

Financial literacy and the use of credit cards in Mexico

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Abstract. The objective of this research is to determine the level of financial literacy of Mexican cardholders and its relationship with sociodemographic variables. The influence of financial education on the level of financial literacy of this group, as well as the relationship between their level of financial literacy and their behavior towards debt contracted via credit cards are also explored. Data was obtained from the Mexican Survey of Financial Inclusion (ENIF, 2018). The sample was made up of 2,170 people who declared receiving income from salary and having a credit card. A Probit regression model was used, with which the significant variables related to the debtor behavior of the respondents were identified. The following sociodemographic control variables were included: gender, age, area of residence, country region, educational level, income from salary, economic dependents, marital status and financial training. The results indicate that Mexican cardholders have a higher level of financial literacy than the general population and that those with less financial literacy are more likely to belong to the group called “fee payers”. It was also found that women have a lower level of financial

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literacy, however, it is men who are more likely to belong to the fee payer group.

Keywords: financial literacy, cardholders, financial behaviour, Mexico.

JEL Classification: G53, G51, G40

1. INTRODUCTION

The issue of financial literacy is becoming increasingly important, not only from a theoretical but also from a practical point of view. Given the changes in the microeconomic context, the importance of individuals being well informed about their financial options and being able to make responsible decisions stands out. According to Hilgert, Hogarth and Beverly (2003) financially educated and informed consumers are more skilled at making good decisions for their families and are in a better financial position to increase their financial security and well-being.

Regarding financial behavior, according to Atkinson and Messy (2012), people with financial knowledge are expected to apply strategies to smooth future income flows and avoid the use of credit for basic needs such as the consumption of non-durable goods and public services. The success in implementing these strategies will depend on the predictability of their income and expenses and the skills the person has.

Credit cards have become an increasingly used payment instrument. They are an important tool utilized by producers and sellers in order to exist in the market and to maintain their strength in today's intense competitive environment. Consumers are allowed short-term cash credit, not needing to carry money, the opportunity for installment shopping and late payment advantage (Önder, 2018). However, it should be considered that the use of credit cards to cover basic needs can be very dangerous and put a family's financial stability at risk. Therefore, Engels, Kumar & Philip, (2019) recommended that the credit card balance must be paid off in full each month.

According to Ceballos and Owen (2018), the payment of credit debt in Mexico generally has an increasing behavior and has an inverted "U" shape in the life cycle of families. "The growing behavior of credit at the beginning of family life is driven by the payment of home loans, however, credit cards, with an increasing behavior throughout the cycle, are the ones with the greatest weight in the total credits of families" (p. 326).

According to the Bank of Mexico (2020a), for Mexicans, credit cards constitute one of the main consumer credit channels and one of the most popular means of payment, representing 38.6% of the total consumer credit portfolio, whose delinquency rate is one of the highest among consumer loans (5.2% in June 2019).

As a financing instrument, the credit card generates interest due to its use. If the payment of the debt is partial and greater than or equal to the minimum payment, interest must be paid on the accumulated debt. These cardholders are known as fee payers. If the entire debt is covered, cardholders do not pay interest on the credit received and are known as customers who pay in full. The cost of credit cards in Mexico, measured by the Total Annual Cost, according to the type and credit limit, is between 40% and 125% (Banco de México, 2020b).

However, according to data from the National Survey of Financial Inclusion (CNBV and INEGI, 2018), only 63.1% of users in Mexico pay what is required each month so as not to generate interest on the whole debt, while 36.9% pay more than the minimum, cover the minimum payment or pay less than the minimum. Given the combination of the high percentage of people who have a credit card, their high

interest rates and a worrying debtor behavior of a significant percentage of cardholders, it is essential to analyze the variables that may influence such behavior.

In economic theory, various factors are identified that influence the behavior of individuals when making financial decisions in the context of debt and savings. According to Parkin and Loría (2015), an individual can increase his preference for present consumption when interest rates are low or his expected future income increases, or if his aversion to risk decreases, which makes it more attractive to get into debt. Knowledge of basic economic and financial concepts is another factor related to financial behavior (Hilgert, Hogarth and Beverly, 2003; Lusardi and Tufano, 2009).

However, according to Lusardi, Mitchell and Curto (2009) and Lusardi and Mitchell (2011c), most individuals are not capable of simple calculations and lack knowledge of elementary concepts of finance. On this matter, financial literacy of the population becomes a fundamental element for making decisions related to personal finances, which can favor the understanding of individuals about financial products and services and avoid unnecessary financial costs.

This research identifies the level of financial literacy of Mexican cardholders and its relationship with sociodemographic variables. It analyzes how financial education influences the level of financial literacy among Mexican cardholders, as well as the relationship between the level of financial literacy of this group and their behavior towards debt contracted via credit cards. Based on this, this research seeks to answer the following questions: What is the level of financial literacy of Mexican cardholders? Does the level of financial literacy of Mexican cardholders differ based on their sociodemographic characteristics? Does financial education influence the level of financial literacy of Mexican cardholders? How does the level of financial literacy of Mexicans influence their behavior of debt contracted with a credit card?

