The Role of Cognitive Characteristics, Personality Traits, and Financial Literacy in Financial Decision Making

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Abstract

The aim of this study is to analyze the relation between cognitive characteristics, personality traits, and financial literacy in savings and credit financial decision making, as well as participation in the formal financial sector. Our analysis is based on the Financial Capabilities Survey, which was applied in four countries of the Andean region: Bolivia, Colombia, Ecuador, and Peru. The empirical analysis shows the importance of numerical abilities and personality traits associated with conscientiousness on the tendency to save and participate in formal financial markets. The results of our instrumental variable analysis demonstrate that the role of financial literacy may be greater in more complex decisions or decisions that require more information, such as involving the use of credit, than for simpler decisions such as holding a basic savings account.

Keywords: savings, credit, personality traits, cognitivie characteristics, financial literacy .

JEL classification: A20, D12, D14, G11, I20, J26.

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1. INTRODUCTION

In recent decades, a variety of literature has appeared that looks at the determinants of financial decisions beyond those discussed in neoclassical theory. First, several studies have shown the importance of cognitive characteristics in explaining socioeconomic behaviors. Cognitive skills are identified with abstract thought and are defined as the rate at which people learn or their ability to reason. They are usually measured by an intelligence test, such as the test for the *IQ*. The effect of cognitive abilities and the ability to explain social outcomes such as educational achievement, crime, and health are well understood and documented (Heckman and Kautz, 2012; Almlund et al., 2011; Borghans et al., 2008; Roberts et al., 2007).

In the last decade, a series of studies have also appeared to show how higher levels of cognitive abilities positively affect financial habits: fewer financial errors are made, the probability of defaulting on payments is less, a greater diversity of financial instruments is used, and more sophisticated financial instruments are acquired, among other outcomes (Cole and Shastry, 2009; McArdle et al., 2009; Christelis et al., 2010; Grinblatt et al., 2011; Agarwal and Mazumder, 2013). It can be deduced from this work that numerical skills in particular are closely related to healthy financial decision making.

More recently, some studies have analyzed the role of personality traits in socioeconomic behaviors (Borghans et al., 2011; Almlund et al., 2011; Heckman and Kautz, 2013). The main conclusion of these studies is that personality traits could have the same or greater potential than cognitive characteristics in the prediction of socioeconomic results, and that they are also more malleable throughout the life cycle.

A group of pioneering papers has begun to analyze the role of personality traits in financial decisions. In general, these papers have found that the personality trait of conscientiousness is strongly related to saving for retirement, timely repayment of credit, and avoidance of financial problems (McCarthy, 2011; Kaufmann, 2012; Jamshidinavid et al., 2012; Klinger et al., 2013a,b; Di Giannatale et al., 2015; Kausel et al., 2016). In particular, a tendency to plan and self control are the traits that best predict these financial habits.

Much of the work that measures the effect of cognitive factors and personality traits on financial decisions addresses the possible relations both have with economic preferences. Regarding cognitive

characteristics, these could influence and determine intertemporal preferences and risk, as well as distinct cognitive biases associated with financial decisions (Frederick, 2005; Burks et al., 2009; Oechssler et al., 2009; Dohmen et al., 2010;Benjamin et al., 2013). On the side of personality traits, personality traits and preferences would seem to be complementary when it comes to explaining financial behaviors (Almlund et al., 2011; Becker et al., 2012; Heckman and Kautz, 2013).

Financial literacy is another element that has recently been considered as a determinant of financial decisions (Lusardi and Mitchell, 2014). The financial literacy literature shows a positive correlation between financial education and healthy financial decisions, such as saving for retirement, and avoiding indebtedness, among other outcomes (Lusardi and Mitchell, 2014). However, the direction of causality has not yet been resolved in many cases. Several papers explore the possible endogeneity between financial literacy and financial decisions per se. Different instruments have been used to try to resolve this problem (Lusardi and Mitchell, 2009; Bucher-Koenen and Lusardi, 2011; Van Rooij et al., 2011; Behrman et al., 2012; Klapper et al., 2012). The aforementioned works show that financial literacy matters, and that its effect is greater than that found in prior empirical analysis.

Building on the above discussion, the objective of this paper is to analyze the potential effects of cognitive characteristics, personality traits, and financial literacy in financial decisions. To our knowledge, this joint analysis of the different determinants and their potential relations and effects has not been carried out before. Previous work, as mentioned above, has focused on analyzing the determinants considered in our study separately, and has not always considered the possible relations between them.

We use the Financial Capabilities Survey in Andean Countries performed in Peru, Bolivia, Colombia, and Ecuador by CAF- Development Bank of Latin America (Mejía and Rodríguez, 2015) to meet our objective. The survey identifies the knowledge, skills, attitudes, and behaviors of individuals in relation to savings and credit, both formal and informal. Based on the survey results, we developed different indicators of financial literacy, cognitive characteristics, and personality traits.

This chapter is organized as follows. Section 2 presents the unit of analysis and the empirical methodology. Section 3 presents the

sample's descriptive statistics. Section 4 shows the theoretical model and the econometric analysis results of the lineal probability model. The results of the instrumental variable method used for the problem of endogeneity in financial literacy are in Section 5. Finally, we discuss our conclusions in the final section.

2. UNIT OF ANALYSIS AND METHODOLOGY

Our unit of analysis is based on the Financial Capabilities Survey (FCS)[1] administered in Bolivia, Colombia, Ecuador, and Peru, during the last quarter of 2013 to a representative sample of people over the age of 18. The questionnaire was created following the methodology developed by the Organization for Economic Co-operation and Development and the International Network of Financial Education (Atkinson and Messy, 2012; OECD-INFE, 2015). Specifically, the survey had a total of 33 questions that provided information about the socioeconomic characteristics of households, household economics, holding financial products, savings behaviors and attitudes, credit holdings, and the evaluation of financial concepts.

The empirical methodology of our study consisted of elaborating, based on the FCS, indicators that would operationally allow the measurement of concepts involved in the research, such as personality traits, cognitive characteristics, temporal and risk preferences, financial knowledge, and sociodemographic characteristics. The indicators are presented and discussed in the following section.

2.1 Financial Literacy and Cognitive Abilities

The FCS contains a broad set of financial literacy questions. Specifically, it poses eight questions related to knowledge of interest and compound interest, inflation and the value of money over time, risk and profitability, and risk diversification.

In order to make the results of the survey comparable with global evidence, we constructed a financial literacy indicator based on a set of standard questions. Specifically, Lusardi and Mitchell (2008, 2011a, 2011b) have designed a reduced set of four standard questions–also collected from the FCS–on the concepts of: *1)* inflation;

[1] For details of the survey, see Mejía and Rodríguez (2016).

2) interest or numerical skills; *3)* compound interest; and *4)* risk diversification, respectively. The authors define financial knowledge or financial literacy to be when the person answers at least three of the four questions correctly.

The results of the previous questions in Bolivia, Colombia, Ecuador and Peru show that the population of these countries has a low level of financial knowledge. Less than one-third of the population was able to answer at least three of the four questions correctly (Table 3 in Annex 1). However, the results at the question level are heterogeneous.

On average, respondents answer relatively well to questions of inflation and risk diversification. This result contrasts with studies in developed economies where the questions with the highest proportion of correct answers are simple and compound interest rates, while questions related to risk diversification receive the least correct answers.

This may be due to the experience of the respondents in the countries we studied. For example, experience with inflation (in the 1980s and 1990s) and economic crises. This result could also be due to the fact that, in reality, the interest rate question measures numerical abilities: it is the only one that explicitly requires a calculation. Following Lusardi and Mitchell, for this reason we suppose in our study that this question is a measurement of numerical ability,[2] not financial literacy.[3] Therefore, financial literacy will be defined in our study according to whether the person answers at least two of the three remaining questions correctly, and the interest rate question is our measure of cognition.

As mentioned in the first section, a large group of studies have shown how numerical skills are, within the different measures of cognition, the most strongly related to financial behaviors and decisions. Banks and Oldfield (2007) affirm that individuals with greater numerical abilities perhaps have more expertise in complex decision making, such as decisions related to finances. In addition, they

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[2] There is a question involving simple division in the survey. It was correctly answered by a majority of those who took the survey. Due to its simplicity, it was not considered a measure of numerical ability.

[3] Although it is true that this question could be a measure of financial literacy, based on empirical evidence offered by Lusardi (2016) this question is considered an indicator of numerical ability.

appear to be more patient, so they are more likely to have saved and invested in the past. Therefore, individuals with greater numerical skills can more easily make the calculations necessary to determine which financial decision is the most favorable.

In this work, as with the most recent literature, we also consider a more sophisticated financial literacy indicator known as PRIDIT. This is adapted to the measurement of financial literacy by Behrman et al. (2012), which is built in two stages. For elaborating this, we take into account the six questions of financial knowledge that the survey poses (these are shown in Table 15, Annex 3).

In the first stage, weighted scores are given based on the relative difficulty of the questions. Incorrect answers are penalized and the penalty is greater if a large percentage of those surveyed answered the question correctly. The penalty is lower if the question was answered incorrectly by a majority of the sample surveyed. For example, in our study, question three was answered correctly by a small percentage of people, so this question is considered difficult (see Table 15, Annex 3). In the second stage the principal component of weighted questions in the first stage is considered in order to take into account the correlation between the questions, and with that, measure how informative each question is. But this is not the sole weighting criterion at this stage. The questions tend to be more important on average, *ceteris paribus*, if the ratio of correct answers is close to a mean, not almost zero or nearly one. The intuition behind this is simple: the effort here is to avoid the extremes. That is, the questions that are answered by the majority of the sample correctly or those that are not.

