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Credit card(s) and default risk: what ENFIH suggests for Mexican households

Tarjeta(s) de crédito y riesgo de incumplimiento: lo que sugiere la ENFIH 2019 para los hogares mexicanos

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Article information	Abstract
Received: 1 May 2025 Accepted: 5 Jun 2025 JEL Classification: C1, G5, G51. Keywords: Credit cards, probability of default, debt, Mexican households.	This paper examines the impact of credit cards on the probability of defaulting on household debt in Mexico. Using probit models, we found that credit cards are directly related to household default in Mexico. Having more credit cards, an unpaid balance, or raising the average balance increases the household's likelihood of defaulting on its debt. In terms of financial inclusion, the findings suggest the need to provide financial education so that individuals know how to manage these financial instruments, which are more expensive and carry a higher credit risk.
Información del artículo	Resumen
Recibido: 01/05/2025 Aceptado: 05/06/2025 Clasificación JEL: C1, G5, G51. Palabras clave: Tarjetas de crédito, probabilidad de incumplimiento, deuda, hogares mexicanos.	Este trabajo aborda la incidencia de las tarjetas de crédito sobre la probabilidad de incumplimiento de la deuda de los hogares mexicanos. Utilizando modelos probit, encontramos que las tarjetas de crédito están directamente relacionadas con el impago de obligaciones crediticias de los hogares en México. Más tarjetas de crédito, deber a las mismas o incrementar el saldo promedio adeudado aumentan la posibilidad del hogar de no pagar su deuda. En términos de inclusión financiera, los hallazgos sugieren la necesidad de proveer educación financiera para que los individuos sepan manejar estos instrumentos financieros, que son más caros e implican mayor riesgo crediticio.

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1. Introduction

The Basel Accords on banking regulation link financial institutions' capital levels to the credit risk they face. They sparked interest in predicting individuals' risk of defaulting on their credits. Furthermore, the study of this risk is relevant because it can identify patterns of behavior associated with such non-compliance and prevent them. Individuals typically resort to credit to address consumption needs or housing-related expenses. According to data from BANXICO (2025a, 2025b), households hold 45.6% of the outstanding credit portfolio in the non-financial private sector, and 58.6% of non-performing loans. In this context, consumer credit accounts for more than 50% of households' non-performing loans, with credit cards representing the largest share within the overdue consumer credit segment (35.7%). Additionally, the ENFIH 2019¹ indicates that 13% of Mexican households have defaulted on any debt.

Studies on this topic from Chile, Brazil, and the U.S, using binary probability models, have shown that individual characteristics—such as age, educational level, income, gender, and marital status—significantly influence the likelihood of default. Moreover, credit card debt has been identified as one of the primary factors negatively impacting household finances, particularly in terms of over-indebtedness and the risk of bankruptcy.

Given the importance of credit card use and the limited literature linking it to individual credit risk in Mexico, this paper aims to investigate how different characteristics of credit card ownership affect households' probability of default. In this regard, the main finding indicates that an increase in the number of credit cards per household, or in the average credit card debt balance, is associated with a higher probability of default across various types of credit. Additionally, holding credit card debt, compared to not holding any, is also positively associated with an increased likelihood of delinquency.

This study is structured as follows: Section 2 presents the literature review that supports the analysis. Section 3 explores the database, variables, and methodology. Section 4 discusses and interprets the main results, and finally, Section 5 offers the conclusions and policy recommendations.

2. Literature review

Several papers have examined the relationship between credit risk and different aspects of credit cards. Domowitz & Sartain (1999) point out that credit card debt is one of the primary factors contributing to the bankruptcy filings among U.S. households. However, Godwin (1999) finds that having an outstanding balance on credit cards does not influence the probability of having difficulty paying debts for American households. For Chile, Salgado & Chovar (2010) find that households increase the probability of becoming over-indebted by having credit cards. The influence of the number of credit cards has also been studied, with mixed results. Drentea (2000) finds that the number does not influence the anxiety level of US households. Rogers, Rogers & Securato (2015) find a positive relationship with the probability that individuals in Brazil have a good credit history. Landaberry (2018) finds that it increases the probability of being late on credit card payments in Uruguay. However, the number of credit cards does not affect the probability when the delay exceeds three months. As far as we know, there are no studies for Mexico linking the probability of default and credit card aspects at the household level.

Having mortgage loans has also been associated with credit risk. For the United States, Godwin (1999) finds that having this type of credit increases the probability that households will have difficulty paying their debts. In contrast, Avery, Calem, & Canner (2004) link mortgage borrowing to a reduction in the probability of default, compared to revolving loans. Salgado & Chovar (2010) find that the probability of over-indebtedness increases when Chilean households have this type of credit. For Portugal, Costa (2012) shows that mortgage holdings do not influence the probability of household default.

Çallı & Coşkun (2021) conduct a longitudinal study to examine, among other things, how credit risk models have changed over time. Their paper helps establish the determinants that explain the probability of default, including individual characteristics such as age, level of education, income, and being a woman or married. When they are

¹ Encuesta Nacional de Finanzas de los Hogares.

significant, they reduce this probability. The number of household members or children increases the likelihood of being in arrears.

