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ECONOMICS
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FINANCIAL LITERACY AND RETIREMENT PLANNING IN MEXICO

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ABSTRACT. According to the Mexican National Survey of Financial Inclusion 2021, Mexicans' behavior regarding retirement savings is of great concern because only one-third of the Mexican population saves for their retirement. This study measures the financial literacy level among Mexicans and determines its relationship with retirement planning and socio-demographic variables. A multinomial logit micro-econometric model was estimated and data from the last Mexican National Survey of Financial Inclusion 2021 were used. The results indicate that women, rural residents, poorly educated people, and low-income earners are more likely not to plan for old age. Furthermore, financial literacy positively influences the decision to formally plan for retirement. The findings may be useful in designing strategies to increase Mexicans' financial literacy levels and, consequently, their planning for retirement.

Introduction

In recent decades, both developed and emerging economies have emphasized the importance of their citizens being financially literate mainly because of the changes in public and private social security systems and the demographic profile, including longevity and decreased birth rate, and the increasing development of financial markets and digitization (OECD, 2019).

Following the modifications in the model of financing retirement pensions, in population structure changes, and in the economic characteristics of aging, more people face risks associated with old age and need to make decisions regarding their short- and long-term savings (Bosch et al., 2019; Ce Villiers and Roux, 2019; Wong et al., 2007). The importance of individuals having adequate information regarding their financial options and the ability to make responsible decisions is highlighted in this context. As Lusardi (2008) asserted, financial

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literacy is an essential decision-making tool, which influences current debt, investment decisions, and retirement planning.

In Mexico, research on financial literacy is still in its incipient stages (García, 2021a). For the first time, a question module on financial capabilities was included in the 2018 version of the Mexican National Survey of Financial Inclusion. According to this survey data and the financial literacy index proposed by OECD (2015), financial education in Mexico is at 58.2 points. The financial knowledge sub-index has 65.8 points, the financial behavior sub-index has 48.2 points, and the financial attitudes sub-index has 65 points (Del Río, Suárez & Castro, 2019).

Since 1997, the main Mexican public pension system has been reformed into a defined-contribution (DC) scheme, with private fund administration and benefits linked to deposits for individual accounts. Workers that registered with the Mexican Institute of Social Security prior to July 1997 have the option to get a pension in the new system or to keep the benefits of the old regime. In December of 2019, the number of Mexicans of actively making social security contributions under the 1973 regime was 6.27 million (Zamarripa & Del Angel, 2020), i.e., 11.37% of all workers in Mexico (INEGI, 2020). As of 2020, there were 53.5 millions of AFORE accounts registered in Mexico, however, only 37% of these accounts were active (CONSAR, 2022).

Social security in Mexico is still fragmented. Seven institutions provide benefits in contributory and non-contributory schemes, as well as subsystems created in federal entities, municipalities and universities which do not operate in an integrated manner (Villareal & Macías, 2020). Moreover, 60% of the working population is excluded from the mandatory pension system, as independent workers are not legally obligated to contribute to a pension scheme (Alonso et al., 2014; Villagómez & González, 2014). Given that Mexican pension coverage levels are far from ideal, most of the labor force is without old-age protection. This study is important because it generates evidence on Mexicans' financial literacy, addressing the information gap in this regard. Financial literacy is a fundamental element in planning for retirement because workers and retirees have increasingly been asked to take on an unprecedented degree of responsibility for their retirement, as defined benefit pensions decline and government programs face insolvency in one country after another (Lusardi and Mitchell, 2006).

Therefore, this study has the following objectives: to measure financial literacy in the population aged 18–65 years in Mexico and determine the relationships between planning for retirement, financial literacy, and sociodemographic variables. Similarly, the influence of having a savings account, having a sophisticated account, and owning wealth on the decision to plan for retirement are analyzed.

1. Literature review

Various studies have identified the relationship between financial literacy and retirement planning behavior in adult and young populations (Chen and Chen, 2023; Bucher-Koenen and Lusardi, 2011; Hauff et al., 2020; Klapper and Panos, 2011; Kimiyagahlam et al., 2019; Safari et al., 2021; Sekita, 2011; Van Rooij et al. 2011). Lusardi and Mitchell (2006, 2011a) and Henager and Cude (2016) showed that those who do not plan to save for retirement lacked knowledge of calculating interest rates, inflation, and understanding risk diversification.

