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Preferences, Financial Literacy, and Economic Development

Maddalena Davoli
Núria Rodríguez-Planas

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Maddalena Davoli
Goethe University Frankfurt

Núria Rodríguez-Planas
Queens College - CUNY and IZA

ABSTRACT

Preferences, Financial Literacy, and Economic Development*

Using data from 74 countries, we uncover important differences in the association between financial literacy and preferences by the level of economic development. We find that patience is only salient in wealthier countries, i.e. countries with their GDP per capita above the sample median. In such cases, countries with higher level of patience display higher levels of financial literacy. Importantly, this association is not driven by a multitude of institutional or cultural factors known to be related to financial literacy. In impoverished countries, we document a higher level of financial literacy in countries with higher levels of risk-taking but with lower levels of trust, positive reciprocity, and altruism. Countries' legal origin drives most of the association with risk-taking and about two fifths of the relationship with trust and positive reciprocity. At the same time, the country's religious composition drives the association between altruism and financial knowledge. Our findings underscore that financial education programs need to be tailored to the cultural aspect of group preferences and suggest what type of traits policies and programs ought to be reinforced in poorer countries.

| **JEL Classification:** | D14, E2, I22 |
| **Keywords:** | financial literacy, preferences, and economic development |

Corresponding author:
Núria Rodríguez-Planas
Queens College - CUNY
Economics Department
Powdermaker Hall
65-30 Kissena Blvd.
Queens, New York 11367
USA
E-mail: nuria.rodriguezplanas@qc.cuny.edu

1. Introduction

Financial literacy[1] is a highly relevant skill for individuals in today's society as many decisions involve complex financial choices from dealing with student loans and credit card debt, to purchasing a car or a home and choosing mortgage products, to investing in the stock market or pension plans. Financial literacy has also been found to improve financial inclusion (Grohmann, Klühs & Menkhoff 2018). However, as many as 3.5 billion adults in the world, the equivalent of 2.5 times the population of China, do not understand very basic concepts of financial literacy according to the Standard and Poor's Ratings Services Global Financial Literacy Survey, the first comprehensive international assessment on financial knowledge (Klapper et al., 2015). While there are substantial differences across countries with financial literacy ranging from 13 percent in Yemen to 71 percent in Denmark (Klapper et al. 2015), financial illiteracy remains widespread around the world. Indeed, more than half of the population from Australia, Japan, the US, and many European countries is financially illiterate (Lusardi & Mitchell 2011). Similarly, low levels of financial literacy are also common in less developed countries (Atkinson & Messy 2011).

Past research has provided an incomplete picture on the sources of financial literacy differences across countries. As Cupak et al. (2021) underscore differences in observable individual characteristics cannot fully account for the observed difference in financial literacy across countries. Furthermore, these authors find that the remaining unexplained differences are correlated with country-level institutional and cultural factors. To design policies and programs aiming at improving financial knowledge, a better understanding of international differences in financial knowledge and the potential role of fundamental economic and social preferences such as altruism, risk-taking, reciprocity, patience, or trust is needed. This is the main objective of this paper.

Exploiting a novel global data set, the Global Preference Survey, which captures economic and social preferences across 76 countries (Falk et al. 2016), we analyze the relationship between financial literacy and economic and social preferences and uncover the following two stylized facts. First, we document a strong association between country-level preferences and financial literacy, finding that patience and risk-taking are positively associated with financial literacy, whereas altruism is negatively associated with financial literacy. Second, we find important differences in the association between financial literacy

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[1] Financial literacy is defined as the "ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions" (Lusardi & Mitchell 2014)

and preferences by the level of economic development. Patience is only salient in countries above the median GDP per capita, whereas we find a diverging association of trust and positive reciprocity with financial literacy for countries above and below the median GDP per capita. In wealthier countries, trust and positive reciprocity are significantly and positively associated with financial literacy, whereas the opposite is true in impoverished countries. Quite interestingly, we also show how the observed relationship between financial literacy and preferences appears to emerge exclusively about risk-diversification and interest compounding knowledge, the two components of the financial literacy index with the lowest rate of correct answers at the country level.

We then identify several institutional and cultural variables as potential drivers of the association between preferences and financial literacy. Legal origin absorbs all of the association as far as concerns risk-taking and about half of the association with trust and positive reciprocity in countries below the median GDP per capita; and all of the association with trust in countries above the median. The association between altruism and financial knowledge vanishes and that of trust is cut in half in countries below the median GDP per capita when introducing controls for the countries' main religious groups. Noteworthy is the fact that the relationship between patience and financial literacy in wealthier countries appears very robust and not channeled through different institutional controls.

Because of the dire consequences of the lack of financial knowledge, there has been considerably academic and public interest in understanding its determinants over the past years. Country-specific studies have found that socio-demographic differences are related to financial literacy, including gender (Lusardi & Mitchell 2008; Lusardi et al. 2010), race and ethnicity (Lusardi & Mitchell, 2007), education (Christelis et al. 2010; and Lusardi 2012), low-wages and unemployment status (Lusardi & Tufano 2015), and urban versus rural residence (Klapper & Panos 2011).[2] There is also evidence showing the salience of family background including parental education or whether the parents held stocks or retirement accounts when the respondents were teenagers (Lusardi et al. 2010; Mahdavi & Horton 2012; Hira et al. 2013). Most recently, Brown, Henchoz & Spycher (2018) and Davoli (2018) and Davoli & Rodríguez-Planas (2020) have analyzed the cultural dimension of financial literacy finding that financial knowledge persists across generations.

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[2] See Lusardi & Mitchell (2014) for an extensive review of the population groups which most lack financial knowledge.

Fewer studies focus on the importance of country-level institutional and cultural factors in explaining observed differences in financial literacy across countries. In general, cross-country evidence is scarcer and often conducted on small samples of countries, for lack of better data. Jappelli (2010) finds that a country's economic literacy, measured with the economic literacy of its business leaders, is directly related to the country's human capital and generosity of resources available for financial investment (proxied with social security contributions rate).[3] Cupak et al. (2021) identify similar relationships on a more representative sample of twelve countries, employing the OECD/INFE financial literacy survey and counterfactual decomposition techniques. Ahunov & van Hove (2019) and De Bekker et al. (2020), using the S&P Survey and the OECD/INFE, respectively, uncover correlations between financial literacy and national cultures measured by mean of Hoefstede's cultural dimensions such as individualism, power distance and uncertainty avoidance. The findings from these two studies diverge possibly due to differences in sample sizes and/or the non-representativeness of Hofstede's cultural proxies. Our study contributes to this cross-country framework by using comparable and standardized measures of both financial literacy and preferences for a large set of countries. We further identify a differential pattern by economic development allowing us to identify relevant institutional factors for impoverished countries.

While there is a vast literature in behavioral and experimental economics showing that social and economic preferences are important in explaining individuals' behaviors and economic choices such as highest educational attainment, saving, smoking, and donating (Barsky et al. 1997; Dohmen et al. 2009; Tanaka et al. 2010; Golsteyn 2014; Åkerlund 2016; Falk et al. 2018, among others), "the relationship between country-level preference profiles and aggregate economic outcomes is essentially uncharted territory" (Falk et al. 2018). The reason is the unavailability of data until recently. Using the GPS and exploiting cross-country variation, Falk and co-authors document a positive correlation between patience and economic development, risk taking, or entrepreneurship, as well as between negative and positive reciprocity and social outcomes (Falk et al. 2018). In another paper, these authors also document a positive association between patience and years of schooling or gross national savings (Falk et al. forthcoming). Patience and risk-aversion are found by Potrafke (2019) to positively relate to intelligence, whereas merging the GPS with PISA data, Hanushek et al. (forthcoming) find that patience and risk-taking in the country of origin of migrant students

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[3] Jappelli's indicator of financial literacy is "computed from a survey of business leaders who represent a cross-section of the business community in the countries examined." Jappelli exploits variation across 44 countries.

have opposing effects (positive effect of patience and negative of risk-taking) on students' math, science and reading test scores in the country of residence. Our work contributes to this literature by providing empirical evidence of the salience of preferences and financial literacy and by documenting diverging patterns based on the country's level of economic development. Albeit our estimates are only capturing correlations, to the extent that they are robust to a battery of sensitivity test and that we identify potential cultural drivers, our work calls for further analysis underlying the causal pathways between preferences and financial literacy.

2. Data

Our analysis combines two country-level standardized data sets: the Global Preference Survey (GPS hereafter) and the Standard & Poor's Ratings Services Global Financial Literacy Survey (S&P FL survey hereafter). The GPS constitutes the first comprehensive attempt to measure economic preferences at a global scale (Falk et al. 2018). Collected as part of the Gallup World Poll 2012[4], the GPS is a cross-culturally validated dataset[5] with reliable and population-representative measures of preferences, allowing for inference for between-country differences in preferences. With about 80,000 participants distributed over 76 countries, and a median sample size of 1,000 participants per country, the GPS covers all continents, different levels of development, and 90% of the global population (Falk and Hermle, 2018).