The study is organized as follows. Section 2 presents a literature review on financial literacy, its determinants and the relationship with cardholders' behavior. Section 3 presents research methodology and the description of the model is developed in section 4. The empirical results are presented in section 5, followed by concluding remarks and implications in section 6.

2. LITERATURE REVIEW

Research by Lusardi and Mitchell (2008, 2011c, 2014) have favored the development of a theoretical framework to explain financial literacy and its relationship with the behavior of individuals regarding the taking of financial decisions in various contexts. Lusardi and Mitchell (2014) consider that financial knowledge is a form of investment in human capital and therefore, individuals decide how much to invest in human capital throughout life. Financial knowledge is also related to the proper use of credit, since on average half of adults in the main emerging countries use a credit card or request a loan, but do not have financial knowledge (Klapper & Lusardi, 2020).

The economic model postulates that the consumer has expectations about the probability of survival in the future, discount rates, investment returns, gross and net earnings, the benefits of retirement schemes and inflation. The theoretical formulation of saving and investment decisions is based on the premise that the individual has a set of fundamental financial knowledge, as well as a set of basic skills to process economic and financial information, implicit in the decision-making process.

Based on these arguments, the empirical strategy used by Lusardi and Mitchell (2008, 2011c, 2014) and Lusardi, Mitchell and Curto (2009) to measure financial literacy is the formulation of three questions (calculation of compound interest, the effect of inflation, and risk diversification) that allow identifying the knowledge that individuals possess on basic but fundamental financial concepts for making financial decisions.

The results of different investigations in both highly industrialized and developing countries have revealed, in recent years, low levels of financial literacy (OCDE, 2020; Morgan and Trinh, 2019; Lusardi and Mitchell, 2011a; Xu and Zia, 2012; Atkinson and Messy, 2012), even in advanced economies with well-developed financial markets (Lusardi, 2019). Even in emerging countries there is a low level in financial knowledge in credit card holders (Klapper & Lusardi, 2020). Tahir, Richards and Abdullah, (2020) reported the result of a study with data from Household, Income and Labour Dynamics in Australia (HILDA, 2016) Survey. They find that higher levels of financial literacy is associated with less credit card debt.

Only 50% of those surveyed answered the inflation and compound interest questions correctly, and only a third answered all three questions correctly. In the diversification question, the most difficult for the respondents, more than a third of the respondents did not know the answer.

Recently, the results of the International Survey of Adult Financial Literacy carried out by the OECD (2020) confirm that financial literacy levels are low across participating economies. Individuals across the entire sample on average scored only 12.7 or just under 61% of the maximum financial literacy score. These results also show clear differences in the level of financial literacy in certain groups. Significant differences exist between the financial literacy and well-being of men and women, with the latter performing worse. Young people and seniors often exhibit lower financial literacy levels, similarly to those who do not use digital devices or services.

In the research by Lusardi, Mitchell, and Curto (2009), results show differences in financial literacy between men and women. From the descriptive analysis of the percentage of correct answers to each of the questions on financial literacy (interest rate, inflation, risk diversification), the results show that women obtained a lower percentage of correct answers in relation to men, with a difference of up to 13% for the inflation and risk diversification questions. These results coincide with those of Atkinson and Messy (2012), Swiecka, Yesildag, Özen and Grima (2020) in Poland, Grigion, Mendes and Kirch (2018) in Brazil and contrast with those of Morgan and Trinh (2019) in Cambodia and Vietnam.

Financial literacy is also highly correlated with the level of schooling (Chen and Volpe, 1998, 2002; Bucher-Koenen and Lusardi, 2011; OECD, 2016; Conrad and Kingstone, 2017) and with the age of the participants. Among students, for example, older people have a higher level of financial knowledge (Garg and Singh, 2018; Morgan and Trinh, 2019). Lusardi and Mitchell (2011a) identify that financial literacy throughout the individual's life cycle has an inverted U shape, lower in young individuals and in older individuals.

The results of the research by Lusardi, Mitchell and Curto (2009) on financial literacy of young people in the United States between 23 and 28 years old, report that 70% of the respondents correctly answered the question about the interest rate. 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. The low percentage of correct answers and the high percentage of the answer "I don't know" shows that young people have a very low level of financial literacy.

Literature has generated important evidence to analyze the relationship between financial literacy and financial behavior. In their research on financial literacy and its relationship with financial behavior, Lusardi and Tufano (2009) identify the sociodemographic characteristics of the subjects according to their type of financial experience and behavior. One of the clusters called "customers who pay in full" is characterized by its experience with the traditional financial system, has relatively high income, experience with financial instruments and a greater probability of being married, with greater financial knowledge. The cluster called "fee payers" has a high probability of paying the minimum amount on its credit cards, generates financial costs, uses its credit card to obtain loans, and has minimal financial experience and less financial knowledge compared to the other groups.

