includes variables related to respondent affiliation with financial institutions and borrowing behavior.[9] Our first variable is "*Bank Account,*" which indicates whether an individual uses a bank account (which includes the use of debit cards). In Russia it is common practice for an employer to provide employees with an account and associated debit card, so-called salary or "plastic" cards, at a bank chosen by the employer, and salaries are paid to these accounts only. However, the employee can use this account only to withdraw salary, and cannot make deposits to the account; thus, this may overestimate the actual voluntary "use" of bank accounts (Danske Bank, 2011). Similarly, accounts might be used only to withdraw government transfers. In our sample, 33.8% of respondents report using a checking account in 2008 and 35% in 2009, with only 13 individuals (1.2%) adding an account in 2009 and no individuals closing an account (changes in financial usage between the two years are shown in Table 2).

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[9] An important feature to note about Russia is the absolute lack of and relatively low levels of trust in the banking sector, which is potentially an important factor in explaining the low level of use of banking products. Remarkably, only 28% of surveyed individuals in Russia report confidence in banks, the second to lowest score in the region (EBRD, 2006).

We also have information on consumer credit received from a bank or other formal financial institution, including consumer debt, credit card debt, and mortgages.[10] In 2008, 18.1% of our sample received bank credit and in 2009, 17.7% did so. Table 2 shows that 12.2% of the sample (131 individuals) used bank credit in 2008 but not in 2009, while 11.8% of the sample (127 individuals) who did not have bank credit in 2008 did have it in 2009.

We measure the use of informal debt by defining a dummy that equals one when individuals respond "yes" to the question "*Do you currently have debt?*" but do not report having any bank credit. In 2008, 17% of individuals in the sample report using informal sources of borrowing, while 12.9% of individuals used informal borrowing in 2009; 13% of the sample used informal borrowing only in 2008, and 9% used informal borrowing only in 2009. Note that informal borrowing typically involves shorter repayment periods than formal borrowing, along with higher interest rates, penalties, and other fees.

4.3   *Capacity to Spend and Save*

The next set of variables assesses respondent spending and saving capacity. The survey includes a self-reported measure of spending capacity. This is a categorical variable: the first category is individuals who report that they do not have enough money, even for food (7%); the next category is individuals who report that they can buy food, but cannot buy clothes (23%); the third category is individuals who report they can buy food and clothes but not durable goods (e.g., a TV set or refrigerator) (52%); the final category is individuals who report they can buy food, clothes, and durable goods (16%).

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[10] Less than 5% of individuals have a mortgage or credit card.

We use an ordinal variable ranking between 1 (highest spending capacity) and 5 (lowest spending capacity) (see footnote 5) and, for robustness, define a dummy variable for individuals who report not having enough money for more than food. As shown in Table 1, 31.6% of individuals in the sample report low spending capacity, with the figure being higher during 2009 (33.1%, compared to 30.1% in 2008), consistent with the financial crisis experienced in that time period.

A second set of variables measures the availability of unspent income, based on the question "*How often during the last 12 months did you (or your family) have any money unspent from previous earnings before new revenues arrived.*" The menu of responses is "always," "very often," "sometimes," "very rarely," and "never." Our main results use an ordinal variable ranging from 1 to 5, and, for robustness, we also define a dummy variable equal to one if the respondent reports "always" or "very often." The statistics shown in Tables 1 and 2 indicate that 39.4% of the sample report having unspent income "always" or "very often" on a typical basis, and that the availability of unspent income increased significantly from 34% in 2008 to 44.8% in 2009. We speculate that at the onset of the crisis, some individuals increased their saving (and/or reduced their spending), expecting to have lower income in the future. The ordinal variable for the availability of unspent income has an average value of 2.36, with the average being significantly higher in 2009 (2.57, compared to 2.14 in 2008).

4.4 *Financial Literacy*

Our survey includes four financial literacy questions, covering the concepts of interest (two questions), inflation (one question), and sales discounts (one question). The exact wording of the questions is reported below:

1) 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?
- *More than 150,000 rubles*
- *Exactly 150,000 rubles*
- *Less than 150,000 rubles*
- *I cannot estimate the amount even roughly*

2) Let's assume that you took a bank credit of 10,000 rubles to be paid back during a year in equal monthly payments. The credit charge is 600 rubles. Give a rough estimate of the annual interest rate on your credit. The interest rate is about:
- *3 %*
- *6 %*
- *9 %*
- *12 %*
- *I cannot estimate it even roughly*

3) Let's assume that in 2010 your income is twice what it is now and that 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?
- *More than today*
- *Exactly the same*
- *Less than today*
- *I cannot estimate it even roughly*

4) Let's assume that you saw a TV set of the same model on sale in two different shops. The initial retail price of it was 10,000 rubles. One shop offered a discount of 1,500 rubles, while the other one offered a 10% discount. Which one is a better bargain—a discount of 1,500 rubles or 10%?
- *A discount of 1,500 rubles*
- *A 10 % discount*
- *I cannot estimate it even roughly*

Similar questions have been asked in other surveys, such as the U.S. Health and Retirement Study, the American Life Panel, and the English Longitudinal Study on Aging, and have been shown to measure both numeracy and financial knowledge

(Lusardi and Mitchell, 2009, 2011c; Banks and Oldfield, 2007; Stango and Zinman, 2009).

On average, in 2008, 41.4% of respondents correctly answered the question on interest compounding; 23.3% correctly answered the monthly interest payment calculation question; 45.6% correctly answered the question on inflation; and 69.5% correctly answered the question on sales discounts. A large number of respondents reported they "did not know" the answer to these questions. On average, in the pooled sample, 30% of individuals replied "don't know" to the question on interest compounding; 49% to the question on monthly interest payments; 24% to the question on inflation; and 22% to the question on sales discounts. These findings are similar to those reported in other surveys (Van Rooij et al., 2011; Lusardi and Mitchell, 2011b; and Lusardi and Tufano, 2009a,b), and in data in other seven countries (Lusardi and Mitchell, 2011c). Notably, we find that correct responses to all but one question increased during the financial crisis, which might be explained by increased attention to financial issues in the media or a rise in individuals' interest in understanding their own finances.

[Insert Table 3 about here]

4.4.1   *Constructing a Financial Literacy Index*

We construct an index of financial literacy using principal component analysis (PCA) to summarize the information from the four questions detailed in the previous subsection. For each question, we create a binary variable to identify the correct response and perform PCA analysis based on polychoric correlations, following the method developed to adapt PCA to ordinal data by Kolenikov and Angeles (2004). We estimate

the financial literacy index as the first principal component of the four financial literacy questions. The procedure is described in greater detail in Appendix A for the year 2008 (the analysis for 2009 is available upon request). The corresponding distribution of eigenvalues is presented in Appendix A, Panel B (the first component accounts for 53% of the variation) and the factor loadings/scoring coefficients for the index are detailed in Panel C.[11] The financial literacy index distribution is shown in Panel E.

4.4.2 *Who is Financially Literate in Russia?*

Table 1, columns 2 and 3, show summary statistics for individuals with high and low levels of financial literacy; asterisks indicate significant mean differences. We identify "high" financial literacy as individuals with a financial literacy index greater than the sample median. Univariate tests find that financially literate individuals are more likely to be male, married or cohabiting, younger, and residents of urban Russian regions. They are more likely to have vocational/technical, or some level of higher education, and be employed in skilled or non-manual occupations. Importantly, individuals in the lowest income quartile are more likely to score low in terms of their financial literacy, while those in the highest income quartile are more likely to be highly financially literate. This is consistent with many other surveys on financial literacy in other countries (see Lusardi and Mitchell, 2011b, for an overview of financial literacy data in eight countries and Christelis, Jappelli, and Padula, 2010, for an overview in eleven countries).

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[11] Although we retain the first factor for the purpose of parsimony, the optimal number of factors, identified by Humphrey-Ilgen parallel analysis (Lance, Butts, and Michels, 2006), is in fact two. We compare the number of factors derived from our survey data against factors for random numbers representing the same number of cases and variables and obtain the optimal number of factors at the intersection of plots of factors against cumulative eigenvalues for the two sets of data (Panel D).

Of primary interest to this study is the association between financial literacy and financial outcomes. Table 1 indicates that there is a moderately positive association between financial literacy and having a bank account (also shown in the correlation matrix between financial literacy and bank account in Appendix Table B3). Individuals in the high literacy group are also significantly more likely to use formal bank credit. In addition, high literacy groups are significantly less likely to experience low spending capacity, both in terms of the binary and the ordinal spending capacity variable. In contrast, individuals with higher financial literacy are significantly more likely to experience having unspent income and with higher frequency.

5.   Financial and Real Consequences of Financial Literacy

The important question we aim to address in this paper is whether financial literacy matters. To do so, we consider the following set of outcomes that expand upon the previous literature. We first estimate a set of regressions in which the dependent variable is (a) having a bank account, (b) using formal bank credit, and (c) using informal credit. In addition to financial consequences we also look at real consequences. Our set of dependent variables is (a) level of spending capacity and (b) availability of unspent income. The sets of explanatory variables in our regressions include financial literacy, gender, single-person household, the logarithm of age, a dummy for a negative income shock during the last year, and dummy variables for education (4 dummies), occupation (8 dummies), family income quartiles, and federal region of residence (7 dummies).

5.1   *Empirical Strategy*

Because we have a panel data set, we are better equipped to assess the effect of financial literacy on a set of outcomes than previous studies. First, we use 2009 measures of financial inclusion and outcomes and 2008 values of financial literacy and other explanatory variables. We use past values of the independent variables to account for both the potential simultaneity between financial literacy and financial outcomes, along with the potential endogeneity of the financial literacy measure.

Second, we use IV estimation to assess the impact of financial literacy on financial behavior. Two instruments are used: (a) the number of newspapers in circulation per two-digit region (both regional and national) and (b) the total number of universities per two-digit region (both public and private). The two variables can be expected to be correlated with financial literacy in terms of "exposure" to newspaper readership (either directly or through family members and neighbors who read the paper) and higher education of peers in the region. The experience of others is not under the control of the respondent and is thus exogenous with respect to his or her actions, but respondents can learn from those around them, thus increasing their own literacy. Several other studies have documented that individuals learn about financial matters from peers (Duflo and Saez, 2003; Hong, Kubik, and Stein, 2004; and Brown, Ivkovic, Smith, and Weisbenner, 2008). Studies have also documented the importance of proximity to a university as an exogenous measure of financial knowledge (Christiansen, Joensen, and Rangvid, 2008).

The bottom of Table 1 shows that the average number (by two-digit region) of newspapers is 56 and the average number of universities is 18 (11 public and 7 private).

Appendix C presents maps illustrating the regional variation in the number of newspapers in circulation and the number of universities in the 46 Russian oblasts of our sample.[12]

Third, to account for unobserved heterogeneity that can account for the relationship between financial literacy and our set of outcomes, we use both years of data and estimate individual random effects and fixed effects models.