The GPS measures preferences in the following six domains: (1) patience and (2) risk-taking, which both capture preferences over the intertemporal timing of rewards; (3) positive and (4) negative reciprocity, which capture the costly willingness to reward kind actions or to punish unkind actions; (5) trust; and (6) altruism. These domains were individually measured through a mixture of 12 qualitative and quantitative questions items, ex-ante experimentally validated and pre-tested to cultural heterogeneities in order to provide comparable cross-countries measures of preferences—a throughout description of the data collection, survey methodology and more can be found in Falk et al. (2018). A precise description of each of the domains is shown in Appendix Table A.1. The GPS dataset provides individual-level standardized measures of preferences, such that each preference in the individual-level world sample has a mean of zero and a standard deviation of one. Our analysis collapsed each preference at the country level using the sampling weights provided by Gallup following the same procedure as in Dohmen et al. (forthcoming). Patience assumes values between -0.61 and

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[4] See www.gallup.com/analytics/213704/world-poll.aspx.
[5] The GPS elicited measures of preferences across countries in a comparable way by using a standardized protocol.

1.07, risk-taking between -0.79 and 0.97, trust and altruism range between -0.71 and -0.94 and 0.61 and 0.91, positive (negative) reciprocity between -1.04 (-0.49) and 0.57 (0.74).

Designed by the World Bank, Gallup, and the George Washington University, the 2014 S&P FL Survey is the first survey to generate an objective and nationally representative measure of the average financial literacy in a given country and time that is comparable across countries. It does so by asking five questions on four basic financial concepts to more than 150,000 adults living in over 140 countries and classifying a person as financially literate when she demonstrates understanding at least three out of the four financial concepts. The four financial concepts include (1) risk diversification, (2) inflation, (3) numeracy and (4) interest compounding. The questions related to each of the four concepts are listed in Appendix Table A.2. Ultimately, the S&P FL index measures the share of a country's population that is financially literate.

Finally, we merge information on financial literacy and preferences with additional country-level data on GDP per capita, education, institutional and cultural characteristics of the country. A complete list of the variables and sources used is found in Appendix Table A.3.

We restricted the sample to countries available in both datasets, leaving us with a total of 74 countries.[6,7] Countries in our sample cover five continents and different levels of development, ranging from high-income countries such as Australia and Canada to lower income countries such as Rwanda or Afghanistan. Appendix Table A.4 displays the average mean and standard deviation for all six preference measures, the S&P FL index and its four subcomponents for the whole sample and by level of economic development. In the table, we classify countries by their level of economic development based on whether they are above or below the median GPD per capita in our sample, which is $14,508 US dollars (year 2012). Our sample is composed of the same number (37) of wealthier and impoverished countries spanning across different continents. There is considerable variation in average preferences between wealthier (columns 3 and 4) and impoverished countries (columns 5 and 6). While most of the

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[6] The 74 countries are: Afghanistan, Algeria, Argentina, Australia, Austria, Bangladesh, Bolivia, Bosnia Herzegovina, Botswana, Brazil, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Egypt, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Guatemala, Haiti, Hungary, India, Indonesia, Iran, Iraq, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Lithuania, Malawi, Mexico, Moldova, Netherlands, Nicaragua, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Saudi Arabia, Serbia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela, Vietnam, Zimbabwe. We dropped two countries from the initial GPS data set (Morocco and Suriname), as they are not part of the S&P survey.
[7] In addition, in some of the analysis we excluded a few countries from the sample because of missing information on legal origin and GINI coefficient (see samples sizes in Table 2).

preferences have sample-wide averages around zero, when splitting the sample in two groups according to economic development, we observe quite diverging patterns. Patience, trust, and negative reciprocity display positive means in wealthier countries, whereas risk-taking, positive reciprocity and altruism exhibit negative averages. The opposite is true for countries with GDP below the sample median. Patience and trust, especially, displays quite diverging values, ranging between 0.16 and 0.05 in wealthier countries to -0.15 and -0.10 in impoverished countries.

Similar pronounced variation is observed in financial literacy between the two groups, with a worryingly share of 70% of the population being financially illiterate in impoverished countries versus a 55% in wealthier ones. Risk diversification and interest compounding are the two areas where all countries struggle the most, with risk diversification being the index subcomponent with the wider gap between wealthier and impoverished countries (48% versus 35% of correct share of response population-wide). Unsurprisingly, we also observe differences in the human capital and economic development indicators across the two groups of countries, and a prevalence of German and Scandinavian commercial laws among the richer countries.

The correlation matrix (shown in Appendix Table A.5) and Figure 1 shows distinct associations between the S&P FL index and preferences by the level of economic development. Figure 1 clearly reveals a positive association between the S&P FL index and patience in countries above the median GDP per capita, and between the S&P FL index and risk-taking in countries below the median. In contrast, the association between S&P FL index and trust or altruism is negative in countries below the median.

3. Main Results

Table 1 presents the results of a set of OLS regressions of country-level financial literacy on country-level preferences. The left-hand side variable is the percentage of adults correctly answering 3 out of 4 financial literacy questions in the S&P survey in a given country. Each panel presents results using a different measure of preference as key right-hand side variable.

The odd columns estimate the average association between the S&P FL index and the preference across the 74 countries holding constant the country log GPD per capita and sequentially adding other covariates controlling for human capital development at the country level. The even columns estimate the average association between the S&P FL index and the preference by level of economic development using the following model:

$$\text{S\&PFLI}_j = \beta_0 + \beta_1 \text{Preference}_j + \beta_2 \text{AboveMedianGPD}_{\text{pc }j}$$

$$+\beta_3(\text{AboveMedianGPD}_{\text{pc}_j} \text{ x Preference}_j) + Z'_j\beta_4 + \varepsilon_j$$

where $S\&PFLI_j$ is the S&P FL index, which measures financial literacy at the country j; Preference$_j$ is the GPS preference measured at the country j; AboveMedianGPD$_{\text{pc}_j}$ is a dummy variable indicating whether country j's GDP per capita is above the median GDP per capita in our sample; and (AboveMedianGPD$_{\text{pc}_j}$ x Preference$_j$) is the interaction between the two aforementioned variables. The vector Z_j includes country-level covariates that will vary with the estimated specification. Standard errors are heteroscedasticity robust.

In the equation above, $\hat{\beta}_1$ measures the average association between the country-level S&P FL index and country-level preference, say patience, in countries below the median GDP per capita. The coefficient, $\hat{\beta}_2$, measures the average difference in financial literacy between countries with a GDP per capita above the median (wealthier countries) and those below (impoverished countries). The sum of the coefficients $\hat{\beta}_1$, $\hat{\beta}_2$, and $\hat{\beta}_3$, namely $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3)$, measures the association between the country-level S&P FL index and country-level preference in countries with GDP per capita above the median. The coefficient, $\hat{\beta}_3$, measures the differential association between financial literacy and preference in wealthier relative to impoverished countries.

Average Results. Column 1 of Table 1 reveals that patience is positively associated to financial literacy in our sample, whereas trust and altruism are negatively related to financial literacy after controlling for the country's log GDP per capita. As financial literacy has been found in the literature to be closely related to education and human capital development (Jappelli, 2010; Cupak et al., 2021), in column 3 we further control for the average schooling of the adult population and the expected schooling for children in each country. Following the findings that financial literacy is related to math cognitive ability (Skagerlund et al., 2018), in column 5, we further control for a subjective measure of math skills at the country level, which proxies for math cognitive ability. While the association between financial literacy and patience or altruism remains unchanged, the association between financial literacy and trust becomes weaker and is no longer statistically significant once country differences in education are accounted for. Interestingly, after controlling for differences in education across countries, financial literacy

is positively associated with risk-taking (albeit only marginally at the 10 percent level) and negatively associated with positive reciprocity.

Based on our baseline estimates, shown in column 5 of Table 1, a one standard deviation increase in patience is associated with 7.05 percentage points increase in financial literacy,[8] the equivalent of an increase of 18.75 percent in financial literacy given the S&P FL index averages 37.60 percent in our sample.[9] This association is statistically significant at the 1 percent level. Estimates in column 5 also reveal that a one standard deviation increase in risk-taking is associated with 2.26 percentage points increase in financial literacy,[10] the equivalent of an increase of 6 percent in financial literacy.[11] However, this association is only statistically significant at the 10 percent level. In contrast, a one standard deviation increase in altruism or positive reciprocity is associated with a *decrease* of 7.87 and 6.85 percent, respectively, in financial literacy.[12,13] Both coefficients are statistically significant at the 5 percent or lower. These results hold when using a Logit instead of a linear regression as shown in column 7 of Table 1. The Logit regression model allows us to better accommodate the fractional nature of the dependent variable, a proportion bounded between 0 and 1.