Various studies have been carried out to analyze in particular the use of the credit card in different populations. In the research by Allgoog and Walstad (2013) about the relationship between financial literacy and payment behavior on credit cards, they identify that in the age range 18-24 years, men are 10 % more likely to pay their credit card debt in full, but the probability decreases for subsequent age groups to half (5%) for the age range 50-59 years. Men aged 60 and older are 5% less likely than women to make the full credit card payment. The group of men, which does not belong to the older age group, presents a positive behavior pattern regarding the control of their debts, and paying on time without incurring in interest costs.

Virot (2014) identifies factors that influence credit card debt. As people's age increases, their indebtedness also increases, but decreases at the end of their life cycle. The civil status of the head of the family (living with her partner) influences as financial support for greater indebtedness. The healthy financial condition of the head of the family, as a sign of good financial behavior in the current period, influences an increase in current debt. When more people at home are employed, indebtedness increases. The educational level of the head of the household is another element related to debt, the higher the educational level and income, the higher the debt.

In an investigation in which 725 university students from the business area in the United States participated, Ludlum et. al. (2012) identified that fewer than 10% of participants knew their interest rate, the late charges, and the over balance penalty on the credit cards they use. This reveals that when the financial literacy of the college students is examined, fewer than one in ten knew these basic facts of a financial tool they have in their pocket every day. This results that refer that the level of financial literacy has a direct relationship with a good use of credit cards coincide with those of Yao and Meng, (2018), Akben-Selcuk, (2015), Allgood and Walstad (2013).

The results of the research carried out by Mottola (2013) in the analysis of the use of the credit card and the difference that may exist with respect to gender, with data from the FINRA Investor Education Foundation's National Financial Capability Study, suggest that women engage in more costly credit card behaviors than men. Largely, the difference can be accounted for by demographic characteristics, economic circumstances, and financial literacy levels. For their part, Dewri, Islam and Saha (2016) identified that there was no significant difference with respect to gender concerning the use of a credit card in a study carried out in Bangladesh.

3. METHODOLOGY

The concept of financial literacy used in this research is the one proposed by Lusardi and Mitchell (2011c). In their operational form, they use three questions to measure financial literacy, referring to the calculation of financial interest, the effect of inflation and the concept of risk diversification. The first two measure the individual's ability to perform a calculation and the third assesses whether the respondent has knowledge of the concept of risk diversification, as a fundamental element in making informed investment decisions.

The data used correspond to the last National Survey of Financial Inclusion in 2018 (CNBV and INEGI, 2018). This survey was answered by 12,466 Mexicans between 18 and 70 years old. They were interviewed in their own home. From the people surveyed, 2170 met the criteria of the research: receiving income from salary and having a credit card. This represent 17.4% of people surveyed. Table 1 shows the sociodemographic characteristics of the sample. The assumption that the proportions of each group have no significant changes could be assumed for the following years 2019-2021 publication.

The proxy variables to measure financial literacy are the concepts of inflation, simple interest and risk diversification, questions 12.4, 12.2 and 4.9.3 of the survey. A dichotomous variable is designed for each question: 1 if the respondent answers correctly, 0 otherwise. Two financial literacy indicators are designed

as in Lusardi and Mitchell (2011b): the first is the number obtained from the sum of correct answers to the financial literacy questions, whose range goes from 0 to 3; the second is a dichotomous variable in which the value of 1 is assigned if the respondent answers the three questions correctly and 0, otherwise.

Table 1

Sociodemographic characteristics of sample

Variables	Categories	Total	Percentage
Gender	Female	989	45.58%
	Male	1181	54.42%
Economic dependents	Without dependents	483	22.26%
	With dependents	1687	77.74%
Area of residence	Rural	309	14.24%
	Urban	1861	85.76%
Region	Northwest	485	22.35%
	Northeast	431	19.86%
	West	401	18.48%
	Mexico city	117	5.39%
	Central south and east	328	15.12%
	South	408	18.80%
Age	15-24	244	11.24%
	25-34	601	27.70%
	35-44	647	29.82%
	45-54	436	20.09%
	55-64	203	9.35%
	65-74	39	1.80%
Income from salary *mexican pesos	Quartile 1 (\$200 to <\$4,000)	618	28.48%
	Quartile 2 (\$4000 to <\$6,000)	501	23.09%
	Quartile 3 (\$6000 to <\$10,000)	554	25.53%
	Quartile 4 (more than \$10,000)	497	22.9%
Marital status	Free union	406	18.71%
	Separated	188	8.66%
	Divorced	102	4.70%
	Widowed	49	2.26%
	Married	945	43.55%
	Single	480	22.12%
Financial training condition	Without financial courses	1895	87.32%
	Withfinance course	275	12.68%

Source: ENIF (2018); Authors calculations.