This finding is relevant, considering that the results of different studies in both highly industrialized and developing countries reveal low levels of financial literacy (Atkinson & Messy, 2012; Hasler & Lusardi, 2017; Hasler & Lusardi, 2019; Lusardi, 2019; Lusardi & Mitchell, 2011a; OECD, 2020; Silgoner et al., 2016; Xu & Zia, 2012). Lusardi and Mitchell

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(2014) and Atkinson and Messy (2012) identified a low financial knowledge level in the entire population, but crucially in specific demographic groups, such as women and those with low education and income levels. Chen and Volpe (1998, 2002) agreed that financial literacy was highly correlated with the education level, university disciplinary training, and age. Conversely, Lusardi and Mitchell (2011a), Sekita (2011), and Silgoner et al. (2016) found that financial literacy had an inverted U shape and was lower in young and older individuals.

1.1. Mexicans´ financial literacy

In Mexico, efforts to improve financial education and financial inclusion of citizens are very recent. The Financial Education National Strategy (FENS) emerged in 2017 as a public policy to promote financial well-being through a multidisciplinary and collaborative approach between government and international organizations (Condusef, 2018). The strategy of increasing financial education levels in Mexico guarantees changes in financial knowledge, attitudes and behaviors (Mungaray, González & Osorio, 2021). At present, the FENS integrates three dimensions to develop Mexicans' financial capabilities: financial knowledge, financial attitudes, and citizens' relationship with financial systems (Gómez, 2018).

Antonio-Anderson et al. (2020) affirmed that Mexicans´ financial literacy was positively related to age, marital status, economic dependents, and income level and García (2021a) found that the relationship between Mexicans' financial literacy and these variables could vary according to region.

Hastings and Tejeda (2008) examined financial literacy and the choice of retirement funds in Mexico and ascertained how literacy influences workers' behavior when choosing retirement savings fund schemes. Those with low financial literacy were less likely to select low-fee fund schemes. Regarding young adult population in Mexico, García (2021b) analyze financial literacy's effect on retirement planning with gender as a moderator variable. His results confirm that the most financially knowledgeable individuals have lesser intentions to pursue passive strategies, while financial behavior and inclusion associate with actively planning. Results also show that gender plays a fundamental role in retirement planning.

Atlatenco et al. (2020) analyzed factors that influenced the probability that young Mexicans (18–29 years old) would resort to contributory pensions when older. They found that gender, marital status, town size, region, level of studies, and work income are significant variables. They included financial knowledge variables but identified no significant relationship with the expectation of receiving a pension. Alvarado and Duana (2018) focused on investigating how young Mexicans perceive saving for retirement. The results indicated that they did not think about retirement or saving for the future; furthermore, men were more likely to save rather than spend in the short term, while women had more saving habits in school and saved up to purchase durable goods that would serve them in the long term.

This study aims to expand the current knowledge of Mexicans' financial literacy and retirement planning behavior. The impact of Mexicans' financial literacy on their decisions is analyzed while considering three alternatives to planning for expenses during old age: no planning, formal planning, and informal planning.

2. Methodological approach

This study was non-experimental, cross-sectional, descriptive, and correlational. The respondents' choices of how to cover expenses during their old age were related to financial literacy and sociodemographic variables.

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The data correspond to the Mexican National Survey of Financial Inclusion (ENIF) 2021 (INEGI, 2022a). The sample was chosen according to the legal framework for retirement in Mexico (art. 154 and 161 of the Mexican Social Security Law), which stated that a person could retire due to unemployment at an advanced age, from 60 years or up to 65 years (Ley Mexicana del Seguro Social, 2018). According to the INEGI (2022b), these data comprise a representative sample of the national population, selected probabilistically and stratified (García, et. al. 2021). The sample comprised 11,500 people aged 18 to 65 years who declared that they had not retired during the survey. The sociodemographic characteristics of the participants are presented in Table 1.