Heterogeneity by Economic Development. Average associations between financial literacy and preferences in our sample conceal notable differences by whether the country is below or above the median GDP per capita. Patience is only salient in wealthier countries, whereas positive reciprocity is notable in impoverished countries. Indeed, the positive association between financial literacy and patience is solely driven by countries whose GDP per capita is above the sample median. Based on estimates of column 6, a one standard deviation increase in patience is associated with an increase of about 30 percent in financial literacy in countries above the median GDP per capita.[14] This effect is statistically significant at the 1 percent level. In contrast, there is no association between patience and financial literacy in countries below

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[8] This is calculated as $(\beta_1 = +0.189) * (Patience_{StDev} = 0.373) = +0.0705$

[9] This is calculated as $\frac{+0.0705}{S\&P\ FL\ Index_{mean}(0.376)} = +0.1875$

[10] This is calculated as $(\beta_1 = +0.074) * (RiskTaking_{StDev} = 0.305) = +0.0226$

[11] This is calculated as $\frac{+0.0226}{S\&P\ FL\ Index_{mean}(0.376)} = +0.0600$

[12] This is calculated as $(\beta_1 = -0.087) * (altruism_{StDev} = 0.340) = -0.0296$
And as $(\beta_1 = -0.076) * (positive\ reciprocity_{StDev} = 0.339) = -0.0258$

[13] This is calculated as $\frac{-0.0296}{S\&P\ FL\ Index_{mean}(0.376)} = -0.0787$ and as $\frac{-0.0258}{S\&P\ FL\ Index_{mean}(0.376)} = -0.0685$

[14] This is calculated as $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3 = +0.301) * (Patience_{StDev} = 0.373) = +0.1123$ and $\frac{+0.1123}{S\&P\ FL\ Index_{mean}(0.376)} = +0.2986$

the median. This difference by countries' economic development is statistically significantly different from zero at the 1 percent level (see $\hat{\beta}_3$).

Moving to positive reciprocity, the observed negative association with financial literacy when using the whole sample of 74 countries is driven solely by countries with a GDP per capita below the median. In these countries, a one standard deviation increase in positive reciprocity is associated with a *decrease* of 11.45 percent in financial literacy.[15] It is important to underscore that such association is inexistent in countries above the median GDP per capita as $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3) = 0.01$ with a standard error of 0.076.

Furthermore, we find a diverging association of trust with financial literacy for countries above and below the median GDP per capita. A one standard deviation increase in trust is associated with an increase of 7.47 percent in financial literacy in wealthier countries, but with a *decrease* of 12.63 percent in impoverished countries.[16] These effects are statistically significant at the 5 percent level. While the coefficients $\hat{\beta}_1$ and $\hat{\beta}_3$ have opposite signs for risk-taking and altruism, we do not have enough precision to reject the null hypothesis $H_0: \hat{\beta}_3 = 0$. These findings are robust to different validation tests. First, in column (8) of Table 1, we estimate the parameters of our preferred specification through a fractional Logit model. Doing so, does not affect the main results. In Appendix Table A.6, we estimate a fully interacted model with all covariates interacted with the above the median GPD per capita dummy. While some of the estimates lose precision, the direction of the associations remains stable. Finally, in Appendix Table A.7, we consider different definitions of country economic development by estimating our baseline specification[17] using GDP quartiles (Panel A), income groups defined by the World Bank (Panel B), and an OECD-countries indicator (Panel C). Our main results are mostly robust to these alternative measures of economic development. The major difference is observed for OECD-countries where we observe higher financial literacy for those with higher levels of risk-taking. This may suggest that the differential effect of risk-taking is not exclusively driven by economic development but by an overall improved policy and legal framework.

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[15]   This is calculated as $(\hat{\beta}_1 = -0.127) * (Positive\ Reciprocity_{StDev} = 0.339) = -0.0431$ and $\frac{-0.0431}{S\&P\ FL\ Index_{mean}(0.376)} = -0.1145$ for positive reciprocity.

[16]   This is calculated as $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3 = +0.100) * (Trust_{StDev} = 0.281) = +0.0281$ and $\frac{+0.0281}{S\&P\ FL\ Index_{mean}(0.376)} = +0.0747$ for countries above the GDP per capita median, and as $(\hat{\beta}_1 = -0.169) * (Trust_{StDev} = 0.281) = -0.0475$ and $\frac{-0.0475}{S\&P\ FL\ Index_{mean}(0.376)} = -0.1263$ for countries below the GDP per capita median.

[17] Column (6) in Table 1

Potential Drivers. To explore which factors may be driving these correlations, we introduce in our OLS model other relevant controls capturing institutional and cultural factors which previous studies have deemed to be relevant in explaining financial literacy. As the culture of a country may influence the degree of interest and investment in financial knowledge, we introduce proxies for cultural institutions.

Results are presented in Table 2.[18] Column 1 presents our baseline model for comparison purposes. Column 2 adds to the baseline model the Gini index. This index measures the extent to which the distribution of income among individuals within a country deviates from a perfectly equal distribution (with an index close to 1 being very unequal and an index close to 0 being very equal). As conjectured by Ahunov and van Hove (2019) in their analysis of national culture and financial literacy, in highly unequal countries less people may have the material means to invest in their financial education. Column 3 adds to our baseline model the legal rights index, which measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending, and column 4 adds to the baseline model the legal origin of the country, which is a strong determinant of the depth of a country's financial markets (LaPorta et al. 1997, 2013). Both covariates aim at capturing institutional differences across countries that are likely to be associated with financial knowledge. Finally, column 5 controls for the share of the population of each country that belongs to the three most widely spread religions in the world, as countries in which the majority of population follow a particular religion may have different incentives to invest in financial literacy (Grohmann, Klühs & Menkhoff 2018).

As a first result, it is worth noting how preferences on patience remains practically unaffected by the introduction of new controls. To put it differently, the relationship underlined in Table 1 between patience and financial literacy in countries above the median GDP per capita appears very robust and not channeled through the different institutional controls we have added to the specification.

As far as concern risk-taking, trust, altruism and positive reciprocity, we observe a noticeable change, in magnitude and significance of the correlations, following the introduction in the model of legal origin, and religion dummies. Legal origin absorbs all of the association as far as concerns risk-taking and about half of the association with trust and positive reciprocity in countries below the median GDP per capita; and all of the association with trust

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[18] For the complete set of results see Table A.8 in the Appendix.

in countries above the median. At the same time, the association between altruism and financial knowledge vanishes and that of trust is cut in half in countries below the median GDP per capita when introducing controls for the countries' main religious groups. Appendix Table A.8 suggest that emphasizing traits common among Protestantism would increase financial literacy in countries below the median GDP per capita. Similarly, emphasizing traits common among Scandinavian legal origin would also benefit financial knowledge in impoverished countries. Column 6 in Table 2 reveals that continent dummies absorb most of the correlation between financial literacy and risk-taking, and half of the one between financial literacy and positive reciprocity.

Subcomponents of Financial Literacy. As a last step, we try to disentangle which field of knowledge is mostly associated to preferences and analyze the different subcomponents of the financial literacy index. The S&P FL index is composed of four different questions on risk diversification, inflation, numeracy, and interest compounding, with quite different response rates across the countries. For example, the questions on inflation and numeracy are the ones that exhibit the highest response rate, with more than half of the sample answering them correctly, whereas, on average, 60 percent of people exhibit illiteracy as far as concern the risk diversification concept (see Table A.4 in the Appendix). While being correlated with each other (Appendix Table A.5), these questions capture different aspects of financial knowledge, and hence may exhibit heterogeneous relationship with preferences. Table 3 estimates our baseline specification, replacing the overall financial literacy index with the four different sub-components of the S&P FL index.

Interestingly, inflation does not appear to correlate with any of the GPS preferences. As for the share of population correctly answering the numeracy question, we observe an association with trust, regardless of the country's economic development measured by the GDP per capita.

The subcomponents of the S&P FL index that truly correlates with preferences, however, are the ones related to risk-diversification and interest compounding. Based on estimates from column 10 of Table 3, a one standard deviation increase in the country-level measure of patience is associated with an increase of about 41 percent in the share of people correctly answering the risk-diversification question in countries with GDP per capita above

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the median.[19] Furthermore, the difference by countries' economic development is statistically different from zero at the 1 percent significant level. In contrast, positive reciprocity, altruism and risk-taking are associated with the share of people correctly answering the risk-diversification question only in countries below the GDP sample median, as the effect in countries above the median is not precisely estimated—i.e., the estimated $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3)$ is not significantly different from zero. In fact, a one standard deviation increase in patience and altruism corresponds to a 21 percent and a 17 percent decrease in the share of correct responses to the risk diversification question. A one standard deviation increase in risk-taking is associated with an 18 percent increase in the share of correct responses to the risk diversification question.[20]

Trust has, like with the general index of financial literacy, a diverging effect according to the economic development: a one standard deviation increase in trust is associated with an increase of about 11 percent in the share of correct responses to the risk diversification question in wealthier countries (significant at the 10 per cent), and with a decrease of 18 percent in impoverished countries (significant at the 1 per cent).[21]

Similarly, based on the estimates of column 8 we observe that, for countries above the median GDP per capita, a one standard deviation increase in patience (trust) is associated with a statistically significant increase of around 22 percent (8 percent) in the share of respondents answering correctly the question on interest compounding.[22] In contrast, in countries below the median, a one standard deviation increase in altruism and trust diminish the share of correct

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[19] This is calculated as $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3 = +0.455) * (Patience_{StDev} = 0.373) = +0.170$ and $\frac{+0.170}{S\&P\ Risk\ Diversification_{mean}(0.413)} = +0.4109$.