To measure financial behavior, question 6.15 of the survey on payment behavior with respect to the credit card is used as a proxy, referring to a departmental or self-service store credit card (question 6.8.1) and / or credit card bank (question 6.8.2). In concordance with Banco de México (2020a) and Lusardi and Tufano (2009), two groups are defined according to this financial experience; a group called fee payers, and another customers who pay in full. The behavior variable is coded as a dichotomous variable: the value of 1 is assigned if the respondent belongs to the first group and 0 if he belongs to the second.

The following sociodemographic control variables are included: gender, age, area of residence, region, educational level, income from salary, economic dependents of the respondent, marital status, and financial training. The coding of the sociodemographic variables and the condition of financial training is presented in table 2. The Probit regression model is used, according to the design of the dependent variable, with which the significant variables that are related to the respondent's debtor behavior are identified.

Table 2

Sociodemographic Variables

Variables	Coding
Gender	Dichotomous variable: Men 1, Women 0.
Economic dependents	Dichotomous variable: With economic dependents 1, Without 0.
Area of residence	Dichotomous variable: Urban 1, rural 0.
Region	A dichotomous variable is constructed for each region: Northwest, Northeast, West, Mexico city, Central south and east, South). The base category is South region.
Age	Categorical variable that indicates ages. The base category is 14-23.
Educational level	Categorical variable that indicates the educational level: without studies, elementary school, high school, bachelor degree, master degree.
Income from salary	Income quartiles are designed. Ordinal categorical variable that indicates the quartile.
Marital status	A dichotomous variable is constructed for each marital status. The base category is single status.
Financial training condition	Dichotomous variable: Has participated in a finance course 1, Has not participated in finance courses 0.

Source: ENIF (2018); Authors calculations.

3.1. Model description

To explain the behavior of the dichotomous dependent variable, the Probit model based on utility theory is used, or from the rational selection perspective based on behavior, as presented in (Gujarati and Porter, 2010). The interpretation of the Probit estimates are based on the equation $P_i = P(Y = 1 / X)$, so to determine the effect of the X characteristics of the respondents on the probability that they present a financial debtor behavior, the marginal effect of a unit change in the value of each independent variable.

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 by $\beta_0 + \beta_i X_i$. In our model, for the case of binary explanatory variables, the marginal effect of going from $x_k=0$ a $x_k=1$, 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 $F(\cdot)$ depends on the values of all x_j . Then, to calculate the marginal effect, the average of the independent variables is used, like in (Wooldridge, 2010). To test the individual significance on the parameters, we used the results of the regression and the z test statistic. The specification is as follows:

$$H_0: \beta_i = \beta_i^0 \quad H_0: \beta_i \neq \beta_i^0$$

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

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

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

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

4. RESULTS

The financial literacy of those who make up the sample is presented in the penultimate column of table 3. 51.80% of the respondents answered the simple interest question correctly. The result is surprisingly low considering that it is a question in which the respondent does not do the operation, but only selects from a set of answers. 83.73% of the respondents answered the question about inflation correctly, which is indicative that they understand that inflation reduces purchasing power after one year. In the question of risk diversification, only a little more than two thirds of the sample (68.20%) answered correctly.

Analyzing all responses, the results show that only 45.02% of the respondents answered both the simple interest question and the inflation question correctly, and less than a third (31.71%) answered the three questions correctly. Likewise, when comparing the correct response percentages of the cardholders and the national population, it is determined that the group of cardholders presents greater financial literacy, whose differences are statistically significant. (2011c).

Table 3

Financial Literacy of Cardholders

	Pay less than the minimum (n=57)	Pay the minimum (n=315)	Makes the minimum payment (n=339)	Pay what is required so as not to generate interest (n=1362)	Don't know (n=37)	Sample (n=2170)	National population
Diversification of saving***							
Correct	59.65%	64.76%	67.17%	69.82%	62.16%	68.20%***	63.0%
Incorrect	40.35%	33.65%	31.33%	29.30%	35.14%	29.08%	32.4%
Don't respond	0.00%	0.59%	1.30%	0.68%	2.60%	1.13%	0.43%
Don't know	0.0%	1.0%	0.2%	0.2%	0.3%	1.24%	4.0%
Calculation of simple interest***							
Correct	42.11%	46.67%	51.38%	52.94%	37.84%	51.80%***	43.9%
Incorrect	49.12%	42.22%	42.36%	41.12%	43.24%	41.75%	40.4%
Don't respond	0.00%	0.63%	0.25%	0.37%	0.00%	0.37%	0.55%
Don't know	8.77%	10.48%	6.02%	5.58%	18.92%	6.68%	15.0%
Inflation knowledge***							
Correct	80.70%	76.51%	86.72%	84.80%	78.38%	83.73%***	76.8%
Incorrect	15.79%	18.10%	12.28%	12.63%	16.22%	13.50%	16.2%
Don't know	3.51%	5.40%	1.00%	2.57%	5.41%	2.76%	6.8%
Simple interest and correct inflation						45.02%***	36.85%
Three questions correct						31.71%***	25.12%

Hypothesis testing is performed to compare the proportion of correct responses of the sample with the national parameter.