Table 1. Numerical characteristics of the sociodemographic variables

Variable	Categories	Total	Percentage
Gender	Female	6229	54.17%
	Male	5271	45.83%
Area of residence	Rural	4219	36.69%
	Urban	7281	63.31%
Region	1.Northwest	2135	18.57%
	2.Northeast	2027	17.63%
	3.West	2214	19.25%
	4. Mexico city	768	6.68%
	5. Central South and East	2138	18.59%
	6. South	2218	19.29%
Age	14-23	1520	13.22%
	24-33	2922	25.41%
	34-43	2848	24.77%
	44-53	2287	19.89%
	54-63	1664	14.47%
	64-73	259	2.25%
Educational level	No education	305	2.65%
	Elementary and Middle school	5603	48.72%
	High school	2889	25.12%
	Undergraduated and posgraduate	2703	23.50%
Monthly income*	No income	3917	33.33%
	Quartile 1 (average: 130.78)	1957	16.65%
	Quartile 2 (average: 269.07)	1957	16.65%
	Quartile 3 (average: 382.77)	1957	16.65%
	Quartile 4 (average: 828.76)	1957	16.65%
Marital status	Common law	2655	23.09%
	Separated	1036	9.01%
	Divorced	357	3.10%
	Widowed	353	3.07%
	Married	4321	37.57%
	Single	2778	24.16%
Working condition	Economically active population	8434	73.34%
	Student	376	3.27%
	Household chores	2023	17.59%
	Disabled	68	0.59%
	Does not work	599	5.21%

*Average income stated in US dollar. Average peso/dollar exchange rate between June 28th and August 13nd, 2021 (19.96 Mexican pesos per dollar). Calculated with data from Banco de México exchange market web page. Retrieved from: https://www.banxico.org.mx/tipcamb/main.do?page=tip&idioma=sp
Source: *Own elaboration with information taken from the ENIF 2021.*

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The sample predominantly comprised women (54.17%). Regarding educational level, 48.72% were characterized as having only basic education (elementary and middle school), 25.12% had high school and 23.50% had a undergraduate or posgraduate. The average monthly income in the first, second, third, and fourth quartiles was 130.78, 269.07, 382.77, and 828.76 USD, respectively. When comparing the sample data with those of the 2020 Population and Housing Census in Mexico (INEGI, 2020), no great differences are found either in terms of men and women proportion (from 18 to 65 years old), or the educational level variable. In the 2020 Population and Housing Census, 51.82% are women, 48.66% have basic educational level, 25.02% high school level and 23.03% a undergraduate or posgraduate.

In the sample, the majority (37.57%) were married, 33.33% did not receive income from work; urban residents (63.31%), and those aged 24–53 years (70.07%). According to their activity status, 73.34% are an economically active population (EAP).

The primary variable in this study was planning for retirement, which was measured by question 9.8 in ENIF 2021: "When old, you plan to cover your expenses with what you get from 1) government support for older adults; 2) your pension, retirement plan, or private retirement plan; 3) selling or renting goods or properties (vehicles, houses, livestock, etc.); 4) money given to you by your spouse or partner, children, or other relatives, 5) or other." The answers were coded as follows: "Yes, No, Does not know." Prominently, respondents had the opportunity to choose more than one option (INEGI, 2022).

Following Klapper and Panos (2011), three main retirement planning strategies were defined based on the options in the question: a) does not plan was defined by options 1, 4, and 5, b) formal strategy was defined by option 2, and c) informal strategy was defined by option 3. Respondents who chose the first or the second or the third strategy were called non-planners, formal planners, and informal planners, respectively. As in García (2021b) and Niu & Zhou (2017), two strategies are considered: option 1 and 4 are called passive strategies, when someone else who takes care of the person's retirement expenses. Option 2 and 3 are called active strategies. In this case, it is the people who took care of covering their expenses in their retirement stage. For statistical analysis, the retirement planning variable was coded as a variable with three unordered alternatives (0: no planners, 1: formal planner, 2: informal planner), exclusive from each other. Considering the different answer options and withdrawal strategies, in the assignment process through an Excel spreadsheet, it is verified that the individual's choices coincide with one and only one strategy, which allowed to define belonging to a single category. Those cases that did not meet this condition, a very low percentage of them, were associated with a strategy based on their first response in the list of options.

The concept of financial literacy used in this study was proposed by Lusardi and Mitchell (2014, p. 302), defined as "people's ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions."