5.2 *Empirical estimates: Financial outcomes*

Our first set of estimates examines the correlates of the use of bank accounts by respondents in our sample. Due to the low number of new bank accounts for the year 2009 in the sample, panel models cannot be estimated. Table 4 presents probit estimates. The dependent variable is a dummy equal to one if the individual reports having a bank account in 2009 and equal to zero otherwise. Explanatory variables are dated as of 2008 in order to mitigate as much as possible simultaneity problems. Marginal effects and robust standard errors are presented throughout the table.

Column 1 of Panel A shows the baseline probit estimates, which exclude measures of financial literacy. We find that individuals who are older, more educated, and have higher income are more likely to have a bank account, consistent with findings in other countries (Christelis, Jappelli, and Padula, 2010; Cole, Sampson and Zia, 2011). Columns 2, 3, and 4 include our two measures of financial literacy (an index and the number of correct responses to the financial literacy questions). Both measures show a significantly positive effect (at the 10% level) of financial literacy on the likelihood of

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[12] In terms of federal regions (figures available upon request), the Central federal region, Volga, and the Southern region have the highest newspaper circulation, while the Urals, the Far-Eastern, and the Siberian region have the lowest numbers of newspapers in circulation. Moreover, the Southern region has the highest number of universities, with the next highest being the North-Western and the Central regions. The lowest numbers of universities are found in the Urals, the Far-Eastern, and the Siberian federal region.

using a bank account. The marginal effects suggest a sizeable impact: a one standard deviation increase from the average level of financial literacy raises the likelihood of using a bank account by 6.3–8.8%, depending on the measure used. Also note that adding financial literacy does not much affect the estimates of education; thus, financial knowledge has an effect above and beyond general schooling.

[Insert Table 4 about here]

Panel B of Table 4 presents IV probit estimates of the probability of using a bank account. In this specification, we take into account that financial literacy could be an endogenous variable. Moreover, financial literacy can be measured with error, and this can also affect the estimated effect of financial literacy on the probability of having a bank account. As discussed earlier, the set of instruments used to instrument financial literacy is the total number of newspapers in circulation and the number of public and private universities in every Russian oblast. The first-stage regressions are shown in Appendix Table B1. The two instruments have a positive and statistically significant impact on financial literacy. Both the F-statistics from the tests of joint significance and the LM tests of omitted variables shown at the bottom of the table reject the null hypotheses of joint insignificance and "significant improvement" to the model.[13]

The estimates in the second stage, reported in the last two columns of Table 4, show that the relationship between literacy and bank account ownership remains positive, statistically significant, and is somewhat larger in the IV probit estimates than in the OLS estimates. Moreover, the exogeneity test is not rejected. Thus, the OLS estimates do not

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[13] The tests stem from two separate specifications for the first stage models, i.e. one incorporating the two instruments and another without the two instrumental variables, respectively.

differ significantly from the IV estimates. Moreover, the Hansen J statistic of overidentifying restriction at the bottom of the table shows that the instruments are valid.

In Table 5, we examine the impact of financial literacy on the probability of using formal bank credit. The probit estimates with past values (dated 2008) of the independent variables in Columns A2 and A3 show that financial literacy is significantly positively related to the likelihood of having formal credit. The marginal effects show that a one standard deviation increase from the average level of financial literacy raises the likelihood of acquiring formal credit by 14–18%, depending on the measure used.

[Insert Table 5 about here]

Panel B of Table 5 presents IV probit estimates. The statistics reported at the bottom of the table reject the hypothesis that the instruments are not valid.[14] The estimates confirm the positive and statistically significant association between financial literacy and formal credit. The magnitude of the marginal effects is very similar to the baseline probit estimates.

One concern is that there are omitted variables (for example, ability) that can bias the estimated effect of financial literacy. In Panels C and D of Table 5 we make use of the panel aspect of the data and report estimates from random effects probit and fixed effects logit models. The latter model excludes observations that do not vary within the panel,[15] and hence uses a smaller sample. Both the marginal effects from the random effects

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[14] Additional linear probability models examine instrument validity. The results are 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 not rejected. Both tests are robust to the use 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. The Hansen J statistic of overidentifying restriction at the bottom of the table marginally rejects the null hypothesis that the instruments are valid at the 10% level.

[15] Moreover, we exclude age in the fixed effects model to achieve identification.

model and the odds ratios for the fixed effects model confirm the positive association between financial literacy and bank credit. Hence, an increase in the financial literacy score within the year is associated with a higher likelihood of acquiring formal credit.

Finally, Table 6 examines the likelihood of using informal credit as the dependent variable. The marginal effects from the probit model with past values of the independent variables, shown in Column 1, suggest that single individuals (those living in single person households) and those with low educational attainment are more likely to use informal credit. Moreover, individuals who experienced a negative income shock during the last year are more likely to use informal credit, which provides some evidence as to how Russians have dealt with shocks. Columns A2 and A3 add financial literacy measures, i.e., the index and the number of correct responses, respectively. Financial literacy is negatively associated with the likelihood of using informal credit. The marginal effects suggest that a one standard deviation increase from the average level of financial literacy reduces the likelihood of acquiring formal credit by 10–13%, depending on the measure used and given the overall predicted probability of the model. The effects are statistically significant at the 1% level.

<div align="center">**[Insert Table 6 about here]**</div>

Panel B presents the marginal effects and robust standard errors from the IV probit regressions using the same instruments that were mentioned previously. The tests at the bottom of the table confirm the validity of the instruments. The results confirm the negative association seen previously between financial literacy and use of informal credit. The magnitude of the coefficient estimates increased by almost twofold compared to the

simple probit model estimates, and the coefficient becomes statistically significant at the 1% level.

The models in Panels C and D indicate weaker negative associations between financial literacy and informal credit, and the negative effects shown are not significant at any conventional levels. Interestingly, the significance of the year 2009 crisis dummy and income shock dummy in the fixed effects model appear to highlight the use of informal credit as a primary way to deal with shocks.

5.3   *Real effects of financial literacy*

We turn now to the real consequences of financial literacy. In this section, we examine the relationship between financial literacy and financial vulnerability indicators, such as respondent level of spending capacity and availability of unspent income. Tables 7 and 8 replicate the same four sets of estimates as the previous tables, using as dependent variables (a) an ordinal spending capacity variable, ranging from 1 (high spending) to 5 (low spending), and (b) an ordinal variable capturing the availability of unspent income, ranging from 1 (low frequency) to 5 (high frequency).

The results in Table 7 show that older individuals, as well as those in the lowest income quartiles, are more likely to experience low spending capacity. The addition of the financial literacy variables in the ordered probit models of Columns A2 and A3 indicates that financial literacy also matters for spending; those who are more financially literate are less likely to report low spending capacity during the financial crisis. The IV estimates in Panel B continue to confirm the negative association between financial literacy and low spending capacity.

[Insert Table 7 about here]

Moreover, the panel models in Panels C and D of Table 7 confirm the negative relationship between financial literacy and low spending capacity, both in the random effects GLS model and within groups, in the fixed effects model. The results are statistically significant at all conventional levels, and the magnitude of the effects is similar to those of the previous model. In the panel models of Table 7, two additional specifications are introduced in Columns C2 and D2.[16] These include interaction terms between financial literacy variables and the dummy variable for the year 2009. The rationale for adding those variables is to examine whether the interaction between financial literacy and the year of the financial crisis is significantly associated with lower spending capacity. However, both sets of interaction terms are not statistically significant.

[Insert Table 8 about here]

In Table 8, we use the frequency of having unspent income as (an ordinal) dependent variable and present estimates of ordered probit models and linear models for two-stage least squares, random effects GLS, and fixed effects in Panels A, B, C, and D, respectively. The model's first three rows show a significantly positive coefficient of financial literacy on the availability of unspent income. The baseline ordered probit estimates in Column 1 show that males and high-income individuals are more likely to have income that is unspent on a regular basis. Columns A2 and A3 add the financial literacy variables to the ordered probit specification and show that financial literacy is significantly positively related to the incidence of having unspent income available. The

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[16] These results are robust to the substitution of the financial literacy index with the number of correct responses, which are not shown.

finding is robust. The IV probit estimates in Panel B confirm a significant and positive effect of financial literacy.[17]

Moreover, the estimates from random effects GLS models in Panel C show a positive effect of financial literacy in the panel sample, with marginal effects similar in magnitude to those of the probit model. The inclusion of the interaction terms between financial literacy and the year 2009 in the panel models shows a significant positive interaction term. Thus, financially literate individuals are significantly more likely to have unspent income in the year 2009. Moreover, the fixed effects model in Panel D shows a positive interaction term for the effect of financial literacy. This suggests that more literate individuals in 2009 are more likely to save more frequently, as compared to less literate individuals.

5.4   *Robustness exercises*

In Appendix Tables B2–B4 we perform three sets of robustness exercises to check the validity of our findings. The estimates in Table B2 in the Appendix replicate the level of spending estimates, using a binary variable for low spending as the dependent variable. All four panels of Table B2 exhibit statistically significant negative coefficients of the financial literacy measures on spending. In the panel models, the interaction terms between financial literacy and the year 2009 are negative, but once again statistically insignificant. The magnitude of the marginal effects in the probit model of Panel A is such that a one standard deviation from the average level of financial literacy reduces the likelihood of experiencing low levels of spending capacity by 8.5–10%, depending on the

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[17] Similarly, Klapper and Panos (2011) find that financial literacy is positively related to participating in private and public retirement plans and negatively related to informal ways of saving for retirement.

measure used and given the overall predicted probability of the model. The IV probit estimates in Panel B confirm the negative association between financial literacy and low spending, along with the validity of the instruments used. The magnitude of the coefficients in the IV model is very similar to the probit model. Moreover, the sign and statistical significance (10% level) of financial literacy is the same, which suggests that the instruments used are valid.

Appendix Table B3 presents estimates for models with a binary version of unspent income as the dependent variable. Columns A2 and A3 show that financial literacy is significantly positively related to the incidence of having unspent income. The magnitude of the marginal effects presented suggests that a one standard deviation increase in financial literacy raises the likelihood of having unspent income by 10–11.5%. The IV probit estimates in Panel B confirm this. They show a significant positive marginal effect of financial literacy, of a slightly lower magnitude than the probit model, and also confirm the validity of the instruments used. Moreover, the estimates from random effects probit models in Panel C show a positive effect of financial literacy in the panel sample, with marginal effects similar in magnitude to those of the probit model. The inclusion of the interaction terms between financial literacy and the year 2009 in the panel models shows a significant positive interaction term. Hence, financially literate individuals are significantly more likely to have unspent income available in the year 2009. However, the fixed effects models in Panel D fail to show significance of the financial literacy variables within individuals although the odds ratios obtained are positive and greater than one.

