Knowledge, Information, and Financial Decisions: Why Do People Choose to Finance from Informal Credit Markets?

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Abstract

Informal credit markets constitute an important and expensive source of household financing, especially in developing countries. In this paper, we assess how a lack of financial information and financial knowledge affect the probability that an individual will obtain credit from an informal source. We also identify some of the main factors that determine households' financial decisions. Specifically, we use a multinomial logit framework to test how individuals' knowledge and ability to solve basic financial problems affect their selection among formal and informal credit options. Our findings suggest that financial literacy affects financial behavior, increasing the probability of acquiring informal credit. Low income and the lack of commercial relations with banks have the same effect on households' financial behavior.

Keywords: personal finance, informal credit, multinomial logit, financial frictions.

JEL classification: D14, E51, G21.

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1. INTRODUCTION

Financial institutions play a crucial role in economic growth. As financial markets develop and become more integrated into society, they aid pave the way for market efficiency and reduce the costs of financing (Rajan and Zingales, 1996; La Porta et al., 1997; Degryse et al., 2009; Gorton and Winton, 2016). Although financial systems have developed in low- and middle-income countries, however, the use of informal financial systems has persisted over the years. For example, informal credit operations constitute approximately 30% of total lending operations in Argentina, 25% in Brazil, 29% in Peru, 29% in Mexico, and up to 30% in the Dominican Republic (De la Torre and Schmukler, 2012). [1]

In contrast to formal sources of credit, access to informal credit is simple, nonbureaucratic, and does not require financial literacy. Nevertheless, informal credit markets can be a source of financial frictions, and obstruct restrictive monetary policies (Batini et al., 2011).

Notable authors (Bell, 1990; Arnott and Stiglitz, 1991; Kochar, 1997) have identified that informal credit markets may result from information asymmetry, leading to problems of adverse selection and moral hazard. However, several studies show how personal knowledge of financial products, or the ability to solve basic financial problems, might affect an individual's decision to borrow from formal or informal credit markets.

For example, according to Lusardi and Tufano (2015), many individuals make poor economic decisions because they lack financial literacy, and show that financial education can benefit society. Moreover, the empirical findings of Lusardi and de Bassa Scheresberg (2013) prove that, among other factors, financial literacy plays a role in explaining why economic agents incur such high costs when taking credit. Thus, one objective of this paper is to address this potential correlation in the credit market of the Dominican Republic.

Using data from the First Survey of Economic and Financial Culture of the Dominican Republic (EGCEF), we create a multinomial logit model to assess how a lack of information on financial products affects the probability that individuals will finance their

[1] The informal financial market is composed of unregulated financial institutions such as moneylenders, family members, and friends.

expenditures with informal credit rather than formal credit, given a number of socioeconomic and individual characteristics. Moreover, we test how an individual's ability to solve basic financial problems might affect the decision to choose among formal or informal credit options. The survey utilized contains information from 2,313 households on 74 questions, covering issues from financial literacy to financial decision-making in the Dominican financial market.

The multinomial logit model allows us to understand the determinants of individuals' decisions to acquire informal credit, formal credit, or to stay out of the credit market. Our findings suggest that policy measures aimed at promoting financial education, as well as financial integration, could greatly improve household financial decisions. It is important to take into account that given the nature and source of our data, our results only refer to households' credit destined to finance *current expenditures*.

This paper is organized as follows: Section 2 reviews the existing literature. Section 3 presents a description and an analysis of the data. Section 4 details the econometric approach used in this study, and Section 5 presents our results. Finally, Section 6 articulates the conclusions of the paper.

2. LITERATURE REVIEW

Economic literature has found many ways financial literacy affects financial behavior (see Lusardi and Mitchell, 2014). A significant number of authors has studied the subject, to the extent that surveys have found a link between agents' financial education and the efficiency of their financial decisions.

Studies have shown that consumers who do not understand the meaning of compound interest tend to borrow higher amounts of money, and to accept higher interest rates (Lusardi and de Bassa Scheresberg, 2013; Lusardi and Tufano, 2015). According to the S&P Global FinLit Survey, this is especially true for poorer and less educated people.

In addition, Campbell (2006) found that a minority of households makes significant mistakes when refinancing mortgages. Again, members of these households appear to be poorer and less educated. Similarly, Agarwal, Driscoll, Gabaix, and Laibson (2009) studied lifecycle patterns in financial mistakes, focusing on decisions

related to credit, and found that these prevail among the groups of old and young people with the lowest levels of financial literacy.

Furthermore, the S&P Global FinLit Survey found that regardless of individuals' income, those who use financial services, like bank accounts and credit cards, usually have higher financial knowledge. Hence, the use of formal financial services may deepen agents' financial skills. It is important to mention that, according to this survey, 35% of the adult population (15 and older) in the Dominican Republic is financially literate.