To compare the proportions of correct responses of the groups, the joint test of difference of proportions, chi-square, is performed*,**,***: Statistical significance at 10%, 5%, 1% respectively.

Source: ENIF (2018); Authors calculations.

Regarding the payment behavior of the cardholders that make up the sample, according to our calculations, the following results are obtained: 63.10% pay what is required so as not to generate interest or the total debt, 17.79% pay more than the minimum, 14.39% makes the minimum payment, 2.5% pay less than the minimum. Regarding gender, it is identified that 64.4% of all women pay what is required in order not to generate interest, while of all men it is 61.47%. By area of residence, 63.14% of the residents of the urban area are customers who pay in full, compared with 60.52% of the rural area. By region, the percentage

of residents of the West and Mexico City regions that pay what is required so as not to generate interest is higher (70.0% and 72.65% respectively) compared to the percentages of the Northwest, Northeast, Central South and South regions (60.41%, 60.56%, 62.80% and 57.84% respectively). A difference of 14.81% is identified between the Mexico City region and the South region.

To explore the relationship between financial literacy and debtor behavior, the percentages of correct responses of the groups in table 3 are compared. A positive association is identified between the percentage of people who answered the financial literacy questions correctly and the type of behavior: 69.82% of respondents belonging to the group that pays the total debt, answers the diversification question correctly, which compared to the percentage of the other groups is higher by up to 10%. 52.94% of the group that pays the total debt answers the question of the simple interest rate correctly, whose percentage is higher with a difference of up to 15% compared to the other groups. 84.80% of the group that pays the total debt answers the inflation question correctly, whose percentage is lower compared to the group that pays more than the minimum (86.72%). However, the percentage differences between those who pay the total debt and those who pay more than the minimum is not significant. The results seem to indicate a strong positive relationship between the individual's behavior regarding their payments and financial literacy.

To measure the numerical relationship between debtor behavior and financial literacy, the correlation coefficient is calculated. For this, two groups are formed, the one called fee-payers, and the other called customers who pay in full. The correlation matrix is presented in table 4. The results indicate a negative relationship between the debtor behavior with the correct answers to the question of diversification, compound interest, inflation and financial literacy rates. Those who answer the financial literacy questions correctly are less likely to engage in debtor behavior.

Table 4

Correlation matrix between debtor behavior and financial literacy

	Number of correct answers	With three answers correct	Debtor behavior	Diversification	Simple interest	Inflation
Number of correct answers	1.000					
With three answers correct	0.801	1.000				
Debtor behavior	-0.070	-0.072	1.000			
Diversification	0.608	0.465	-0.045	1.000		
Simple interest	0.687	0.665	-0.045	0.050	1.000	
Inflation	0.535	0.300	-0.038	0.029	0.117	1.000

Source: ENIF (2018); Authors calculations.

The financial literacy of the sample according to its sociodemographic characteristics is presented in table 5. Gender makes the difference in financial literacy. The percentage of women who answered the three questions correctly is lower compared to men, with significant differences of 6% in the simple interest question and 5% in the inflation question. Women also obtain the highest percentage of incorrect answers and “don't know”, with a greater difference in the simple interest question, the result of which is an indicator of a very low level of knowledge about this concept.

Among the groups that have or do not have economic dependents, there is a difference of 3% in the percentage of respondents with economic dependents who answer the questions correctly, although the difference is not significant. By area of residence, a higher percentage of respondents from the urban area answered the three questions of financial literacy correctly. From the rural area, only 42.39% answered the question of simple interest correctly, while in the urban area it was 52.66%, whose difference is significant.

In this question, the highest percentage of “don't know” answers is presented for both groups; for the rural area it is 13.27% and for the urban area it is 5.5%.

The Mexico City region presents the highest percentage of correct answers for the three questions: simple interest (64.10%), inflation (93.16%) and diversification (78.63%). The South region and the Central South and East region present the lowest percentage of correct answers for the questions of simple interest (43.63% and 48.78%) and inflation (80.15% and 81.40%), respectively. The joint test of difference of proportions for the variable region is significant.

