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FINANCIAL LITERACY AND ITS RELATIONSHIP WITH SOCIODEMOGRAPHIC VARIABLES

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ABSTRACT. The aim of this research is to determine if there is a significant difference between the socio-demographic population groups in relation to financial literacy in Mexican adults, between 18 and 70 years old. It is assumed that there is a significant difference in financial literacy levels according to age, gender, educational level, residence, region, marital status, household position, economic dependents, work conditions, job position, income, material and financial wealth, and financial experience. The method is derived from the approaches of Lusardi and Mitchell (2011a), OECD (2018), OECD (2017) and Atkinson and Messy (2012). Data from the Mexican survey ENIF (2018) are used. The methodology and the use of microeconomic data provide originality on the research of financial literacy for Mexico. The results of the Probit econometric model show sociodemographic variables that help to predict the probability that Mexican adults will answer the financial literacy questions correctly and provide evidence on specific groups of the Mexican population that present significant differences in financial literacy. Particularly this refers to those with low educational level, women, the disabled, retirees, low-income people, those who are not included in the financial system, as well as those who lack training in financial education issues. The findings can be useful for the design of public policies on financial literacy, the basic financial knowledge that the population should acquire in order to make informed decisions.

JEL Classification: A53,
D14.

Keywords: financial literacy, probit model, population, groups, Mexico.

Introduction

The Organization for Economic Co-operation and Development (OECD) defines financial education as the process through which consumers and investors improve their understanding of financial products, concepts and risks, and through information and training develop skills and the confidence to make informed decisions, to know where to seek help and to take other effective measures to improve their well-being (OECD, 2005).

Financial education has been one of the fundamental topics on the world economic agenda for the last 20 years, since access to financial services plays a fundamental role in the

development of any economy by facilitating economic growth and the reduction of poverty levels (OECD, 2005; EBF, 2009; Ardic, Heiman, and Mylenko, 2011; Demirguc-Kunt and Klapper, 2012). International organizations are implementing various strategies to promote financial education. However, according to Lusardi, Mitchell, and Curto (2009), Lusardi and Mitchell (2011a) and Atkinson and Messy (2012), most individuals cannot perform simple calculations and lack knowledge of elementary concepts of finance, such as the calculation of compound interest, the effect of inflation and basic elements for risk and diversification.

In the context of education, literacy is defined as an ability to read and write, through which people from an early age acquire knowledge of things. Lusardi (2014) considers financial literacy as the new literacy and suggests that the term refer to the basic financial knowledge which the population should acquire from an early age in order to make informed decisions. In her opinion, the population that does not have basic knowledge in the financial field could hardly participate in economic activity in the modern world.

The issue of financial literacy is becoming increasingly important, not only from a theoretical point of view but also from a practical one. There is ample evidence of the impact of financial literacy on people's decisions and financial behavior. For example, financial literacy has been proven to affect both saving and investment behavior, debt management and borrowing practices (Lusardi, 2019). However, according to Demirguc-Kunt and Klapper (2012), while modern technology, investments, and liberalization have generated new financial products and services, only 50% of adults have an account at a formal financial institution.

Klapper et al. (2015) estimated that the percentage of financial literate Mexican people aged 15 and over were 32%. The issue of financial literacy in Mexico has been approached from the main financial institutions (CNVB, 2009; BANAMEX- UNAM, 2008), but just few studies have been carried out and these researches have been focused on specific groups (Villagómez & González 2014; Villagómez, 2016; Arceo-Gomez & Villagómez, 2017; Villagómez & Hidalgo, 2017; Antonio-Anderson et al., 2020; Hernández-Mejía, García-Santillán & Moreno-García, 2021). It means that Mexicans financial literacy has been insufficiently researched (García, 2021).

The National Financial Inclusion Policy outlines the strategies to promote inclusion and both economic and financial competencies, as well as the protection of the user of financial products and services in Mexico (CNBV, 2018). When considering the historical polarity of Mexico, not only geographical but also economic, educational and of social equality, it is interesting to determine if there is also a difference in financial literacy among population groups, defined from sociodemographic and economic variables.

The paper is organized as follows. The second section consist of the literature review. Next section describes the method and present the research model. Fourth section shows the analysis and results. Fifth section presents main findings discussion and finally the conclusions section. Method and the use of microeconomic data bring originality to the research of financial literacy in Mexico. The limited number of variables to measure financial literacy is a research gap, as well as the data date but the Mexican national survey is carried out every four years.

1. Literature review

From the different proposals on the concept and measurement of financial literacy, two main non-exclusive approaches have been identified which have been the basis for comparison of financial literacy in several countries (Stolper & Walter, 2017).

On the one hand, there is the so-called Lusardi and Mitchell approach (2011a), who from a three-block question design (calculation of compound interest, effect of inflation, and risk diversification) measure financial literacy. On the other hand, the approach of the

Organization for Economic Cooperation and Development is identified, which states that financial literacy is made up of three components: financial knowledge, financial behavior and financial skills (OECD, 2017; OECD, 2018; Atkinson and Messy, 2012).