Finally, in Appendix Table B4, we perform an additional robustness check concerning the validity of our instruments. We use specifications similar to our IV regressions in the previous tables, but also include control variables for the log values of the regional unemployment rate and the average monthly income per capita in every administrative region.[18] These robustness checks largely refute that the impact of our instrumental variables is due to regional differences in living standards. All financial literacy effects remain large and statistically significant, with the only exception being the effects in the spending regressions, where the coefficients become smaller in magnitude and statistically insignificant. This is indeed the variable that is likely to be affected the most by regional living standard differences. Hence, the results confirm the robustness of our instruments, and the magnitude of the majority of the effects remains high and statistically significant.

In unreported regressions, we use self-assessed financial literacy (on a scale from 1 to 5) in place of the financial literacy measures used so far. Our results prove robust to the use of this measure and are available upon request.

6. Conclusion

Our study contributes to the literature on financial literacy by examining its effects on both financial and real behavior in a relatively understudied context, that of an emerging market experiencing a financial crisis. We find that financial literacy is significantly related to greater participation in formal financial markets and negatively related to the use of informal sources of borrowing. Moreover, individuals with higher

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[18] The data is available from the Russian Federation Federal State Statistics service at:
http://www.gks.ru/bgd/regl/b10_06/IssWWW.exe/Stg/1/17-01.htm

levels of financial literacy are significantly more likely to report greater levels of unspent income and less likely to report lower levels of spending. Finally, the relationship between financial literacy and the level of unspent income is higher during the financial crisis, after controlling for household characteristics. Our results suggest that greater financial literacy can help individuals face unexpected macroeconomic and income shocks.

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Figure 1: Financial Literacy, % of individuals answering correctly
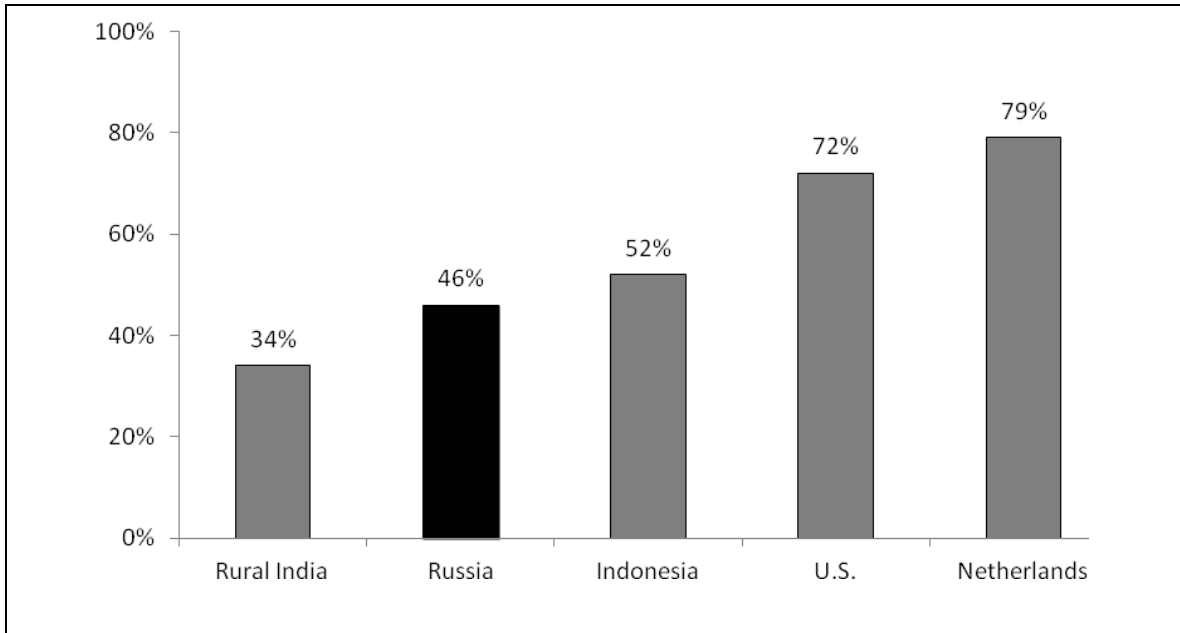
Source: Cole, et al. (2010); the authors; Cole, et al. (2010); Lusardi and Mitchell (2007a); van Rooij, et al. (2008), respectively.

Figure 2: Russian Household Debt (US$, billions) and Per Capita Income (US$)
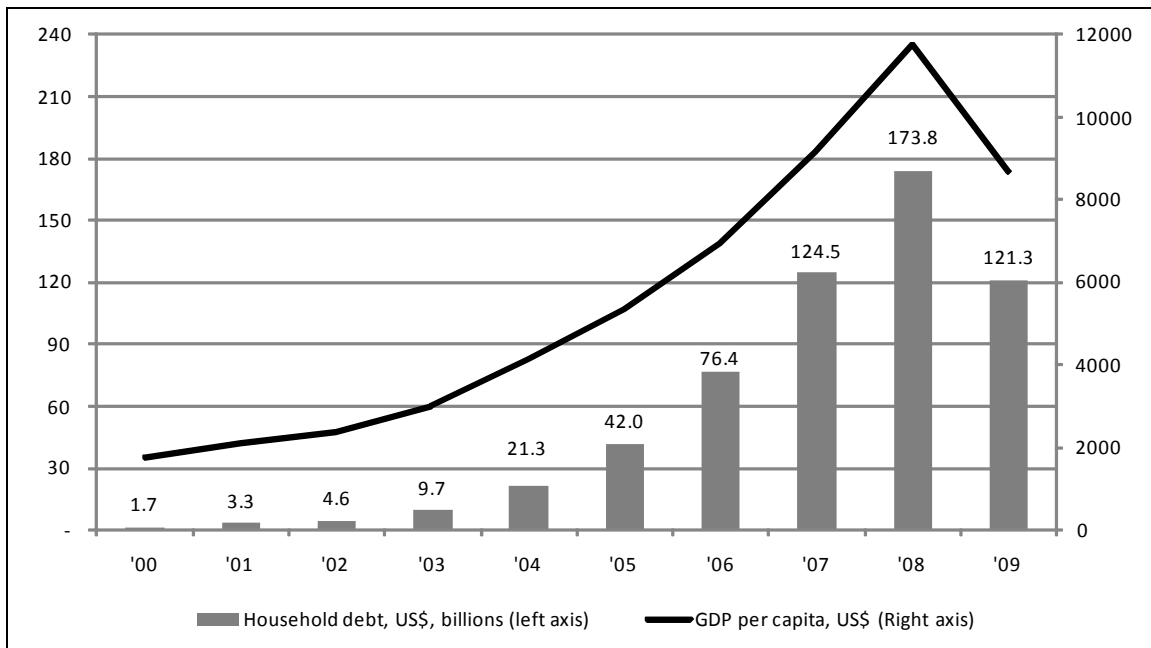
Source: WB-WDI Statistics (2010)

Table 1

Summary Statistics

	Pooled sample	Financial Literacy Index	
		High (≥median)	*Low (<median)*
#Obs.	*2,148*	*986*	*1,162*
Male	43.9%	46.7%**	41.5%
Single Person Household	11.6%	8.7%	14.0%***
Age	45.13	41.36	48.33***
Urban region	28.2%	37.0%	35.0%
Has experienced negative income shock in last year	35.9%	32.2%***	24.9%
Education:			
Primary or Incomplete	8.4%	4.3%	11.9%***
Secondary	29.9%	26.3%	33.0%***
Vocational-Technical	38.4%	41.1%**	36.1%
Higher or incomplete higher	23.4%	28.4%***	19.1%
Occupation:			
Skilled Non-Manual	9.0%	11.7%***	6.8%
Skilled Manual	26.9%	30.0%***	24.3%
Unskilled Non-Manual	13.5%	15.6%***	11.7%
Unskilled Manual	3.1%	3.0%	3.1%
Entrepreneur	2.8%	3.1%	2.5%
Unemployed	0.9%	0.8%	1.0%
Pensioner	25.5%	15.5%	34.0%***
Other	18.3%	20.2%**	16.6%
Family Income	20,354.3	23,511.1***	17,675.7
- 1st Quartile - (lowest)	26.3%	18.1%	33.2%***
- 2nd Quartile -	25.1%	25.3%	24.9%
- 3rd Quartile -	23.1%	24.4%	22.0%
- 4th Quartile - (highest)	25.6%	32.3%***	19.9%
Federal region:			
Central	27.1%	27.9%	26.4%
North-Western	10.0%	11.0%	9.1%
Southern	17.3%	14.5%	19.7%***
Volga	22.9%	24.3%	21.7%
Urals	5.8%	5.6%	5.9%
Siberian	11.3%	11.5%	11.1%
Far-Eastern	5.7%	5.3%	6.0%
Financial Penetration:			
Bank Account	34.4%	37.2%**	32.0%
Formal Credit	17.9%	21.5%***	14.8%
Informal Credit	14.9%	14.4%	15.4%
Financial Vulnerability:			
Low Spending	31.6%	24.1%	37.9%***
Low Spending Index (1-5)	3.22	3.06	3.36***
Unspent Income	39.4%	44.9%***	34.7%
Unspent Income Index (1-5)	2.36	2.49***	2.24
Financial Literacy:			
Fin. Literacy: Index	0.00		
Fin. Literacy: #Correct Responses	1.85		
Fin. Literacy: Self-Assessment	2.55		
Regional statistics (by 2-digit region):			
Total number of newspapers	55.80		
Total number of universities	18.54		

Notes: * p<0.10, ** p<0.05, *** p<0.01: From a t-test of mean differences between individuals with high and low financially literacy

Table 2

Panel A: Changes in main variables				
	2008, not 2009		**2009, not 2008**	
	%	**(#Obs.)**	**%**	**(#Obs.)**
Bank Account	0.0%	(0)	1.2%	(13)
Formal Credit	12.2%	(131)	11.8%	(127)
Informal Credit	13.0%	(140)	9.0%	(97)
Low Spending	13.8%	(148)	16.8%	(180)
Decreased Level of Spending	22.5%	(242)	27.5%	(295)
Unspent Income	16.1%	(173)	26.9%	(289)
Increased Level of Unspent Income	25.1%	(270)	44.3%	(476)
Negative Income Shock	22.4%	(240)	23.8%	(256)

Table 3

Summary Statistics of Financial Literacy Questions, 2008 and 2009 Surveys

Panel A: Summary Statistics						
Variable	**Definition**	**Year**	**Correct**	**Incorrect**	**"Don't' Know"**	
Interest_1	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	2008	41.43%	31.19%	27.37%	
		2009	34.64%	32.02%	33.33%	
Interest_2	Let's assume that you took a bank credit of 10,000 rubles to be paid back during a year in equal monthly payments. The credit charge is 600 rubles. Give a rough estimate of the annual interest rate on your credit.	2008	23.37%	28.31%	48.32%	
		2009	35.94%	14.06%	50.00%	
Inflation	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?	2008	45.62%	31.47%	22.91%	
		2009	50.47%	24.12%	25.42%	
Discounts	Let's assume that you saw a TV-set of the same model on sales in two different shops. The initial retail price of it was 10,000 rubles. One shop offered a discount of 1,500 rubles, while the other one offered a 10% discount. Which one is a better bargain – a discount of 1,500 rubles or 10%?	2008	69.55%	9.12%	21.32%	
		2009	69.55%	8.38%	22.07%	