To measure the financial literacy of the respondent, the Klapper and Panos (2011) methodology is followed. Lusardi and Mitchell (2006 and 2014) and Lusardi (2008) explain how these three questions about fundamental concepts in personal finance allow us to know if people are financially literate. These studies have been benchmarks for comparing financial literacy among countries (Xu and Zia, 2012; Lusardi and Mitchell, 2011b). The first question assesses the understanding of risk diversification, the second assesses whether the individual understands compound interest, and the third assesses the understanding of inflation.

Three questions from the ENIF (2021) were used to measure financial literacy. The first question assessed the understanding diversification. And the second question assessed whether individuals understand compound interest. The third question assesses the understanding of the concept of inflation.

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According to Klapper and Panos (2011), the answers to these three questions were positively correlated, which indicates that those who answered one question correctly were likely to answer the other two correctly; however, the correlation between the questions was not high ($r < 0.14$, $p < 0.01$), indicating that each question measured a different aspect of financial literacy.

A dichotomous variable was designed for each question: 1 if a respondent answered correctly and 0 otherwise. Two financial literacy indicators were designed as in Lusardi and Mitchell (2011a). The first was a dichotomous variable, in which 1 was assigned if a respondent answered the three questions correctly and 0 otherwise. The second was the number obtained from the sum of correct answers to the financial literacy questions, which ranged from 0 to 3. Sociodemographic variables and other economic indicators were included: Retirement Funds Administrator (AFORE), savings accounts, sophisticated accounts and wealth. An income shock variable was included to capture the information related to the current overspending presented by the respondents (question 4.3 of the ENIF 2021: Was what you spent or received each month enough to cover your expenses?) The coding data for sociodemographic variables are presented in Table 2.

Table 2. Demographic and socioeconomic variables coding of the respondent

Variable	Variable type	Survey´s question number (INEGI, 2022a)	Operationalization
Gender	Dichotomus	2.4	Categories: Male, Female. Dichotomus; 1 if male, 0 if female (Peña et. al, 2014; Van Rooij, M., Lusardi, A., & Alessie, R., 2011)
Age	Continuous	2.5	Ordinal variable stated in years. Categories are designed as proposed in Van Rooij, M., Lusardi, A., & Alessie, R., (2011): 14-23, 24-33, 34-43, 44-53, 54-63, 64-73 years old. Base category: 14-23 years old. (Proposed by the authors).
Educational level	Categorical	3.1	Categories: No education, elementary and middle school, high school, undergraduate, master's or doctorate degree. (Secretaría de Educación Pública, 2021). A dichotomus variable is designed for each category (Van Rooij, M., Lusardi, A., & Alessie, R.,2011; Sekita, S.,2011). Base category: No education.
Marital status	Categorical	3.2	Categories: Common law, separated, divorced, widowed, married, single. A dichotomus variable is designed for each category. Base category: married (Peña et. al, 2014).
Working conditions	Categorical	3.5	Categories: Occupied, student, household chores, retired, disabled, does not work. A dichotomus variable is designed for each category. Base category: occupied. (Peña et. al, 2014)
Monthly income *	Quantitative	3.8a, 3.8b	Income quartiles are designed as in (Sekita, S., 2011), expressed in dollars, at the average peso/dollar exchange rate (19.96 pesos per dollar), calculated with data from Banco de Mexico exchange market portal, observed in the period of application of the survey. A dichotomus variable is designed for each quartile: 0.0 dollars < quartile 1 ≤ 200.20 dollars