The results of different investigations in the United States and in other highly industrialized countries reveal low levels of financial literacy (Lusardi and Mitchell, 2011b; Xu and Zia, 2012; Atkinson and Messy, 2012). Lusardi and Mitchell (2011a) and Lusardi, Mitchell, and Curto (2009) identify that most individuals cannot perform simple calculations and have a lack of knowledge of elementary concepts of finance. In the research by Lusardi and Mitchell (2011a), only 50% of the respondents answered the inflation and compound interest question correctly, and only a third of the respondents answered all three questions correctly. In the diversification question, which was the most difficult for the respondents, more than a third of the respondents did not know the answer.

In the research by Bucher-Koenen and Lusardi (2011), 82% of those surveyed answered the interest rate question correctly, and only 11% said they did not know the answer. On the inflation question, 78% of those surveyed answered correctly, however 17% said they did not know the answer (a high percentage compared to 5% who did not answer correctly). In the question on risk diversification, only 62% answered the question correctly, but almost a third said they did not know the answer. Although this topic is not part of the curriculum, the authors argue that the understanding of the concept may come through education in economics or finance, or through investment experience.

From the research, it is not only identified that the low level of financial knowledge is present in a general way in the entire population but also in an acute way in specific demographic groups such as women, and in those with low educational level (Lusardi, Mitchell, & Curto, 2009; Lusardi & Mitchell, 2011; Atkinson & Messy, 2012). The above results are not only specific to age groups, but also common to other surveys on financial literacy in college students. Similarly, in the various empirical studies around the world, when considering samples from various population groups (Danes & Hira, 1987; Volpe, Chen, & Pavlicko, 1996; Chen & Volpe, 1998; Chen & Volpe, 2002; Lusardi, Mitchell, & Curto, 2009; Lusardi & Mitchell, 2011; Atkinson & Messy, 2012, Fornero & Monticone, 2011) the relationship of sociodemographic factors, family history, and social interactions with financial literacy stand out.

Regarding young people, Lusardi, Mitchell, and Curto's (2009) research on financial literacy among young Americans, ages 23-28, found that 70% of respondents answered the interest rate question correctly. In the question about inflation, 54% answered correctly and 15% said they did not know the answer. Only 47% answered the risk diversification question correctly and 37% said they did not know the answer. This represents significant evidence of low levels of financial literacy among young people in the United States.

Regarding gender, it is generally identified that women have less knowledge in certain areas of personal finance than men (Danes & Hira, 1987). In the research by Volpe, Chen, and Pavlicko (1996) on financial literacy, on the subject of personal investment, it is identified that women have less knowledge than men. Chen and Volpe (1998, 2002) not only present evidence on the difference in financial knowledge between men and women, but also identify the variables that influence financial literacy. For both groups, variables related to education (academic discipline and class grade), work experience, and age favor financial literacy.

In the research by Lusardi, Mitchell, and Curto (2009), differences in financial literacy between men and women are identified. The results show that women obtained a lower percentage of correct answers in relation to men, with a difference of up to 13% for inflation and risk diversification questions.

Financial literacy is also highly correlated with the level of schooling, the college degree of the respondent, and the participants age (Chen & Volpe, 1998, 2002). The authors present evidence on the difference on financial knowledge according to the age of the participants, and the results indicate that older students have more financial knowledge compared to younger ones. Lusardi and Mitchell (2011b) identify that financial literacy throughout a person's life has an inverted U shape, lower in young individuals and in older individuals.

Differences in financial literacy also stand out according to family background. Lusardi, Mitchell, and Curto (2009) identify the relationship between the financial literacy of young people between 23 and 28 years of age with the characteristics of their homes where they grew up. Financial education on young people is positively related to the parents' education, particularly that of the mother, and also with the fact that the parents participated in the financial market, in the purchase of shares or pension accounts.

According to Danes and Hira (1987), Volpe, Chen, and Pavlicko (1996), Chen and Volpe (1998, 2002), Van Rooij, Lusardi, and Alessie (2011), Lusardi and Mitchell (2011b), Silgoner, Greimel-Fuhrmann, and Weber (2015) financial literacy differs between population groups, but minority or vulnerable groups are also those with the least financial knowledge. Table 1 shows the set of sociodemographic variables and financial experience of the subject, related to financial literacy.

Table 1. Variables related to financial literacy according to Lusardi and Mitchell (2011b) and Silgoner, Greimel-Fuhrmann, and Weber (2015).