[20] This is calculated as $(\hat{\beta}_1 = -0.255) * (Positive\ Reciprocity_{StDev} = 0.339) = -0.0864$ and $\frac{-0.0864}{S\&P\ Risk\ Diversification_{mean}(0.413)} = -0.2093$ for positive reciprocity; $(\hat{\beta}_1 = -0.205) * (Altruism_{StDev} = 0.34) = -0.0697$ and $\frac{-0.0697}{S\&P\ Risk\ Diversification_{mean}(0.413)} = -0.1688$ for altruism; $(\hat{\beta}_1 = +0.246) * (RiskTaking_{StDev} = 0.305) = +0.075$ and $\frac{+0.075}{S\&P\ Risk\ Diversification_{mean}(0.413)} = +0.1817$ for risk-taking measure.

[21] This is calculated as $(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3 = +0.167) * (Trust_{StDev} = 0.281) = +0.0469$ and $\frac{+0.0469}{S\&P\ Risk\ Diversification_{mean}(0.413)} = +0.1136$ for countries above the GDP per capita median, and as $(\hat{\beta}_1 = -0.27) * (Trust_{StDev} = 0.281) = -0.0758$ and $\frac{-0.0758}{S\&P\ Risk\ Diversification_{mean}(0.413)} = -0.1837$ for countries below the GDP per capita median.

[22] The effect mentioned are calculated as follow: $\frac{(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3) * Patience_{StDev}}{S\&P\ Interest\ Compounding_{mean}} = \frac{0,2707 * 0.373}{0,449} = 0,2248$; $\frac{(\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3) * Trust_{StDev}}{S\&P\ Interest\ Compounding_{mean}} = \frac{0,129\ *\ 0,281}{0,449} = 0,0810$

response by around 8 percent. At the same time, a one standard deviation increase in positive reciprocity decreases financial literacy by about 10 percent in countries below the median.[23]

4. Conclusion

While difference in financial literacy across groups and populations exists and are in some case substantial, meaningful cross-country evidence on the topic is scarce. Moreover, preferences and financial literacy are both considered to be important correlates of general well-being in the population, but the interplay between the two has not been widely studied. Merging two global, representative and relatively novel datasets, the Global Preference Survey and the Standard & Poor's Ratings Services Global Financial Literacy Survey, we uncover important differences in the association between financial literacy and preferences by the level of economic development.

In countries below the median GPD per capita, we document a higher level of financial literacy in countries with higher levels of risk-taking, but with lower levels of trust, positive reciprocity, and altruism. Countries' legal origin drives all of the association with risk-taking and about half of the relationship with trust and positive reciprocity. The countries' distribution of major religions drives the association between altruism and financial knowledge. Ultimately our results document that the association between these preferences and financial literacy in countries below the median GPD per capita appears to be driven by the following institutional factors, suggesting that training program and policies emphasizing certain traits associated with Scandinavian legal origin or Protestantism would help improve financial literacy.

Interestingly, patience is only salient in countries above the median GDP per capita, with higher financial literacy in countries with higher level of patience. Importantly, this association is very robust, and it is not driven by a multitude of institutional or cultural factors known to be related to financial literacy. This is somewhat in line with the work of Hanushek et al. (forthcoming) and with the idea that human capital investment decisions are, by nature, intertemporal decisions, and hence inextricably linked to cultural traits, such as time preferences, related to the valuation of present versus future payoffs. The lack of relationship between patience and financial literacy in impoverished countries, and the generally lower level of patience, might be related to the more uncertain horizon that populations in those countries may face.

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[23] The effect mentioned are calculated as follow: $\frac{(\hat{\beta}_1)*PositiveRecip_{StDev}}{S\&P\ Interest\ Compounding_{mean}} = \frac{-0.136\ *\ 0,339}{0,449} = -0,1027;$ $\frac{(\hat{\beta}_1)*Altruism_{StDev}}{S\&P\ Interest\ Compounding_{mean}} = \frac{-0,108\ *\ 0,34}{0,449} = -0,0818; \frac{(\hat{\beta}_1)*Trust_{StDev}}{S\&P\ Interest\ Compounding_{mean}} = \frac{-0,136\ *\ 0,281}{0,449} = -0,0852$

The last interesting result of our analysis relates to the differential relationship between preferences and the four sub-components of the financial literacy index. The associations outlined above only emerge when knowledge on risk diversification and interest compounding are taken into account, the two financial literacy questions people struggle the most with (Lusardi& Mitchell 2014).

Overall, our study is, first, underlying the need for additional studies and theories to explain a possible link between financial literacy and the different preferences, in the context of different levels of economic development. Second, it suggests that policies aimed at improving financial literacy should be multi-faceted and take into consideration not only the formal institutional framework where the initiative is promoted, but also the societal and cultural context.

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Tables and Figures

Figure 1: Preferences and Financial Literacy, by Whether Below (a) or Above (b) Median GDP Per Capita
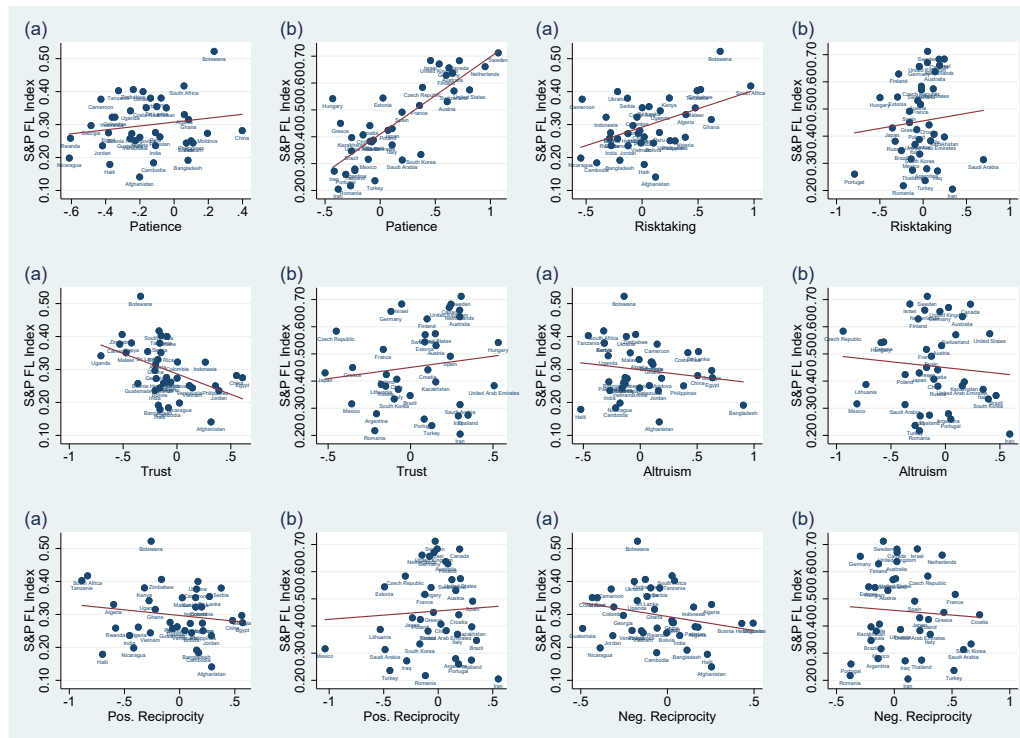
Notes: On the x-axis, we plot the percentage of adult population classified as financially literate in each country, according to the *S&P* Financial Literacy Index, on the y-axis the country level value of preferences from the Global Preferences Survey. In (a): countries with GDP pc in PPP below the sample median; in (b) countries with GDP peGDP pc in PPP above the sample median.