Stango and Zinman (2009) show that controlling for household characteristics, exponential growth bias[2] explains the tendency of households to underestimate the interest rate, and that biased households tend to borrow more. Almenberg and Gerdes (2011) expanded these findings by studying the correlation between exponential growth bias and financial literacy, finding a negative correlation between the magnitude of the bias and financial literacy.

Moreover, Guirkinger (2006) studies the determinants of the demand for informal credit, despite its high-interest rate, in Piura, Peru, using a panel data survey of households, along with information on informal lenders' behavior regarding contractual risk. Her findings suggest that households use informal loans when they cannot access the formal sector. Similarly, households are significantly more likely to use informal credit when they perceive high contractual costs and high risk from formal contracts (Cole, 2010).

According to the credit markets theory, informal credit markets can be either a complement or a substitute for formal credit markets. For instance, in the case of Mexico, Campero and Kaise (2013) show that informal credit markets play a role in the demand for different segments of the population across different situations. That is, individuals participating in the formal credit market might value informal credit in certain situations, such as emergencies, which supports the hypothesis of complementarity between informal and formal credit markets. In contrast, using survey data from 200 rice farmers, Muhammed (2013) finds that informal credit sources can act as substitutes for formal lending sources.

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[2] Exponential growth bias is the pervasive tendency to linearize exponential functions when assessing them intuitively (Stango and Zinman, 2009).

Following the aforementioned literature, we will analyze how the role of information on financial products and financial literacy might affect the probability of acquiring credit from an informal lender in the Dominican Republic. Presently, a significant number of government agencies and central banks around the world implement national programs on financial education and financial literacy to promote financial inclusion among low- and middle- income households. Thus, we expect that our findings will contribute to the development of these policy programs in our country.

3. SURVEY DATA ANALYSIS

For this research, we use data from the First Survey of Economic and Financial Culture of the Dominican Republic (EGCEF), published in November 2014. This survey contains information from interviews of 2,313 households in the Dominican Republic, with 74 questions pertaining to their financial literacy and other factors that potentially played an important role in their financial decisions.[3]

Our sample contains information on 947 individuals who answered questions related to their lending behavior and the sources from which they acquired financing. Specifically, this survey asked individuals: "In the last twelve months, did expenditure exceed income?" If the respondents answered *yes,* they then answered the following: "What actions were taken when this happened?" We classify individuals' answers to this question according to whether they financed their expenditures from formal or informal credit, drew from both sources simultaneously, or stayed out of the market and did not acquire any credit (Table 1). At this point, it is important to take into account, given the nature and source of our data, our results only refer to households' credit destined to finance *current expenditures.*

[3] The Central Bank of the Dominican Republic conducted this survey with the financial support of the Inter-American Development Bank (IDB) and the collaboration of the US Department of the Treasury's Office of Technical Assistance (OTA).

Table 1

CREDIT CLASSIFICATION

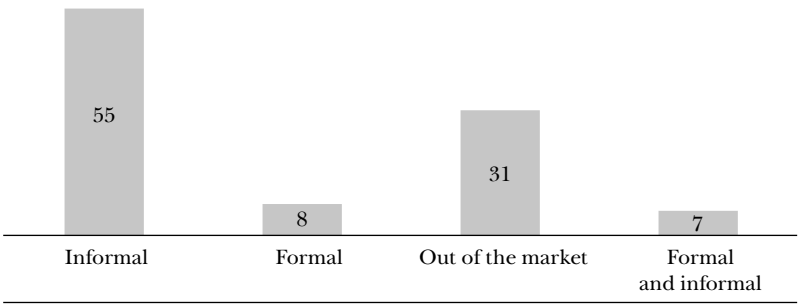
Formal credit	Authorized overdraft
	Mortgage
	Personal loan
	Payroll loan
	Unauthorized overdraft
	Credit card cash advance
Informal credit	Borrowed credit from an informal provider
	Borrowed money from friends and/or family
	Took a loan/San[1]
	Pawned something that belongs to them
Out of the market	Reduced expenditures
	Money withdrawn from savings
	Sold something of their property
	Worked extra hours

Note: [1] The San is a system of community savings based on the contributions by quotas of those who form the community. In a particular date, previously selected, the amount of the accummulated contributions is given to whom in the next on turn.

Figure 1

HOUSEHOLD's SOURCE OF FINANCING

From a sample of 947 households, in percentages



The survey data indicates that approximately 55% of households financed their expenditures from the informal credit market, approximately 8% financed their expenditures from the formal credit market, and approximately 31% reported that they did not take any form of credit but instead adjusted their expenditures (stayed out of the market). Additionally, 7% of households financed their expenditures combining formal and informal credit (see Figure 1). In other words, the percentage of households that obtained credit from the informal market may have varied between 55% and 62% among all Dominican households.

To assess how information asymmetry and how respondents' cognitive abilities can influence the decision to obtain informal credit, we use a number of variables that help us measure both the ability to solve basic financial problems, and the level of financial information held by households. Specifically, they answer the following questions.