2.2 Personality Traits

Personality traits are defined as "relatively long-lasting patterns of thinking, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances," (Roberts, 2009). Psychologists have also developed a relatively accepted taxonomy of personality characteristics known as the *big five*: openness to new experiences, conscientiousness, extraversion, agreeableness, and neuroticism or emotional instability (Borghans et al., 2008; Almlund et al., 2011).

The FCS contains several questions that allow you to extract information about some traits associated with conscientiousness, which

is one of the big five. In particular, the following subcharacteristics associated with conscientiousness can be evaluated from the survey questions: *1)* propensity to plan or establish long-term goals; *2)* perseverance; and *3)* scrupulosity This information is shown in Table 1.

Table 1

SURVEY QUESTIONS RELATED TO CONSCIENTIOUSNESS

Survey questions	*Subcharacteristics of conscientiousness*
a) Does your family have a budget? [Yes; No; I do not know]	Preference for long-term goals or a tendency to plan ahead
b) Does your family use this budget to accurately guide spending or as a plan for spending generally? [Precisely; In general; I do not know]	Scrupulousness
c) Does your family follow this plan for using money? [Precisely; In general; I do not know]	Perseverance or effort to succeed
d) Sometimes people find that their income does not cover their expenses. Has this happened to you in the last 12 months? [Yes; No; I do not know]	Preference for long-term goals or a tendency to plan ahead, perseverance
e) Before purchasing something, do you carefully consider if you can afford it? [Totally agree; Totally disagree (five categories)]	Scrupulousness
f) I pay my bills on time [Totally agree; Totally disagree (five categories)]	Perseverance
g) I have long-term financial goals and I strive to achieve them [Totally agree; Totally disagree (five categories)]	Preference for long-term goals or a tendency to plan ahead, perseverance

Based on the above questions, we created a conscientiousness index. This index ranges from zero to one, where higher scores imply greater conscientiousness. As for the methodology for calculating the index, for convenience it was decided to calculate it based on an average weight, assigning the same weight to the values of each of the prevous mentioned questions since they measure subcharacteristics that are distinct from a person's conscientiousness. To corroborate this, following Klapper et al. (2012) and Garber and Koyama (2016), a principal component analysis was performed to construct a conscientiousness index that compiled the highest correlation between these questions. We did not find a strong correlation between the questions, which is consistent with the fact that they measure different traits of conscientiousness.

Given that the questions we considered for developing the indicator have the same written structure and words used successfully in other contexts (Caprara et al., 1993; Barbaranelli et al., 2003; Lord, 2007; De Mel et al., 2008; Kaufmann, 2012; Heckman, 2012; Soto and John, 2016), we think they are a good measure of the personality traits that we were seeking to measure in our study (John et al., 1994).

Table 2

SURVEY QUESTIONS RELATED TO THE PREFERENCES

	Category scale (five options)	
Valuation criteria	*Total agreement*	*Total disagreement*
Risk preferences		
I am willing to risk some of my own money when I invest	Likes risk/Neutral towards risk	Risk averse
Time preferences		
I live for today and do not worry about tomorrow	Short term	Long term
I prefer to spend money rather than save for the future	Short term	Long term
Money is meant to be spent	Short term	Long term

2.3 Time and Risk Preferences

Regarding risk and time preferences, we used the questions in the FCS listed in Table 2.

Based on the previous valuation, two binary variables were defined that reflect risk aversion and time preferences. The aversion to risk variable takes the value of one if the person responded one or two (averse to risk), and zero otherwise (likes risk/risk neutral). For its part, the time preference variable takes the value of one if the accumulated score of the questions is less than or equal to six(prefers the long term), and zero on the contrary (prefers the short term).

2.4 Sociodemographic Variables

The survey allowed us to consider the following sociodemographic variables: age, sex, income stability, income stratum, schooling, marital status, and employment status. Except for the age variable, all variables are categorical or binary. The variable income stability takes the value of one if the person, considering all sources of their household income, reports that it is regular and stable, or zero if the opposite is the case. The variable income stratum is a categorical variable that takes the value one, two, and three for the low strata (monthly income less than or equal to 400 USD), medium strata (401 USD-1,600 USD), and high strata (more than 1,600 USD)[4] respectively. The variables schooling, marital status, and employment status are categorical variables that show the maximum level of study achieved, the civil status of the person, and the person's employment status respectively.

2.5 Financial Decision Making

Based on the information from the survey, we created the following five dichotomous variables related to savings and credit decisions, which will function as dependent variables in our econometric analysis:

- V1. Holding some type of formal savings instrument. Takes a

[4] Given that in each country the original income strata were reported in local currency, we expressed the income frontiers of each stratum in US dollars, based on the nominal exchange rate at the end of November 2014, a date close to that of deadlines for survey applications.

value of one if the respondent reports having at least one formal savings instrument; zero if not.

- V2. Saved in the last year: Takes a value of one if savings have occurred in the last 12 months in a formal manner (savings bank, current account, term deposit, or other mechanism specific to the country), or an informal manner (livestock, rotating savings and credit groups, cash kept at home); otherwise, a value of zero.
- V3. Formal savings over the past 12 months: Takes a value of one if the respondent has saved over the past 12 months in some formal way; zero if them have not, but instead has saved using an informal method (saving money at home, or with a group of people, among others)
- V4. Informal savings over the past 12 months: Takes a value of one if the respondent has saved over the past 12 months in some informal way (saving money at home, in sequences, or with a group of people, among others); or zero if them have not saved or saved using a formal method.
- V5. Holding formal credit products: Takes a value of one if the person has some type of credit (consumer credit, housing credit, credit card, microcredit, or other instrument specific to the country); otherwise, a value of zero.

Table 3 in Annex 1 presents the breakdown of financial decision variables at the country level. First, in terms of the possession of a formal savings instrument, on average 44.8% have some instruments, with Ecuador reaching a figure of 67. 2 per cent.

Second, the data also shows that in the sample countries more than 50% of the population saved in the last 12 months under some modality, and that the population of these countries uses both formal and informal methods to save. The savings were especially high in Bolivia, where, as in Peru, the percentages of both formal and informal savings are similar. However, there are significant differences between the population that saved using any type of instrument in relation to those that saved using a formal instrument.

Regarding the holding of some form of credit product, formal or informal, it is striking that on average, for the whole sample, the rate is lower than that of a savings product: 24.2%. In the case of

informal credit, this percentage is very similar (22.1%), with formal credit being very low (2.1%). These results contrast with the informal credit figures recorded in the Global Findex World Bank database (Demirgüç-Kunt et al., 2015), where in Latin America and the Caribbean 13.5% sought to borrow from friends and relatives and 39.5% requested a loan.

We believe that the reported low level of possession of informal credit may be related to a measurement error in the question. In this question, the only modality of informal credit was with individuals who lend money for a living, whereas respondents might be familiar with other types of informal credits that are either not recognized in this modality (family, friends, and employers, for example), or have another name. That is why, within the large percentage of people who reported not using a credit instrument, we think it includes persons who use informal means of credit.

3. DESCRIPTIVE STATISTICS

This section performs a disaggregated analysis of the data to identify relations from financial decisions and financial literacy with socioeconomic, personality and cognitive characteristics, and preferences at the country level. There follows a presentation and discussion of the main patterns. For financial literacy, the figure of two correct answers over three was used. We present some patterns found in the data (tables 4 and 5, Annex 1) as a first approximation of the possible relation between financial decisions and the remaining variables.

First, in Table 4 we show the average score, as well as the 25th, 50th, and 75th percentiles on the conscientiousness index for the variable groups (V1-V5). The percentiles show a symetric distribution. Consistent with the other works that were mentioned in the introduction, we found that those that save or use formal savings or credit instruments have conscientiousness levels that are significantly higher than those that do not. The difference is 0.06, 0.06, 0.07, 0.01, and 0.06 points for the variables V1, V2, V3, V4 and V5, respectively. The mean difference test confirms that these are significant for all financial decisions.

In Table 5, we present the affirmative financial decisions: holding of a formal savings instrument, formal or informal savings, only formal savings, only informal savings, and holding of formal credit

holdings disaggregated by financial literacy, numerical abilities, preferences, and socioeconomic characteristics. In line with the literature, those with higher levels of numerical skills tend to save more and participate in the formal financial sector, through both credit and savings. Nevertheless, it is striking that in the case of informal savings, no significant differences are observed when individuals are financially literate or have numerical skills. We believe that this could be due to the fact that in these countries successive financial crises have generated distrust in the formal sector, and as such the use of formal and informal methods coexist harmoniously.

In relative terms, people with financial literacy, higher educational attainment, income level, and stability, such as more stable work situations, save more and have greater participation in the formal financial sector. Finally, in terms of age, we can see that in the case of savings there is no defined pattern, while for credit–as with financial literacy–there is an inverted U-shape. This result is in line with the life-cycle models that show people become indebted during adulthood, compared to youth or old age.

4. ECONOMETRIC ANALYSIS

Our empirical model is based on Roy's theoretical model of comparative advantage (1951). This model was initially used by Heckman et al. (2006) to introduce the effect of personality traits on results in the employment market and social behavior. In our analysis we extend the model to explain the financial savings and credit decisions discussed in section 2.5.

In order to identify the potential influence of personality traits, cognition, and financial literacy on financial decision-making, we first estimate a linear probability model by ordinary least squares (OLS)[5]:

$$Y_i = \beta_0 + \beta_1 COG_i + \beta_2 DIL_i + \beta_3 AF_i + X_i'\theta + u_i, \quad (1)$$

[5] Models were weighted using countries' sampling weights and aggregated by the population over the age of 18 in each country, with clustered standard errors in urban and rural areas within regions or departments, in order to mitigate potential selection bias due to the designs of the surveys.