Table 5

Financial literacy distribution responses by sociodemographic variables

	Correct Diversifica tion	Don't know	Correct simpleInte rest	Don't know	Correct Inflation	Don't know
Gender			***		***	
Female	67.14%	1.31%	48.03%	9.20%	80.89%	3.34%
Male	69.09%	0.93%	53.85%	4.57%	86.11%	2.29%
Economic dependents						
Without dependents	67.49%	1.04%	54.04%	8.07%	81.99%	4.14%
With dependents	68.41%	1.13%	50.39%	6.28%	84.23%	2.37%
Area of residence	***		***		***	
Rural	65.37%	1.94%	42.39%	13.27%	80.58%	5.18%
Urbana	68.67%	0.97%	52.66%	5.59%	84.26%	2.36%
Region	***		***		***	
1.Northwest	65.36%	1.24%	53.81%	5.36%	82.68%	2.47%
2.Northeast	65.43%	0.46%	51.74%	6.96%	87.01%	2.55%
3.West	69.58%	0.50%	53.37%	6.73%	84.29%	2.74%
4.Mexico city	78.63%	0.85%	64.10%	0.00%	93.16%	1.71%
5.South central and east	69.51%	1.52%	48.78%	9.15%	81.40%	3.66%
6. South	69.12%	1.96%	43.63%	7.84%	80.15%	2.94%
Age	**		***		***	
15-24	65.57%	1.23%	49.18%	4.51%	75.41%	2.46%
25-34	68.72%	1.16%	55.07%	5.16%	81.53%	2.50%
35-44	70.63%	1.08%	55.49%	5.10%	84.54%	2.47%
45-54	69.50%	0.92%	45.64%	7.11%	88.99%	2.29%
55-64	61.58%	0.99%	41.87%	15.76%	85.71%	5.91%
65-74	56.41%	2.56%	43.59%	17.95%	87.18%	2.56%
Income from salary	***		***		***	
Quartile 1	62.94%	2.10%	43.20%	14.08%	75.73%	5.99%
Quartile2	61.88%	1.00%	47.31%	4.91%	83.03%	2.20%
Quartile3	71.12%	0.54%	53.61%	3.61%	87.0%	1.62%
Quartile 4	77.87%	0.60%	62.37%	2.62%	90.74%	0.60%
Marital status			***		*	
Free union	63.55%	1.48%	43.60%	8.37%	80.54%	3.45%
Separate	67.55%	1.60%	46.28%	12.23%	82.98%	3.19%
Divorced	64.71%	0.00%	53.92%	2.94%	87.25%	0.00%
Widowed	71.43%	2.04%	44.90%	22.45%	81.63%	6.12%
Married	68.99%	0.85%	53.23%	5.08%	85.29%	2.75%
Single	71.25%	1.25%	55.63%	5.42%	83.13%	2.29%
Financial training	***		***		***	
Without courses	67.39%	1.73%	49.66%	7.12%	83.22%	2.96%
With courses	73.82%	1.09%	61.82%	3.64%	87.27%	1.45%

The joint test of difference of proportions of correct answers is performed using the statistic χ^2 . *, **, ***: Statistical significance at 10%, 5%, 1% respectively.

Source: ENIF (2018); Authors calculations.

The South region and the Central south and East region present the highest percentages in the “don't know” answers, mainly in the questions that involve a calculation, as in the question of the interest rate and inflation. The propensity is higher in the southern region of Mexico than in the northern region.

When analyzing financial literacy by age, it is identified that the lowest percentages of correct answers are presented in the simple interest question. The age range 15-24 and the last three ranges present the lowest percentage compared to the central ranges (25-34 and 35-44), with a difference of up to 13%. It is also observed that the percentage of correct answers has an increasing trend in the age ranges of 15-24, 25-34 and 35-44 years and from the range 45-54 it decreases, with which, considering all age ranges it is observed that the behavior of the percentage of correct answers has an inverted “U” shape. For the inflation and diversification questions there is a similar pattern. There is also a marked increasing trend of the “don't know” answers in relation to older age ranges in the interest rate question.

Financial literacy is positively related to educational attainment. In all three questions, the proportion of correct answers is higher for each consecutive educational level. It is in the simple interest question, where the greatest differences in percentages of correct answers are identified among the different educational levels. Less than 50% of the respondents answered correctly in the groups with an educational level lower than a bachelor's degree. The proportion of correct answers increases with education, while the proportion of incorrect answers and "don't know" decreases. A similar pattern is observed in the responses on inflation and diversification.

For the variable income from salary, the highest percentage of correct answers is obtained by quartile 3 and quartile 4. In the interest and inflation questions it is identified that the percentages of correct answers are higher for each consecutive income level, which gives an indication that financial literacy is positively related to income.

For the variable marital status, it is the simple interest question where the greatest differences in financial literacy are observed. The groups that present the lowest percentage of answers are widowhood (44.90%), free union (43.60%) and separated (46.28%), while the single, divorced and married groups present the highest percentage (55.63%, 53.92%, and 53.23%), respectively. Regarding financial training, the group that has taken a course has a higher percentage of respondents who correctly answer the financial literacy questions.