Table 4

Bank Account: Past-value models; Marginal Effects and Robust Standard Errors

Dependent variable: Bank Account (1/0)	Probit Model			Probit Model with IV	
	(A1)	(A2)	(A3)	(A1)	(A2)
Financial Literacy: Index	-	0.022*	-	0.037*	-
		[0.013]		[0.019]	
Financial Literacy: #Correct Responses	-	-	0.018*	-	0.030*
			[0.010]		[0.016]
Male	0.036	0.035	0.035	0.033	0.033
	[0.032]	[0.033]	[0.033]	[0.031]	[0.031]
Single Person Household	0.035	0.036	0.036	0.035	0.035
	[0.053]	[0.053]	[0.053]	[0.050]	[0.050]
Log(Age)	0.129**	0.132**	0.132**	0.129***	0.129***
	[0.052]	[0.052]	[0.052]	[0.050]	[0.050]
Has experienced income shock in the last year	-0.019	-0.016	-0.016	-0.014	-0.014
	[0.032]	[0.032]	[0.032]	[0.031]	[0.031]
Education (Ref:. Primary/Incomplete)					
Secondary	0.110*	0.107	0.107	0.098	0.098
	[0.067]	[0.067]	[0.067]	[0.062]	[0.062]
Vocational-Technical	0.140**	0.134**	0.134**	0.121**	0.121**
	[0.065]	[0.065]	[0.065]	[0.061]	[0.061]
Higher or incomplete higher				0.177***	0.176***
	0.211***	0.199***	0.199***		
	[0.072]	[0.073]	[0.073]	[0.066]	[0.066]
Family Income (Ref: - 1st - (lowest))					
- 2nd -	0.057	0.055	0.055	0.051	0.051
	[0.047]	[0.047]	[0.047]	[0.044]	[0.044]
- 3rd -	0.082*	0.080	0.080	0.075*	0.075*
	[0.049]	[0.049]	[0.049]	[0.045]	[0.045]
- 4th - (highest)	0.046	0.040	0.040	0.035	0.035
	[0.057]	[0.057]	[0.057]	[0.054]	[0.054]
No. of Observations	1,074	1,074	1,074	1,074	1,074
Pseudo R^2	0.039	0.041	0.041	-	-
Log-Likelihood	-668.0	-667.1	-667.1	-1,567.4	-1,784.4
Wald χ^2				56.25***	56.30***
	51.95***	53.82***	53.76***		
Predicted Probability	0.3502	0.3503	0.3503		
Wald χ^2 test of exogeneity				1.86	1.90
Partial R^2 of excluded instruments:				0.0238	0.0231
Test of excluded instruments F(2, 1050)				12.87***	12.41**
Additional statistics based on Linear Probability Models (available upon request)					
(a) Kleibergen-Paap rk LM statistic: χ^2 (2)				27.95***	27.07***
(a) Kleibergen-Paap rk Wald statistic: χ^2 (2)				26.39***	25.44***
(b) Kleibergen-Paap Wald rk F statistic				12.87***	12.41**
(c) Anderson-Rubin Wald test: F(2,1050)				1.94	1.94
(c) Anderson-Rubin Wald test : χ^2(2)				3.97	3.97
(c) Stock-Wright LM S statistic: χ^2 (2)				3.91	3.91
(d) Hansen J statistic: χ^2 (1)				1.482	1.489

Notes: * p<0.10, ** p<0.05, *** p<0.01. The specifications also include a constant term and dummy variables for occupation (8) and federal region (7). The observed probability is 0.1769 for Panel (A). (a) denotes underidentification tests, (b) weak identification test, (c) denotes weak-instrument-robust inference (tests of joint significance of endogenous regressors in main equation), and (d) denotes overidentification tests. Stock-Yogo weak ID test critical values: 10% maximal IV size: 19.93.

Table 5
Formal Credit

Dependent Variable: Formal Credit (1/0)	Probit Model (Marginal Effects)			Probit Model with IV (Marginal Effects)		(Panel) Probit Model with Random Effects (Marginal Effects)		(Panel) Logit Model with Fixed Effects (Odds Ratios)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Fin. Literacy: Index	-	0.032*** [0.012]	-	0.030** [0.015]	-	0.026*** [0.009]	-	1.392*** [0.147]	-
Fin. Literacy: #Correct Responses	-	-	0.025*** [0.009]	-	0.024** [0.012]	-	0.021*** [0.007]	-	1.328*** [0.114]
Year 2009	-	-	-	-	-	-0.006 [0.015]	-0.006 [0.015]	0.920 [0.118]	0.918 [0.118]
Male	-0.049** [0.024]	-0.050** [0.024]	-0.050** [0.024]	-0.051** [0.024]	-0.051** [0.024]	-0.046** [0.019]	-0.046** [0.019]	-	-
Single Person Household	0.001 [0.043]	0.002 [0.043]	0.002 [0.043]	0.001 [0.043]	0.002 [0.043]	-0.037 [0.032]	-0.037 [0.032]	-	-
Log(Age)	-0.053 [0.039]	-0.048 [0.039]	-0.048 [0.039]	-0.048 [0.039]	-0.048 [0.039]	-0.043 [0.030]	-0.043 [0.030]	-	-
Has experienced income shock in the last year	-0.003 [0.025]	0.001 [0.025]	0.001 [0.025]	0.001 [0.025]	0.001 [0.025]	0.018 [0.017]	0.018 [0.017]	1.173 [0.214]	1.164 [0.213]
Education (Ref:. Primary/Incomplete)									
Secondary	-0.012 [0.051]	-0.017 [0.050]	-0.017 [0.050]	-0.017 [0.052]	-0.017 [0.052]	0.029 [0.042]	0.029 [0.042]	-	-
Vocational-Technical	-0.029 [0.051]	-0.039 [0.050]	-0.038 [0.050]	-0.039 [0.052]	-0.039 [0.052]	-0.005 [0.042]	-0.005 [0.042]	-	-
Higher or incomplete higher	0.011 [0.056]	-0.007 [0.054]	-0.007 [0.054]	-0.006 [0.055]	-0.006 [0.055]	0.025 [0.044]	0.025 [0.044]	-	-
Family Income (Ref: - 1st - (lowest))									
- 2nd -	-0.003 [0.034]	-0.005 [0.033]	-0.005 [0.033]	-0.005 [0.034]	-0.005 [0.034]	0.001 [0.025]	0.001 [0.025]	-	-
- 3rd -	0.011 [0.036]	0.01 [0.036]	0.01 [0.037]	0.010 [0.036]	0.010 [0.036]	0.012 [0.026]	0.012 [0.026]	-	-
- 4th - (highest)	-0.025 [0.038]	-0.032 [0.037]	-0.032 [0.037]	-0.033 [0.040]	-0.033 [0.040]	0.006 [0.029]	0.006 [0.029]	-	-
No. of Observations	1,074	1,074	1,074	1,074	1,074	2,148	2,148	516	516
Pseudo R²	0.084	0.090	0.090					0.032	0.036
Log-Likelihood	-464.8	-461.5	-461.6	-1,362.8	-1,577.5			-173.0	-172.4
Wald χ² /LR for LogitFE	86.86***	87.69***	87.74***	86.52***	86.59***			11.62***	12.85***
Predicted Probability	0.1767	0.1766	0.1766						
Wald χ² test of exogeneity				0.03	0.02				
Partial R² of excluded instruments:				0.0238	0.0231				
Test of excluded instruments F(2, 1050)				12.87***	12.41***				
Additional statistics based on Linear Probability Models (available upon request)									
(a) Kleibergen-Paap rk LM statistic χ²(2)				27.95***	27.07***				
(a) Kleibergen-Paap rk Wald statistic χ²(2)				26.39***	25.44***				
(b) Kleibergen-Paap Wald rk F-statistic				12.87***	12.41**				
(c) Anderson-Rubin Wald test: F(2,1050)				1.68	1.68				
(c) Anderson-Rubin Wald test: Chi-sq(2)				3.45	3.45				
(c)Stock-Wright LM S statistic Chi-sq(2)				3.43	3.43				
(d) Hansen J statistic Chi-sq(1)				3.423*	3.420*				

Notes: The comments in Table 4 hold.