Question	*Answer*
The interest rate on Bank A's credit card is 5% (monthly) and Bank B's interest rate is 60% (annual). Assuming that the interest is simple, not compounded:	Bank A charge a lower interest rate than Bank B.
	Bank A charge a higher interest rate than Bank B.
	Both Banks charge the same interest rate.
	Do not know.
Let's say you have DOP 200 (Dominican pesos) in a savings account. The account accrues 10% interest per year. How much will you have in the account after two years?	More than DOP 200.
	Less than DOP 200.
	Exactly DOP 200.
	Do not know.

Both comprehension of simple interest and ability to distinguish between a monthly and annual rate was tested. In addition, individuals indicated if they felt the need of more financial information to make efficient financial decisions.

These variables reveal important results. For example, we find that 61% of individuals who acquired credit from the informal credit market were not able to differentiate between monthly and annual interest rates successfully. On the other hand, more than half of the households that acquired credit from the formal credit market (54%) answered the question on interest rates correctly.

Moreover, 32% of those who took credit from the informal market seem to lack financial education, since they did not answer the question about the simple interest rate correctly. In contrast, 76% of those who borrowed from formal sources answered the question correctly.

Additionally, roughly 64% of the sample expressed the need for more financial information; of these respondents, a large number were individuals who either took credit from informal markets or decided to stay out of the market. As a number of authors have suggested, the information gap causes individuals to make suboptimal decisions in the credit market (Claessens, 2006).

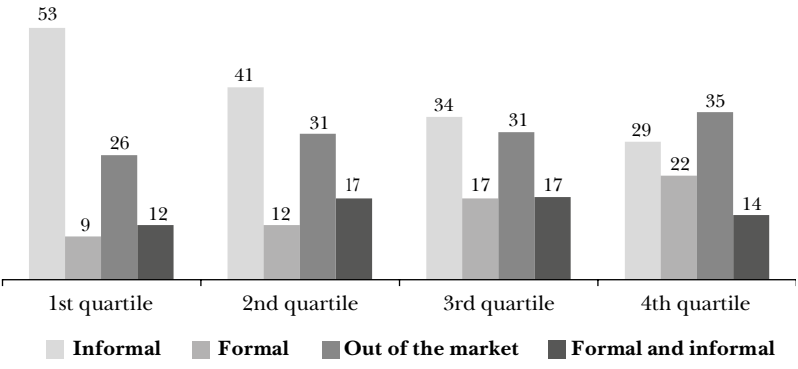
Furthermore, the survey provides a measure of financial discipline, derived from a set of questions about attitudes towards expenditure. Since our study focuses on credit for current expenditure, we decided to test the effect of this variable on households' financial behavior in the credit market. The Dominican Republic shows the highest score of the region since 78% of the respondents got a positive score.

Regarding income distribution, households have an average income of DOP 15,346.12 (USD 337.77). By dividing the data into quartiles, we find that the first quartile has an average income of USD 133.58; the second, USD 230.18; the third, USD 370; and the fourth, USD 914.88. Also noteworthy is the observation that lower incomes tend to be associated with greater involvement in the informal credit market, while higher incomes are more likely to finance their expenditures in the formal market (see Figure 2).

In our sample, approximately 40% of all households reported that they had no commercial relations with banks—i.e., no savings, deposits, or credit accounts. Such households are sometimes referred to as *unbanked households*. Notably, 64% of unbanked households participated in the informal credit market, and only 3% acquired credit from the formal credit market. Additionally, 30% of unbanked households declared that they had not participated in the credit market at all, and 4% financed their expenditures through a combination of formal and informal loans.

Figure 2

FINANCIAL DECISIONS BY INCOME QUARTILE
In percentages



4. ECONOMETRIC MODEL

4.1 Multinomial Logit

To model the dynamics of the credit market in the Dominican Republic, we use a logit model with a multinomial distribution. With this, we model the probability of alternative *j* being chosen by household *i*, where *j*= {informal credit, formal credit, no credit, formal and informal credit}, given a set of variables that describe a households' characteristics.

Multinomial logit models aim to provide a more realistic representation of individual behavior by following microeconomic theory. Thus, it is assumed that household *i* chooses among different *j* alternatives, and selects the one with the highest utility:

1 $$U_{ij} = \max\left(U_{i1},\ldots,U_{i4}\right).$$ [4]

In our model, alternative 1 (*j*= 1) corresponds to operating in the informal credit market, alternative 2 (*j*= 2) refers to operating in the formal market, alternative 3 (*j*= 3) refers to the choice of staying out of the market, and alternative 4 (*j*= 4) corresponds to choosing to obtain credit from both markets simultaneously.

[4] Note that the last *j* in brackets is four; that is, the model attempts to capture four possible decisions.