Table 1: Financial literacy and Preferences

Dep.Var.: S&P FL	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Patience	0.217***	0.059	0.189***	0.031	0.189***	0.031	0.174***	0.035
	(0.036)	(0.060)	(0.035)	(0.062)	(0.036)	(0.060)	(0.033)	(0.060)
Above median log(GDP)		0.102***		0.051*		0.054**		0.046*
		(0.025)		(0.027)		(0.026)		(0.026)
Above median log(GDP)× Pat.		0.229***		0.209***		0.216***		0.186***
		(0.070)		(0.072)		(0.068)		(0.068)
Average schooling			0.023***	0.016***	0.023***	0.018**	0.023***	0.018***
			(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)
Expected schooling			0.010	0.001	0.010	0.001	0.010	0.002
			(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)
Subjective Math skills					0.001	-0.013	-0.001	-0.012
					(0.019)	(0.020)	(0.018)	(0.019)
Panel B								
Risktaking	0.076	0.112***	0.078*	0.105**	0.074*	0.104**	0.076*	0.115**
	(0.048)	(0.037)	(0.040)	(0.044)	(0.043)	(0.046)	(0.041)	(0.047)
Above median log(GDP)		0.164***		0.028		0.026		0.023
		(0.029)		(0.033)		(0.033)		(0.030)
Above median log(GDP)× Riskt.		-0.056		-0.064		-0.073		0.090
		(0.116)		(0.096)		(0.102)		(0.092)
Average schooling			0.027***	0.023***	0.025**	0.021**	0.026***	0.022***
			(0.009)	(0.007)	(0.010)	(0.008)	(0.009)	(0.007)
Expected schooling			0.019**	0.014*	0.019**	0.014*	0.019**	0.015**
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Subjective Math skills					0.014	0.013	0.012	0.013
					(0.023)	(0.023)	(0.022)	(0.021)
Panel C								
Trust	-0.095**	-0.124***	-0.045	-0.163***	-0.063	-0.169***	-0.067	-0.189***
	(0.044)	(0.035)	(0.042)	(0.041)	(0.042)	(0.042)	(0.042)	(0.046)
Above median log(GDP)		0.164***		0.025		0.024		0.023
		(0.027)		(0.034)		(0.034)		(0.032)
Above median log(GDP)× Trust		0.207**		0.258***		0.245***		0.257***
		(0.097)		(0.080)		(0.086)		(0.079)
Average schooling			0.027***	0.027***	0.023**	0.025***	0.022**	0.025***
			(0.009)	(0.007)	(0.010)	(0.009)	(0.009)	(0.008)
Expected schooling			0.015*	0.012	0.017*	0.013	0.016**	0.013*
			(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.007)
Subjective Math skills					0.030	0.015	0.030	0.016
					(0.024)	(0.022)	(0.023)	(0.020)
Panel D								
Altruism	-0.077**	-0.040	-0.080**	-0.125***	-0.087***	-0.120***	-0.085***	-0.130***
	(0.032)	(0.039)	(0.032)	(0.042)	(0.030)	(0.043)	(0.029)	(0.045)
Above median log(GDP)		0.150***		-0.004		-0.007		-0.011
		(0.030)		(0.033)		(0.033)		(0.030)
Above median log(GDP)× Altr.		-0.003		0.083		0.063		0.078
		(0.078)		(0.066)		(0.071)		(0.067)
Average schooling			0.029***	0.026***	0.025***	0.023***	0.025***	0.024***
			(0.009)	(0.007)	(0.009)	(0.008)	(0.008)	(0.008)
Expected schooling			0.017**	0.016*	0.019**	0.016*	0.018**	0.016**
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Subjective Math skills					0.030	0.020	0.030	0.019
					(0.025)	(0.025)	(0.024)	(0.023)
Panel E								
Pos. Recip.	-0.045	-0.034	-0.071**	-0.128***	-0.076**	-0.127***	-0.076**	-0.135***
	(0.037)	(0.036)	(0.034)	(0.039)	(0.034)	(0.041)	(0.032)	(0.042)
Above median log(GDP)		0.159***		0.005		0.003		-0.002
		(0.029)		(0.032)		(0.032)		(0.029)
Above median log(GDP)× Pos Rec		0.065		0.145**		0.135*		0.142**
		(0.089)		(0.065)		(0.071)		(0.066)
Average schooling			0.030***	0.028***	0.027***	0.026***	0.027***	0.028***
			(0.009)	(0.007)	(0.009)	(0.008)	(0.009)	(0.007)
Expected schooling			0.018**	0.015*	0.020**	0.016**	0.019**	0.016**
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Subjective Math skills					0.027	0.012	0.027	0.011
					(0.024)	(0.023)	(0.023)	(0.021)
Panel F								
Neg Reciprocity	-0.060	-0.085*	-0.020	-0.059	-0.020	-0.060	-0.022	-0.068
	(0.051)	(0.048)	(0.046)	(0.057)	(0.047)	(0.060)	(0.043)	(0.060)
Above median log(GDP)		0.164***		0.030		0.028		0.024
		(0.031)		(0.035)		(0.035)		(0.032)
Above median log(GDP)× Neg Rec		0.050		0.040		0.040		0.052
		(0.097)		(0.089)		(0.091)		(0.083)
Average schooling			0.028***	0.026***	0.026**	0.023**	0.026***	0.023***
			(0.009)	(0.007)	(0.010)	(0.009)	(0.009)	(0.008)
Expected schooling			0.016*	0.011	0.017*	0.011	0.017**	0.012
			(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)
Subjective Math skills					0.021	0.018	0.020	0.017
					(0.025)	(0.024)	(0.023)	(0.022)
N	74	74	74	74	74	74	74	74

Note: The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions in the S&P survey. All regressions include a constant and robust standard errors (in parenthesis). Odd columns control also for log of GDP pc in PPP. "Above median log(GDP)" is a dummy for countries with GDP pc above the sample median. Columns (7) and (8) report average marginal effects from a logit model. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Financial literacy and Preferences: additional controls

	(1)	(2)	(3)	(4)	(5)	(6)
Patience	0.031	0.034	0.037	-0.011	0.010	0.034
	(0.060)	(0.058)	(0.059)	(0.058)	(0.063)	(0.041)
Above median log(GDP)	0.054**	0.071**	0.058**	0.062**	0.060**	0.068***
	(0.026)	(0.028)	(0.028)	(0.027)	(0.030)	(0.024)
Above median log(GDP) × Patience	0.216***	0.232***	0.198***	0.232***	0.202***	0.189***
	(0.068)	(0.069)	(0.071)	(0.068)	(0.074)	(0.053)
Risktaking	0.104**	0.132**	0.117**	0.019	0.079*	-0.008
	(0.046)	(0.053)	(0.046)	(0.050)	(0.043)	(0.044)
Above median log(GDP)	0.026	0.043	0.043	0.020	0.034	0.043
	(0.033)	(0.043)	(0.034)	(0.031)	(0.032)	(0.030)
Above median log(GDP) × Risktaking	-0.073	-0.015	-0.070	-0.037	-0.042	0.067
	(0.102)	(0.122)	(0.090)	(0.101)	(0.087)	(0.094)
Trust	-0.169***	-0.215***	-0.149***	-0.090*	-0.085*	-0.078*
	(0.042)	(0.055)	(0.044)	(0.048)	(0.044)	(0.041)
Above median log(GDP)	0.024	0.040	0.034	0.022	0.028	0.038
	(0.034)	(0.040)	(0.035)	(0.031)	(0.034)	(0.030)
Above median log(GDP)× Trust	0.245***	0.328***	0.229**	0.108	0.186**	0.166**
	(0.086)	(0.104)	(0.088)	(0.108)	(0.083)	(0.075)
Altruism	-0.120***	-0.133***	-0.113**	-0.098***	-0.069	-0.083*
	(0.043)	(0.049)	(0.044)	(0.036)	(0.047)	(0.044)
Above median log(GDP)	-0.007	0.001	0.008	-0.014	0.001	0.020
	(0.033)	(0.040)	(0.035)	(0.031)	(0.032)	(0.030)
Above median log(GDP)× Altruism	0.063	0.090	0.074	0.008	-0.025	0.023
	(0.071)	(0.084)	(0.071)	(0.067)	(0.072)	(0.065)
Pos. Reciprocity	-0.127***	-0.151***	-0.125***	-0.070*	-0.101**	-0.048
	(0.041)	(0.047)	(0.039)	(0.038)	(0.041)	(0.042)
Above median log(GDP)	0.003	0.002	0.019	0.011	0.010	0.032
	(0.032)	(0.038)	(0.033)	(0.031)	(0.031)	(0.031)
Above median log(GDP) × Pos. Reciprocity	0.135*	0.133*	0.154**	0.060	0.094	0.056
	(0.071)	(0.079)	(0.067)	(0.073)	(0.069)	(0.066)
Neg. Reciprocity	-0.060	-0.074	-0.054	-0.062	-0.011	-0.056
	(0.060)	(0.066)	(0.065)	(0.044)	(0.060)	(0.054)
Above median log(GDP)	0.028	0.036	0.038	0.028	0.028	0.047
	(0.035)	(0.039)	(0.037)	(0.032)	(0.035)	(0.031)
Above median log(GDP)× Neg. Reciprocity	0.040	0.104	0.060	0.046	0.020	0.037
	(0.091)	(0.099)	(0.092)	(0.083)	(0.086)	(0.079)
N	74	66	74	73	74	74
GINI		X				
Legal rights index			X			
Legal Origin				X		
Religion					X	
Continent dummies						X