Table 6
Informal Credit

Dependent Variable: Informal Credit (1/0)	Probit Model (Marginal Effects)			Probit Model with IV (Marginal Effects)		(Panel) Probit Model with Random Effects (Marginal Effects)		(Panel) Logit Model with Fixed Effects (Odds Ratios)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Financial Literacy: Index	-	-0.017*	-	-0.038***		-0.009	-	0.898	-
		[0.010]		[0.014]		[0.008]		[0.110]	
Fin. Literacy: #Correct Responses	-	-	-0.013*		-0.031***	-	-0.008	-	0.905
			[0.006]		[0.012]		[0.006]		[0.091]
Year 2009	-	-	-	-	-	-0.036***	-0.036**	0.702***	0.704***
						[0.014]	[0.014]	[0.095]	[0.095]
Male	-0.006	-0.005	-0.005	-0.004	-0.004	-0.017	-0.017	-	-
	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]	[0.017]	[0.017]		
Single Person Household	0.107**	0.105**	0.105**	0.087***	0.088***	-0.012	-0.012	-	-
	[0.047]	[0.046]	[0.046]	[0.033]	[0.033]	[0.027]	[0.027]		
Log(Age)	-0.067*	-0.068**	-0.068**	-0.074**	-0.074**	-0.041	-0.041	-	-
	[0.034]	[0.035]	[0.035]	[0.036]	[0.036]	[0.027]	[0.027]		
Has experienced income shock in the last year	0.052**	0.049**	0.049**	0.048**	0.048**	0.079***	0.079***	1.766***	1.768***
	[0.023]	[0.022]	[0.022]	[0.021]	[0.021]	[0.015]	[0.015]	[0.357]	[0.358]
Education (Ref:. Primary/Incomplete)									
Secondary	0.088*	0.092*	0.091*	0.089**	0.089**	0.052	0.052	-	-
	[0.053]	[0.052]	[0.052]	[0.044]	[0.044]	[0.033]	[0.033]		
Vocational-Technical	0.103**	0.111**	0.110**	0.113***	0.113***	0.048	0.048	-	-
	[0.050]	[0.049]	[0.049]	[0.043]	[0.043]	[0.033]	[0.033]		
Higher or incomplete higher	0.009	0.020	0.020	0.030	0.030	-0.021	-0.02	-	-
	[0.049]	[0.050]	[0.050]	[0.048]	[0.048]	[0.037]	[0.037]		
Family Income (Ref: - 1st - (lowest))									
- 2nd -	0.043	0.044	0.044	0.047	0.047	0.004	0.004	-	-
	[0.033]	[0.033]	[0.033]	[0.029]	[0.029]	[0.021]	[0.021]		
- 3rd -	0.049	0.051	0.051	0.052*	0.052*	-0.043*	-0.043*	-	-
	[0.034]	[0.034]	[0.034]	[0.031]	[0.031]	[0.024]	[0.024]		
- 4th - (highest)	0.002	0.005	0.004	0.013	0.013	-0.042	-0.042	-	-
	[0.037]	[0.038]	[0.038]	[0.038]	[0.038]	[0.027]	[0.027]		
No. of Observations	1,074	1,074	1,074	1,074	1,074	2,148	2,148	474	474
Pseudo R^2	0.067	0.070	0.070					0.050	0.051
Log-Likelihood	-386.2	-384.9	-385.0	-1,283.7	-1,498.2	-851.4	-851.2	-156.0	-155.9
Wald χ² /LR χ² in (D)	58.08***	64.77***	63.78***	75.25***	75.20***	77.08***	77.29***	16.58***	16.81***
LR χ² (ϱ=0)						10.79***	10.78***		
Predicted Probability	0.1294	0.1293	0.1293						
Wald χ² test of exogeneity				4.97**	5.66**				
Partial R² of excluded instruments:				0.0238	0.0231				
Test of excluded instruments F(2, 1050)				12.87***	12.41***				
Additional statistics based on Linear Probability Models (available upon request)									
(a) Kleibergen-Paap rk LM statistic χ²(2)				27.95***	27.07***				
(a) Kleibergen-Paap rk Wald statistic χ²(2)				26.39***	25.44***				
(b) Kleibergen-Paap Wald rk F-statistic				12.87***	12.41**				
(c) Anderson-Rubin Wald test: F(2,1050)				1.85	1.85				
(c) Anderson-Rubin Wald test χ²(2)				3.79	3.79				
(c) Stock-Wright LM S statistic χ²(2)				3.72	3.72				
(d) Hansen J statistic χ²(1)				2.431	2.436				

Notes: The notes in Table 4 hold.

Table 7
Level of Spending Capacity

Dependent Variable: Level of Spending (1: high-5: low)	Ordered Probit Model (Coefficients)			2SLS Model (Coefficients)		(Panel) GLS Model with Random Effects (Coefficients)		(Panel) Fixed Effects Model (Coefficients)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Fin. Literacy: Index	-	-0.075** [0.036]		-0.085** [0.038]	-	-0.100*** [0.016]	-0.085*** [0.022]	-0.091*** [0.023]	-0.077** [0.030]
Fin. Literacy: #Correct Responses	-	-	-0.064** [0.029]	-	-0.071** [0.032]	-	-	-	-
Year 2009	-	-	-	-	-	0.085*** [0.027]	0.085*** [0.027]	0.056* [0.029]	0.056* [0.029]
2009*(Fin. Lit. Index)	-	-	-	-	-	-	-0.030 [0.030]	-	-0.027 [0.038]
Male	-0.043 [0.074]	-0.040 [0.074]	-0.040 [0.074]	-0.070 [0.047]	-0.070 [0.047]	-0.022 [0.037]	-0.022 [0.037]	-	-
Single Person Household	0.19 [0.127]	0.186 [0.127]	0.185 [0.127]	0.121 [0.079]	0.121 [0.079]	0.069 [0.052]	0.067 [0.052]	-	-
Log(Age)	0.296** [0.120]	0.286** [0.120]	0.286** [0.120]	0.227*** [0.075]	0.226*** [0.075]	0.121** [0.061]	0.121** [0.061]	-	-
Has experienced income shock in the last year	0.045 [0.073]	0.038 [0.073]	0.038 [0.073]	0.076 [0.047]	0.077* [0.047]	0.126*** [0.032]	0.130*** [0.032]	0.131*** [0.043]	0.134*** [0.043]
Secondary Education	0.004 [0.145]	0.010 [0.145]	0.010 [0.145]	0.117 [0.091]	0.117 [0.091]	0.103 [0.069]	0.104 [0.069]	-	-
Vocational-Technical Education	-0.042 [0.147]	-0.022 [0.147]	-0.021 [0.147]	0.015 [0.089]	0.016 [0.089]	0.042 [0.069]	0.042 [0.069]	-	-
Higher or incomplete higher	-0.193 [0.160]	-0.161 [0.161]	-0.159 [0.160]	-0.089 [0.098]	-0.087 [0.098]	-0.034 [0.075]	-0.034 [0.075]	-	-
- 2nd Income quartile	-0.355*** [0.100]	-0.347*** [0.100]	-0.347*** [0.100]	-0.459*** [0.070]	-0.459*** [0.070]	-0.463*** [0.046]	-0.464*** [0.046]	-	-
- 3rd Income quartile	-0.344*** [0.107]	-0.339*** [0.107]	-0.339*** [0.107]	-0.639*** [0.074]	-0.639*** [0.074]	-0.674*** [0.050]	-0.674*** [0.050]	-	-
- 4th Income quartile (highest)	-0.580*** [0.123]	-0.564*** [0.123]	-0.564*** [0.123]	-0.903*** [0.083]	-0.902*** [0.083]	-0.900*** [0.056]	-0.899*** [0.056]	-	-
No. of Observations	1,044	1,044	1,044	1,044	1,044	2,101	2,101	2,101	2,101
R^2 (Overall)				0.323	0.323	0.291	0.291	0.026	0.027
Pseudo R^2	0.065	0.066	0.066						
Log-Likelihood	-1,183.8	-1,181.7	-1,181.5	-1,083.7	-1,083.7			-1,338.2	-1,337.7
F-statistic				20.88***	20.89***			9.13***	6.98***
Wald χ^2	155.66***	160.25***	161.12***			755.03***	755.98***		
Partial R^2 of excluded instruments:				0.0238	0.0231				
Test of excluded instruments $F(2, 1050)$				12.14***	11.59***				
Additional statistics based on Linear Probability Models (available upon request)									
(a) Kleibergen-Paap rk LM statistic χ^2 (2)				27.95***	27.07***				
(a) Kleibergen-Paap rk Wald statistic χ^2 (2)				26.39***	25.44***				
(b) Kleibergen-Paap Wald rk F-statistic				12.87***	12.41**				
(c) Anderson-Rubin Wald test $F(2,1050)$				2.46*	2.46*				
(c) Anderson-Rubin Wald test χ^2 (2)				5.03*	5.03*				
(c) Stock-Wright LM S-statistic χ^2 (2)				5.04*	5.04*				
(d) Hansen J statistic χ^2 (1)				0.005	0.006				

Notes: The remaining notes in Table 4 hold.

Table 8
Availability of Unspent Income

Dependent Variable: Availability of Unspent Income (1: low-5: high)	Ordered Probit Model (Coefficients)			2SLS Model (Coefficients)		(Panel) GLS Model with Random Effects (Coefficients)		(Panel) Fixed Effects Model (Coefficients)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Fin. Literacy: Index	-	0.109***	-	0.164***		0.137***	0.062	0.021	-0.056
		[0.036]		[0.055]		[0.028]	[0.039]	[0.040]	[0.052]
Fin. Literacy: #Correct Responses	-	-	0.093***		0.134***	-	-	-	-
			[0.029]		[0.044]				
Year 2009	-	-	-	-	-	0.399***	0.399***	0.425***	0.425***
						[0.050]	[0.050]	[0.050]	[0.050]
2009*(Fin. Lit. Index)	-	-	-	-	-	-	0.148***	-	0.150**
							[0.052]		[0.064]
Male	0.126*	0.123*	0.123*	0.137	0.138	0.130**	0.130**	-	-
	[0.071]	[0.071]	[0.071]	[0.085]	[0.085]	[0.060]	[0.060]		
Single Person Household	-0.028	-0.023	-0.023	0.002	0.002	0.075	0.085	-	-
	[0.119]	[0.120]	[0.120]	[0.138]	[0.138]	[0.090]	[0.090]		
Log(Age)	-0.098	-0.083	-0.083	-0.076	-0.076	-0.086	-0.085	-	-
	[0.114]	[0.115]	[0.115]	[0.138]	[0.138]	[0.100]	[0.099]		
Has experienced income shock in the last year	0.037	0.049	0.049	0.073	0.072	-0.235***	-0.250***	-0.259***	-0.277***
	[0.072]	[0.072]	[0.072]	[0.085]	[0.085]	[0.055]	[0.055]	[0.073]	[0.073]
Secondary Education	0.015	0.004	0.004	-0.040	-0.040	-0.116	-0.122	-	-
	[0.146]	[0.147]	[0.147]	[0.164]	[0.164]	[0.113]	[0.113]		
Vocational-Technical Education	-0.042	-0.074	-0.074	-0.121	-0.121	-0.115	-0.117	-	-
	[0.149]	[0.150]	[0.150]	[0.168]	[0.168]	[0.113]	[0.112]		
Higher or incomplete higher	0.139	0.088	0.085	0.035	0.034	0.022	0.021	-	-
	[0.158]	[0.159]	[0.159]	[0.183]	[0.183]	[0.123]	[0.123]		
- 2nd Income quartile	0.303***	0.295***	0.295***	0.336***	0.336***	0.152*	0.156**	-	-
	[0.101]	[0.101]	[0.101]	[0.117]	[0.117]	[0.079]	[0.079]		
- 3rd Income quartile	0.257**	0.251**	0.250**	0.291**	0.290**	0.314***	0.310***	-	-
	[0.107]	[0.107]	[0.107]	[0.123]	[0.123]	[0.086]	[0.086]		
- 4th Income quartile (highest)	0.531***	0.506***	0.506***	0.635***	0.636***	0.477***	0.475***	-	-
	[0.124]	[0.124]	[0.124]	[0.149]	[0.149]	[0.096]	[0.096]		
No. of Observations	1,074	1,074	1,074	1,074	1,074	2,148	2,148	2148	2148
R² (Overall)				0.087	0.088	0.107	0.110	0.074	0.079
Pseudo R²	0.027	0.030	0.030						
Log-Likelihood	-1,581.5	-1,576.8	-1,576.4	-1,786.9	-1,786.5			-2,599.7	-2,594.3
F-statistic				4.24***	4.25***			28.45***	22.80***
Wald χ²	90.43***	100.83***	101.95***			245.40***	254.13***		

Partial R² of excluded instruments:	0.0238	0.0231

Test of excluded instruments F(2, 1050)	12.87***	12.41***
Additional statistics based on Linear Probability Models (available upon request)		
(a) Kleibergen-Paap rk LM statistic χ²(2)	27.95***	27.07***
(a) Kleibergen-Paap rk Wald statistic χ²(2)	26.39***	25.44***
(b) Kleibergen-Paap Wald rk F statistic	12.87***	12.41***
(c) Anderson-Rubin Wald test: F(2,1050)	0.36	0.36
(c) Anderson-Rubin Wald test: χ²(2)	0.73	0.73
(c) Stock-Wright LM S-statistic: χ²(2)	0.73	0.73
(d) Hansen J statistic χ²(1)	0.009	0.009

Notes: The remaining notes in Table 4 hold.