Since the utility levels derived from households' financial decisions are not observed, we need to make additional assumptions:

$$U_{ij} = \mu_{ij} + E_{ij}. \quad (2)$$

U_{ij} is determined by a nonstochastic function of observable variables (μ_{ij}), such as income level, age, or financial information held by the household, among others, and a stochastic function of unobservable variables (E_{ij}). Therefore, the probability of household i choosing alternative j is

$$P(Y_i = j) = P\left[U_{ij} = \max(U_{i1},\ldots,U_{i4})\right]. \quad (3)$$

To evaluate this probability, we must consider that we are using the maximum number of random variables. Despite the difficulties that this entails, it is convenient if we can assume that all E_{ij} are mutually independent with a so-called log Weibull distribution or extreme value type I distribution (Verbeek, 2012). In this case, the distribution function of each E_{ij} is given by

$$F(t) = \exp\left(-e^{-t}\right). \quad (4)$$

Under these assumptions, the probability of household i choosing alternative j can be modeled as

$$P\{Y_i = j\} = \frac{exp\left(x_i\beta_j\right)}{1 + \exp\left(x_i\beta_2\right) + \ldots + \exp\left(x_i\beta_4\right)}, \ \beta_1 = 0 \quad (5)^{5}$$

This is the multinomial logit model. Under regularity conditions, and assuming the model is correctly specified, this model provides consistent, efficient, and asymptotically normal estimators for the β coefficient.

However, this model assumes that each E_{ij} is independent, meaning the utility levels derived from any of the four alternatives are independent of each other, conditional upon observed characteristics.[6] Thus, we assume that the factors that increase the utility of

[5] The multinomial logit model is overidentified. Therefore, it is normalized by $\beta_1 = 0$.

[6] This assumption is known in academia as independence of irrelevant alternatives (IIA).

covering the budget deficit in the formal market, in the informal market, out of the market, or in both markets are simultaneously independent of each other. In effect, we also assume that the elements that increase the utility derived from obtaining credit from the formal market, the informal market, or both markets simultaneously are independent of each other.

The test of independence among the alternatives does not reject the null hypothesis of the errors' independence between alternatives, validating our assumption and the results for each group (see appendix).[7]

4.2 Relative Risk Ratios

The properties of the multinomial logit model allow a comparison between the probabilities of a households' set of choices. For example, we compare the probability of taking credit from the informal market with the probability of borrowing formal credit (base group). We do so by analyzing the relative risk ratio (RRR):

$$RRR = \frac{\Pr(j \neq base | x_i)}{\Pr(j = base \mid x_i)}. \quad (6)$$

This ratio calculates by what amount the probability of choosing alternative *j*, conditional upon x_i, exceeds the probability of choosing the base alternative under the same conditions (result set as the *base group*).

Furthermore, to understand how the change in an explicative variable can change the RRR, we calculate:

$$\frac{\partial RRR}{\partial x_i} = \beta_i \left[\exp(x_i \beta_i) \right] = \beta_i * RRR. \quad (7)$$

This equation represents the first derivative of the relative risk ratio regarding the variable *i* (x_i), and measures the changes in the relative risk ratio when x_i increases one unit.[8]

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[7] A Haussman transformation test is used to test whether there are significant differences between regressions when one of the alternatives *(j)* is removed from the estimation. In all cases, the null hypothesis is rejected.

[8] The software used calculates the relative risk ratios when $x_i = 1$; therefore, for quantitative variables, we are interested in seeing the first derivative of the relative risk ratios instead of only the relative risk ratio.

5. RESULTS

Table 2 indicates how many times the probability going to the informal credit market or staying out of the market exceeds the probability of acquiring formal credit. Thus, using equation 6 we can calculate to what extent the probability of an outcome exceeds the probability of the base group, and using equation 7 (taking the RRR of tables and regression coefficients, β) we can measure the change of the RRR given how the change in one of the control variables affects the RRR.

According to our results, not knowing financial concepts, such as *simple interest rate*, has a significant negative effect on the probability of acquiring informal credit. In addition, knowing the difference between annual and monthly interest rate has a positive effect on the probability of acquiring informal credit. Nevertheless, this variable is not significant in the model. Thus, it seems that the effect of financial literacy is captured by the question: *Let's say you have DOP 200 in a savings account. The account accrues 10% interest per year. How much will you have in the account after two years?*

Moreover, individuals that feel the need for financial information have a higher probability of obtaining formal credit. However, this effect could emerge from the fact that individuals feel the need for more financial information once in the formal market. This could be true as 68% of the households in the formal market said they needed more financial information.

The financial discipline shown by households also has an effect on credit behavior. The less disciplined an individual the more prone to acquire credit from the informal market, or to stay out of the credit market.

Estimates suggest that when a household experiences an increase of DOP 1,000 (or USD 21) in its monthly income, the ratio of the probability of obtaining credit in the informal market over the likelihood of acquiring credit from the formal market decreases by 2.5%.[9] Specifically, an increase of USD 21 decreases the likelihood of obtaining credit from the informal market by 0.40 percentage points, while the probability of obtaining credit from the formal market increases by 0.25 percentage points.

[9] Income is measured in thousands of Dominican pesos. Therefore, in the marginal analysis, we consider increases of DOP 1,000 (or USD 21).