Note: The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions in the $S\&P$ survey. All regressions include a constant, controls for education and math skills and robust standard errors (in parenthesis). "Above median log(GDP)" is a dummy for countries with GDP pc above the sample median. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Financial literacy sub-questions and Preferences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Fin. Literacy		Inflation		Numeracy		Interest		Risk-diversification	
Patience	0.189***	0.031	-0.038	-0.062	0.061*	0.021	0.211***	0.088	0.273***	0.040
	(0.036)	(0.060)	(0.030)	(0.072)	(0.033)	(0.052)	(0.037)	(0.079)	(0.042)	(0.093)
Above median log(GDP)		0.054**		-0.014		0.014		0.018		0.094**
		(0.026)		(0.031)		(0.029)		(0.032)		(0.040)
Above median log(GDP)× Patience		0.216***		0.032		0.053		0.164*		0.321***
		(0.068)		(0.078)		(0.059)		(0.086)		(0.098)
Risktaking	0.074*	0.104**	-0.041	-0.044	-0.008	0.018	0.081	0.084	0.188***	0.246***
	(0.043)	(0.046)	(0.033)	(0.044)	(0.031)	(0.037)	(0.056)	(0.064)	(0.052)	(0.069)
Above median log(GDP)		0.026		-0.021		0.003		-0.002		0.060
		(0.033)		(0.029)		(0.030)		(0.033)		(0.044)
Above median log(GDP) × Risktaking		-0.073		0.003		-0.067		-0.004		-0.145
		(0.102)		(0.065)		(0.074)		(0.118)		(0.120)
Trust	-0.063	-0.169***	0.020	0.035	-0.087**	-0.139***	-0.009	-0.136**	-0.115*	-0.270***
	(0.042)	(0.042)	(0.045)	(0.060)	(0.040)	(0.043)	(0.045)	(0.053)	(0.061)	(0.068)
Above median log(GDP)		0.024		-0.017		0.011		-0.009		0.051
		(0.034)		(0.029)		(0.029)		(0.034)		(0.052)
Above median log(GDP)× Trust		0.245***		-0.050		0.113		0.274***		0.387***
		(0.086)		(0.083)		(0.073)		(0.091)		(0.119)
Altruism	-0.087***	-0.120***	-0.016	0.024	-0.059**	-0.040	-0.045	-0.108**	-0.114***	-0.205***
	(0.030)	(0.043)	(0.029)	(0.045)	(0.027)	(0.036)	(0.031)	(0.052)	(0.041)	(0.072)
Above median log(GDP)		-0.007		-0.021		-0.012		-0.027		0.009
		(0.033)		(0.030)		(0.030)		(0.036)		(0.052)
Above median log(GDP)× Altruism		0.063		-0.088		-0.038		0.112		0.183*
		(0.071)		(0.058)		(0.055)		(0.078)		(0.094)
Pos. Reciprocity	-0.076**	-0.127***	0.016	0.000	-0.025	-0.014	-0.062*	-0.136***	-0.169***	-0.255***
	(0.034)	(0.041)	(0.034)	(0.052)	(0.027)	(0.036)	(0.037)	(0.048)	(0.050)	(0.062)
Above median log(GDP)		0.003		-0.014		0.001		-0.025		0.007
		(0.032)		(0.032)		(0.030)		(0.034)		(0.044)
Above median log(GDP)× Pos. Reciprocity		0.135*		0.032		-0.017		0.179**		0.224**
		(0.071)		(0.067)		(0.061)		(0.070)		(0.092)
Neg Reciprocity	-0.020	-0.060	0.047	0.121*	0.005	-0.004	-0.051	-0.160**	-0.050	-0.146
	(0.047)	(0.060)	(0.040)	(0.065)	(0.036)	(0.060)	(0.052)	(0.078)	(0.067)	(0.094)
Above median log(GDP)		0.028		-0.028		0.007		0.005		0.061
		(0.035)		(0.029)		(0.031)		(0.036)		(0.051)
Above median log(GDP) × Neg Reciprocity		0.040		-0.119		-0.009		0.159		0.124
		(0.091)		(0.086)		(0.080)		(0.103)		(0.132)
N	74	74	74	74	74	74	74	74	74	74

The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions (column (1)-(2)) or the specific questions (column (3)-(10)). All regressions include a constant, education and math skills regressors as in Table 1 column (6) and robust standard errors. Odd columns control also for log of GDP per capita. "Above median log(GDP)" is a dummy for countries with GDP per capita above the sample median.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendices

Table A.1: Financially Literacy Questions in the 2014 Standard & Poor's Ratings Services Global Financial Literacy Survey

Preference	Question
Time Preference/Patience	Combination of: (a) a quantitative survey measure which consists of a series of five interdependent hypothetical binary choices between immediate and delayed financial rewards. In each of the five questions, participants had to decide between receiving a payment today or larger payments in 12 months; (b) a qualitative measure of patience, given by the respondent' self-assessment regarding their willingness to wait on an 11-point Likert scale, asking "how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?"
Risk Preference	Elicited through roughly equally weighted (a) series of five binary choices, between a fixed lottery, in which the individual could win x or zero, and varying sure payments, y. Choice of the lottery resulted in an increase of the sure amount being offered in the next question, and vice versa, thereby zooming in around the individual's certainty equivalent; (b) a qualitative question
Positive Reciprocity	Respondents' propensities to act in a positively reciprocal way were measured using (a) a choice scenario in which they were asked to imagine that they got lost in an unfamiliar area and that a stranger – when asked for directions – offered to take them to their destination. Respondents were then asked which out of six presents (worth between 5 and 30 euros, or the respective country-specific equivalents) they would give to the stranger as a "thank you"; (b) a self-assessment about how willing they are to return a favor on an 11-point Likert scale. The items were roughly equally weighted
Negative Reciprocity	Elicited through three self-assessments, roughly equally weighted, on (a)how willing respondents are to take revenge if they are treated very unjustly, even if doing so comes at a cost (Likert scale, 0-10); (b) respondents' willingness to punish someone for unfair behavior towards themselves or (c) towards a third person. This last item captures prosocial punishment and hence a concept akin to norm enforcement
Altruism	Roughly equally weighted combination of (a) one qualitative asking respondents how willing they would be to give to good causes without expecting anything in return on an 11-point scale; (b) a quantitative scenario which depicted a situation in which the respondent unexpectedly received 1,000 euros and asked them to state how much of this amount they would donate.
Trust	One item which asked respondents whether they assume that other people only have the best intentions (Likert scale, 0-10)

Source: The Global Preference Survey, https://www.briq-institute.org/global-preferences/about

Table A.2: Financially Literacy Questions in the 2014 Standard & Poor's Ratings Services Global Financial Literacy Survey

Concept	Question	Possible answers
Risk Diversification	*Suppose you have some money. Is it safer to put your money into one business or investment, or to put your money into multiple businesses or investments?*	one business or investment; multiple businesses or investments; don't know; refused to answer
Inflation	*Suppose over the next 10 years the prices of the things you buy double. If your income also doubles, will you be able to buy less than you can buy today, the same as you can buy today, or more than you can buy today?*	less; the same; more; don't know; refused to answer
Compound Interest	*Suppose you put money in the bank for two years and the bank agrees to add 15 percent per year to your account. Will the bank add more money to your account the second year than it did the first year, or will it add the same amount of money both years?*	more; the same; don't know; refused to answer
	Suppose you had 100 US dollars in a savings account and the bank adds 10 percent per year to the account. How much money would you have in the account after 5 years if you did not remove any money from the account?	more than 150 dollars; exactly 150 dollars; less than 150 dollars; don't know; refused to answer
Numeracy	*Suppose you need to borrow 100 US dollars. Which is the lower amount to pay back: 105 US dollars or 100 US dollars plus three percent?*	105 US dollars; 100 US dollars plus three percent; don't know; refused to answer

Source: The 2014 Standard & Poor's Ratings Services Global Financial Literacy Survey (Klapper et al., 2015).

Table A.3: Definitions and Sources of Country-level Variables

Variable	Definition and Source
Average Schooling	One of the components of the education dimension in the Human Development Index. It is the average years of schooling for adults aged 25 years and more. Source: United Nations Development Program
Expected Schooling	One of the components of the education dimension in the Human Development Index. It provides the expected years of schooling for children of school entering age. Source: United Nations Development Program
Subjective Math Skills	Self-reported proxy for cognitive skills derived by asking people to assess themselves regarding the statement "I am good at math" on an 11-point Likert scale. Source: Global Preferences Survey
GINI	It measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Here I take the average of all the GINI coefficients available from 2001 to 2005. Source: World Bank Development Indicators.
Legal Right Index	It measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 10, with higher scores indicating that these laws are better designed to expand access to credit. We use the 2004–2005 average index. Source: Warnock & Warnok (2008)
Legal Origin	Identifies the legal origin of the Company Law or Commercial Code of each country. There are five possible origins: (1) English Common Law; (2) French Commercial Code; (3) German Commercial Code; (4) Scandinavian Commercial Code; and (5) Socialist/Communist laws. Source: "The Quality of Government" LaPorta et al. (1999)

Continues on next page

Table A.3 – *Continues from previous page*

Variable	Definition and Source
Religion	Identifies the percentage of the population of each country that belonged to the three most widely spread religions in the world. For countries of recent formation, the data is available for 2000. The numbers are in percent (scale from 0 to 1). The three religions identified here are: (1) Roman Catholic; (2) Protestant; and (3) Muslim. The residual is called "other religions". Sources: CIA World Factbook 2000
log(GDP)	Per capita values for gross domestic product (GDP) expressed in current international dollars converted by purchasing power parity (PPP) conversion factor. GDP is the sum of gross value added by all resident producers in the country plus any product taxes and minus any subsidies not included in the value of the products. Conversion factor is a spatial price deflator and currency converter that controls for price level differences between countries. Total population is a mid-year population based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. . Source: World Bank Indicators, 2012.