Where Y_i represents a binary financial decision variable, COG_i is the binary variable of cognition or numerical abilities, DIL_i is the conscientiousness indicator, AF_i is an indicator of financial literacy (alternatively the binary variable or PRIDIT indicator), while X_i' is a vector of the control variables: sex, age, education, marital status, income category, unemployment, income stability, and nd country-specific dummies; and u_i is the stochastic residual that captures the omitted variables and follows a binomial distribution.

Roy's model assumes that cognitive and noncognitive characteristics, preferences, and financial literacy are mutually independent. Cunha et al., (2010) and Cunha and Heckman (2006) have specified more robust economic models in which the factors are nonlinear and inseparable. Although this type of modeling might be more accurate, the assumption of linearity in the parameters and separability considerably simplifies the analysis. However, for future research we hope to explore the supposed independence between cognitive and noncognitive characteristics.

Table 6 in Annex 2 reports the regression results of the linear probability model[6] for the possession of at least one formal savings instrument. The magnitude of R^2 is at levels higher than other works in related literature (Lusardi and Mitchell, 2014). Column 1 shows the regression without considering the control variables X_i'. In that case, financial literacy, measured as having had two of the three financial literacy questions correctly answered, the cognitive and conscientiousness variables are significant. Also, higher values of these variables imply a greater tendency to have at least one formal savings instrument. The same result is obtained if financial literacy is measured by the PRIDIT indicator (column 3). Nevertheless, the measures of financial literacy become nonsignificant when introducing control variables in both models.

As for the sociodemographic variables (columns 2 and 4), being an employed man with higher, stable income, a higher educational level, and residing in Bolivia, Colombia, or Ecuador related to Peru increases the probability of having at least one savings instrument, while being a woman or being unemployed reduces it. Column 5 includes all controls except the financial literacy variable.

[6] The same econometric exercise presented below was performed considering logit models and testing. The significance and effect of the variables do not change when using these models (Wooldridge, 2010).

The explanatory power of the model does not change, nor does the significance of the distinct variables.

It should be noted that temporary preferences and risk aversion are not significant in any of the regressions. In our introduction, we discuss the possible relation between cognitive and preference variables, going in the direction of causality from the first to the second. This possible relation could be a factor that eliminates or reduces the significance of preferences in our econometric exercise.

Table 7 in Annex 2 reports the results of the regression of the linear probabilistic model for the decision to have saved in some form, formal and/or informal, during the last twelve months. The results are similar to the previous regression with two important caveats. In the first place, the variable of financial literacy is not significant both with and without controls. Only in the case where this variable is measured by the PRIDIT indicator it is significant, but with the opposite sign expected. Second, sex is no longer significant, but age becomes significant at certain levels. In other words, the older the individual, the higher their likelihood of having saved in the last twelve months.

Table 8 in Annex 2 shows the regression for the decision to have saved using at least one formal instrument in the last twelve months. Again, conscientiousness and numerical skills are positively related to formal savings. As far as financial literacy is concerned, neither of the two measures used proved to be significant. In the first regression, sex again becomes significant–but not age–which is consistent with using a formal savings instrument.

Table 9 in Annex 2 shows the regression of the linear probabilistic model for the decision to save informally in the last twelve months. It is notable that in this financial decision case, being diligent is significant, while having superior numerical skills is not. As for financial literacy, it is only significant when measured with PRIDIT with the expected sign, both with controls and without them. Consistent with the literature, being female and having lower level of education is related to informal saving. However, it is striking that having a stable income is positively related to informal savings, and with a higher coefficient than that of formal savings. The explanation, according to our intuition, is that a stable income increases total savings, both formal and informal. In the case of Bolivia and Ecuador, participation in the informal sector is greater when compared with Peru.

From the empirical analysis of the four savings decisions, we can deduce the importance of cognitive abilities and personality traits when explaining the tendency to save, and the use of the formal sector to do so. These results are consistent with the studies that were discussed in our introduction, which emphasize the role of numerical skills and conscientiousness, and their subcharacteristics, in financial decision making. The same is true of sociodemographic variables, which play an important role when explaining savings decisions, and we see the expected results. For example, in line with the literature (Lusardi and Mitchell, 2008), in the case of sex, being a man seems to be relevant in explaining participation in the formal versus informal sector. Having a stable income plays a similar role.

Regarding financial literacy, results with respect to its significance are inconclusive. As we explain later, our intuition tells us this result could be due to the possible endogeneity of this variable in terms of saving decisions.

In relation to the decision to have a formal credit instrument (Table 10, Annex 2), we again observe that personality characteristics and cognitive abilities are significant, both with and without controls. In the case of financial literacy, we observe that–even including controls–this variable is significant. However, in the case of the PRIDIT indicator, financial literacy become nonsignificant when controls are included.

As for control variables, both tables show that having a higher and stable income, higher levels of education, and being a male increase the probability of using credit, while age is positive and significant regarding level, but negative and significant when squared, which is consistent with life-cycle and permanent income models.

From this analysis, we conclude that financial literacy plays a minor role, or no role at all, in whether an individual holds formal savings products or has saved during the previous twelve months. It does, however, have a significant effect on saving informally and borrowing through formal instruments. In line with the literature, what might be happening is that in the case of more complex decisions or those requiring more information–such as using credit or having stock holdings–the role of financial literacy could be greater, while in simpler decisions such as holding basic savings accounts or bonds, the role of financial literacy could be minor or nonexistent (Christelis et al., 2010, Van Rooij et al., 2011).

However, it is important not to ignore the fact that financial literacy's lack of significance may be due to the problem of endogeneity. This may be stronger in the case of savings than in the case of credit, in the degree to which the savings considered in the survey are short-term and credit instruments are medium- or long-term. In the case of savings, being short-term instruments, the process of financial learning may be behind the problem of endogeneity.

Alternatively, financial literacy's lack of significance may be due to the fact that it is strongly related to education and cognitive skills (Delavande et al., 2008, McArdle et al., 2009, Lusardi and Mitchell, 2014). If this is the case, education and cognition may be reflecting the effect of financial literacy, and introducing the latter might imply over-controlling the estimation (McArdle et al., 2009; Gerardi et al., 2013).

5. ECONOMETRIC ANALYSIS: INSTRUMENTAL VARIABLE ANALYSIS

As indicated at the end of the previous section, there is a possibility that there is an endogeneity problem between financial literacy indicators and those regarding financial decisions. This problem leads that the OLS linear probability estimators obtained could be incoherent and biased due to the presence of a non-zero correlation between financial literacy and the regression error term. In order to tackle the endogeneity issue head on, we followed an instrumented feasible generalized method of moments (GMM-IV), which is based on a two-step estimation (Baum et al., 2007).

In order to check the validity of the set of instruments considered, we rely on a set of statistical tests. First, to test whether the instruments are robust in the first stage, the following is used: the *F*-test of excluded instruments, the weak identification test of Kleibergen-Paap LM, and the *F*-test for Kleibergen-Paap weak instruments with Stock and Yogo (2005) critical values. Second, to verify that the instruments are independent of the error term in the second stage, the Hansen *J* overidentification test is used.

Regarding the composition of the vector of instruments for estimating financial literacy, there is extensive literature that considers several types of variables used as instruments for financial literacy (Lusardi and Mitchell, 2009; Van Rooij et al., 2011; Bucher-Koenen

and Lusardi, 2011; Klapper et al., 2012; Behrman et al., 2012). In most cases, the appropriate instruments can not be identified a priori. Therefore, we start from a set of possible candidates that could predict financial literacy, but that could not be related to the endogenous variables under study. Taking into account the literature that has addressed the problem of endogeneity with several instruments (Lusardi and Mitchell, 2014), we took *number of universities by region* as an instrument. With this instrument we tried to account for exposure to financial information or to peers/colleagues with higher financial knowledge (Klapper et al., 2012). Following the same line of thought, the following questions of the FCS, related to an individual's exposure to sophisticated financial information, were included as instruments: *1)* if the individual is aware of the concept of deposit insurance funds; *2)* if the individual has heard about mutual funds or investments in the stock markets; and *3)* if the individual has heard about any insurance products at all. In the countries under consideration, the majority of the population is simply not aware of these concepts. It may be that people are exposed to these concepts when looking for savings or other banking products, such as when financial entities seize the opportunity to offer investment funds or insurance products.

As an additional instrument, we consider the number of banking crises during the life of the person, based on Reinhart and Rogoff (2009). This instrument was chosen due to the fact that, in questions of financial literacy, unlike what is observed in developed countries, questions related to concepts of inflation and risk diversification are the ones that had the least number of incorrect responses or *I do not know* answers. This leads us to think that perhaps the experiences of financial crises in these countries may have provoked people to learn about these economic concepts. Additionally, it can be argued that crises lead to uncertainty, which affects economic activity and unemployment, and has direct effects on the dependent variables. Finally, a variable was included as an instrument that proved to be of little significance in explaining financial decisions: aversion to risk.

For the estimation we followed the GMM-IV approach, by taking the PRIDIT as a proxy indicator of financial literacy, because its continuous nature makes for easy handling and interpretation of the

results.[7] At the same time, we took into account the specific survey design of each country in the estimation.