Table 6 presents the results of the Probit econometric model with the two measures of financial literacy and the sociodemographic control variables. In both models, the coefficient of the financial literacy variable is negative and significant. The result indicates that debtor behavior is negatively related to financial literacy. In other words, those with less financial literacy are more likely to belong to the group called fee payers.

In model 1, the coefficient of the financial literacy indicator (measured by the total number of correct answers) indicates that those who correctly answered one more financial literacy question are up to 3.08% less likely to belong to the fee-payer group. In model 2, the coefficient of the financial literacy indicator (measured by the three correct ones) indicates that those who answered the three questions correctly are up to 5.8% less likely to belong to the fee payers group, compared to those who obtained zero correct answers. Financial literacy has an independent and statistically significant effect on debtor behavior, after controlling with the sociodemographic variables.

The control variables are also related to the credit card payment behavior and differ by group. Gender is a variable that makes a difference in behavior towards credit card payments. The sign of the coefficient of the gender variable is positive and significant. Men have a 39.18% probability of belonging to the group called fee payers, while the probability for women is 34.35%. Therefore, men are 4.9% more likely to belong to the fee payers group. The region of residence is related to the debtor behavior, the sign of the coefficient is negative and significant for the Westregion and Mexico City. Those who belong to these regions are less

likely, in the magnitudes of 11.1% and 12.3% respectively, to belong to the fee payers group, compared to those from other regions.

Table 6

Probit model. Dependent variable: debtor behavior

Financial literacy measurements	Model 1		Model 2	
	P-value	Marginal effect	P-value	Marginal effect
Total number of corrects	0.01881**	-0.0308749		
The three corrects			0.01078**	-0.058942
Sociodemographic variables				
Constant	0.53233		0.90232	
Gender	0.03219**	0.0490	0.03481**	0.0483
Dependents	0.81593	-0.0067	0.78374	-0.0079
Area of residence	0.81716	-0.0071	0.82422	-0.0068
1.Northwest	0.61178	-0.0164	0.60527	-0.0167
2.Northeaste	0.61660	-0.0167	0.65309	-0.0150
3.West	0.00080***	-0.1116	0.00084***	-0.1111
4.Mexico city	0.01367**	-0.1236	0.01499**	-0.1222
5.Central southand east	0.11418	-0.0558	0.11506	-0.0557
Age:25-34	0.76603	-0.0127	0.78862	-0.0114
Age:35-44	0.46182	0.0330	0.46295	0.0329
Age:45-54	0.81477	0.0108	0.85144	0.0086
Age:55-64	0.80280	-0.0129	0.78235	-0.0143
Age:65-74	0.28308	0.0868	0.29538	0.0844
Quartile 2	0.29059	-0.0316	0.27520	-0.0326
Quartile 3	0.08047*	-0.0526	0.06527*	-0.0553
Quartile 4	0.06663*	-0.0588	0.05583*	-0.0610
Free union	0.71670	0.0130	0.71729	0.0129
Separated	0.40320	-0.0371	0.41152	-0.0365
Divorced	0.19177	-0.0711	0.18538	-0.0721
Widowed	0.07508*	-0.1300	0.07784*	-0.1288
Married	0.02124**	-0.0736	0.02085**	-0.0738
Financial training	0.30972	-0.0328	0.33632	-0.0311

Observations number: 2133. Respondents who answered "don't know" in the debt payment behavior question are excluded. Dependent variable mean: 0.3723. Number of 'correctly predicted' cases: model 1 = 1386 (63.9%), model 2 = 1379 (63.5%)

McFadden R-square: model1=0.019, model2=0.019. *,**,***: Statistical significance at 10%, 5%, 1% respectively.

Source: ENIF (2018); Authors calculations.

The level of income from salary is a significant variable that also explains debtor behavior, the coefficient of quartile 3 and quartile 4 is negative and significant. The probability of belonging to the fee payers group decreases when the income level is higher; individuals with an income greater than 6,000 pesos a month are less likely to belong to this group.

Finally, marital status is a significant variable in the credit card payment behavior equation. The coefficient for married and widowed marital status is negative and significant. According to the sign, the probability of covering all of the credit card debt is higher for someone widowed or married (13% and 7.3% respectively) compared to someone who is single.

5. DISCUSSION

Regarding the financial literacy of the sample, the results obtained in the analysis are consistent with the investigations of Lusardi and Mitchell (2011c), Greimel-Fuhrmann, Silgoner 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), Xu and Zia (2012).

68.20% of the participants answered the question on diversification correctly, while in Greimel-Fuhrmann et al. (2015), only 61% of the respondents understand the concept of risk diversification. In Lusardi and Mitchell (2011c) the diversification question presented greater difficulty for the respondents, only 52.3% answered it correctly and more than a third of the respondents did not know the answer.