Appendix A: Construction of the Financial Literacy Index

Panel A: Polychoric Pairwise Correlations Between Financial Literacy Responses

The variables have been transformed to dummies, equal to 1 for correct response, equal to 0 for incorrect responses and "Do not know".

|	Interest_1	Interest_2	Inflation
Interest_1	1.000		
Interest_2	0.225***	1.000	
Inflation	0.203***	0.295***	1.000
Discounts	0.586***	0.411***	0.378***

Panel B: Polychoric Pairwise Correlations between Financial Literacy Questions, 2008

Component	Eigenvalues	Proportion explained	Cum. explained
1	2.117	0.529	0.529
2	0.909	0.227	0.756
3	0.604	0.151	0.908
4	0.370	0.092	1.000

## Panel C: Scoring Coefficients for PCA, 2008

Variable	Coeff. 1	Coeff. 2	Coeff. 3
Interest_1	0.455	-0.600	-0.060
Interest_2	0.617	0.620	-0.935
Inflation	0.394	0.469	0.605
Discounts	0.293	-0.139	-0.008

Panel D: Parallel Analysis for the Optimal Number of Factors, 2008
PA based on 10 replications
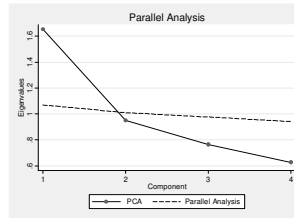
Panel E: Financial Literacy Index, 2008

First principal component based on 4 financial literacy questions, equally weighted; "Difficulty Answering" is coded as 0.
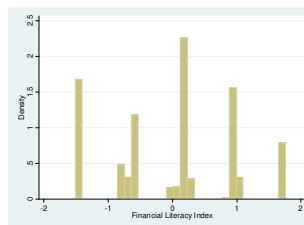
Pooling Financial Literacy Responses

We deviate from the approach taken by Van Rooij, Lusardi, and Alessie (2011), who perform an iterated principal factor analysis of dummies based on the correct and "do not know" responses to each financial literacy question, since (a) binary data do not lend themselves to traditional factor analysis (Shapiro, Lasarev, and McCauley; 2002), and (b) creating multiple binary variables based on categorical data introduces spurious correlation into the principal factor procedure (Kolenikov and Angeles; 2008).

For robustness, we compute two versions of a financial literacy index using the Van Rooij *et al.* (2011) method: one based on the four dummies used in our approach and another based on two dummies for each question – one each for the correct and "do not know" responses. Both versions of these indices are highly correlated with our index (*Panel B*).

To test whether two alternatives can be pooled in a multinomial logistic model – Anderson (1984) refers to this as "alternatives being indistinguishable with respect to the independent variables in the model" – we employ a simple likelihood ratio (LR) test for the following hypothesis:

H$_0$: $\beta_{1,A|B} = \ldots \beta_{K,A|B} = 0$ for alternatives A and B in a model with K parameters (1)

We fit two models: an unrestricted model with test statistic LR^2_F and a restricted model with outcome A as the base category and all coefficients except the intercept for outcome B restricted to 0, with test statistic LR^2_R. The test statistic for combining categories A and B is $LR^2_{A/B} = LR^2_F - LR^2_R \sim \chi^2$ with K degrees of freedom (Long and Freese, 2006; Claudill, 2000).

Following Lusardi and Mitchell (2007a), we classify responses to the financial literacy questions in the survey as either "correct", "incorrect", or "do not know". We test whether the last two alternatives can be pooled, and the resulting test statistics (available upon request) indicate that we cannot reject the null hypothesis that "incorrect" and "do not now" responses are indistinguishable in our model.

As a second test, we construct for each financial literacy variable an ordered variable = 0 if answered "difficulty answering", = 1 if answered incorrectly, and = 2 if answered correctly. We find no significant differences between logit and ordered logit tests on the determinants of financial literacy responses (results available upon request).

Appendix B: Additional Results

Table B1
Financial Literacy: 1st stage Regressions

	(A) Fin. Lit.: Index		(B) Fin. Lit.: #Correct Responses	
Number of newspapers per region	-	0.116**	-	0.141**
		[0.046]		[0.057]
Number of universities per region	-	0.004***	-	0.005***
		[0.001]		[0.001]
Male	0.041	0.037	0.049	0.043
	[0.063]	[0.063]	[0.078]	[0.077]
Single Person Household	-0.049	-0.045	-0.060	-0.055
	[0.097]	[0.095]	[0.119]	[0.117]
Log(Age)	-0.136	-0.151	-0.168	-0.187
	[0.098]	[0.098]	[0.121]	[0.120]
Has experienced income shock	-0.108*	-0.126**	-0.124*	-0.146*
in the last year	[0.061]	[0.061]	[0.074]	[0.075]
Education (Ref: Primary or Incomplete)				
Secondary	0.112	0.13	0.14	0.161
	[0.116]	[0.118]	[0.141]	[0.143]
Vocational-Technical	0.294**	0.319***	0.357**	0.387***
	[0.117]	[0.118]	[0.142]	[0.144]
Higher or incomplete higher	0.486***	0.506***	0.604***	0.627***
	[0.127]	[0.128]	[0.155]	[0.156]
Occupation (Ref: Unemployed)				
Skilled Non-Manual	0.577*	0.575*	0.724*	0.722*
	[0.306]	[0.318]	[0.373]	[0.389]
Skilled Manual	0.484	0.504	0.607*	0.631*
	[0.294]	[0.307]	[0.358]	[0.374]
Unskilled Non-Manual	0.486	0.482	0.606*	0.601
	[0.299]	[0.311]	[0.364]	[0.380]
Unskilled Manual	0.528	0.48	0.662	0.604
	[0.332]	[0.343]	[0.404]	[0.419]
Entrepreneur	0.655*	0.679*	0.838**	0.867**
	[0.337]	[0.348]	[0.412]	[0.425]
Pensioner	0.177	0.157	0.236	0.211
	[0.304]	[0.317]	[0.370]	[0.387]
Other	0.486*	0.477	0.620*	0.61
	[0.295]	[0.308]	[0.359]	[0.375]
Family Income (Ref: - 1st - (lowest))				
- 2nd -	0.094	0.081	0.110	0.095
	[0.089]	[0.089]	[0.109]	[0.109]
- 3rd -	0.069	0.023	0.087	0.032
	[0.090]	[0.090]	[0.110]	[0.110]
- 4th - (highest)	0.231**	0.144	0.280**	0.174
	[0.109]	[0.109]	[0.135]	[0.135]
Federal Region (Ref: Central)				
North Western	0.131	1.316***	0.125	1.558**
	[0.094]	[0.491]	[0.115]	[0.604]
Southern	0.059	0.038	0.056	0.029
	[0.099]	[0.099]	[0.121]	[0.121]
Volga	0.220**	0.355***	0.269**	0.433***
	[0.090]	[0.096]	[0.110]	[0.118]
Urals	0.294*	2.003***	0.386**	2.453***
	[0.150]	[0.665]	[0.183]	[0.819]
Siberian	0.002	0.854**	0.003	1.032**
	[0.114]	[0.359]	[0.141]	[0.443]
Far Eastern	0.289**	1.454***	0.345**	1.752***
	[0.139]	[0.460]	[0.171]	[0.567]
Constant	-0.388	-7.348***	1.366**	-7.048**
	[0.483]	[2.762]	[0.592]	[3.403]
IV: Test of joint significance:	-	12.87***	-	12.41**
IV: Test of omitted variables	31.45***	-	30.54***	-
No. of Observations	1,074	1,074	1,074	1,074
R²	0.124	0.145	0.125	0.145
Log-Likelihood	-1,433.6	-1,420.7	-1,651.9	-1,639.4
F-statistic	7.40***	8.09***	7.46***	8.02***

Table B2

Low Spending

Dependent Variable: Low Spending (1/0)	Probit Model (Marginal Effects)			Probit Model with IV (Marginal Effects)		(Panel) Probit Model with Random Effects (Marginal Effects)		(Panel) Logit Model with Fixed Effects (Odds Ratios)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Fin. Literacy: Index	-	-0.034** [0.016]	-	-0.031* [0.019]		-0.042*** [0.010]	-0.038*** [0.014]	0.813** [0.069]	0.828* [0.094]
Fin. Literacy: #Correct Responses	-	-	-0.028** [0.013]		-0.026* [0.016]	-	-	-	-
Year 2009	-	-	-	-	-	0.053*** [0.017]	0.052*** [0.017]	1.218* [0.138]	1.213* [0.140]
2009*(Fin. Lit. Index)	-	-	-	-	-	-	-0.008 [0.018]	-	0.964 [0.141]
Male	-0.028 [0.032]	-0.026 [0.032]	-0.026 [0.032]	-0.021 [0.026]	-0.021 [0.026]	-0.007 [0.022]	-0.007 [0.022]	-	-
Single Person Household	0.093* [0.052]	0.092* [0.052]	0.092* [0.052]	0.070* [0.038]	0.070* [0.038]	0.069** [0.030]	0.068** [0.030]	-	-
Log(Age)	0.153*** [0.053]	0.147*** [0.053]	0.146*** [0.053]	0.120*** [0.044]	0.119*** [0.044]	0.088** [0.037]	0.088** [0.037]	-	-
Has experienced income shock in the last year	0.039 [0.033]	0.036 [0.032]	0.036 [0.032]	0.029 [0.026]	0.029 [0.026]	0.062*** [0.019]	0.063*** [0.019]	1.581*** [0.258]	1.589*** [0.262]
Secondary Education	0.052 [0.058]	0.054 [0.058]	0.054 [0.058]	0.044 [0.046]	0.044 [0.045]	0.065* [0.039]	0.066* [0.039]	-	-
Vocational-Technical Education	0.031 [0.056]	0.041 [0.056]	0.041 [0.056]	0.034 [0.045]	0.034 [0.045]	0.053 [0.039]	0.053 [0.039]	-	-
Higher or incomplete higher	-0.001 [0.061]	0.018 [0.062]	0.018 [0.062]	0.016 [0.051]	0.017 [0.051]	0.028 [0.044]	0.028 [0.044]	-	-
- 2nd Income quartile	-0.229*** [0.028]	-0.227*** [0.028]	-0.227*** [0.028]	-0.223*** [0.031]	-0.223*** [0.031]	-0.220*** [0.023]	-0.220*** [0.023]	-	-
- 3rd Income quartile	-0.296*** [0.026]	-0.296*** [0.026]	-0.296*** [0.026]	-0.314*** [0.032]	-0.314*** [0.032]	-0.338*** [0.025]	-0.337*** [0.025]	-	-
- 4th Income quartile (highest)	-0.354*** [0.026]	-0.350*** [0.027]	-0.350*** [0.027]	-0.402*** [0.041]	-0.402*** [0.041]	-0.409*** [0.031]	-0.409*** [0.031]	-	-
No. of Observations	1,074	1,074	1,074	1,074	1,074	2,148	2,148	656	656
Pseudo R^2	0.229	0.232	0.232					0.035	0.035
Log-Likelihood	-506.7	-504.2	-504.2	-1,630.9	-1,870.0	-1,053.2	-1,053.1	-219.5	-219.5
Wald χ² / LR χ² in (D)	261.16***	264.85***	264.66***	264.78***	264.82***	276.3***	277.0***	15.73***	15.79***
LR χ² (ϱ=0)						26.67***	26.45***		
Predicted Probability	0.3310	0.3309	0.3309						
Wald χ² test of exogeneity				0.05	0.07				
Partial R² of excluded instruments:				0.0238	0.0231				
Test of excluded instruments F(2, 1050)				12.87***	12.41***				
Additional statistics based on Linear Probability Models (available upon request)									
(a) Kleibergen-Paap rk LM statistic χ² (2)				27.95***	27.07***				
(a) Kleibergen-Paap rk Wald statistic χ² (2)				26.39***	25.44***				
(b) Kleibergen-Paap Wald rk F-statistic				12.87***	12.41**				
(c) Anderson-Rubin Wald test: F(2,1050)				1.58	1.58				
(c) Anderson-Rubin Wald test: χ²(2)				3.24	3.24				
(c) Stock-Wright LM S-statistic: χ²(2)				3.23	3.23				
(d) Hansen J statistic χ²(1)				0.031	0.032				