The results of the first stage of the GMM-IV model are presented in Table 11 in Annex 2. Similar to the financial decision regressions in the previous section, many of the control variables included in equation 1, such as cognition, conscientiousness, schooling, and income stability, are significant. This is an indication of the financial literacy variable's endogeneity problem. Equally, the six candidate instruments included were individually significant and, together, they are good tools for predicting financial literacy. First, the F test statistic of excluded instruments is equal to 7.89 (value $p = 0.0000$). Secondly, the subidentification Kleibergen-Paap statistic χ^2 is equal to 50.53 (value $p = 0.0000$) thus rejecting the null hypothesis that the model is subidentified. Finally, the statistic F of the Kleinergen-Paap weak instrument contrast is equal to 8.80, indicating a relative maximum bias of between 10% and 20% regarding the IV (instrumental variable) calculation with respect to the OLS calculation, in accordance with the critical values tabulated by Stock and Yogo (2005).

The results of the second stage are presented in Table 12 (Annex 2). At this stage we verified that the instruments are independent of the error term using the Hansen J overidentification test. The results indicate that the instruments used are independent of the second stage error term for cases involving estimates of dependent variables V2 (savings in the last 12 months), V3 (only formal savings in the last 12 months), V4 (only informal savings in the last 12 months), and V5 (use of credit instruments), which together with the fulfillment of the condition of being sufficiently strong instruments, evaluated in the first stage, make them valid instruments for the GMM-IV model calculation.

The results of the GMM-IV estimates show that the coefficients of conscientiousness variables remain positive and significant for the calculation of the five dependent variables considered (V2-V5), whereas the coefficients of the cognition variable are positive and significant, except in cases of savings using formal or informal mechanisms (Table 12, Annex 2).

[7] In case of using the binary indicator of financial literacy, there is no clear consensus as to what is the appropriate methodology to solve the problem of endogeneity.

On the other hand, the financial literacy coefficient is significantly negative only for the regression of informal savings, and positive for the holding of formal credit instruments. These results can be interpreted respectively as: a) a higher level of financial literacy reduces the probability of using informal saving mechanisms, which helps to overcome barriers of financial self-exclusion (Roa, 2013); and b) a higher level of financial literacy increases the probability of using formal financial instruments, which is associated mainly with the medium- and long-term.

Another aspect worth highlighting about the results obtained in the second stage of the GMM-VI model is that the magnitudes of the financial literacy coefficients on decisions to save only informally and to have formal credit instruments, are higher in absolute value then the coefficients obtained through the respective linear probability models, which is consistent with the empirical evidence in which both methodologies have been used (Lusardi and Mitchell, 2014).

As for the other sociodemographic controls included in the calculation, the coefficients generally maintain the magnitudes resulting from the OLS linear probability model regressions, both in their significance and in their sign. Specifically, the sex differences are no longer significant for the probability of having a formal savings instrument, whereas, for this same dependent variable, squared age becomes negative and significant. On the other hand, stability of income is not significant to estimate the probability of saving in the last twelve months through formal mechanisms.

Finally, the same estimate exercise using IV variables at the country level was repeated (tables 13 and 14, Annex 2). [8] The results suggest that the instruments are weak for the cases of Colombia, Peru, and Ecuador, while for Bolivia they are adequate. For the last country, in line with the aggregate model, financial literacy matters for formal savings, informal savings, and using credit decisions.

[8] It is important to note that the instruments *number of universities* and *cumulative banking crises* do not have sufficient variability at country level. In this sense, the instrumental analysis was carried out with the remaining instruments. The results of Peru, Colombia, and Ecuador are not reported since they do not pass the minimum model specification requirements. Those results may be requested from the authors.

6. CONCLUSIONS

The objective of this study has been to analyze the importance of cognitive characteristics, personality traits, and financial literacy in savings and credit decisions, through formal and/or informal mechanisms. The results of our empirical analysis show that the numerical skills and three traits associated with the conscientiousness variable–propensity to plan, perseverance, and scrupulosity–are relevant in explaining the tendency to save and participate in formal financial markets. The same occurs with stable income and higher levels of education. Consistent with the literature, being female and having a lower level of education is related to informal savings and credit. As might be expected from what is shown by life-cycle theories, using credit has a non-lineal relation with age.

It should be noted that, while a propensity to save through informal mechanisms positively depends on conscientiousness and income, it is not related to cognition. As has been shown in other surveys (Global Findex, Demirguc-Kunt et al., 2015), this result might be linked to the fact that in the surveyed countries, formal and informal savings mechanisms coexist harmoniously across all socioeconomic levels.

In relation to financial literacy, we used an instrumental variable (IV) analysis to tackle the possible endogeneity of this variable. The results using instrumenal variable (IV) analysis for the distinct savings decisions show that the financial literacy coefficient is only significant and negative for the informal savings regression, which suggests that a higher level of financial literacy lowers the probability of using informal, short-term savings mechanisms. For formal credit, financial literacy is significant with a positive coefficient, or, in other words, it increases the probability of having formal financial instruments, whose decision is associated mainly to the medium and long term. Consistent with the literature discussed in this work, for more complex products such as investment funds or medium- and long-term credit, financial literacy is relevant compared to simpler products such as a deposit or a bond.

Our results suggest that fostering numerical skills, especially in early years, could be key to acquiring healthy financial behavior. These skills become fixed between the ages of six and eight (Hopkins and Bracht, 1975; Schuerger and Witt, 1989).

Secondly, we can draw conclusions about the importance of conscientiousness in financial decisions. This result is of great relevance when designing education or financial-inclusion programs that seek to promote or establish healthy financial behaviors for different segments of the population, beyond sex or age. Specifically, the use of empirical methodologies to measure personality traits would serve to identify those individuals who due to their personality traits are more prone to fall behind with payments, avoid saving, or participate in the informal financial sector. In the future, we hope to explore not only the role of conscientiousness and its subcharacteristics in financial decision making, but also analyze the effect of the big five personality traits. In that sense, it would also be desirable to have a more complete survey instrument that would allow the development of stronger indicators for other variables, such as preferences or other cognitive characteristics dimensions.

Last but not least, our research shows the relevant role of financial literacy programs to encourage participation in the formal financial sector. It also underlines the importance of this variable in more complex financial decisions. We hope that these results enrich the understanding of the underlying processes and determinants of financial decision-making in developing economies.

ANNEX

Annex 1. Descriptive Statistics

Table 3

PROFILES OF FINANCIAL DECISION VARIABLES BY COUNTRY
In percentages

	Peru	*Bolivia*	*Colombia*	*Ecuador*	*Total*
V1. One if has some type of savings instrument; zero ifhas no type of savings instrument					
0	72.3	58.0	60.9	32.8	59.1
1	27.7	42.0	39.1	67.2	40.9
V2. One is has saved in the last 12 months in some way; zero if has not saved/ not asnwered					
0	48.8	29.3	41.5	43.8	42.6
1	51.2	70.8	58.5	56.3	57.4
V3. One if has saved in the last 12 months in an informal way; zero if has not saved or has used an informal savings method					
0	80.2	64.8	78.6	82.9	78.3
1	19.8	35.3	21.4	17.1	21.7
V4. One if has saved in the last 12 months in at least one informal way; zero if has not saved or has used an informal savings method					
0	68.6	70.4	62.9	92.8	64.3
1	31.4	29.6	37.1	7.2	35.7
V5. One if has some type of formal credit; zero if does not have credit or has informal credit					
0	77.5	71.4	73.2	92.8	76.8
1	22.5	28.6	26.8	7.2	23.2
Total	100	100	100	100	100

Note: The observations are weighted by the weights at the country level (in the cases of Bolivia and Ecuador they are not necessary), and for the total they are multiplied in turn by the proportion of the population older than 18 years of age in each country with respect to the same population for the four countries.

Table 4

CONSCIENTIOUSNESS AND FINANCIAL DECISIONS
Due conscientiousness characteristics scoring

	P(25)	*P(50)*	*P(75)*	*Average*	*Difference (0) and (1)*
V1. One if has some type of savings instrument; zero if has no type of savings instrument					
0	0.63	0.69	0.80	0.71	−0.06[c]
1	0.69	0.78	0.87	0.77	
V2. One if has saved in the last 12 in some way; zero if not saved/not answered					
0	0.60	0.69	0.80	0.70	−0.06[c]
1	0.68	0.76	0.86	0.76	
V3. One if has saved in the last 12 months in an informal way; zero if has not saved or has used an informal savings method					
0	0.63	0.70	0.81	0.72	−0.07[c]
1	0.70	0.81	0.88	0.79	
V4. One if has saved in the last 12 months in at least one informal way; zero if has not saved or has used an informal savings method					
0	0.63	0.72	0.83	0.73	−0.01[c]
1	0.66	0.75	0.84	0.74	
V5. One if has some type of formal credit; zero if does not have credit or has informal credit					
0	0.63	0.70	0.82	0.72	−0.06[c]
1	0.69	0.79	0.87	0.78	

Note: The observations are weighted by the weights at the country level (in the cases of Bolivia and Ecuador they are not necessary), and for the *total* they are multiplied in turn by the proportion of the population older than 18 years of each country with respect to the same population for the four countries. Average differences test. [a] $p<0.05$, [b] $p<0.01$, [c] $p<0.001$.