Table A.4: Summary statistics

	Full Sample		Wealthy countries		Impoverished countries	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Patience	0.001	0.373	0.155	0.424	-0.154	0.231
Risktaking	0.012	0.305	-0.034	0.255	0.057	0.346
Trust	-0.023	0.281	0.048	0.257	-0.094	0.289
Altruism	-0.047	0.340	-0.112	0.346	0.017	0.327
Pos. reciprocity	-0.044	0.339	-0.038	0.304	-0.050	0.374
Neg. Recipr.	0.020	0.272	0.095	0.292	-0.055	0.232
Financial Literacy	0.376	0.144	0.454	0.152	0.298	0.079
FL: risk diversification	0.413	0.168	0.477	0.152	0.349	0.139
FL: inflation	0.546	0.114	0.560	0.086	0.492	0.089
FL: numeracy	0.521	0.105	0.569	0.099	0.473	0.089
FL: interest compounding	0.449	0.122	0.479	0.132	0.419	0.104
log(GDP) per capita	9.469	1.028	10.298	0.421	8.640	0.745
Expected schooling	14.380	2.671	16.32	1.759	12.439	1.904
Average schooling	9.748	2.675	11.484	1.789	8.012	2.262
Subjective math skills	5.084	0.721	5.407	0.653	4.762	0.643
GINI	0.398	0.093	0.364	0.079	0.430	0.095
Legal Right Index	5.459	2.952	5.270	2.815	5.648	3.111
Legal Origin:						
English	0.287	0.456	0.216	0.417	0.361	0.487
French	0.397	0.493	0.351	0.484	0.444	0.504
Socialist	0.219	0.416	0.243	0.435	0.194	0.401
German	0.069	0.254	0.135	0.347	0	0
Scandinavian	0.027	0.164	0.054	0.229	0	0
Religion:						
Catholic	0.283	0.374	0.330	0.381	0.236	0.367
Muslim	0.206	0.352	0.158	0.341	0.254	0.367
Other	0.456	0.413	0.448	0.418	0.463	0.414
Protestant	0.055	0.130	0.064	0.141	0.046	0.120

Note: Wealthy (impoverished) countries are countries with GDP per capita above (below) the sample median.

Table A.5: Correlation Matrix

Full Sample

	FLindex	Risk diversification	Inflation	Numeracy	Interest Comp.	Patience	Risktaking	Pos. reciprocity	Neg. reciprocity	Altruism	Trust
Risk diversification	0.8278	1.0000									
Inflation	0.5827	0.1898	1.0000								
Numeracy	0.7972	0.4946	0.5304	1.0000							
Interest Comp.	0.7524	0.6356	0.1924	0.4771	1.0000						
Patience	0.7313	0.6613	0.3368	0.4856	0.6191	1.0000					
Risktaking	0.1080	0.3135	-0.1532	-0.0690	0.1659	0.2288	1.0000				
Pos. reciprocity	-0.0104	-0.2139	0.1899	0.0548	-0.0633	0.0357	-0.2608	1.0000			
Neg. reciprocity	0.0562	-0.0101	0.1938	0.0654	-0.0718	0.2443	0.1910	-0.1165	1.0000		
Altruism	-0.2003	-0.2172	-0.0595	-0.2031	-0.0912	0.0093	-0.0120	0.6981	-0.0933	1.0000	
Trust	0.0783	-0.0090	0.1843	-0.0908	0.0902	0.1883	-0.0663	0.3739	0.1579	0.2826	1.0000

Rich countries

	FLindex	Risk diversification	Inflation	Numeracy	Interest Comp.	Patience	Risktaking	Pos. reciprocity	Neg. reciprocity	Altruism	Trust
Risk diversification	0.8840	1.0000									
Inflation	0.6469	0.3124	1.0000								
Numeracy	0.8413	0.6525	0.6410	1.0000							
Interest Comp.	0.8960	0.7461	0.5111	0.6621	1.0000						
Patience	0.8021	0.8484	0.3352	0.4910	0.7721	1.0000					
Risktaking	0.0931	0.1889	-0.0714	-0.1233	0.2000	0.2735	1.0000				
Pos. reciprocity	0.0617	-0.0027	0.1415	-0.1016	0.1706	0.0151	0.0109	1.0000			
Neg. reciprocity	-0.0670	-0.0539	-0.0426	-0.0816	0.0064	0.0944	0.4243	-0.1266	1.0000		
Altruism	-0.0989	-0.0091	-0.2369	-0.2966	0.0779	0.0873	0.1698	0.7530	-0.0150	1.0000	
Trust	0.1392	0.2098	-0.0751	-0.1124	0.3272	0.1206	0.2664	0.3754	-0.0134	0.3109	1.0000

Poor countries

	FLindex	Risk diversification	Inflation	Numeracy	Interest Comp.	Patience	Risktaking	Pos. reciprocity	Neg. reciprocity	Altruism	Trust
Risk diversification	0.6521	1.0000									
Inflation	0.2469	-0.2772	1.0000								
Numeracy	0.5817	0.0266	0.2093	1.0000							
Interest Comp.	0.4724	0.3804	-0.3182	0.0823	1.0000						
Patience	0.1706	0.0612	-0.0157	0.1375	0.1755	1.0000					
Risktaking	0.4839	0.6321	-0.1050	0.1018	0.2399	0.4743	1.0000				
Pos. reciprocity	-0.1614	-0.4864	0.2469	0.1935	-0.3233	0.0612	-0.1323	1.0000			
Neg. reciprocity	-0.2466	-0.2518	0.1869	-0.0574	-0.4040	0.2763	0.6937	-0.0796	1.0000		
Altruism	-0.1654	-0.3545	0.2580	0.0615	-0.2143	0.1352	-0.2221	0.3875	0.2165	1.0000	
Trust	-0.4499	-0.4836	0.1736	-0.3707	-0.3085	0.0639	-0.2221	0.3875	0.2165	0.3878	1.0000

Note: Pairwise Pearson correlations at country level

Table A.6: Financial literacy and Preferences: fully interacted

	(1)	(2)
Patience	0.031	0.040
	(0.060)	(0.055)
Above median log(GDP)	0.054**	-0.498*
	(0.026)	(0.268)
Above median log(GDP)× Patience	0.216***	0.130*
	(0.068)	(0.077)
Risktaking	0.104**	0.114***
	(0.046)	(0.031)
Above median log(GDP)	0.026	-1.001***
	(0.033)	(0.242)
Above median log(GDP)× Risktaking	-0.073	-0.127
	(0.102)	(0.087)
Trust	-0.169***	-0.133***
	(0.042)	(0.034)
Above median log(GDP)	0.024	-0.877***
	(0.034)	(0.244)
Above median log(GDP)× Trust	0.245***	0.208***
	(0.086)	(0.077)
Altruism	-0.120***	-0.083**
	(0.043)	(0.035)
Above median log(GDP)	-0.007	-1.081***
	(0.033)	(0.243)
Above median log(GDP)× Altruism	0.063	-0.007
	(0.071)	(0.060)
Pos. Reciprocity	-0.127***	-0.079**
	(0.041)	(0.032)
Above median log(GDP)	0.003	-0.992***
	(0.032)	(0.244)
Above median log(GDP)× Pos. Reciprocity	0.135*	0.052
	(0.071)	(0.065)
Neg. Reciprocity	-0.060	-0.083
	(0.060)	(0.050)
Above median log(GDP)	0.028	-1.053***
	(0.035)	(0.251)
Above median log(GDP)× Neg. Reciprocity	0.040	0.076
	(0.091)	(0.076)
N	74	74

The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions in the $S\&P$ survey. Column (1) includes controls for education as in Table 1 column (4), interacted with "Above median log(GDP)". Column (2) includes controls for education and math skills as in Table 1 column (6), interacted with "Above median log(GDP)"

Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.7: Financial literacy and Preferences: alternative subgroups