Table 2

RELATIVE RISK RATIOS; FORMAL CREDIT AS BASE GROUP

	Informal Credit	*Out of the Market*
Income	0.9999[c]	0.9999[a]
Age		
25-46	0.2470[b]	0.3033[a]
47-59	0.2107[b]	0.2865[a]
60 and older	0.1278[c]	0.2145[b]
Education		
Secondary	0.9111	1.0628
Tertiary	0.4405[b]	0.5293[a]
Banked	0.3851[c]	0.3682[c]
Financial discipline	0.7074[c]	0.7062[c]
Financial literacy (Dif annual and monthly)	1.2532	1.0437
Financial literacy (Concept)	0.5398[b]	1.6268
Needs information	0.6225[a]	0.5499[b]
Number of observations = 947		
LR $\chi^2(33) = 96.45$		
Prob > $\chi^2 = 0.0000$		
Pseudo $R^2 = 0.0476$		

Nota: [a]p<0.1, [b]p<0.05, [c]p<0.01.

It is important to consider that the estimated parameter in the income variable might be negatively biased. The households in our sample have a lower income on average than the rest of the households in the survey. Since lower-income households are more prone to acquire credit from the informal credit market, the effect of an income increase on the probability of acquiring formal credit might be underestimated. Because the average income of the households in our sample is significantly different from the average income of the rest of the households, the presence of higher-income individuals in our sample would have had important positive effects on the income coefficient.[10] This implies that changes in the probability of acquiring formal credit, given an increase of DOP 1000 in household income, would have been higher, on average, if the higher-income individuals had experienced budget deficits in the past twelve months.

On the other hand, the relative risk ratio conditioned upon the variable *banked* measures the percentage by which the relative risk ratio of a banked individual exceeds the RRR of an unbanked individual. In the Dominican Republic, this percentage is 160% (1/0.38), meaning that compared to an unbanked individual, a banked individual is more prone to obtain credit from the formal credit market than from the informal market.

Since possible endogeneity would stem from the fact that those who use financial services like bank accounts and credit cards usually have higher financial knowledge (S&P Global FinLit Survey), we tested the interaction of financial literacy with the variable *banked* to see if there was a possible effect of using formal financial services and financial literacy. Nevertheless, the variable was not significant, and the coefficients did not show important changes. (See Annex)

Furthermore, following Guirkinger (2006), we tested the possibility of individuals not entering the formal credit market due to the possibility of rejection from it. But the introduction of this variable to the model produced similar results.

[10] This is possible if we assume that the high-income individuals in our sample behave similarly to the rest of the high-income individuals in the survey.

6. CONCLUSIONS

The goal of this paper was to analyze the effect of financial literacy on the behavior of economic agents in the credit market of the Dominican Republic. We could understand the role of this variable through the study of individuals facing the decision of choosing between informal and formal credit to finance their current expenditures.

By measuring financial literacy as the comprehension of the interest rate, our results allow us to conclude that lack of financial literacy has important effects on credit behavior. Specifically, a literate individual has an 85% higher probability of acquiring formal credit over obtaining informal credit. Tertiary education also increases the probability of acquiring formal credit.

Our model shows that those who feel the need of financial information have a higher probability of being in the formal credit market. This could indicate that once in the formal market, households feel the need of financial information, which is interesting as it points to a lack of information on the formal credit market.

Financially disciplined households tend to finance their expenditures with formal credit, rather than informal credit. This goes hand-in-hand with financial literacy since financially educated individuals tend to be more disciplined when it comes to credit.

Moreover, the banked variable shows high significance, suggesting that inclusion in the banking system is a key factor in the promotion of formal credit. However, since banks perceive low-income individuals as risky, they establish a threshold for income level debtors. They must pass this threshold to qualify for credit, thus excluding low-income individuals from the formal market. Consequently, for some individuals, an income increase has no effect on the probability of acquiring credit from the formal credit market.

Consequently, our results support the hypothesis of Campero and Kaiser (2013) regarding the complementarity of formal and informal credit markets. Households below the income threshold established by banks are automatically excluded from the formal market. Therefore, informal agents' advantage of monitoring lenders allows them to reach the marginalized segment of the market (Tressel, 2003), functioning as a fund channel from the banking sector (Bose, 1998; Floro and Ray, 1997; Hoff and Stiglitz, 1998). [11]

[11] Specifically in Latin America, monitoring mechanisms often rely on violence and threats and depend on the proximity between lenders and borrowers (CAF, 2011).

Our results also coincide with Campbell (2006) and the S&P Global FinLit Survey, as within our model poorer and less educated individuals have higher probabilities of acquiring informal credit. However, the informal credit market can strengthen development by reaching segments of the population that formal credit entities cannot reach. Even so, the formal credit market has lower transactional costs, as well as a more efficient allocation of capital, financial resources, and economic risk.

The findings of our study in the Dominican Republic and in other literature suggest efforts should be made to expand financial education and banking services among poor households.