Table 5

AFFIRMATIVE FINANCIAL DECISIONS, FINANCIAL KNOWLEDGE AND SOCIODEMOGRAPHIC CHARACTERISTICS

Percentages

	V1. Holding savings (1)	*V2. Saved formally and/or informally (1)*	*V3. Saved formally (1)*	*V4. Saved informally (1)*	*V5. Possession of formal credit (1)*
A. Financial knowledge (2/3)					
No	33.8	53.2	18. 3	35.0	17.4
Yes	47.1	61. 1	24.7	36.4	28.2
B. Numerical abilities					
No	36.3	55.0	19.5	35.6	20.9
Yes	63.6	69.2	32.6	36.5	34.1
C. Risk preferences					
Risk loving or neutral	38.5	50.6	18.5	32.1	20.5
Risk averse	41.6	59.4	22.6	36.8	23.9
D. Time preferences					
Prefers the short term more	36.7	51.8	16.9	34.9	18.5
Prefers the long term more	42.5	59.6	23.5	36.1	24.9
E. Age groups					
18-29	44.3	66.8	24.0	42.8	20.5
30-39	47.0	58.9	22.6	36.3	28.1
40-49	38.8	57.7	22.8	35.0	23.8
50-59	36.6	48.5	20.9	27.7	24.5
60-69	31.9	45.0	14.1	30.9	20.8
>70	26.6	38.3	14.5	23.8	12.8
F. Sex					
Men	45.9	58.8	26.3	32.5	26.3
Women	36.3	56.1	17.4	38.7	20.2
G. Country					
Peru	35.0	54.2	24.5	29.8	27.8
Bolivia	42.0	70.8	35.3	35.5	28.6
Colombia	35.8	56.3	19.5	36.8	24.8
Ecuador	67.2	56.3	17.1	39.2	7.2

	V1	*V2*	*V3*	*V4*	*V5.*
H. Marital Status					
Married	45.3	57.1	24.5	32.6	27.0
Single	41.7	58.9	22.7	36.2	19.7
Separated/divorced	42.5	51.9	17.0	35.0	23.8
Domestic partnership	36.4	59.0	19.0	40.0	23.6
Widow/widower	25.2	46.3	13.2	33.0	14.6
No response	23.6	75.0	33.7	41.3	9.8
I. Work status					
I work for myself and have no employees	34.1	55.9	19.5	36.4	24.9
I own a business of my own and have a least one employee	62.0	76.7	38.6	38.1	39.2
I work full-time as an employee	65.9	65.9	32.8	33.1	34.1
I work part-time as an employee	49.0	67.6	29.5	38.1	22.5
I am a student	39.4	67.2	23.4	43.8	16.6
I dedicate my time to homemaking and the family	22.8	46.5	9.3	37.2	9.6
I am retired (receive a pension)	52.9	54.5	32.8	21.7	34.5
I am unemployed	25.5	42.3	7.8	34.5	12.4
I am not working because of disability, or prolonged illness	12.6	28.1	1.0	27.1	8.1
I live off of investments, interest and/or dividends (I am a person of independent means)	32.7	62.5	31.4	31.1	38.3
Other	30.5	46.7	14.5	32.2	16.2
No response	16.4	34.0	5.7	28.3	11.8

Table 5 (cont.)

	V1	*V2*	*V3*	*V4*	*V5.*
J. Stable income					
Yes	47.3	64.5	26.6	37.9	28.5
No	29.6	45.0	12.9	32.1	13.5
Do not know	28.9	42.9	12.8	30.0	16.3
No response	29.2	44.9	16.7	28.3	18.3
K.Education level					
Secondary education not completed or less	23.6	46.0	11.5	34.5	13.7
Completed secondary education	39.7	57.2	18.4	38.8	22.3
Technical education not completed	37.5	66.5	21.2	45.2	25.3
Technical education	60.1	69.4	33.6	35.8	34.3
University education not completed	64.3	72.9	34.5	38.4	29.2
University-level education	72.7	73.9	46.9	26.9	43.7
Post graduate	94.7	90.8	71.9	18.9	65.8
L. Income stratum					
Vulnerable class, moderate poverty and extreme poverty (up to 400 USD monthly)	30.9	50.9	15.1	35.8	15.8
Middle class (between 401 USD and 1,600 USD)	58.5	70.8	32.1	38.7	32.7
High income (1,600 USD and above)	67.0	78.0	49.5	28.5	52.3

Note: Understood as affirmative financial decisions for the first group of people (1) composed of the variables (V1-V5) who decided to save, save using a formal instrument, save using an informal instrument or obtain formal credit. The observations are weighted by the weights at the country level (in the cases of Bolivia and Ecuador they are not necessary), and for the total they are multiplied in turn by the proportion of the population older than 18 years of age in each country with respect to the same population for the four countries.

Annex 2. Regressions

Table 6

OLS REGRESSIONS: POSSESSION OF FORMAL SAVINGS INSTRUMENTS (V1)

	1	*2*	*3*	*4*	*5*
Financial knowledge (2/3)	0.0474[c]	−0.0135			
	(0.0175)	(0.0171)			
Conscientiousness index	0.814[c]	0.497[c]	0.806[c]	0.490[c]	0.493[c]
	(0.0658)	(0.0705)	(0.0662)	(0.0706)	(0.0702)
Numerical abilities	0.232[c]	0.119[c]	0.246[c]	0.113[c]	0.114[c]
	(0.0217)	(0.0220)	(0.0205)	(0.0212)	(0.0212)
Women		−0.0450[c]		−0.0440[c]	−0.0444[c]
		(0.0161)		(0.0161)	(0.0161)
Stable income		0.0512[c]		0.0505[c]	0.0511[c]
		(0.0175)		(0.0175)	(0.0174)
Age		−0.0000771		−0.000391	−0.000253
		(0.00307)		(0.00307)	(0.00307)
Age^2		−0.00000715		−0.00000388	−0.00000531
		(0.0000331)		(0.0000331)	(0.0000332)
Completed secondary education		0.0932[c]		0.0912[c]	0.0922[c]
		(0.0210)		(0.0210)	(0.0210)
Technical education not completed		0.0986[a]		0.0980[a]	0.0982[a]
		(0.0528)		(0.0529)	(0.0529)
Technical education		0.288[c]		0.285[c]	0.287[c]
		(0.0333)		(0.0334)	(0.0333)
University education not completed		0.217[c]		0.214[c]	0.215[c]
		(0.0339)		(0.0339)	(0.0338)
University-level education		0.325[c]		0.322[c]	0.324[c]
		(0.0324)		(0.0326)	(0.0325)
Post graduate		0.492[c]		0.486[c]	0.488[c]
		(0.0427)		(0.0420)	(0.0420)

	1	2	3	4	5
Married		0.0225		0.0224	0.0225
		(0.0199)		(0.0199)	(0.0199)
Single		−0.00242		−0.00162	−0.00209
		(0.0223)		(0.0223)	(0.0223)
Separated/ divorced		0.0252		0.0255	0.0252
		(0.0364)		(0.0363)	(0.0364)
Unemployed		−0.0674[b]		−0.0686[b]	−0.0679[b]
		(0.0342)		(0.0342)	(0.0342)
Middle class (between 401 USD and 1,600 USD)		0.125[c]		0.124[c]	0.125[c]
		(0.0198)		(0.0198)	(0.0198)
High income (1,600 USD and above)		0.139[b]		0.137[b]	0.138[b]
		(0.0583)		(0.0584)	(0.0584)
Bolivia		0.0790[c]		0.0782[c]	0.0784[c]
		(0.0196)		(0.0196)	(0.0196)
Colombia		0.0443[b]		0.0415[b]	0.0434[b]
		(0.0190)		(0.0191)	(0.0190)
Ecuador		0.343[c]		0.341[c]	0.342[c]
		(0.0189)		(0.0189)	(0.0188)
PRIDIT			0.0220[c]	0.00476	
			(0.00648)	(0.00641)	
Constant	−0.254[c]	−0.161[a]	−0.227[c]	−0.154[a]	−0.161[a]
	(0.0467)	(0.0850)	(0.0477)	(0.0857)	(0.0851)
Observations	4,871	4,411	4,871	4,411	4,411
R^2	0.0899	0.238	0.0906	0.238	0.238
Controls	No	Yes	No	Yes	Yes

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). Squared minimums weighted by country-wide sample weights (in the case of Bolivia and Ecuador they are not necessary), and by the proportion of the population over 18 years of age in each country with respect to the same population for the four countries and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$.

Table 7

OLS REGRESSIONS: 12-MONTH SAVINGS – FORMAL/INFORMAL (V2)

	1	*2*	*3*	*4*	*5*
Financial knowledge (2/3)	0.0190	−0.00979			
	(0.0182)	(0.0185)			
Conscientiousness index	0.907[c]	0.637[c]	0.924[c]	0.645[c]	0.634[c]
	(0.0652)	(0.0726)	(0.0656)	(0.0726)	(0.0724)
Numerical abilities	0.111[c]	0.0542[b]	0.121[c]	0.0541[c]	0.0505[b]
	(0.0210)	(0.0215)	(0.0196)	(0.0204)	(0.0203)
Women		−0.00213		−0.00322	−0.00169
		(0.0174)		(0.0174)	(0.0174)
Stable income		0.0915[c]		0.0935[c]	0.0914[c]
		(0.0194)		(0.0194)	(0.0194)
Age		−0.00690[b]		−0.00651[b]	−0.00703[b]
		(0.00329)		(0.00329)	(0.00329)
Age^2		0.0000254		0.0000214	0.0000268
		(0.0000358)		(0.0000358)	(0.0000358)
Completed secondary education		0.0292		0.0322	0.0284
		(0.0228)		(0.0228)	(0.0228)
Technical education not completed		0.0951[a]		0.0959[a]	0.0949[a]
		(0.0528)		(0.0525)	(0.0528)
Technical education		0.0863[c]		0.0899[c]	0.0852[c]
		(0.0330)		(0.0329)	(0.0329)
University education not completed		0.0670[b]		0.0723[b]	0.0657[b]
		(0.0318)		(0.0317)	(0.0316)
University-level education		0.0906[c]		0.0969[c]	0.0893[c]
		(0.0324)		(0.0324)	(0.0325)
Post graduate		0.185[c]		0.190[c]	0.182[c]
		(0.0637)		(0.0638)	(0.0636)