	Variables	Relation to financial literacy
Sociodemographic characteristics	Gender	(+) if the person is a man
	Age	(+)
	Educational level	(+)
	Residence	(+) if it is an urbanized area
	Region	(+) if it is in the north
	Marital status	(+) if the person has a spouse
	Household position	(+) if the person is the head of the household
	Economic dependents	(+) if the person had dependents
	Work condition	(+) if the person works
	Job position	(+) if the person has a higher position at work
	Income	(+)
	Material wealth	(+)
	Financial wealth	(+)
Financial experience	Having a bank account	(+) if the person has an account
	Having investment funds	(+) if the person has an account
	Education in money management	(+) if the person has taken any courses

Source: own

2. Methodological approach

The concept of financial literacy, the object of study of this research, is defined in its theoretical and operational form from Lusardi and Mitchell (2011a) and the approach of the OECD (2017). In Lusardi and Mitchell (2011a), financial literacy is defined as the skills that the respondent has to do simple mathematical operations, as well as the knowledge of some fundamental economic and financial concepts in the saving and investment decision-making process. The empirical strategy used to measure financial literacy is based on the design of three

questions. The first question measures the individual's ability to calculate compound interest. The second question measures the understanding of inflation, in the context of a basic financial decision. The third question is a joint knowledge test to assess whether the respondents possess knowledge of the concept of risk diversification.

In this research, for the empirical measurement of the term financial literacy, three questions are selected from the National Survey of Financial Inclusion 2018 (INEGI, 2018). As presented in table 2, the questions correspond to the concepts of inflation, compound interest and risk diversification. The population studied is made up of Mexicans in the age range of 18 to 70 years old, living in the six geographical areas of the country (Northwest, Northeast, West, Mexico City, Central South and East, and South). The sample is made up of a total of 12,466 people that answer the survey at their homes. The survey also includes questions corresponding to sociodemographic characteristics. The Probit regression model is used, with which the significant variables that are related to financial literacy are identified.

Table 2. Questions to measure the term financial literacy

Variable	Question	Source
Savings diversification condition	ENIF question 2018. Number. P4_9_3 It is better to save money in two or more ways or places than in just one (a savings account, group savings with relatives or acquaintances, etc.). True.....1, False.....2 Does not respond.....8, Does not know.....9	ENIF 2018
Knowledge of compound interest	ENIF question 2018: Number. P12_3 If you deposit 100 pesos in a savings account that gives you a profit of 2% per year and you do not make deposits or withdrawals, including interest, you will have ... at the end of five years. READ ALL OPTIONS AND CIRCLE ONE CODE ONLY More than \$110?.....1 Exactly \$110?.....2 Less than \$110?.....3 Does not respond.....8, Does not know.....9	ENIF 2018
Knowledge of the meaning of inflation	ENIF 2018: Question number P12_4 If someone gives you 1,000 pesos, but you have to wait a year to spend it and in that year inflation is 5%, you could buy ... More than you can buy today?.....1 The same?.....2 Less than you can buy today?.....3 Does not know.....9	ENIF 2018

Source: Own elaboration with data from ENIF 2018.

To measure financial literacy, a dichotomous variable is constructed for each question as suggested by Lusardi and Mitchell (2011a) and Van Rooij, Lusardi, and Alessie (2011). According to the characteristics of the questions (with correct and incorrect answers), a fictional variable is constructed for each question. The value of 1 is assigned to the question that the respondent answered correctly and 0 for the incorrect answer. The coding of the sociodemographic and financial experience variables is carried out as presented in Table 3.

Table 3. Sociodemographic variables

Variables	Codification
Gender	Dichotomic variable: 1 male, 0 female.
Location size	According to INEGI (Rural: < 2 500; Urban: > 2 500 people) Dichotomic variable: 1 if the person lives in an urban area, 0 if the person lives in a rural area
Region	Dichotomic variable: 1 if the person belongs to the region i, 0 if the person belongs to a different region i. South region as reference region.
Age	Quantitative variable expressed in whole numbers (years)
Relationship of the informant regarding the head of the household	Dichotomic variable: 1 if the person is head of household, 0 otherwise.
Marital status	Dichotomic variable: 1 if the person fulfills the condition i, 0 if the person fulfills a different condition to i. Reference condition is the single condition.
Economic dependents	Quantitative variable expressed in positive whole numbers
Schooling	Dichotomic variables are designed to define the group the person belongs to according to his schooling.
Work condition	Dichotomic variable: 1 if the person fulfills the condition i, 0 if the person fulfills a different condition to i. Reference condition is no work.
Job position	Dichotomic variable: 1 if the person fulfills the condition i, 0 if the person fulfills a different condition to i.
Workincome	Five dichotomic variables are designed to define the group the person belongs to according to his income.
Asset holding condition	Dichotomic variable: 1 if the person has some form of housing, 0 if the person has no form of housing
Havingan Afore*	Dichotomic variable: 1 if the person has a retirement savings account or Afore, 0 if the person does not have a retirement savings account or Afore
Bank account holding condition	Dichotomic variable: 1 if the person has a bank account, 0 if the person does not have a bank account
Financial training condition	Dichotomic variable: 1 if the person has taken a course, 0 if the person has not taken a course

* An Afore means a retirement fund manager. It is a private financial institution that is in charge of managing retirement funds for workers affiliated to the Mexican Social Security.

Source: Own elaboration with information from the ENIF 2018.