ANNEX

Model

	Coefficients	*Standard error*	*z*	*P>|z|*	*[95% Confidence interval]*	
Informal credit						
Income	−2.6E−05	5.92E−06	−4.39	0	−3.8E−05	−1.4E−05
Age						
25-46	−1.39832	0.669675	−2.09	0.037	−2.71086	−0.08578
47-59	−1.55712	0.703804	−2.21	0.027	−2.93655	−0.17769
60 and older	−2.05726	0.72619	−2.83	0.005	−3.48057	−0.63395
Education						
Secondary	−0.09307	0.346205	−0.27	0.788	−0.77162	0.585478
Tertiary	−0.81977	0.343306	−2.39	0.017	−1.49264	−0.14691
Banked	−0.9542	0.333584	−2.86	0.004	−1.60801	−0.30039
Financial discipline	−0.34616	0.133664	−2.59	0.01	−0.60814	−0.08418
Financial literacy (Monthly and annual)	0.225698	0.273251	0.83	0.409	−0.30986	0.761261
Financial literacy (simple interest)	−0.6166	0.323684	−1.9	0.057	−1.25101	0.017805
Needs information	−0.4737	0.284825	−1.66	0.096	−1.03194	0.084551
Constraint	6.83513	1.000461	6.83	0	4.874262	8.795998

	Coefficients	*Standard error*	*z*	*P>|z|*	*[95% Confidence interval]*	
Formal credit	(base outcome)					
Out of the market						
Income	−5.24E−06	3.11E−06	−1.69	0.092	−1.1E−05	8.48E−07
Age						
25-46	−1.19317	0.680406	−1.75	0.079	−2.52674	0.140402
47-59	−1.25009	0.715269	−1.75	0.081	−2.65199	0.151815
60 and older	−1.53927	0.737131	−2.09	0.037	−2.98402	−0.09452
Education						
Secondary	0.060867	0.353763	0.17	0.863	−0.6325	0.75423
Tertiary	−0.63613	0.351405	−1.81	0.07	−1.32487	0.052614
Banked	−0.99923	0.338589	−2.95	0.003	−1.66286	−0.33561
Financial discipline	−0.34786	0.135574	−2.57	0.01	−0.61358	−0.08214
Financial literacy (Monthly and annual)	0.042753	0.279676	0.15	0.879	−0.5054	0.590908
Financial literacy (Simple interest)	−0.46716	0.330169	−1.41	0.157	−1.11428	0.179959
Needs information	−0.59801	0.289561	−2.07	0.039	−1.16554	−0.03048
Constraint	5.776349	1.013449	5.7	0	3.790025	7.762673

Formal and informal						
Income	−9.07E−06	8.23E−06	−1.1	0.27	−2.5E−05	7.06E−06
Age						
25-46	−1.13457	0.863079	−1.31	0.189	−2.82617	0.557036
47-59	−0.68465	0.897622	−0.76	0.446	−2.44396	1.074657
60 and older	−1.40091	0.957622	−1.46	0.143	−3.27781	0.475999
Education						
Secondary	−0.01179	0.490417	−0.02	0.981	−0.97299	0.949413
Tertiary	−0.59126	0.50241	−1.18	0.239	−1.57596	0.393447
Banked	−0.09607	0.471873	−0.2	0.839	−1.02093	0.82878
Financial discipline	−0.56045	0.172965	−3.24	0.001	−0.89946	−0.22145
Financial literacy (Monthly and annual)	0.551547	0.396845	1.39	0.165	−0.22625	1.329348
Financial literacy (Simple interest)	−0.52703	0.450214	−1.17	0.242	−1.40943	0.355372
Needs information	−0.48508	0.396704	−1.22	0.221	−1.26261	0.292444
Constraint	3.687037	1.256388	2.93	0.003	1.224562	6.149512