	1	2	3	4	5
Married		−0.0254		−0.0250	−0.0254
		(0.0224)		(0.0224)	(0.0224)
Single		−0.0536[b]		−0.0551[b]	−0.0534[b]
		(0.0235)		(0.0235)	(0.0235)
Separated/ divorced		−0.0286		−0.0295	−0.0286
		(0.0400)		(0.0400)	(0.0400)
Unemployed		−0.0955[b]		−0.0934[b]	−0.0958[b]
		(0.0414)		(0.0415)	(0.0414)
Middle class (between 401 USD and 1,600 USD)		0.106[c]		0.107[c]	0.106[c]
		(0.0198)		(0.0198)	(0.0198)
High income (1,600 USD and above)		0.149[c]		0.153[c]	0.149[c]
		(0.0518)		(0.0517)	(0.0515)
Bolivia		0.121[c]		0.122[c]	0.121[c]
		(0.0200)		(0.0201)	(0.0200)
Colombia		−0.00222		0.00439	−0.00281
		(0.0205)		(0.0205)	(0.0204)
Ecuador		−0.0104		−0.00719	−0.0112
		(0.0200)		(0.0200)	(0.0200)
PRIDIT			−0.00601	−0.0179[c]	
			(0.00694)	(0.00692)	
Constant	−0.122[b]	0.232[b]	−0.126[c]	0.208[b]	0.232[b]
	(0.0480)	(0.0908)	(0.0489)	(0.0913)	(0.0908)
Observations	4,871	4,411	4,871	4,411	4,411
R^2	0.0648	0.132	0.0647	0.133	0.132
Controls	No	Yes	No	Yes	Yes

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). Squared minimums weighted by country-wide sample weights (in the case of Bolivia and Ecuador they are not necessary), and by the proportion of the population over 18 years of age in each country with respect to the same population for the four countries and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$.

Table 8

OLS REGRESSIONS: FORMAL SAVINGS 12 MONTHS (V3)

	1	*2*	*3*	*4*	*5*
Financial knowledge (2/3)	0.0122	−0.0189			
	(0.0144)	(0.0146)			
Conscientiousness index	0.722[c]	0.480[c]	0.718[c]	0.476[c]	0.474[c]
	(0.0563)	(0.0589)	(0.0563)	(0.0589)	(0.0587)
Numerical abilities	0.109[c]	0.0412[b]	0.112[c]	0.0346[a]	0.0342[a]
	(0.0199)	(0.0204)	(0.0189)	(0.0197)	(0.0197)
Women		−0.0594[c]		−0.0588[c]	−0.0586[c]
		(0.0138)		(0.0138)	(0.0138)
Stable income		0.0281[b]		0.0282[b]	0.0279[b]
		(0.0142)		(0.0141)	(0.0141)
Age		−0.00219		−0.00236	−0.00243
		(0.00266)		(0.00268)	(0.00268)
Age^2		0.0000178		0.0000197	0.0000204
		(0.0000285)		(0.0000287)	(0.0000287)
Completed secondary education		0.0281[a]		0.0271	0.0266
		(0.0167)		(0.0167)	(0.0167)
Technical education not completed		0.0232		0.0228	0.0227
		(0.0400)		(0.0402)	(0.0401)
Technical education		0.150[c]		0.149[c]	0.148[c]
		(0.0292)		(0.0293)	(0.0292)
University education not completed		0.126[c]		0.125[c]	0.124[c]
		(0.0317)		(0.0317)	(0.0316)
University-level education		0.227[c]		0.225[c]	0.224[c]
		(0.0335)		(0.0335)	(0.0335)
Post graduate		0.415[c]		0.411[c]	0.410[c]
		(0.0900)		(0.0901)	(0.0903)

	1	*2*	*3*	*4*	*5*
Married		0.0233		0.0234	0.0234
		(0.0175)		(0.0175)	(0.0175)
Single		0.00331		0.00355	0.00377
		(0.0191)		(0.0191)	(0.0191)
Separated/ divorced		−0.0102		−0.0103	−0.0102
		(0.0289)		(0.0290)	(0.0290)
Unemployed		−0.0806[c]		−0.0810[c]	−0.0813[c]
		(0.0237)		(0.0238)	(0.0238)
Middle class (between 401 USD and 1,600 USD)		0.0773[c]		0.0767[c]	0.0766[c]
		(0.0170)		(0.0170)	(0.0170)
High income (1,600 USD and above)		0.193[c]		0.193[c]	0.192[c]
		(0.0543)		(0.0545)	(0.0545)
Bolivia		0.0868[c]		0.0861[c]	0.0860[c]
		(0.0188)		(0.0188)	(0.0188)
Colombia		−0.0545[c]		−0.0548[c]	−0.0557[c]
		(0.0171)		(0.0172)	(0.0171)
Ecuador		−0.0827[c]		−0.0838[c]	−0.0843[c]
		(0.0170)		(0.0170)	(0.0169)
PRIDIT			0.00733	−0.00228	
			(0.00522)	(0.00536)	
Constant	−0.339[c]	−0.0623	−0.331[c]	−0.0643	−0.0611
	(0.0387)	(0.0727)	(0.0393)	(0.0732)	(0.0727)
Observations	4,871	4,411	4,871	4,411	4,411
R^2	0.0626	0.152	0.0628	0.151	0.151
Controls	No	Yes	No	Yes	Yes

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). Squared minimums weighted by country-wide sample weights (in the case of Bolivia and Ecuador they are not necessary), and by the proportion of the population over 18 years of age in each country with respect to the same population for the four countries and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$.

Table 9

OLS REGRESSIONS: INFORMAL SAVINGS 12 MONTHS (V4))

	1	*2*	*3*	*4*	*5*
Financial knowledge (2/3)	0.00688	0.00911			
	(0.0180)	(0.0189)			
Conscientiousness index	0.185[c]	0.157[b]	0.206[c]	0.170[b]	0.160[b]
	(0.0666)	(0.0744)	(0.0670)	(0.0743)	(0.0740)
Numerical abilities	0.00208	0.0129	0.00920	0.0195	0.0163
	(0.0221)	(0.0233)	(0.0208)	(0.0223)	(0.0222)
Women		0.0573[c]		0.0556[c]	0.0569[c]
		(0.0178)		(0.0178)	(0.0178)
Stable income		0.0634[c]		0.0654[c]	0.0635[c]
		(0.0194)		(0.0194)	(0.0194)
Age		−0.00472		−0.00415	−0.00460
		(0.00329)		(0.00329)	(0.00329)
Age^2		0.00000759		0.00000166	0.00000635
		(0.0000351)		(0.0000351)	(0.0000351)
Completed secondary education		0.00114		0.00508	0.00183
		(0.0230)		(0.0230)	(0.0229)
Technical education not completed		0.0720		0.0731	0.0722
		(0.0534)		(0.0532)	(0.0535)
Technical education		−0.0642[a]		−0.0592[a]	−0.0632[a]
		(0.0345)		(0.0345)	(0.0344)
University education not completed		−0.0595[a]		−0.0526	−0.0583
		(0.0355)		(0.0357)	(0.0355)
University-level education		−0.136[c]		−0.128[c]	−0.135[c]
		(0.0335)		(0.0335)	(0.0333)
Post graduate		−0.230[c]		−0.222[c]	−0.228[c]
		(0.0761)		(0.0770)	(0.0761)

	1	2	3	4	5
Married		−0.0487[b]		−0.0484[b]	−0.0488[b]
		(0.0227)		(0.0227)	(0.0227)
Single		−0.0569[b]		−0.0587[b]	−0.0571[b]
		(0.0246)		(0.0246)	(0.0246)
Separated/ divorced		−0.0184		−0.0193	−0.0184
		(0.0398)		(0.0397)	(0.0398)
Unemployed		−0.0149		−0.0124	−0.0145
		(0.0413)		(0.0414)	(0.0413)
Middle class (between 401 USD and 1,600 USD)		0.0291		0.0302	0.0295
		(0.0208)		(0.0208)	(0.0208)
High income (1,600 USD and above)		−0.0436		−0.0394	−0.0432
		(0.0591)		(0.0596)	(0.0594)
Bolivia		0.0345[a]		0.0356[a]	0.0349[a]
		(0.0210)		(0.0209)	(0.0209)
Colombia		0.0523[b]		0.0592[c]	0.0529[b]
		(0.0208)		(0.0210)	(0.0208)
Ecuador		0.0723[c]		0.0766[c]	0.0731[c]
		(0.0204)		(0.0204)	(0.0203)
PRIDIT			−0.0133[a]	−0.0156[b]	
			(0.00695)	(0.00728)	
Constant	0.217[c]	0.294[c]	0.205[c]	0.272[c]	0.293[c]
	(0.0483)	(0.0936)	(0.0492)	(0.0941)	(0.0935)
Observations	4,871	4,411	4,871	4,411	4,411
R^2	0.00248	0.0387	0.00348	0.0400	0.0386
Controls	No	Yes	No	Yes	Yes

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). Squared minimums weighted by country-wide sample weights (in the case of Bolivia and Ecuador they are not necessary), and by the proportion of the population over 18 years of age in each country with respect to the same population for the four countries and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$.