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			200.20 dollars < quartile 2 ≤ 300.60 dollars
			300.60 dollars < quartile 3 ≤ 450.90 dollars
			quartile 4 > 450.90
			A dichotomus variable is designed for those who declared to have no income and for those who do have an income, but decided not to mention the amount. Base category: no income.
Location size	Dichotomus	Identification question	Rural location: from 1 to 14,999 inhabitants; Urban location: 15,000 or more inhabitants (INEGI, 2022a). Dichotomus: 1 if the surveyed lives in an urban area, 0 if the surveyed lives in a rural area.
Geographical region	Categorical	Identification question	Regions of Mexico: Northwest, Northeast, West and Bajío, Mexico City (CDMX), Central South and East, South (INEGI, 2022a). A dichotomus variable is built for each region. Base category: CDMX
Has an AFORE	Dichotomus	9.1	Categories: Has AFORE, Does not have AFORE. Dichotomus: 1 has one, 0 does not have one (Lusardi, 2011).
Has a saving account	Dichotomus	5.4.4	Categories: Has a saving account, Does not have a saving account. Dichotomus: 1 has a savings account, 0 does not have one (Lusardi, 2011).
Has a sophisticated account	Dichotomus	5.4.5, 5.4.6, 5.4.7	Categories: Has a sophisticated account, does not have a sophisticated account. Dichotomus: value 1 is assigned if the person has one of the following accounts: checking, fixed-term deposit, investment fund, 0 if the person does not have any (Lusardi, Mitchell & Curto, 2010).
Owns wealth	Dichotomus	14.2.1, 14.2.3	Categories: Owns wealth, does not own wealth. Dichotomus: value 1 is assigned if the person owns a house or apartment, or has a piece of land for farming or housing, 0 if the person has none (Sekita, S., 2011).
Income shock	Dichotomus	4.3	Categories: Had shocks, did not have shocks. Dichotomus: 1 if the person declares an overdraft a month, 0 if the person does not have any (Sekita, S., 2011).

* Average income stated in US dollar. Average peso/dollar exchange rate between June 28th and August 13nd, 2021 (19.96 Mexican pesos per dollar). Calculated with data from Banco de México exchange market web page. Retrieved from: https://www.banxico.org.mx/tipcamb/main.do?page=tip&idioma=sp

Source: *Own elaboration with information taken from the ENIF 2021.*

According to the design of the dependent variable, a multinomial logit regression model was used, which made it possible to relate the individuals' decisions to plan with financial literacy and sociodemographic variables. The significant variables related to the retirement planning of the respondents were identified, and the probabilities were calculated for each planning alternative.

2.1. Model description

A multinomial logit model based on utility theory was used for an individual's decision to their specific set of characteristics, as presented in Greene (1999). For the probability that an individual i belonged to the category j = 1, 2,…, J was modeled as follows:

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$$Prob\ (Y_i = j) = \frac{e^{B'_j x_i}}{\sum_{k=0}^{J} e^{B'_k x_i}} \qquad\qquad j = 0, \dots, J$$

In this model, the decision for any of the alternatives depended on the characteristics of Xi. In this study, the following equations were defined:

$$Prob\ (Y = 0/x) = 1 - Prob(Y = 1/x) - Prob(Y = 2/x)$$
$$Prob\ (Y = 1/x) = \frac{e^{B'_1 x_i}}{1 + e^{B'_1 x_i} + e^{B'_2 x_i}}$$
$$Prob\ (Y = 2/x) = \frac{e^{B'_2 x_i}}{1 + e^{B'_1 x_i} + e^{B'_2 x_i}}$$

From this, two parameter vectors, B'_1 and B'_2, of size k were estimated using a likelihood function. The estimation showed the determinants of the decision to plan for the three categories. The adjusted probabilities for each category and the marginal effect, including the change effect in the variable Xi on the absolute probability of choosing any of the alternatives, were calculated. To calculate the marginal effect of the binary variable, when going from xk = 0 to xk = 1, the equations were evaluated at the mean value of the independent variables.

In this study, the dependent variable, retirement planning y_i, was coded with three unordered alternatives (0: non-planners, 1: formal planner, 2: informal planner). The independent variables x_i were: financial literacy, gender, age, educational level, monthly income, marital status, working conditions, location size, geographical region, having an AFORE, wealth, having a savings account, having a sophisticated account, and income shocks.

3. Conducting research and results

3.1 Financial literacy of the sample

Table 3 shows the distribution of responses to questions that measure the financial literacy of the sample and the national population.

Table 3. Financial literacy of the samples

Questions	Research sample: Age 14-65 (n=11,500)	Age 18 and older (n=13,554)
Savings diversification		
True (correct)	68.26%	68.80%
False	28.37%	27.60%
Does not answer o does not know	3.67%	3.60%
Compound interest		
More than 110 pesos (correct)	36.23%	36.30%
Exactly 110 pesos	34.75%	35.00%
Less than 110 pesos	15.93%	15.60%
Does not answer o does not know	13.09%	13.20%
Knowledge of inflation		
More than what you can buy today	6.92%	6.20%
The same	12.80%	12.50%
Less than what you can buy today (correct)	74.88%	76.10%

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Does not know	5.40%	5.30%
Interest and inflation correct	27.35%	26.12%
Index I. The three answers are correct	19.92%	18.66%
Index 2. Average of correct answers	1.79	1.73
No correct answers	6.17%	7.75%

Source: *Own elaboration with data from ENIF 2021.*

Of the respondents, 68.26% answered the diversification question correctly, and 74.88% answered the inflation question correctly. The compound interest question may have been the most difficult: only 36.23% of the sample answered it correctly, while 13.09% did not answer it o did not know.