Notes: The observed probability is 0.3305 for Panel (A). The remaining notes in Table 4 hold.

Table B3
Unspent Income

Dependent Variable: Unspent Income (1/0)	Probit Model (Marginal Effects)			Probit Model with IV (Marginal Effects)		(Panel) Probit Model with RE (ME)		(Panel) Logit Model with FE (Odds Ratios)	
	(A1)	(A2)	(A3)	(B1)	(B2)	(C1)	(C2)	(D1)	(D2)
Fin. Literacy: Index	-	0.053***	-	0.041**	-	0.056***	0.037**	1.057	0.991
		[0.017]		[0.020]		[0.011]	[0.016]	[0.082]	[0.099]
Fin. Literacy: #Correct Responses	-	-	0.045***	-	0.033**	-	-	-	-
			[0.014]		[0.016]				
Year 2009	-	-	-	-	-	0.100***	0.098***	1.689***	1.679***
						[0.020]	[0.020]	[0.164]	[0.164]
2009*(Fin. Lit. Index)	-	-	-	-	-	-	0.036*	-	1.137
							[0.021]		[0.141]
Male	0.048	0.046	0.046	0.044	0.044	0.036	0.036	-	-
	[0.034]	[0.034]	[0.034]	[0.032]	[0.032]	[0.023]	[0.023]		
Single Person Household	-0.003	0.001	0.001	0.001	0.001	0.024	0.026	-	-
	[0.054]	[0.054]	[0.054]	[0.051]	[0.051]	[0.036]	[0.036]		
Log(Age)	-0.088	-0.081	-0.081	-0.078	-0.078	-0.051	-0.05	-	-
	[0.056]	[0.056]	[0.056]	[0.052]	[0.052]	[0.039]	[0.039]		
Has experienced income shock in the last year	0.004	0.010	0.010	0.008	0.008	-0.070***	-0.073***	0.676***	1.679***
	[0.034]	[0.034]	[0.034]	[0.032]	[0.032]	[0.022]	[0.022]	[0.100]	[0.164]
Secondary Education	-0.055	-0.061	-0.061	-0.056	-0.056	-0.060	-0.062	-	-
	[0.064]	[0.064]	[0.064]	[0.061]	[0.061]	[0.044]	[0.044]		
Vocational-Technical Education	-0.068	-0.084	-0.084	-0.076	-0.076	-0.056	-0.057	-	-
	[0.064]	[0.064]	[0.064]	[0.061]	[0.061]	[0.044]	[0.044]		
Higher or incomplete higher	-0.035	-0.061	-0.062	-0.053	-0.053	-0.023	-0.023	-	-
	[0.070]	[0.070]	[0.070]	[0.067]	[0.067]	[0.048]	[0.048]		
- 2nd Income quartile	0.156***	0.152***	0.152***	0.143***	0.143***	0.058*	0.059*	-	-
	[0.048]	[0.048]	[0.048]	[0.044]	[0.044]	[0.032]	[0.032]		
- 3rd Income quartile	0.145***	0.142***	0.142***	0.133***	0.133***	0.111***	0.110***	-	-
	[0.050]	[0.050]	[0.050]	[0.046]	[0.046]	[0.034]	[0.034]		
- 4th Income quartile (highest)	0.267***	0.257***	0.257***	0.245***	0.245***	0.194***	0.194***	-	-
	[0.054]	[0.055]	[0.055]	[0.053]	[0.053]	[0.037]	[0.037]		
No. of Observations	1,074	1,074	1,074	1,074	1,074	2,148	2,148	924	924
Pseudo R²	0.055	0.062	0.062					0.058	0.06
Log-Likelihood	-698.0	-693.0	-692.6	-1,594.0	-1,810.4	-1,345.9	-1,344.5	-301.6	-301.1
Wald χ² /LR χ² in (D)	78.00***	83.70***	84.33***	79.47***	79.44***	158.1***	160.7***	37.23***	38.30***
LR χ² (ϱ=0)						2.12*	2.08*		
Predicted Probability	0.4481	0.4483	0.4483						
Wald χ² test of exogeneity				0.54	0.81				
Partial R² of excluded instruments:				0.0238	0.0231				
Test of excluded instruments F(2, 1050)				12.87***	12.41***				
Additional statistics based on Linear Probability Models (available upon request)									
(a) Kleibergen-Paap rk LM statistic χ²(2)				27.95***	27.07***				
(a) Kleibergen-Paap rk Wald statistic χ²(2)				26.39***	25.44***				
(b) Kleibergen-Paap Wald rk F-statistic				12.87***	12.41***				
(c) Anderson-Rubin Wald test: F(2,1050)				1.06	1.06				
(c) Anderson-Rubin Wald test: χ²(2)				2.17	2.17				
(c) Stock-Wright LM S-statistic: χ²(2)				2.16	2.16				
(d) Hansen J statistic χ²(1)				0.331	0.331				

<u>Notes</u>: The observed probability is 0.4479 for Panel (A). The remaining notes in Table 4 hold.

Table B4

Instrumental Variables Regressions: Robustness tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Bank Account	Formal Credit	Informal Credit	Low Spending	Level of Low Spending	Income Unspent	Level of Unspent Income
Fin. Literacy: Index	0.041**	0.031**	-0.038***	-0.012	-0.050	0.041**	0.169***
	[0.019]	[0.015]	[0.014]	[0.019]	[0.038]	[0.020]	[0.055]
Log(regional unemployment rate)	-0.137*	-0.023	0.089*	-0.176***	-0.387***	-0.039	-0.264
	[0.075]	[0.053]	[0.047]	[0.061]	[0.122]	[0.080]	[0.217]
Log(monthly income per capita)	-0.151**	-0.058	0.027	-0.309***	-0.520***	-0.008	-0.181
	[0.073]	[0.055]	[0.048]	[0.061]	[0.110]	[0.077]	[0.209]
Male	0.03	-0.051**	-0.004	-0.027	-0.077*	0.043	0.135
	[0.031]	[0.024]	[0.022]	[0.026]	[0.046]	[0.032]	[0.085]
Single Person Household	0.036	0.003	0.090***	0.078**	0.127	-0.002	-0.004
	[0.049]	[0.043]	[0.033]	[0.039]	[0.080]	[0.051]	[0.138]
Log(Age)	0.133***	-0.046	-0.072**	0.137***	0.248***	-0.08	-0.079
	[0.050]	[0.039]	[0.036]	[0.043]	[0.075]	[0.052]	[0.139]
Has experienced income shock in the last year	-0.012	0.001	0.046**	0.032	0.084*	0.01	0.079
	[0.031]	[0.025]	[0.021]	[0.026]	[0.046]	[0.032]	[0.085]
Secondary Education	0.099	-0.016	0.089**	0.044	0.118	-0.056	-0.037
	[0.062]	[0.052]	[0.043]	[0.045]	[0.090]	[0.061]	[0.164]
Vocational-Technical Education	0.123**	-0.039	0.110***	0.031	0.014	-0.074	-0.113
	[0.061]	[0.052]	[0.043]	[0.044]	[0.088]	[0.061]	[0.168]
Higher or incomplete higher	0.174***	-0.007	0.031	0.007	-0.104	-0.053	0.033
	[0.066]	[0.055]	[0.048]	[0.050]	[0.097]	[0.067]	[0.183]
- 2nd Income quartile	0.06	-0.002	0.047	-0.206***	-0.433***	0.143***	0.343***
	[0.044]	[0.034]	[0.030]	[0.030]	[0.069]	[0.044]	[0.117]
- 3rd Income quartile	0.087*	0.015	0.052*	-0.286***	-0.596***	0.132***	0.298**
	[0.045]	[0.036]	[0.031]	[0.033]	[0.075]	[0.047]	[0.123]
- 4th Income quartile (highest)	0.055	-0.022	0.022	-0.349***	-0.827***	0.239***	0.635***
	[0.055]	[0.042]	[0.038]	[0.042]	[0.087]	[0.055]	[0.153]
Wald χ² test of exogeneity	2.17	0.03	5.24**	0.36	-	0.57	-
Partial R2 of excluded instruments:	0.0179	0.0179	0.0179	0.0179	0.0176	0.0179	0.0179
Test of excluded instruments F(2, 1050)	8.56***	8.56***	8.56***	8.56***	8.22***	8.56***	8.56***
Additional statistics based on Linear Probability Models (available upon request)							
(a) Kleibergen-Paap rk LM statistic χ2(2)	19.96***	19.96***	19.96***	19.96***	19.28	19.96***	19.96***
(a) Kleibergen-Paap rk Wald statistic χ2(2)	17.58***	17.58***	17.58***	17.58***	16.88	17.58***	17.58***
(b) Kleibergen-Paap Wald rk F-statistic	8.56***	8.56***	8.56***	8.56***	8.22	8.56***	8.56***
(c) Anderson-Rubin Wald test: F(2,1050)	2.43*	1.78	0.59	0.18	0.18	0.83	0.35
(c) Anderson-Rubin Wald test: χ2(2)	4.98*	3.66	1.22	0.38	0.36	1.71	0.71
(c) Stock-Wright LM S-statistic: χ2(2)	4.87*	3.61	1.21	0.38	0.37	1.71	0.71
(d) Hansen J statistic χ2(1)	2.309	3.513*	0.77	0.355	0.201	0.064	0.16
No. of Observations	1,074	1,074	1,074	1,074	1,057	1,074	1,074
Pseudo R²	-	-	-	-	0.338	-	0.088
Log-Likelihood	-1,562.1	-1,358.8	-1,278.2	-1,615.7	-	-1,590.4	-
Wald χ²	59.21***	90.05***	77.20***	269.05***	-1,071.5***	80.52***	-1,786.1***
F-statistic	-	-	-	-	20.98	-	4.07