Table 10

OLS REGRESSIONS: POSSESSION OF FORMAL CREDIT (V5)

	1	*2*	*3*	*4*	*5*
Financial knowledge (2/3)	0.0651[c]	0.0465[c]			
	(0.0156)	(0.0158)			
Conscientiousness index	0.597[c]	0.318[c]	0.601[c]	0.327[c]	0.331[c]
	(0.0586)	(0.0643)	(0.0590)	(0.0644)	(0.0639)
Numerical abilities	0.0869[c]	0.0327	0.109[c]	0.0487[b]	0.0501[b]
	(0.0218)	(0.0219)	(0.0203)	(0.0209)	(0.0209)
Women		−0.0367[b]		−0.0382[b]	−0.0388[c]
		(0.0149)		(0.0149)	(0.0149)
Stable income		0.0611[c]		0.0608[c]	0.0616[c]
		(0.0154)		(0.0154)	(0.0154)
Age		0.00748[c]		0.00788[c]	0.00809[c]
		(0.00264)		(0.00265)	(0.00265)
Age^2		−0.0000837[c]		−0.0000879[c]	−0.0000900[c]
		(0.0000277)		(0.0000279)	(0.0000279)
Completed secondary education		0.0482[b]		0.0502[c]	0.0517[c]
		(0.0194)		(0.0195)	(0.0195)
Technical education not completed		0.0434		0.0444	0.0447
		(0.0428)		(0.0429)	(0.0429)
Technical education		0.0886[c]		0.0917[c]	0.0935[c]
		(0.0315)		(0.0316)	(0.0315)
University education not completed		0.0798[b]		0.0832[c]	0.0858[c]
		(0.0313)		(0.0313)	(0.0312)
University-level education		0.145[c]		0.148[c]	0.151[c]
		(0.0324)		(0.0327)	(0.0326)
Post graduate		0.311[c]		0.319[c]	0.322[c]
		(0.0897)		(0.0892)	(0.0892)

	1	2	3	4	5
Married		0.0235		0.0230	0.0231
		(0.0191)		(0.0192)	(0.0192)
Single		−0.0311		−0.0316	−0.0323
		(0.0206)		(0.0207)	(0.0207)
Separated/ divorced		0.0303		0.0307	0.0303
		(0.0329)		(0.0329)	(0.0330)
Unemployed		−0.0427		−0.0419	−0.0409
		(0.0310)		(0.0308)	(0.0308)
Middle class (between 401 USD and 1,600 USD)		0.0857[c]		0.0872[c]	0.0875[c]
		(0.0181)		(0.0181)	(0.0181)
High income (1,600 USD and above)		0.229[c]		0.230[c]	0.232[c]
		(0.0599)		(0.0604)	(0.0604)
Bolivia		0.00330		0.00508	0.00540
		(0.0187)		(0.0187)	(0.0188)
Colombia		−0.0276		−0.0277	−0.0248
		(0.0180)		(0.0182)	(0.0180)
Ecuador		−0.209[c]		−0.206[c]	−0.205[c]
		(0.0154)		(0.0155)	(0.0154)
PRIDIT			0.0196[c]	0.00711	
			(0.00580)	(0.00594)	
Constant	−0.258[c]	−0.198[b]	−0.231[c]	−0.191[b]	−0.201[b]
	(0.0404)	(0.0790)	(0.0416)	(0.0798)	(0.0791)
Observations	4,871	4,411	4,871	4,411	4,411
R^2	0.0528	0.136	0.0505	0.134	0.133
Controls	No	Yes	No	Yes	Yes

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 17, Annex 17). Squared minimums weighted by country-wide sample weights (in the case of Bolivia and Ecuador they are not necessary), and by the proportion of the population over 18 years of age in each country with respect to the same population for the four countries and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$.

Table 11

PRIDIT–IV FIRST STAGE RESULTS

	1
Conscientiousness index	0.561[b]
	(0.249)
Numerical abilities	0.233[c]
	(0.0634)
Women	−0.0546
	(0.0433)
Stable income	0.112[b]
	(0.0533)
Age	0.0420[c]
	(0.00938)
Age^2	−0.000405[c]
	(0.0000947)
Completed secondary education	0.181[c]
	(0.0501)
Technical education not completed	0.0942
	(0.164)
Technical education	0.245[c]
	(0.0758)
University education not completed	0.333[c]
	(0.0906)
University-level education	0.393[c]
	(0.0827)
Post graduate	0.347[b]
	(0.165)
Married	0.0251
	(0.0649)
Single	−0.123[b]
	(0.0540)
Separated/divorced	−0.0480
	(0.109)
Middle class (between 401 USD and 1,600 USD)	0.0260
	(0.0411)
High income (1,600 USD and above)	0.244[c]
	(0.0804)
Unemployed	0.157
	(0.101)

Bolivia	0.315[b]
	(0.127)
Colombia	0.605[c]
	(0.121)
Ecuador	0.415[c]
	(0.122)
Instruments:	
Number of universities	−0.00149[a]
	(0.000887)
Accumulated banking crises	−0.274[c]
	(0.0629)
Knowledge: deposit insurance	0.129[b]
	(0.0548)
Risk preferences	0.118[b]
	(0.0524)
Knowledge: investment funds and/or stock market	0.0642
	(0.0579)
Knowledge: insurance	0.115[a]
	(0.0681)
Constant	−1.433[c]
	(0.290)
Observations	4,709
F test of excluded instruments (6,130)	9.11
Value *p* (*F* instruments)	0.0000
Kleibergen-Paap rk LM (χ^2) sub-identification test	32.10
Value *p* (Kleibergen-Paap rk LM)	0.0000
Kleibergen-PaapWald (*F*) weak instruments test	9.11
Critical values Stock-Yogo (2005)	
10% maximum relative bias of IV	11.12
20% maximum relative bias of IV	6.76

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). GMM calculation in two stages (Baum et al., 2007) and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. The *F*-instruments test has a null hypothesis that the set of instruments is not significant for the calculation of financial literacy. The null hypothesis after the Kleibergen-Paap rk LM subidentification test is that the reduced-form matrix is under identified (vs. the alternative hypothesis that it is exactly identified). Meanwhile, the Kleibergen-Paap weak instruments *F* statistic reveals the relative maximum bias of the variable instrument calculators with respect to the OLS calculations, when compared to the critical values tabulated by Stock and Yogo (2005).

Table 12

SECOND STAGE PRIDIT-IV CALCULATION RESULTS

	V1	*V2*	*V3*	*V4*	*V5*
PRIDIT	0.101[a]	0.0215	0.0846[a]	−0.0884[a]	0.109[c]
	(0.0569)	(0.0594)	(0.0464)	(0.0487)	(0.0395)
Conscientiousness index	0.478[c]	0.612[c]	0.477[c]	0.245[c]	0.284[c]
	(0.0854)	(0.0730)	(0.0678)	(0.0711)	(0.0563)
Numerical abilities	0.0913[c]	0.0519[b]	0.00220	0.0559[b]	0.0384[a]
	(0.0266)	(0.0216)	(0.0238)	(0.0252)	(0.0197)
Sex	−0.0256	0.00310	−0.0476[c]	0.0547[c]	−0.0329[c]
	(0.0209)	(0.0159)	(0.0180)	(0.0168)	(0.0110)
Stable income	0.0496[b]	0.0848[c]	0.0157	0.0680[c]	0.0328[b]
	(0.0198)	(0.0159)	(0.0137)	(0.0168)	(0.0143)
Age	0.00551[a]	−0.00831[c]	−0.00246	−0.00346	0.00785[c]
	(0.00311)	(0.00282)	(0.00235)	(0.00250)	(0.00201)
Age^2	−0.0000617[a]	0.0000399	0.0000201	−0.00000421	−0.000084[c]
	(0.0000339)	(0.0000302)	(0.0000257)	(0.0000258)	(0.0000215)
Completed secondary education	0.0853[c]	0.00831	0.0235	−0.00912	0.0333[b]
	(0.0183)	(0.0287)	(0.0159)	(0.0234)	(0.0153)
Technical education not completed	0.0961[b]	0.135[c]	0.0646[a]	0.0486	0.0630[a]
	(0.0404)	(0.0451)	(0.0380)	(0.0390)	(0.0377)
Technical education	0.242[c]	0.0895[c]	0.117[c]	−0.0456	0.0857[c]
	(0.0314)	(0.0326)	(0.0328)	(0.0418)	(0.0268)
University education not completed	0.190[c]	0.0633	0.113[c]	−0.0138	0.0501[b]
	(0.0393)	(0.0387)	(0.0398)	(0.0355)	(0.0252)
University-level education	0.253[c]	0.0888[b]	0.191[c]	−0.112[c]	0.137[c]
	(0.0457)	(0.0367)	(0.0402)	(0.0398)	(0.0341)
Post graduate	0.431[c]	0.178[c]	0.376[c]	−0.167[b]	0.258[c]
	(0.0480)	(0.0657)	(0.0944)	(0.0654)	(0.0621)

	V1	*V2*	*V3*	*V4*	*V5*
Married	0.0279[b]	−0.0164	0.0165	−0.0478[b]	0.0233
	(0.0136)	(0.0237)	(0.0200)	(0.0229)	(0.0146)
Single	0.0189	−0.0552[b]	0.00819	−0.0555[c]	−0.0210[b]
	(0.0194)	(0.0274)	(0.0206)	(0.0201)	(0.0106)
Separated/ divorced	0.0235	−0.0297	0.00300	−0.00892	0.0131
	(0.0259)	(0.0306)	(0.0281)	(0.0306)	(0.0244)
Middle class (between 401 USD and 1,600 USD)	0.141[c]	0.102[c]	0.0617[c]	0.0213	0.0438[c]
	(0.0220)	(0.0186)	(0.0177)	(0.0171)	(0.0131)
High income (1,600 USD and above)	0.100[b]	0.140[b]	0.161[c]	−0.0443	0.141[c]
	(0.0430)	(0.0631)	(0.0495)	(0.0356)	(0.0386)
Unemployed	−0.115[c]	−0.0922[c]	−0.0648[c]	0.00701	−0.0821[c]
	(0.0298)	(0.0265)	(0.0213)	(0.0353)	(0.0270)
Bolivia	0.0649[b]	0.138[c]	0.0862[c]	0.0440	−0.0165
	(0.0265)	(0.0360)	(0.0244)	(0.0300)	(0.0232)
Colombia	−0.0431	0.00650	−0.106[c]	0.0876[c]	−0.0961[c]
	(0.0359)	(0.0452)	(0.0283)	(0.0339)	(0.0247)
Ecuador	0.306[c]	0.00844	−0.108[c]	0.100[c]	−0.235[c]
	(0.0337)	(0.0442)	(0.0330)	(0.0332)	(0.0229)
Constant	−0.254[b]	0.255[b]	−0.0362	0.168[a]	−0.102
	(0.108)	(0.110)	(0.0952)	(0.0990)	(0.0830)
Observations	4,709	4,709	4,709	4,709	4,709
Hansen-*j*	18.54	4.172	5.122	6.249	6.520
Hansen-*p*	0.00234	0.525	0.401	0.283	0.259
PRIDIT endogeneity test	0.219	0.594	0.1150	0.2078	0.0418