Only 27.35% of respondents aged between 18 and 65 years correctly answered both questions: the compound interest and the inflation. Less than a fifth (19.92%) answered all three questions correctly, 6.17% did not answer any question correctly, and the average number of correct answers was less than 2. No significant differences were noted concerning the total sample.

3.2. Results of the econometric model

The logit multinomial econometric model results are described below using the two measures of financial literacy and the sociodemographic control variables. Model 1 includes the financial literacy measure of all correct answers.

From Model 1, respondents who answered all financial literacy questions correctly were more likely to plan formally (up to 3 percentage points) and informally (less than one percentage point) for retirement than those who did not answer any question correctly.

Model 2 includes a measure of the number of correct answers. In Model 2, after answering an additional question on financial literacy correctly, the respondents were 3.27% more likely to plan formally and 1.21% more likely to plan informally. In contrast, those who did not respond correctly were 4.48% more likely not to plan.

In this model, the inclusion of the gender variable was relevant, and comparing the three alternatives was important. Men were more likely to have informal planning than women (with a difference of 2 percentage points). Furthermore, women were more likely not to plan for old age than men and depended on support from the government or relatives, with a difference of 2 percentage points. Planning for retirement varied with the age of the respondents. Younger people were more likely to have formal planning than older adults (with a difference of 92 percentage points). This comparison implied that new generations were very enthusiastic about formal planning for old age. Likewise, the probability that the youngest respondents (18–24 years) decided not to plan was 4.16%, compared to a 90.81% probability for the oldest respondents (64–73 years).

Educational level was a determining factor in choosing formal retirement planning. Respondents with low educational levels were less likely to have formal planning than those with high levels of education (undergraduate, master's, or doctorate). The probability of deciding to plan formally increased with educational level. The probability of deciding not to plan for retirement for those who only attended elementary school or were without education was 77.12% and 60.43%, respectively, compared to a 45.40% probability for those with undergraduated, master's or doctorated degrees. The income from work variable was important in choosing to plan for retirement based on its three options. The probability of deciding on formal planning increased with income levels.

The probability of deciding to plan for old age formally depended on marital status; the results were significant for those without partners (single and widowed) compared to those who were married, and the difference in probabilities was 2.03% and 2.05%, respectively. Regarding employment status, those who work at home, those with disabilities, and those without employment were less likely to plan formally than the employed, with a difference of up to 10 percentage points. Students at high school levels or higher were up to 25.06% more likely to plan formally than the employed.

Differences in the probability of a choice regarding retirement planning were identified by the location type and geographic region. Compared to rural counterparts, urban residents were more likely to have a formal savings plan, with a difference of up to 7 percentage points. Likewise, the probability of not planning was greater for rural residents, with a difference of 5 percentage points. The residents of the northwest, northeast, and western regions were more likely to have formal planning than CDMX residents. The south region had a lower probability of selecting the no-planning option than CDMX residents.

In both models, the coefficient of the financial literacy variable was positive and significant. The adjusted probability values were obtained from the estimates, as shown in Table 4.

Table 4. Adjusted probability values (%) of the multinomial logistic regression model