Testing Independence of Irrelevant Alternatives

Test [m1_3 = m2_3], cons	*Test [m1_4 = m2_4], cons*
[m1_3]ingreso - [m2_3] ingreso = 0	[m1_4]ingreso - [m2_4] ingreso = 0
[m1_3]1b.age - [m2_3]1b. age = 0	[m1_4]1b.age - [m2_4]1b. age = 0
[m1_3]2.age - [m2_3]2.age = 0	[m1_4]2.age - [m2_4]2.age = 0
[m1_3]3.age - [m2_3]3.age = 0	[m1_4]3.age - [m2_4]3.age = 0
[m1_3]4.age - [m2_3]4.age = 0	[m1_4]4.age - [m2_4]4.age = 0
[m1_3]1b.educ - [m2_3]1b. educ = 0	[m1_4]1b.educ - [m2_4]1b. educ = 0
[m1_3]2.educ - [m2_3]2. educ = 0	[m1_4]2.educ - [m2_4]2. educ = 0
[m1_3]3.educ - [m2_3]3. educ = 0	[m1_4]3.educ - [m2_4]3. educ = 0
[m1_3]ban - [m2_3]ban = 0	[m1_4]ban - [m2_4]ban = 0
[m1_3]actitud_fin - [m2_3] actitud_fin = 0	[m1_4]actitud_fin - [m2_4] actitud_fin = 0
[m1_3]dif_tasa - [m2_3] dif_tasa = 0	[m1_4]dif_tasa - [m2_4] dif_tasa = 0
[m1_3]tasa_av - [m2_3]tasa_ av = 0	[m1_4]tasa_av - [m2_4]tasa_ av = 0
[m1_3]nec_info - [m2_3] nec_info = 0	[m1_4]nec_info - [m2_4] nec_info = 0
[m1_3]_cons - [m2_3]_ cons = 0	[m1_4]_cons - [m2_4]_ cons = 0
Constraint 2 dropped	Constraint 2 dropped
Constraint 6 dropped	Constraint 6 dropped
$\chi^2(12) = 8.02$	$\chi^2(12) = 4.50$
Prob > $\chi^2 = 0.7834$	Prob > $\chi^2 = 0.9726$

Test [m1_2 = m3_2], cons	*Test [m1_4 = m3_4], cons*
[m1_2]ingreso - [m3_2] ingreso = 0	[m1_4]ingreso - [m3_4] ingreso = 0
[m1_2]1b.age - [m3_2]1b. age = 0	[m1_4]1b.age - [m3_4]1b. age = 0
[m1_2]2.age - [m3_2]2.age = 0	[m1_4]2.age - [m3_4]2.age = 0
[m1_2]3.age - [m3_2]3.age = 0	[m1_4]3.age - [m3_4]3.age = 0
[m1_2]4.age - [m3_2]4.age = 0	[m1_4]4.age - [m3_4]4.age = 0
[m1_2]1b.educ - [m3_2]1b. educ = 0	[m1_4]1b.educ - [m3_4]1b. educ = 0
[m1_2]2.educ - [m3_2]2. educ = 0	[m1_4]2.educ - [m3_4]2. educ = 0
[m1_2]3.educ - [m3_2]3. educ = 0	[m1_4]3.educ - [m3_4]3. educ = 0
[m1_2]ban - [m3_2]ban = 0	[m1_4]ban - [m3_4]ban = 0
[m1_2]actitud_fin - [m3_2] actitud_fin = 0	[m1_4]actitud_fin - [m3_4] actitud_fin = 0
[m1_2]dif_tasa - [m3_2] dif_tasa = 0	[m1_4]dif_tasa - [m3_4] dif_tasa = 0
[m1_2]tasa_av - [m3_2]tasa_ av = 0	[m1_4]tasa_av - [m3_4]tasa_ av = 0
[m1_2]nec_info - [m3_2] nec_info = 0	[m1_4]nec_info - [m3_4] nec_info = 0
[m1_2]_cons - [m3_2]_ cons = 0	[m1_4]_cons - [m3_4]_ cons = 0
Constraint 2 dropped	Constraint 2 dropped
Constraint 6 dropped	Constraint 6 dropped
$\chi^2(12) = 16.64$	$\chi^2(12) = 2.96$
Prob > $\chi^2 = 0.1635$	Prob > $\chi^2 = 0.9958$

Test [m1_2=m4_2], cons	*Test [m1_3=m4_3], cons*
[m1_2]ingreso - [m4_2] ingreso = 0	[m1_3]ingreso - [m4_3] ingreso = 0
[m1_2]1b.age - [m4_2]1b. age = 0	[m1_3]1b.age - [m4_3]1b. age = 0
[m1_2]2.age - [m4_2]2.age = 0	[m1_3]2.age - [m4_3]2.age = 0
[m1_2]3.age - [m4_2]3.age = 0	[m1_3]3.age - [m4_3]3.age = 0
[m1_2]4.age - [m4_2]4.age = 0	[m1_3]4.age - [m4_3]4.age = 0
[m1_2]1b.educ - [m4_2]1b. educ = 0	[m1_3]1b.educ - [m4_3]1b. educ = 0
[m1_2]2.educ - [m4_2]2. educ = 0	[m1_3]2.educ - [m4_3]2. educ = 0
[m1_2]3.educ - [m4_2]3. educ = 0	[m1_3]3.educ - [m4_3]3. educ = 0
[m1_2]ban - [m4_2]ban = 0	[m1_3]ban - [m4_3]ban = 0
[m1_2]actitud_fin - [m4_2] actitud_fin = 0	[m1_3]actitud_fin - [m4_3] actitud_fin = 0
[m1_2]dif_tasa - [m4_2] dif_tasa = 0	[m1_3]dif_tasa - [m4_3] dif_tasa = 0
[m1_2]tasa_av - [m4_2]tasa_ av = 0	[m1_3]tasa_av - [m4_3]tasa_ av = 0
[m1_2]nec_info - [m4_2] nec_info = 0	[m1_3]nec_info - [m4_3] nec_info = 0
[m1_2]_cons - [m4_2]_ cons = 0	[m1_3]_cons - [m4_3]_ cons = 0
Constraint 2 dropped	Constraint 2 dropped
Constraint 6 dropped	Constraint 6 dropped
$\chi^2(12) = 8.02$	$\chi^2(12) = 3.57$
Prob > $\chi^2 = 0.7835$	Prob > $\chi^2 = 0.9900$