2.1. Description of the model

To explain the behavior of the dichotomous dependent variable, the Probit model based on utility theory is used, or the rational selection perspective based on behavior, as presented in Gujarati and Porter (2010). The set of independent variables (X_i) used in the Probit model are of the quantitative and qualitative type. The interpretation of the Probit estimates are based on the equation $P_i = P(Y = 1 / X)$. Thus, since the objective of this research is to explain the effect of the X characteristics of the respondents on the probability of answering the financial literacy questions correctly, the marginal effect of a unit change in the value of a regressor is calculated.

From the above equations, the effect of a unit change in X on the probability that $Y = 1$ is given by the following derivative:

$$\frac{dP_i}{dX} = f(\beta_0 + \beta_i X_i) \beta_i$$

Where $f(\beta_0 + \beta_i X_i)$ is the standard normal probability density function evaluated at $\beta_0 + \beta_i X_i$. In our model, quantitative and qualitative independent variables are contemplated. For the case of binary explanatory variables, the marginal effect of going from $x_k = 0$ to $x_k = 1$, keeping all the other viable variables fixed, is calculated as

$$= F(\beta_0 + \beta_1 X_1 + \dots + \beta_{k-1} X_{k-1} + \beta_k) - F(\beta_0 + \beta_1 X_1 + \dots + \beta_{k-1} X_{k-1})$$

Where the expression $F(\)$ depends on the values of all the other x_j . Then, to calculate the marginal effect, the average of the independent variables is used, as proposed in Wooldridge (2010). Thus, the model allows us to interpret the marginal effect of the change in the value of a discrete variable x_k from zero to one, as the probability of correctly answering the corresponding financial literacy question.

To test the individual significance on the parameters, the results of the regression and the z test statistic are used. The specification of the tests is as follows:

$$H_0 : \beta_i = \beta_i^0 \quad \text{vs} \quad H_1 : \beta_i \neq \beta_i^0$$

If the null hypothesis $H_0 : \beta_i = 0$ is correct, then

$$z = \frac{\hat{\beta}_i}{\sqrt{\text{var}(\hat{\beta}_i)}} = \frac{\hat{\beta}_i - \beta_i^0}{\sqrt{\text{var}(\hat{\beta}_i)}} \sim Z(0,1)$$

If α is the significance level of the test and Z_{tables} is the critical value, then we use the test mechanism that rejects the null hypothesis $H_0 : \hat{\beta}_i = 0$ if,

$$P[|Z| > Z_{tables}] = \alpha$$

3. Results

Based on the responses of the 12,466 people, the frequency distribution is presented. From the results, it is observed in Table 4 that only 63% of the sample answered the phrase "it is better to save money in two or more ways or places than in just one (a savings account, a group savings with relatives or acquaintances, etc.)" correctly. In the compound interest question, only 34.1% answered correctly. In the question of knowledge of the meaning of inflation, more than three quarters of the respondents (76.8%) answered correctly.

Table 4. Distribution of answers to the questions on financial knowledge.

Variables	Correct	Incorrect	Does not know	Does not respond
Savings diversification condition	63.0%	32.4%	4.0%	0.43%
Compound interest knowledge	34.1%	47.6%	2.9%	15.7%
Knowledge of the inflation meaning	76.8%	16.2%	6.8%	

Source: Own with ENIF 2018 data.

Based on the Probit econometric model for the savings diversification equation, the sample is reduced to 11,725 observations during the process of identifying significant variables. The McFadden R-squared goodness-of-fit measure is 0.029684 and the value of the count R-squared is 7444 correct predictions (63.5%). The sign and significance of the variables are described below.

As presented in Table 5. The coefficient of the gender variable is statistically significant at 5% level, whose positive sign coincides with the expectation. Thus, the probability of answering the question on diversification correctly is 2.4% higher for a male person compared to someone of the female sex.

For the variable age range, the coefficients of the categories 25-34, 45-54, 55-64 and 65-74 are significant at 5%, whose negative sign coincides with the expectation. As observed in the value of the marginal effect, the probability of answering the risk question correctly varies according to age. In the age ranges of 25-34 and 45-54 years the probability is below the base category (15-24 years) in the magnitudes of 2.4% and 2.8% respectively; while for ranges 55-64, 65-74 is 9.6% and 8.8%, respectively.