Sociodemographic and economic characteristics	Categories	Model 1			Model 2		
		Does not plan	Formal planning	Informal planning	Does not plan	Formal planning	Informal planning
Indicator 1. Financial literacy	All correct	44.68	42.64	12.67			
	No correct answer	48.27	39.55	12.17			
Indicator 2. Financial literacy	Number of correct: 1				50.95	37.65	11.39
	Number of correct: 0				55.43	34.38	10.18
Gender	Male	46.54	39.95	13.50	46.33	40.03	13.63
	Female*	48.38	40.30	11.31	48.24	40.35	11.40
Age**	18-23	4.16	93.54	2.28	3.99	93.66	2.33
	24-33	18.68	74.42	6.89	18.32	74.67	7.00
	34-43	51.17	36.14	12.67	51.05	36.17	12.76
	44-53	77.41	9.69	12.89	77.71	9.57	12.71
	54-63	88.17	1.95	9.80	88.61	1.89	9.48
	64-73	90.81	0.85%	8.3%	91.28	0.81	7.90
Educational level	No education	77.12	17.74	7.13	75.54	16.67	7.77
	Elementary or Middle school	60.43	26.70	12.86	60.06	26.99	12.93
	High school	55.08	33.07	11.83	54.60	33.34	12.04
	Undergraduated, Master´s or doctorated degree*	45.40	39.39	15.19	45.34	39.29	15.36
Income	No income	51.15	37.06	11.78	50.93	37.15	11.90
	Quartile 1	49.78	38.23	11.97	49.58	38.31	12.09
	Quartile 2	48.26	39.55	11.18	48.08	39.62	12.29
	Quartile 3	46.78	40.83	12.37	46.62	40.89	12.47
	Quartile 4	41.35	45.61	13.02	41.27	45.63	13.08

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Marital status	Married*	47.64	39.67	12.55	47.58	39.75	12.66
	Common law	48.55	38.75	12.68	48.38	38.80	12.80
	Separated	50.07	40.11	9.81	49.84	40.22	9.93
	Divorced	49.74	40.96	9.29	49.64	40.97	9.38
	Widow	48.58	41.72	9.78	48.45	41.80	9.74
	Single	46.86	41.70	11.42	46.73	41.74	11.52
Working condition	EAP *	47.20	40.40	12.39	47.05	40.45	12.48
	Student	28.42	65.46	6.10	28.74	65.16	6.09
	Household chores	57.69	29.21	13.08	57.46	29.29	13.24
	Disabled	59.65	37.10	3.24	58.70	37.88	3.40
	Does not work	52.44	36.81	10.73	52.02	37.06	10.90
Area of residence	Rural*	50.34	35.83	13.81	49.97	36.01	14.00
	Urban	45.83	42.74	11.42	47.77	42.73	11.48
Region	Mexico city*	50.80	38.03	11.16	50.60	38.13	11.26
	Northeast	34.96	50.09	14.93	34.55	50.29	15.14
	Northwest	31.09	53.91	14.98	31.00	53.90	15.09
	West	34.62	51.43	13.94	34.71	51.32	13.95
	Central South and East	35.63	44.47	19.88	35.89	44.23	19.86
	South	34.42	48.13	17.44	34.38	48.07	17.53
Has an AFORE	No*	63.10	21.06	15.83	62.79	21.17	16.02
	Yes	24.93	68.39	6.67	24.94	68.34	6.71
Owns wealth	No*	52.47	37.63	9.88	52.21	37.79	9.99
	Yes	42.10	42.54	15.35	42.03	42.51	15.44
Has a saving account	No*	48.83	39.94	11.22	48.57	40.08	11.34
	Yes	45.42	43.76	10.80	45.53	43.48	10.98
Has Sophisticated account	No*	46.04	42.24	11.70	45.91	42.26	11.82
	Yes	49.72	38.44	11.82	49.81	38.17	12.01
Income shock	No*	45.52	41.76	12.71	45.39	41.79	12.80
	Yes	49.68	38.49	11.81	49.47	38.59	11.93

*Category of reference

** For purposes of the frequency distribution design, a lower range is considered in the younger age group.

Source: *Own.*

The "having an AFORE" variable was significant in the three options for planning for old age. Having wealth was a significant variable in all three options. Compared to those without any, those having physical wealth (their own home or land) were up to 5 percentage points more likely to decide on formal planning, while those without wealth were more likely not to plan and, therefore, depended on government resources or their family members for retirement.

Differences in probabilities of having savings accounts or sophisticated accounts variables were significant for formal planning. Respondents with savings accounts were 3.82% more likely to formally plan for retirement, while those without savings accounts were more likely not to plan or plan informally for retirement. Finally, those who indicated having had a negative income shock in the previous year were less likely to have formal retirement planning.