Testing the Interaction of Financial Literacy with the Variable Banked

	Coefficients	*Standard error*	*z*	*P>|z|*	*[95% Confidence interval]*	
Informal credit						
Income	−2.6E−05	5.97E−06	−4.42	0	−0.0000381	−0.0000147
Age						
25-46	−1.44579	0.671708	−2.15	0.031	−2.762317	−0.1292706
47-59	−1.59759	0.704881	−2.27	0.023	−2.979134	−0.2160502
60 and older	−2.11035	0.728343	−2.9	0.004	−3.537879	−0.6828266
Education						
Secondary	−0.11384	0.347864	−0.33	0.743	−0.7956391	0.5679642
Tertiary	−0.80661	0.343863	−2.35	0.019	−1.48057	−0.1326514
Banked	−2.01311	1.022146	−1.97	0.049	−4.016478	−0.009739
Financial discipline	−0.34112	0.133641	−2.55	0.011	−0.6030462	−0.0791849
Financial literacy (Monthly and annual)	−0.08019	0.597015	−0.13	0.893	−1.25032	1.089936
Financial literacy (Simple interest)	−1.49054	1.003928	−1.48	0.138	−3.458205	0.4771215
Needs information	−0.47151	0.285234	−1.65	0.098	−1.030556	0.0875397
Monthly-annual_ban	0.942225	1.062058	0.89	0.375	−1.139371	3.023821
Simpleinterest_ban	0.482863	0.661766	0.73	0.466	−0.8141749	1.7799
Constraint	7.771248	1.336776	5.81	0	5.151216	10.39128

	Coefficients	*Standard error*	*z*	*P>|z|*	*[95% Confidence interval]*	
Formal credit	(base outcome)					
Out of the market						
Income	−5.49E−06	3.12E−06	−1.76	0.078	−0.0000116	6.19E−07
Age						
25-46	−1.15438	0.682198	−1.69	0.091	−2.491463	0.182705
47-59	−1.22059	0.716188	−1.7	0.088	−2.624289	0.1831138
60 and older	−1.50326	0.738577	−2.04	0.042	−2.950847	−0.0556784
Education						
Secondary	0.075177	0.354812	0.21	0.832	−0.6202428	0.7705961
Tertiary	−0.63297	0.351687	−1.8	0.072	−1.322265	0.0563217
Banked	−1.76295	1.030501	−1.71	0.087	−3.782693	0.2567954
Financial discipline	−0.34564	0.135505	−2.55	0.011	−0.6112238	−0.0800545
Financial literacy (Monthly and annual)	0.216001	0.607648	0.36	0.722	−0.9749673	1.40697
Financial literacy (Simple interest)	−1.41119	1.012238	−1.39	0.163	−3.395142	0.5727568
Needs information	−0.59756	0.289872	−2.06	0.039	−1.165693	−0.0294167
Monthly-annual_ban	1.077975	1.072325	1.01	0.315	−1.023743	3.179693
Simpleinterest_ban	−0.33432	0.674649	−0.5	0.62	−1.656604	0.9879726
Constraint	6.460918	1.349243	4.79	0	3.816451	9.105385

Formal and informal						
Income	−8.90E−06	7.73E−06	−1.15	0.249	−0.000024	6.24E-06
Age						
25-46	−1.14256	0.869294	−1.31	0.189	−2.846345	0.5612229
47-59	−0.67648	0.90241	−0.75	0.453	−2.445169	1.092214
60 and older	−1.42338	0.959529	−1.48	0.138	−3.304023	0.4572602
Education						
Secondary	−0.06807	0.48837	−0.14	0.889	−1.025258	0.8891163
Tertiary	−0.60804	0.502147	−1.21	0.226	−1.592226	0.3761529
Banked	−2.16724	1.218572	−1.78	0.075	−4.555597	0.2211151
Financial discipline	−0.56531	0.173932	−3.25	0.001	−0.9062077	−0.2244073
Financial literacy (Monthly and annual)	1.144198	0.870187	1.31	0.189	−0.561337	2.849733
Financial literacy (Simple interest)	−3.33816	1.189385	−2.81	0.005	−5.669315	−1.00701
Needs information	−0.46055	0.398611	−1.16	0.248	−1.241811	0.3207141
Monthly-annual_ban	3.799344	1.318304	2.88	0.004	1.215517	6.383172
Simpleinterest_ban	−0.77625	0.961426	−0.81	0.419	−2.660609	1.108113
Constraint	5.095929	1.587076	3.21	0.001	1.985316	8.206541

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