Table 5. Probit model. Dependent variable: Diversification

	Coefficient	Typical Deviation	Z	P-value		Marginal effect
Constant	0.0762752	0.0460816	1.6552	0.09788	*	
Gender	0.0660648	0.0301474	2.1914	0.02842	**	0.0249217
Age:25-34	-0.0648762	0.0316625	-2.0490	0.04046	**	-0.0246391
Age:45-54	-0.073903	0.0351813	-2.1006	0.03567	**	-0.0281196
Age:55-64	-0.249561	0.0397744	-6.2744	<0.00001	***	-0.0965059
Age:65-74	-0.228281	0.0538143	-4.2420	0.00002	***	-0.088492
Location size	0.0995961	0.0306336	3.2512	0.00115	***	0.0379238
Northwest	-0.153496	0.0340703	-4.5053	<0.00001	***	-0.0587875
Northeast	-0.0677465	0.0343738	-1.9709	0.04874	**	-0.025763
Mexico City	0.178658	0.0554624	3.2212	0.00128	***	0.0654835
Central South East	0.106625	0.0337486	3.1594	0.00158	***	0.0398043
Head of the household	-0.0745291	0.0289001	-2.5788	0.00991	***	-0.0281638
Educational level	0.0500446	0.00575412	8.6972	<0.00001	***	0.0189041
Home	-0.0805365	0.0377154	-2.1354	0.03273	**	-0.0306633
Employee	-0.160382	0.0334625	-4.7929	<0.00001	***	-0.0607468
Day laborer	-0.150021	0.061087	-2.4559	0.01405	**	-0.0577708
Quartil2	0.0910452	0.0402389	2.2626	0.02366	**	0.0340205
Quartil3	0.123023	0.0411021	2.9931	0.00276	***	0.045816
Quartil4	0.234233	0.0475127	4.9299	<0.00001	***	0.0855536
Housing	0.0807983	0.027563	2.9314	0.00337	***	0.030407
Afore	0.0622006	0.0288353	2.1571	0.03100	**	0.0234533
Sofistication1	0.10032	0.0319409	3.1408	0.00168	***	0.0374834

Observations number: 11725

Number of "correctly predicted" cases= 7444 (63.5%)

McFadden R-squared: 0.029684

*, **, ***: Statistical significance at 10%, 5%, 1% respectively

Source: own calculated with Econometric Views 3.0

This presents a marginal effect with a decreasing trend in relation to age, which suggests that the youngest (including the 35-44-year-old category) have a greater probability of answering the diversification question correctly compared to the older ones.

For the variable location size, the coefficient is statistically significant at 1%, whose sign coincides with the expected one. Thus, the probability of answering the diversification question correctly is 3.7% higher for someone who belongs to the urban location compared to someone from the rural location. The coefficients of the Northwest, Northeast, Mexico City, and Central South and East regions are significant at 5%.

As observed in the value of the marginal effect, the probability of answering the diversification question correctly is 6.5% higher for someone who belongs to the Mexico City region and 3.9% higher for someone from the Central South and East compared to those who live in the South region, which is the comparison category.

The coefficient of the head of household variable is significant at 1%, whose negative sign indicates that the probability of answering the diversification question correctly is 2.8% lower for someone who has the position of head of household compared to those who do not have said position.

The coefficient of educational level is significant at 1% whose positive sign coincides with the expectation. Thus, the probability of answering the diversification question correctly is 1.8% higher for each completed educational level. The coefficient of the household variable is significant at 5%, whose negative sign indicates that the probability of answering the diversification question correctly is 3% lower for someone who works at home compared to those who do not work, which is the base category.

According to the position in the occupation, the coefficients of the variables employee and day laborers are significant at 5%, with a negative coefficient. For the level of income from work, the coefficients of quartile2, quartile3 and quartile4 are significant at 5%. In all categories there is a positive coefficient that matches the expected sign. As indicated in the value of the marginal effect, the probability of correctly answering the diversification question is 3.4%, 4.5% and 8.5% higher for someone who belongs to quartile2, quartile3 or quartile4, respectively, compared to those who do not receive income. For the housing variable, a positive and significant coefficient is obtained at 1%.

Thus, the probability of answering the diversification question correctly is 3% higher for someone who has a home compared to someone who does not have their own place. For the Afore variable, a positive coefficient is obtained with a significance of 5%; thus, the probability of answering the diversification question correctly is 2.3% higher in the case of someone who has an Afore account compared to someone who does not. For the financial sophistication variable, a positive coefficient is obtained with a significance of 1%. The probability of answering the diversification question correctly is 3.7% higher for individuals who have an account (savings, checking or fixed-term deposit) compared to someone who does not have an account.

From the results of the estimation for the dependent variable on the knowledge of compound interest, the sample is reduced to 11,725 observations during the process of identifying significant variables. The McFadden R-squared goodness-of-fit measure is 0.016933 and the value of the count R-squared is 7717 correct predictions (65.8%). The sign and significance of the variables are described below.

As presented in table 6, for the variable age range the coefficients of the categories 25-34, 55-64 and 65-74 are significant, with a negative sign. Thus, the probability of answering the question of knowledge of compound interest correctly is lower for someone who belongs to the categories 25-34, 55-64 and 65-74 years compared to the base category (15-24 years), in the magnitudes of 2.2%, 4.6% and 6.1%, respectively.

The results indicate that older subjects are less likely to answer the question of compound interest correctly, compared to younger ones. A possible conjecture is because the

younger group is in an educational stage or because they are familiar, from their experience as a consumer, with the concept of compound interest.