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4. Discussion

Mexicans' behavior regarding saving for retirement is a matter of serious concern. According to the Mexican National Survey of Financial Inclusion 2021, approximately one-third (36.40%) of the Mexican population between 18 and 70 years of age have savings accounts, and only 39.10% have retirement saving accounts or retirement fund administrators (AFORE). The percentage differs by gender (48.7% are men and 30.6% are women) and by geographical region (46.55% in the north, 49.15% in the center, and 33.44% in the south of the country). Only 6.0% make voluntary contributions to their AFORE. In Mexico, a significant percentage of adults over 65 work informally; however, their income is often insufficient, especially for women (Nava et al., 2016).

The results of this study revealed a positive and significant relationship between planning to cover old-age expenses and financial literacy, as presented in García (2021b), Lusardi and Mitchell (2006), Sekita (2011), Klapper and Panos (2011), and Bucher et al. (2011). The influence on planning for retirement is an important reason to increase research about Mexican financial literacy and its relationship with sociodemographic variables. Concerning the financial literacy of the sample, the results obtained in the descriptive analysis were consistent with those of Lusardi (2008), Silgoner et al. (2016), Lusardi and Mitchel (2014), and studies that have used the questions for international comparison purposes, as presented by Atkinson and Messy (2012), Xu and Zia (2012), Hasler and Lusardi (2017), and OECD (2020). The discussion regarding the relationship between financial planning for old age and sociodemographic and economic factors is presented in the context of the Mexican pension system.

The results indicated that the gender variable is statistically significant and that retirement planning varies with the respondents' age. Younger people were more likely to decide on formal planning than older adults. A possible explanation is based on the existence of a digital divide due to the fact that young people use the internet more than older people. The use of the Internet by the elderly may not reach the levels noted for younger audiences (Paul & Stegbauer, 2005).

The estimates revealed that the probability of formally planning for old age increases with educational level and income positively affects formal retirement planning: the probability of deciding on formal planning increases with income level. There are large gaps in educational quality owing to the students´ socioeconomic levels, a situation present throughout Mexico (Gómez, 2017).

The results on working conditions showed that individuals who work at home, those with disabilities, and the unemployed were less likely to plan formally than employees. Students are the ones who most plan to cover their expenses through a formal way. This could be explained because of the high expectations they have of being part of the formal labor market upon finishing their degrees. In Mexico, these results could be attributed to the employer's obligation to contribute to the workers' retirement accounts rather than the employees' savings habits.

The difference in planning based on urban or rural locations in Mexico related to the situation referred to by Hernández (2001) and ECLAC (2006). In rural areas, agricultural workers, temporary day laborers, and unpaid family workers are vulnerable because of the lack of skills and savings facilities during their productive lives. When they reach retirement age, they must seek support from family (Murillo-López & Venegas-Martínez, 2011). In Mexico, despite the majority of the EAP in cities belonging to the informal sector, casual workers, and unpaid family workers, they tend to save more for retirement than rural workers. Moreover, having an AFORE account is a significant variable that conditions formal planning for old age.

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Our results showed that wealth was highly correlated with retirement planning, as Sekita (2011), Klapper and Panos (2011), and Van Rooij et al. (2011) confirm. Area of residence-orientated results showed a higher percentage among those saving formally for retirement in cities as opposed to those in rural locations. This could be explained because in Mexico, rural areas have a higher percentage of informal jobs than cities.

Based on our results, having a savings account increased the probability of formal retirement planning. Moreover, as discussed in Klapper et al. (2012), individuals with higher education and income were more likely to have a bank account. Finally, those respondents who indicated having had a negative shock in income during the last year were less likely to have a formal retirement plan, as Sekita (2011) found. In contrast with the findings of Klapper and Panos (2011) and Lusardi and Mitchel (2011a), our results indicate that negative shocks are not motivating people to think about the future.

Conclusion

This study aimed to measure financial literacy level among Mexicans and determine its relationship with retirement planning and sociodemographic variables. The study's results provided evidence of a low overall financial literacy level in Mexico. They also reveal that individuals with greater financial literacy are more likely to save formally. Results coincide with those of international studies regarding the lowest financial literacy levels in vulnerable groups and their lower likelihood to save formally for retirement; considering the Mexican context, different explanations and hypotheses of this behavior can emerge.

The results of this study can assist Mexican public policymakers in evaluating the importance of a stronger financial education program for the entire population. Apart from students, this involves the adult population (including informal workers and communities in rural areas and the Southern region of Mexico), who has fewer retirement savings for their old age.

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