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

Table B5
Pairwise Correlation Matrix

|	Outcome variables							Instr. variables		Financial Literacy			Indiv. Charact.		
	Bank Account	Formal Credit	Informal Credit	Low Spending	Unspent Income	Level of Low Spending	Level of Unspent Income	# Newspapers	# Universities	Index	#Correct Responses	Self-Assessment	Family Income	Income shock	Urban region
Outcome variables															
Bank Account	1.00														
Formal Credit	0.05*	1.00													
Informal Credit	-0.01	-0.19*	1.00												
Low Spending	-0.05*	-0.02	0.07*	1.00											
Unspent Income	0.12*	0.00	-0.06*	-0.26*	1.00										
Low Spending Index	-0.08*	-0.02	0.06*	0.84*	-0.31*	1.00									
Unspent Income Index	0.16*	-0.03	-0.08*	-0.28*	0.85*	-0.34*	1.00								
Instrumental variables															
# Newspapers	-0.03	-0.06*	0.04*	0.02	-0.01	0.02	-0.04	1.00							
# Universities	0.00	-0.05*	-0.04	-0.07*	0.01	-0.10*	0.01	0.15*	1.00						
Financial Literacy															
Index	0.09*	0.10*	-0.02	-0.20*	0.15*	-0.25*	0.16*	0.34*	0.12*	1.00					
#Correct Responses	0.09*	0.10*	-0.03	-0.20*	0.16*	-0.25*	0.16*	0.34*	0.12*	0.99*	1.00				
Self-Assessment	0.11*	0.14*	0.01	-0.20*	0.22*	-0.27*	0.24*	0.16*	0.01	0.37*	0.36*	1.00			
Individual Characteristics															
Family Income	0.09*	0.03	-0.04*	-0.34*	0.19*	-0.44*	0.19*	0.15*	0.19*	0.23*	0.23*	0.23*	1.00		
Income shock in last year	0.01	0.03	0.13*	0.06*	-0.07*	0.09*	-0.09*	0.01	-0.04*	0.02	0.03	0.02	-0.05*	1.00	
Male	0.00	0.00	-0.02	-0.07*	0.04*	-0.07*	0.05*	0.02	0.00	0.05*	0.05*	0.07*	0.08*	0.01	-0.01
Single Person Household	0.00	-0.07*	-0.02	0.19*	-0.02	0.17*	-0.02	-0.11*	0.01	-0.13*	-0.13*	-0.13*	-0.17*	-0.05*	0.02
Age	0.04	-0.15*	-0.06*	0.27*	-0.09*	0.28*	-0.09*	-0.18*	0.00	-0.27*	-0.27*	-0.25*	-0.31*	-0.10*	-0.05*
Education															
Primary or Incomplete	-0.08*	-0.07*	-0.02	0.12*	-0.03	0.14*	-0.04	-0.13*	0.00	-0.18*	-0.18*	-0.24*	-0.18*	-0.04	-0.11*
Secondary	-0.05*	0.02	0.05*	0.05*	-0.04*	0.09*	-0.04*	-0.06*	-0.03	-0.07*	-0.07*	-0.08*	-0.08*	0.03	-0.08*
Vocational-Technical	0.02	-0.01	0.03	-0.02	-0.01	-0.02	-0.01	0.04*	-0.04*	0.03	0.03	0.04*	0.03	0.00	0.04
Higher or incomplete higher	0.07*	0.04	-0.07*	-0.12*	0.08*	-0.16*	0.09*	0.10*	0.08*	0.16*	0.16*	0.19*	0.16*	-0.02	0.12*

Occupation															
Skilled Non-Manual	0.03	0.01	0.00	-0.06*	0.06*	-0.09*	0.05*	0.07*	0.03	0.10*	0.10*	0.13*	0.12*	-0.02	0.00
Skilled Manual	-0.01	0.12*	-0.02	-0.12*	0.01	-0.11*	0.01	0.03	-0.07*	0.09*	0.08*	0.04	0.11*	0.03	0.06*
Unskilled Non-Manual	0.06*	0.06*	0.00	-0.06*	0.03	-0.06*	0.05*	0.02	0.02	0.06*	0.06*	0.08*	0.05*	0.02	0.07*
Unskilled Manual	-0.05*	0.00	0.02	0.05*	-0.03	0.06*	-0.04*	0.02	0.00	0.00	0.00	0.01	-0.05*	0.04	-0.08*
Entrepreneur	0.02	0.04*	0.00	-0.02	0.02	-0.05*	0.03	0.05*	-0.01	0.02	0.02	0.03	0.05*	-0.01	0.00
Unemployed	0.03	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.02	-0.01	-0.01	-0.03	0.00	0.03	-0.01
Pensioner	-0.01	-0.18*	-0.04*	0.26*	-0.08*	0.27*	-0.09*	-0.18*	0.00	-0.28*	-0.27*	-0.24*	-0.32*	-0.10*	-0.10*
Other	-0.05*	-0.02	0.06*	-0.07*	0.00	-0.06*	0.00	0.04*	0.03	0.07*	0.07*	0.03	0.09*	0.05*	0.01
Federal Regions															
Urban	0.05*	-0.03	-0.04*	-0.13*	0.03	-0.17*	0.01	0.08*	0.28*	0.11*	0.11*	0.08*	0.24*	-0.01	1.00*
Central	0.09*	-0.07*	-0.04	-0.11*	0.08*	-0.12*	0.07*	0.19*	0.17*	0.04*	0.04*	0.01	0.29*	-0.02	0.08*
North Western	0.01	0.00	-0.04*	0.00	0.05*	-0.01	0.08*	-0.21*	0.11*	0.00	0.00	0.01	0.04*	-0.03	0.05*
Southern	-0.04*	-0.02	0.03	0.04	-0.02	0.07*	-0.05*	0.09*	0.01	-0.05*	-0.05*	-0.01	-0.13*	0.03	-0.07*
Volga	-0.10*	0.02	0.04*	0.11*	-0.06*	0.10*	-0.07*	0.08*	-0.15*	0.00	0.00	-0.06*	-0.20*	0.03	-0.01
Urals	0.02	0.00	-0.02	-0.02	0.00	-0.02	0.01	-0.18*	-0.07*	0.01	0.01	-0.01	0.02	0.00	0.01
Siberian	0.00	0.05*	0.00	-0.02	-0.07*	-0.02	-0.05*	-0.07*	-0.06*	0.01	0.01	0.04	-0.05*	-0.05*	0.01
Far-Eastern	0.02	0.07*	0.01	0.00	0.02	0.00	0.01	-0.12*	-0.06*	-0.04*	-0.04	0.03	0.00	0.04*	-0.11*

Notes:
*: p<0.05

Appendix C: Instrumental Variables (2007)

Panel A: Number of newspapers by federal region (darker → higher)

Panel B: Number of Universities
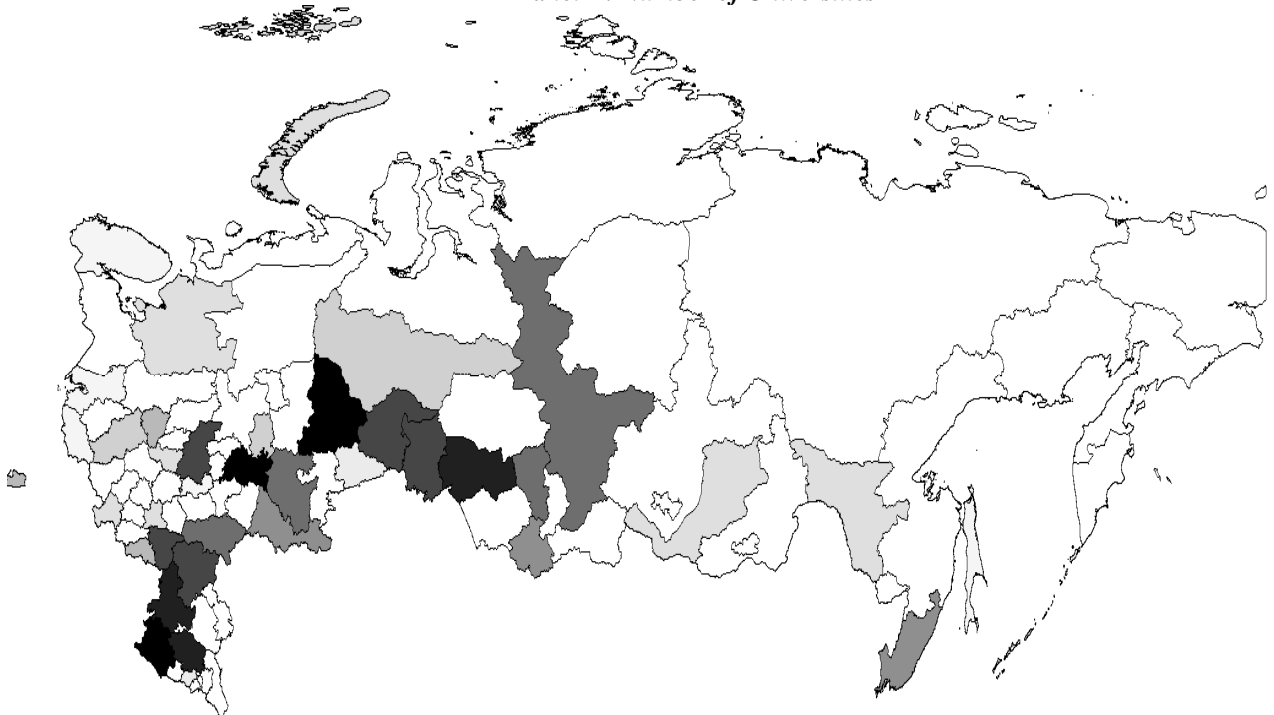
Source: The data sources are: Bank branches and Number of Universities: Central Bank of Russia (2007); Number of newspapers: East View Information Services (2008), http://www.eastview.com/Online/DBtitlelists.aspx. The map coordinates for the Russian administrative regions, along with map platforms are available at: http://www.diva-gis.org/gData.