Table 6. Probit model. Dependent variable: compound interest

	Coefficient	Typical Deviation	Z	P-value		Marginal effect
Constant	-0.634592	0.0360425	-17.6068	<0.00001	***	
Age:25-34	-0.0632392	0.0297167	-2.1281	0.03333	**	-0.0229765
Age:55-64	-0.128894	0.0387833	-3.3234	0.00089	***	-0.0461859
Age:65-74	-0.174476	0.0562341	-3.1027	0.00192	***	-0.0616306
Dependents	0.0907184	0.0267822	3.3873	0.00071	***	0.0330139
West	0.216084	0.0306616	7.0474	<0.00001	***	0.0810077
Mexico City	-0.132171	0.0521112	-2.5363	0.01120	**	-0.0471116
Common law	-0.0946493	0.0306211	-3.0910	0.00199	***	-0.0342375
Separado(a)	-0.171923	0.0460216	-3.7357	0.00019	***	-0.0608476
Educational level	0.0313482	0.00540741	5.7973	<0.00001	***	0.0114726
Retired	0.183165	0.0754174	2.4287	0.01515	**	0.0691319
Disabled	-0.488672	0.197334	-2.4764	0.01327	**	-0.156212
Quartil3	0.0622676	0.0319027	1.9518	0.05096	*	0.0229684
Afore	0.0926235	0.0265061	3.4944	0.00048	***	0.0339924
Sofistication1	0.0918416	0.0306994	2.9916	0.00277	***	0.0339809

Observations number: 11725

Number of "correctly predicted" cases = 7717 (65.8%)

McFadden R-squared: 0.016933

*, **, ***: Statistical significance at 10%, 5%, 1% respectively

Source: own calculated with Econometric Views 3.0

The positive coefficient of the economic dependent variable is significant at 1%; thus, the probability of answering the question of the knowledge of compound interest correctly is 3.3% higher for someone with economic dependents compared to someone who does not have any dependents. The coefficients for the West and Mexico City regions are significant, the first with a positive sign and the second with a negative sign. As observed in the value of the marginal effect, the probability of answering the question of compound interest correctly is 8% higher for someone who belongs to the West region compared to someone who lives in the South region, while for someone that belongs to the Mexico City region is 4% lower. Regarding the marital status, the coefficients of common law and separated are significant at 1%. According to the negative sign of the coefficient, the probability of answering the question of the knowledge of compound interest correctly is lower for someone in common law or separated (a), in the magnitudes of 3.4% and 6.0% respectively, compared to someone who is single.

For educational level, the positive coefficient is significant at 1%. The result of the marginal value indicates that the probability of answering the question of the knowledge of compound interest correctly is 1.1% higher for each educational level completed. According to the activity condition, the coefficients of retired and disabled are significant at 1%; the first presents a positive coefficient and the second negative coefficient. As seen in the value of the marginal effect, the probability of answering the question of compound interest knowledge correctly is 6.9% higher for someone who is retired, compared to those who do not work; while for someone disabled the probability is 15% lower. According to the level of income from work, the positive coefficient of quartile 3 is significant at 10%. As indicated by the value of the marginal effect, the probability of answering the compound interest knowledge question

correctly is 2.2% higher for someone with the income level belonging to quartile 3, compared to someone who has no income.

The positive coefficient of the Afore variable is significant at 1%. Thus, the probability of answering the question of the knowledge of compound interest correctly is 3.3% higher for someone who has an Afore account compared to someone who does not. The coefficient of the financial sophistication variable of type 1 is significant at 1%. Thus, the probability of answering the question of the knowledge of compound interest correctly is 3.3% higher in the case of someone who has an account (savings, checking account, fixed-term deposit) compared to someone who does not have any of these.

The results of the estimation for the dependent variable on the knowledge of inflation are presented in Table 7. The sample is reduced to 11,725 observations during the process of identifying significant variables. The McFadden R-squared goodness-of-fit measure is 0.054651 and the value of the count R-squared is 8980 correct predictions (76.6%). The sign and significance of the variables are described below.