Dep. Variable: $S\&P$ FL	(1) Patience	(2) Risktaking	(3) Trust	(4) Altruism	(5) Pos. Recipr.	(6) Neg. Recipr.
			Panel A			
Preference	-0.081	0.101*	-0.220***	-0.099*	-0.093	-0.124
	(0.095)	(0.059)	(0.033)	(0.052)	(0.067)	(0.100)
Q2	0.009	-0.054	-0.022	-0.040	-0.035	-0.027
	(0.037)	(0.038)	(0.032)	(0.039)	(0.038)	(0.034)
Q3	0.040	-0.058	-0.021	-0.079*	-0.055	-0.014
	(0.045)	(0.049)	(0.043)	(0.046)	(0.046)	(0.044)
Q4	0.011	0.072	0.092	0.063	0.070	0.176***
	(0.049)	(0.069)	(0.063)	(0.064)	(0.062)	(0.064)
Q2×Preference	0.206	0.005	0.157**	0.010	-0.012	0.084
	(0.131)	(0.080)	(0.066)	(0.074)	(0.078)	(0.114)
Q3 ×Preference	0.256*	-0.150	0.229*	-0.010	0.043	0.191
	(0.151)	(0.117)	(0.115)	(0.078)	(0.084)	(0.119)
Q4×Preference	0.374***	-0.094	0.325**	-0.008	0.276**	-0.159
	(0.099)	(0.173)	(0.137)	(0.151)	(0.134)	(0.126)
Constant	0.150	-0.008	-0.009	-0.053	-0.015	0.147
	(0.116)	(0.129)	(0.144)	(0.133)	(0.119)	(0.134)
N	74	74	74	74	74	74
r2	0.725	0.650	0.673	0.668	0.664	0.684
			Panel B			
Preference	-0.079	0.099*	-0.170***	-0.094**	-0.088*	-0.137*
	(0.080)	(0.052)	(0.044)	(0.043)	(0.047)	(0.078)
Upper-middle	0.025	-0.045	-0.024	-0.056*	-0.045	-0.045
	(0.034)	(0.028)	(0.027)	(0.031)	(0.028)	(0.029)
High	0.075**	0.078	0.082*	0.038	0.059	0.076
	(0.035)	(0.052)	(0.047)	(0.051)	(0.048)	(0.057)
Upper-middle ×Preference	0.250*	-0.017	0.082	0.022	0.015	0.076
	(0.128)	(0.082)	(0.077)	(0.077)	(0.061)	(0.096)
High ×Preference	0.297***	0.003	0.298***	0.073	0.214	0.093
	(0.089)	(0.131)	(0.095)	(0.088)	(0.102)	(0.119)
Constant	0.160	0.009	-0.004	-0.065	-0.015	-0.020
	(0.109)	(0.128)	(0.125)	(0.146)	(0.133)	(0.139)
N	74	74	74	74	74	74
r2	0.735	0.621	0.649	0.608	0.621	0.604
			Panel C			
Preference	0.050	0.077*	-0.125***	-0.061**	-0.076**	-0.037
	(0.056)	(0.039)	(0.034)	(0.030)	(0.030)	(0.043)
OECD	0.087***	0.163***	0.133***	0.124***	0.136***	0.144***
	(0.033)	(0.033)	(0.030)	(0.034)	(0.032)	(0.035)
OECD ×Preference	0.159**	0.156*	0.291***	0.038	0.186***	-0.051
	(0.071)	(0.083)	(0.076)	(0.077)	(0.067)	(0.113)
Constant	0.204*	0.101	0.039	0.017	0.051	0.049
	(0.113)	(0.100)	(0.095)	(0.119)	(0.106)	(0.108)
N	74	74	74	74	74	74
r2	0.685	0.614	0.646	0.593	0.612	0.570

The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions in the $S\&P$ survey. Each column control for a different preference from the GPS. All regressions include controls for education and math skills as in Table 1 column (6) and present robust standard errors in parenthesis. "Upper-middle" and "High" are dummy variables corresponding to the income group definition by the World Bank (low/low-middle income countries are the reference category). Q2, Q3 and Q4 are dummy variables corresponding to the 2*nd*, 3*rd*, 4*th* quartile of the distribution of the GDP pc in PPP of each country in the sample (Q1 is the reference category). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.8: Financial literacy and Preferences: additional controls

	(1)	(2)	(3)	(4)	(5)	(6)
Patience	0.031	0.034	0.037	-0.011	0.010	0.034
	(0.060)	(0.058)	(0.059)	(0.058)	(0.063)	(0.041)
Above median log(GDP)	0.054**	0.071**	0.058**	0.062**	0.060**	0.068***
	(0.026)	(0.028)	(0.028)	(0.027)	(0.030)	(0.024)
Above median log(GDP) × Patience	0.216***	0.232***	0.198***	0.232***	0.202***	0.189***
	(0.068)	(0.069)	(0.071)	(0.068)	(0.074)	(0.053)
GINI		0.033				
		(0.140)				
Legal Right Index			0.005			
			(0.004)			
Legal origin:						
english				0.012		
				(0.032)		
french				-0.052*		
				(0.030)		
socialist				-0.050		
				(0.034)		
german				-0.094*		
				(0.049)		
Religion:						
catholic					-0.041	
					(0.029)	
muslim					-0.068**	
					(0.030)	
protestant					0.083	
					(0.077)	
Continent dummies						X
Risktaking	0.104**	0.132**	0.117**	0.019	0.079*	-0.008
	(0.046)	(0.053)	(0.046)	(0.050)	(0.043)	(0.044)
Above median log(GDP)	0.026	0.043	0.043	0.020	0.034	0.043
	(0.033)	(0.043)	(0.034)	(0.031)	(0.032)	(0.030)
Above median log(GDP) × Risktaking	-0.073	-0.015	-0.070	-0.037	-0.042	0.067
	(0.102)	(0.122)	(0.090)	(0.101)	(0.087)	(0.094)
GINI		-0.293**				
		(0.142)				
Legal Right Index			0.010***			
			(0.004)			
Legal origin:						
english				-0.081		
				(0.052)		
french				-0.180***		
				(0.047)		
socialist				-0.194***		
				(0.049)		
german				-0.134**		
				(0.065)		
Religion:						
catholic					-0.075**	
					(0.035)	
muslim					-0.092**	
					(0.038)	
protestant					0.240***	
					(0.069)	
Continent dummies						X
Trust	-0.169***	-0.215***	-0.149***	-0.090*	-0.085*	-0.078*
	(0.042)	(0.055)	(0.044)	(0.048)	(0.044)	(0.041)
Above median log(GDP)	0.024	0.040	0.034	0.022	0.028	0.038
	(0.034)	(0.040)	(0.035)	(0.031)	(0.034)	(0.030)
Above median log(GDP)× Trust	0.245***	0.328***	0.229**	0.108	0.186**	0.166**
	(0.086)	(0.104)	(0.088)	(0.108)	(0.083)	(0.075)
GINI		-0.156				
		(0.154)				
Legal Right Index			0.007**			
			(0.003)			
Legal origin:						
english				-0.091*		
				(0.049)		

	(1)	(2)	(3)	(4)	(5)	(6)
french				-0.173***		
				(0.049)		
socialist				-0.189***		
				(0.047)		
german				-0.131**		
				(0.064)		
Religion:						
catholic					-0.065**	
					(0.032)	
muslim					-0.082*	
					(0.042)	
protestant					0.231***	
					(0.068)	
Continent dummies						X
Altruism	-0.120***	-0.133***	-0.113**	-0.098***	-0.069	-0.083*
	(0.043)	(0.049)	(0.044)	(0.036)	(0.047)	(0.044)
Above median log(GDP)	-0.007	0.001	0.008	-0.014	0.001	0.020
	(0.033)	(0.040)	(0.035)	(0.031)	(0.032)	(0.030)
Above median log(GDP)× Altruism	0.063	0.090	0.074	0.008	-0.025	0.023
	(0.071)	(0.084)	(0.071)	(0.067)	(0.072)	(0.065)
GINI		-0.160				
		(0.163)				
Legal Right Index			0.008**			
			(0.004)			
Legal origin:						
english				-0.056		
				(0.054)		
french				-0.152***		
				(0.049)		
socialist				-0.183***		
				(0.048)		
german				-0.100		
				(0.062)		
Religion:						
catholic					-0.084**	
					(0.034)	
muslim					-0.071*	
					(0.038)	
protestant					0.282***	
					(0.061)	
Continent dummies						X
Pos. Reciprocity	-0.127***	-0.151***	-0.125***	-0.070*	-0.101**	-0.048
	(0.041)	(0.047)	(0.039)	(0.038)	(0.041)	(0.042)
Above median log(GDP)	0.003	0.002	0.019	0.011	0.010	0.032
	(0.032)	(0.038)	(0.033)	(0.031)	(0.031)	(0.031)
Above median log(GDP) × Pos. Reciprocity	0.135*	0.133*	0.154**	0.060	0.094	0.056
	(0.071)	(0.079)	(0.067)	(0.073)	(0.069)	(0.066)
GINI		-0.219				
		(0.161)				
Legal Right Index			0.009***			
			(0.003)			
Legal origin:						
english				-0.082*		
				(0.048)		
french				-0.174***		
				(0.045)		
socialist				-0.185***		
				(0.045)		
german				-0.131**		
				(0.063)		
Religion:						
catholic					-0.074**	
					(0.034)	
muslim					-0.065*	
					(0.037)	
protestant					0.263***	
					(0.064)	

	(1)	(2)	(3)	(4)	(5)	(6)
Continent dummies						X
Neg. Reciprocity	-0.060	-0.074	-0.054	-0.062	-0.011	-0.056
	(0.060)	(0.066)	(0.065)	(0.044)	(0.060)	(0.054)
Above median log(GDP)	0.028	0.036	0.038	0.028	0.028	0.047
	(0.035)	(0.039)	(0.037)	(0.032)	(0.035)	(0.031)
Above median log(GDP)× Neg. Reciprocity	0.040	0.104	0.060	0.046	0.020	0.037
	(0.091)	(0.099)	(0.092)	(0.083)	(0.086)	(0.079)
GINI		-0.170				
		(0.185)				
Legal Right Index			0.009**			
			(0.004)			
Legal origin:						
english				-0.080		
				(0.049)		
french				-0.184***		
				(0.047)		
socialist				-0.193***		
				(0.049)		
german				-0.134**		
				(0.062)		
Religion:						
catholic					-0.080**	
					(0.035)	
muslim					-0.089**	
					(0.039)	
protestant					0.264***	
					(0.070)	
Continent dummies						X
N	74	66	74	73	74	74

Note: The dependent variable is the country-level percentage of individuals who have correctly answered 3 out of 4 financial literacy questions in the *S&P* survey. All regressions include a constant, controls for education and math skills and robust standard errors (in parenthesis)."Above median log(GDP)" is a dummy for countries with GDP pc above the sample median. "Scandinavian" is the reference category for legal origins; "Other" is the reference category for religions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$