Regarding the calculation of interest, only 51.80% of the respondents answered correctly. In Greimel-Fuhrmann et al. (2015), 67% of the respondents answered correctly. In Atkinson and Messy (2012) the percentages range from 40% to 75% for the 14-country sample, for example, in Peru it is 40%, in Germany it is 64% and in Norway it is 75%.

In the question on inflation, 83.7% of the respondents answered the question correctly, while in Greimel-Fuhrmann et al. (2015) 65% of the respondents understood that inflation implies a lower purchasing power over time, given a fixed amount. In Lusardi and Mitchell (2011c), the inflation question presented the highest percentage of correct answers (75.2%).

Regarding financial literacy and its relationship with the sociodemographic characteristics of the participants, the results obtained are similar to the bulk of research around the world. The results show that women obtain a lower percentage of correct answers than men, with a significant difference. The result coincides with those obtained in Lusardi and Mitchell (2011c), Lusardi, Mitchell and Curto (2009), Atkinson and Messy (2012), Swiecka, et al. (2020) and Grigion, Mendes and Kirch (2018). There is no difference in the level of literacy in the groups formed according to the economic dependents. Regarding the area of residence, in the three questions of financial literacy the percentage of correct answers is higher for those who belong to the urban area compared to those who live in the rural area, as it is presented in Russia (Klapper and Panos, 2011) and in the United States (Bumcrot, Lin and Lusardi, 2011).

The Mexico City region presents the highest percentage of correct answers for the three questions, while the South, Central-South and East regions present the lowest percentage. The results of the joint test show that financial literacy differs in the six regions of Mexico. The previous results coincide with Bucher-Koenen and Lusardi (2011), in which they identify differences in financial literacy between the West and East regions of Germany, and with Fornero and Monticone (2011) who show that financial literacy differs widely between regions in Italy.

Regarding the relationship between financial literacy and the income level, it is identified that those belonging to the first two quartiles present the lowest percentages of correct answers in the three questions. This is consistent with the results of Chen and Volpe (1998) who identified that participants with the highest income answered a greater number of questions correctly than those with the lowest income. Regarding marital status, those in a state of widowhood, free union and separated are the groups that present the lowest percentage of correct answers. In contrast, the single, divorced and married groups present higher percentages. In Danes and Hira (1987), married people show greater financial literacy than single people, since the former have had financial experience such as debt or credit cards, have had their own car and work. Likewise, in the research by Bucher-Koenen and Lusardi (2011), women who are single and make decisions individually have a lower and significant probability of answering the three financial literacy questions correctly, compared to those who decide together with a partner.

Regarding the financial literacy variable, those who indicated having taken a course obtained the highest percentage of correct answers in all financial literacy questions, compared to those who did not take a course.

The result coincides with the findings of Chen and Volpe (2002) who identified that financial education is a relevant variable in the level of financial literacy and that 65% of the participants were financially educated through courses at school and later at the university and on personal initiative.

The results of the Probit model determine that the behavior towards the debt contracted with credit cards is negatively related to the level of financial literacy, after considering the effect of the sociodemographic variables. Therefore, those subjects with a lower level of financial literacy are more likely to belong to the group called fee payers. The results coincide with Lusardi and Tufano (2009) who identify that people with a higher level of financial literacy and a higher level of income are more likely to belong to the customers who pay in full group.

6. CONCLUSION

The descriptive results show that the financial literacy of the sample is higher than that of the national population, whose difference is statistically significant. 51.80% of the sample answered the simple interest question correctly, 83.73% answered the inflation question correctly, and 68.20% the risk diversification question. About a third (31.71%) answered the three questions correctly.

From the estimates of the Probit econometric model, it is determined that the behavior of the respondents regarding the payment of credit card debt is related to their level of financial literacy. Those surveyed with a lower level of financial literacy are more likely to make only partial payments on their debt and greater than or equal to the minimum payment. Those with the highest level of financial literacy are more likely to cover all of their debt.

The variables gender, region, income and marital status are significantly related to the payment behavior of the debt contracted with credit cards.

Regarding the differences in behavior by gender, it was identified that women have a lower level of financial literacy than men, however, men are more likely to belong to the fee payers group. It can be intuited that this behavior could be related to a greater aversion towards risk from women compared to men (Outreville, 2014) and consequently decide to have a more cautious behavior in the use of their credit, although it should be explored in future research. People who live in the West region, as well as in Mexico City, those who, due to their income level, belong to quartile 2 or quartile 3, as well as those who have a marital status of widower or married, have a higher probability of covering the entire debt.

Considering the 15% of “don't know” responses, the research identifies that respondents have difficulty in calculating simple interest, while in other countries the concept with the greatest difficulty for respondents to understand has been diversification, as shown in Lusardi, Mitchell, and Curto (2009) with 37.3% of “don't know” responses.

The results of this research provide evidence for Mexico on the importance of financially educating the banking population for a better use of their credit cards, for the benefit of the domestic economy of Mexicans.

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