Table 7. Probit model. Dependent variable: knowledge of the concept of inflation

	Coefficient	Typical Deviation	z	P-Value		Marginal effect
Constant	-0.149074	0.0548415	-2.7183	0.00656	***	
Gender	0.0729843	0.0312566	2.3350	0.01954	**	0.0216628
Age:25-34	0.0966093	0.0448502	2.1540	0.03124	**	0.0281927
Age:35-44	0.190598	0.0462346	4.1224	0.00004	***	0.0544783
Age:45-54	0.338362	0.0490564	6.8974	<0.00001	***	0.0921883
Age:55-64	0.361338	0.0530971	6.8052	<0.00001	***	0.0963558
Age:65-74	0.29148	0.0661595	4.4057	0.00001	***	0.0780634
Location size	0.116593	0.0318034	3.6661	0.00025	***	0.0355192
Northwest	0.0810919	0.036197	2.2403	0.02507	**	0.0236719
West	0.0927093	0.0350876	2.6422	0.00824	***	0.0269841
Mexico City	0.114497	0.0608527	1.8815	0.05990	*	0.0327568
Educational Level	0.0991308	0.00682547	14.5237	<0.00001	***	0.0295164
Economically active population (EAP)	-0.20802	0.105729	-1.9675	0.04913	**	-0.0597741
Student	0.201709	0.0938912	2.1483	0.03169	**	0.055567
Retired	0.207524	0.0940376	2.2068	0.02733	**	0.0570467
Without payment	0.310602	0.122703	2.5313	0.01136	**	0.0819135
Quartil1	0.181999	0.105735	1.7213	0.08520	*	0.0517111
Quartil2	0.275563	0.106486	2.5878	0.00966	***	0.0760595
Quartil3	0.314235	0.107079	2.9346	0.00334	***	0.0861754
Quartil4	0.339847	0.111323	3.0528	0.00227	***	0.0912766
Banked	-0.0573117	0.0324987	-1.7635	0.07782	*	-0.0170626
Afore	0.158701	0.0322415	4.9223	<0.00001	***	0.0467681
Sofistication1	0.122071	0.0404653	3.0167	0.00256	***	0.0352954
Courses	0.0954651	0.0544782	1.7524	0.07971	*	0.0275465

Observations number: 11725

Number of "correctly predicted" cases = 8980 (76.6%)

McFadden R-squared: 0.054651

*, **, ***: Statistical significance at 10%, 5%, 1% respectively

Source: own calculated with Econometric Views 3.0

For the gender variable, a positive coefficient is obtained that coincides with the expected sign, with a significant one of 5%. The results indicate that the probability of answering the question about the knowledge of inflation correctly is 2.1% higher for someone of the male sex compared to someone who is female. For the variable age range, the coefficients of the categories 25-34, 35-44, 45-54, 55-64 and 65-74 years are significant.

As observed in the value of the marginal effect, the probability of answering the question of the knowledge of inflation correctly shows an increasing behavior until reaching a maximum value of 9.6% in the 55-64 years category, and decreases in the category of 65-74 years. The results indicate that the youngest and the oldest are less likely to answer the question correctly, despite the fact that people in the oldest group lived through more inflationary periods in Mexico.

The positive coefficient of the location size variable is significant at 1%. Thus, the probability of answering the question of knowledge of inflation correctly is 3.5% higher in the case of someone who belongs to the urban area compared to someone who lives in the rural area. The coefficients of the Northwest, West and Mexico City are significant at the 5%, 1% and 10% level respectively. All the categories present a positive coefficient that coincides with the descriptive analysis. According to the value of the marginal effect, the probability of answering the question of knowledge of inflation correctly is greater for someone who belongs to the Northwest, West or Mexico City, in the magnitudes of 2.3%, 2.6% and 3.2% respectively, compared to someone who belongs to the South region.

The positive coefficient of the variable educational level is significant at 1%. The result indicates that the probability of answering the inflation question correctly is 2.9% higher for each educational level completed. According to the activity condition, the coefficient of the EAP, student and retired categories is significant; the first has a negative sign and the others have a positive sign. As observed in the value of the marginal effect, the probability of answering the question about inflation correctly is 5.9% lower for someone who belongs to the EAP, compared to someone who does not work; for the case of students and retirees the probability is 5.5% and 5.7% higher, respectively.

According to the position in the occupation, the coefficient of unpaid workers is significant; thus, the probability of answering the question about inflation correctly is 8.1% higher for unpaid workers, compared to those who do not work. For the variable level of income from work, the coefficient of the categories Quartile1, Quartile2, Quartile3 and Quartile4 is significant. All the categories present a positive coefficient that matches the expected sign. As indicated in the value of the marginal effect, the probability of answering the question on inflation correctly is higher for those subjects who belong to Quartile1, Quartile2, Quartile3 and Quartile4, in the magnitudes of 5.1%, 7.6%, 8.6% and 9.1% respectively, compared to those who do not receive income.

For the banked variable, a negative coefficient is obtained with a significance of 10%. Thus, the probability of answering the question of knowledge of the concept of inflation correctly is 1.7% lower for someone who has a bank account compared to someone who does not. For the Afore variable, a positive coefficient is obtained with a significance of 1%. Thus, the probability of answering the question of knowledge of the concept of inflation correctly is 4.6% higher for someone who has an Afore account compared to someone who does not.

For the type 1 financial sophistication variable, a positive coefficient with a significance of 1% is obtained. Thus, the probability of answering the question about inflation correctly is 3.5% higher for someone who has an account (savings, checking, fixed-term deposit) compared to someone who does not have any of these. For the variable financial courses, a positive coefficient is obtained with a significance of 10%, so the probability of answering the question

of knowledge of the concept of inflation correctly is 2.7% higher for someone who has taken a financial course, compared to someone that he has not taken any.

4. Discussion of the results

In the estimation model of the meaning of inflation, the positive coefficient of the age range categories and the behavior of the value of the marginal effect with an inverted “U” shape are highlighted, indicating that the youngest and the oldest are less likely to answer the question about the concept of inflation correctly, as emphasized in Lusardi and Mitchell (2014). The results of the region variable are also highlighted, in which there are differences on the probability of answering the inflation question correctly for those who belong to the North region compared to those from the South, as is also presented in Bucher -Koenen and Lusardi (2011) and Fornero and Monticone (2011).