Note: PRIDIT is a financial literacy index calculated in two stages (see Table 15, Annex 3). GMM calculation in two stages (Baum et al., 2007) and standard errors adjusted for 131 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Hansen-*j* and Hansen-*p* represent the statistic and value *p* of the Hansen test, respectively. The Hansen test is a proof of over-identification of instruments under the null hypothesis that the instrument cluster is valid, which is to say they are not correlated with the error and therefore the orthogonality conditions are satisfied. The endogeneity test shows the value p according to the hypothesis that PRIDIT can be treated as exogenous (Baum et al, 2007).

Table 13

PRIDIT–IV FIRST-STAGE RESULTS, BOLIVIA

	1
Conscientiousness index	2.007[c] (0.419)
Numerical abilities	0.181[c] (0.0695)
Women	−0.0379 (0.0534)
Stable income	0.325[c] (0.0810)
Age	−0.00201 (0.0109)
Age^2	0.00000547 (0.000123)
Completed secondary education	0.227 (0.151)
Technical education not completed	0.327[a] (0.197)
Technical education	0.454[c] (0.152)
University education not completed	0.277[a] (0.152)
University-level education	0.294[a] (0.158)
Post graduate	0.426 (0.287)
Married	−0.174 (0.140)
Single	−0.104 (0.0724)
Separated/divorced	−0.162 (0.184)

	1
Unemployed	−0.683[a] (0.390)
Middle class (between 401 USD and 1,600 USD)	0.0693 (0.0836)
High income (1,600 USD and above)	−0.0308 (0.155)
Instruments	
Knowledge: investment funds and/or stock market	0.183[c] (0.0550)
Knowledge: deposit insurance	0.456[c] (0.157)
Constant	−2.212[c] (0.565)
Observations	1,166
F test of excluded instruments (2.20)	10.84
Value *p* (*F* instruments)	0.0006
Kleibergen-Paap sub-identification test rk LM (χ^2)	10.93
Value *p* (Kleibergen-Paap rk LM)	0.0042
Kleibergen-PaapWald (*F*) weak instruments test	10.84
Critical values Stock-Yogo (2005)	
10% maximum relative bias of IV	19.93
20% maximum relative bias of IV	8.75

Note: GMM calculation in two stages (Baum et al., 2007) and standard errors adjusted for 21 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. The *F*-instruments test has a null hypothesis that the set of instruments is not significant for the calculation of financial literacy. The null hypothesis after the Kleibergen-Paap rk LM sub-identification test is that the reduced-form matrix is under identified (vs. the alternative hypothesis that it is exactly identified). Meanwhile, the Kleibergen-Paap weak instruments *F* statistic reveals the relative maximum bias of the variable instrument calculators with respect to the OLS calculations, when compared to the critical values tabulated by Stock and Yogo (2005).

Table 14

PRIDIT–IV SECOND-STAGE RESULTS, BOLIVIA

	V1	*V2*	*V3*	*V4*	*V5*
PRIDIT	0.128	−0.0147	0.179[b]	−0.191[b]	0.202[c]
	(0.0850)	(0.0438)	(0.0823)	(0.0899)	(0.0770)
Conscientious-ness index	0.244	0.702	0.319[a]	0.301	−0.197
	(0.244)	(.)	(0.185)	(0.201)	(0.238)
Numerical abilities	0.108[b]	0.0534[b]	0.0827[c]	−0.0301	−0.00623
	(0.0446)	(0.0235)	(0.0316)	(0.0297)	(0.0384)
Sex	−0.0297	−0.0143	−0.0177	0.00729	0.0331
	(0.0225)	(0.0298)	(0.0356)	(0.0209)	(0.0221)
Stable income	0.0325	0.0643[a]	−0.00837	0.0589	−0.0130
	(0.0332)	(0.0378)	(0.0381)	(0.0458)	(0.0301)
Age	−0.000704	−0.00237	−0.00404	−0.00625	0.0110[c]
	(0.00386)	(0.00659)	(0.00371)	(0.00779)	(0.00381)
Age^2	0.0000143	−0.0000152	0.0000421	0.0000302	−0.000147[c]
	(0.0000388)	(0.0000732)	(0.0000392)	(0.0000827)	(0.0000411)
Completed secondary education	0.0442	0.0750	−0.0111	0.0874	−0.0931[c]
	(0.0362)	(0.0494)	(0.0275)	(0.0604)	(0.0277)
Technical education not completed	0.273[c]	0.140[b]	0.0741	0.0406	−0.0467
	(0.0791)	(0.0618)	(0.0732)	(0.0610)	(0.0890)
Technical education	0.211[b]	0.156[c]	0.236[c]	−0.0755	0.0288
	(0.0841)	(0.0327)	(0.0724)	(0.0714)	(0.0559)
University education not completed	0.187[c]	0.115[c]	0.135[b]	−0.0212	−0.00926
	(0.0591)	(0.0252)	(0.0607)	(0.0694)	(0.0502)
University-level education	0.276[c]	0.0828[b]	0.226[c]	−0.127[a]	0.0937
	(0.0802)	(0.0332)	(0.0668)	(0.0676)	(0.0720)
Post graduate	0.388[c]	0.225[c]	0.282[c]	−0.00363	0.216
	(0.139)	(0.0558)	(0.0974)	(0.141)	(0.158)

	V1	*V2*	*V3*	*V4*	*V5*
Married	0.0443	0.00199	0.0449	−0.0533[a]	0.0444
	(0.0414)	(0.0337)	(0.0341)	(0.0290)	(0.0315)
Single	−0.0216	−0.0226	−0.0224	−0.0247	−0.0418
	(0.0366)	(0.0229)	(0.0381)	(0.0354)	(0.0281)
Separated/ divorced	−0.0296	−0.124[a]	−0.00232	−0.0706	0.107
	(0.0476)	(0.0660)	(0.0694)	(0.0609)	(0.0680)
Unemployed	−0.0526	−0.381[c]	−0.315[c]	−0.0293	−0.0268
	(0.104)	(0.0771)	(0.0652)	(0.127)	(0.0797)
Middle class (between 401 USD and 1,600 USD)	0.0202	0.0119	0.0288	−0.00128	0.0458
	(0.0338)	(0.0197)	(0.0274)	(0.0375)	(0.0440)
High income (1,600 USD and above)	0.119	0.0795	0.186	−0.155	0.301[a]
	(0.118)	(0.0596)	(0.119)	(0.104)	(0.156)
Constant	0.143	0.220[b]	0.152	0.290[a]	0.224
	(0.248)	(0.105)	(0.152)	(0.168)	(0.206)
Observations	1,166	1,166	1,166	1,166	1,166
Hansen-*j*	0.374	0.000	2.415	2.455	0.501
Hansen-*p*	0.541	0.998	0.120	0.117	0.479

Note: GMM calculation in two stages (Baum et al., 2007) and standard errors adjusted for 21 clusters (urban and rural by governing department). [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$. Hansen-*j* and Hansen-*p* represent the statistic and value *p* of the Hansen test, respectively. The Hansen test is a proof of over-identification of instruments under the null hypothesis that the instrument cluster is valid, which is to say they are not correlated with the error and therefore the orthogonality conditions are satisfied.

Annex 3. Financial Literacy PRIDIT

Table 15

FINANCIAL LITERACY QUESTIONS AND WEIGHTING FOR BUILDING PRIDIT

Question	*Percentage correct (%)*	*PRIDIT weighting*
Q1: Now imagine that the brothers have to wait a year to get their share of the X pesos and inflation remains at 2% per year. After a year, will they be able to buy...? [four options; I do not know; No response; Irrelevant response.]	43.8%	0.382
Q2: Imagine that you lent X pesos to a friend one night and he returned these X pesos to you the next day. Did your friend pay any interest on this loan? [Note.]	87.7%	0.372
Q3: Let's assume you have $100 in a savings account that pays a 2% annual interest rate. You do not pay in any other money nor do you pay anything out (...) And considering the same 2% interest rate, how much would you have in the account at the end of five years? [four options; I do not know; no response.]	34.1%	0.247
Q4: I would like to know if you think the following statements are true or false: 1) When you invest a lot of money, there is also a possibility of losing a lot of money. [True; false; I do not know; no response.]	83.3%	0.400
Q5: I would like to know if you think the following statements are true or false: 2) High inflation means the cost of living is rising rapidly. [True; false; I do not know; no response.]	81%	0.511
Q6: I would like to know if you think the following statements are true or false: 3) The probability of losing all your money is lower if you invest it in more than one place. [True; false; I do not know; no response.]	65.2%	0.485

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