The positive coefficient of the educational level indicates that financial literacy is positively related to formal education, so the probability that someone answers the inflation question correctly is related to a higher completed educational level. The results show the difference in financial knowledge between groups of different school years, as presented in Chen and Volpe (1998, 2002) through a logistic regression, and a significant difference in financial knowledge between groups of different educational levels such as it is presented in Lusardi, Mitchell, & Curto (2009) using a Probit model.

The differences in the results of the gender variable show that women are less likely to answer the questions of diversification of savings, simple interest and knowledge of inflation correctly, in the magnitudes of 2.4%, 5.4% and 2.1% respectively. The above percentages are compared with those obtained in Lusardi and Mitchell’s research (2011a) whose results from the Probit model indicate that women are almost ten percent less likely than men to answer the questions of the compound interest rate and inflation as well as the diversification question correctly.

In Lusardi, Mitchell, and Curto’s research (2009), the results of the Probit model indicate significant differences in the percentage of correct answers between men and women, in relation to the questions on financial literacy (interest rate, inflation, risk diversification).

The results of the marital status are also highlighted, where married individuals have a 1.9% greater probability of answering the risk question correctly, compared to someone who is single; while individuals in common law, separated or married have 1% more probability of answering the simple interest question without calculation correctly; those in common law or separated are less likely to answer the question of compound interest. The results are comparable with those obtained from Danes and Hira (1987) in which the index of knowledge that subjects have on financial management in general is significantly related to marital status, specifically those married subjects have greater knowledge on financial management because of experience and financial needs.

The results of the financial sophistication variable are highlighted in the risk models, diversification, knowledge of basic accounts, simple interest, and compound interest in which individuals who have a savings account, checking or fixed-term deposit, have more probability (2%, 3.7%, 21.8%, 2.5%, 3.3%, respectively) of answering the financial literacy questions correctly compared to those who do not have any.

The previous percentages are compared with those obtained in Lusardi, Mitchell, and Curto’s research (2009) where they identify that those subjects whose parents have savings accounts have a 6% more probability of answering the question on financial diversification correctly, while those whose parents have actions have a 7% probability of answering the

question correctly. The results indicate that family wealth significantly influences the financial literacy of the subjects.

The statistical importance of the variable courses (financial education) is remarkable in the models of knowledge of basic accounts, simple interest and knowledge of the concept of inflation. The probability of answering the questions correctly is higher (15.7%, 3.6%, 2.7%, respectively) for someone who has taken a financial course, compared to someone who has not taken one, as discussed in Lusardi and Mitchell (2011b).

Conclusion

The research results allow to identify a set of sociodemographic variables and the individual's financial experience related to financial literacy. The variables that have been identified are: gender, wealth of the individual, experience, age, education, educational level, employment status, marital status, educational level of the parents, among others according to Danes and Hira (1987); Volpe, Chen, and Pavlicko (1996); Chen and Volpe (1998); Lusardi and Mitchell (2011a).

The results obtained in the descriptive and correlational analysis are consistent with the research by Lusardi and Mitchell (2011a), Lusardi, Mitchell, and Curto (2009), Silgoner, Greimel-Fuhrmann, and Weber (2015), Lusardi and Mitchell (2014) and with those studies that have used the questions for international comparison purposes, as presented in Atkinson and Messy (2012) and Xu and Zia (2012).

In Mexico, respondents have greater difficulty understanding the concept of simple interest with calculation, due to the high percentage of "I don't know" responses (15.0%). In other countries, the concept with the greatest difficulty to understand by those surveyed is the concept of diversification, as presented in Lusardi, Mitchell and Curto (2009) with 37.3% of "I don't know" responses, in Lusardi and Mitchell (2011b) with 33.7%, in Bucher-Koenen and Lusardi (2011) with 13% of "I don't know" responses. In other various countries populations, the percentages of the "I don't know" answers are above 18% (Lusardi and Mitchell, 2014).

It is concluded that financial literacy for Mexicans is varied and differentiated for each population group. Specific results of sociodemographic variables are identified that predict the probability that Mexicans of 18 years of age or older answer the financial literacy questions correctly. The results of this research provide evidence for Mexico about specific groups of the population that present significant differences in financial literacy, particularly those with low educational level, women, the disabled, retirees, low-income people, those who are not included in the financial system, as well as those who lack training in financial education issues.

These results provide to Mexican government evidence in order to design public policies to enhance the possibilities of the most disadvantage groups, to those who were the most affected by the Covid crises. Financial literacy had a profound mediating effect on the personal finance of individuals during the COVID-19 pandemic because the lockdown increased joblessness and people financial illiterate were not able to make money and they were spending their savings to meet basic requirements (Anand, Mishra, Verma, & Taruna (2021).

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