3. Data and methodology

3.1. Information resources and variables

For this study, we use data from the ENFIH 2019. This survey was conducted by the *Instituto Nacional de Estadística y Geografía* (INEGI) and published in 2021. The ENFIH 2019 is a nationally representative survey that provides detailed information on the sociodemographic and economic-financial characteristics of households in Mexico. It is the only survey that allows us to calculate the probability of default among Mexican households, considering different types of credit.

The sample consists of 17,386 households, from which only individuals aged 18 and above were interviewed. The main limitation of our study is that we analyze the data cross-sectionally, making it impossible to conduct comparative analyses over time. We use the sociodemographic and financial variables of the households presented in Table 1.

Table 1: Variable descriptions.

Dependent variable	
Debt default probability	Dummy variable equal to 1 if the household defaults for three months or more (according to banking regulations) and 0 otherwise.
Independent Variables:	
Mortgage credit access	Dummy variable equal to 1 if households have a mortgage and 0 otherwise.
TDC access	Dummy variable equal to 1 if a household has at least one credit card, and 0 otherwise.
Amount of TDC	Discrete variable that measures the number of credit cards of a household.
Debt in TDC	Dummy variable equal to 1 if a household has debt in TDC and 0 otherwise.
Average debt balance in TDC	Continuous variable obtained by dividing the value of the household's credit card debt by the number of cards it holds.
Control variables	
Household income	Labor and non-labor income of household members. Used in logarithm.
Household debt	Debt level of all household members, including mortgage and non-mortgage debt. Used in logarithm.
Average age	Arithmetic average of the ages of household members.
Household size	Categorical variable that takes values between 1 and 6: 1 = One inhabitant 2 = Two inhabitants 3 = Three inhabitants 4 = Four inhabitants 5 = Five inhabitants 6 = Six or more
Educational level of the head of the household	Categorical variable that takes values between 0 and 4: 0 = No education 1 = Basic education 2 = Upper secondary education 3 = Bachelor or equivalent 4 = Postgraduate
Marital status of the head of the household	Categorical variable that takes values between 0 and 2: 0 = Couple in free union or married 1 = Single 2 = Otherwise
Sex of the head of the household	Dummy variable equal to 1 if the head of household is male and 0 otherwise.

Source: Authors' elaboration.

3.2. Econometric approach

A binary probit response model is used for the estimation to determine whether credit cards affect the probability of default among Mexican households, controlling for household sociodemographic characteristics. In this regard, we follow Wooldridge's (2010) approach:

$$\Pr(Y_i = 1|X_i) = \Phi(X\beta + e_i), \quad e_i \sim (0, \sigma^2). \quad (1)$$

In this sense, Y_i is the binary dependent variable (probability of default), which takes the value of 1 if Mexican households fail on their debt payment for more than three months and 0 otherwise. $\Phi(\cdot)$ represents the standard normal cumulative distribution function. The regressor matrix for each household in the sample is represented by X_{ixj} and β_{jx1} is the vector of estimated coefficients for each of the explanatory variables.

The results of the probit model are represented through the marginal effects, which are represented as follows:

$$\frac{\partial \Pr(Y_i = 1|X_i)}{\partial X_j} = \phi(X\beta)\beta_j \quad (2)$$

where $\phi(\cdot)$ is the density function of the normal distribution.

4. Results and discussion

The probabilistic model estimates yielded interesting results. In this regard, Table 2 shows the change in the probability of default for Mexican households, considering variables related to access to the debt market, as well as other control variables standard in the literature on this topic. Model (1) includes the variable of access to the mortgage debt market, showing that having this type of credit decreases the probability of defaulting on household debt by 1.68%. This finding is consistent with Avery et al. (2004) for American households. Keeping the wealth effect and the household's financial stability constant, the existence of a guarantee causes the opportunity cost of default to be too high, as they could lose the asset.

Model (2) includes the variable of access to credit card financing. It exhibits a positive and significant relationship with the probability of defaulting on household debt. The coefficient indicates that having at least one credit card in the household increases the probability of defaulting on debt by 10.15% compared to households without this type of financial instrument. Salgado & Chovar (2010) found similar results for Chilean households. Additionally, model (3) includes both variables related to access to the debt market, specifically access to mortgage debt and credit cards. In this case, it can be observed that having a credit card consistently maintains its sign and significance. However, in the case of access to the mortgage market, the relationship with default becomes insignificant.

Table 2: Marginal effects of debt market access on the probability of default of Mexican households.

	(1)	(2)	(3)
Household characteristics			
Mortgage credit access	-0.0168 * (0.0101)		0.0012 (0.0102)
TDC access		0.1015 *** (0.0106)	0.1017 *** (0.0108)
Income (ln)	-0.0197 *** (0.0056)	-0.0257 *** (0.0056)	-0.0257 *** (0.0056)
Debt (ln)	0.0251 *** (0.0027)	0.0272 *** (0.0023)	0.0270 *** (0.0026)
Average age	-0.0015 *** (0.0004)	-0.0015 *** (0.0004)	-0.0015 *** (0.0004)

Table 2: Marginal effects of debt market access on the probability of default of Mexican households. (continued).

Household size				
	Two inhabitants	-0.0252 (0.0189)	-0.0289 (0.0191)	-0.0289 (0.0191)
	Three inhabitants	-0.0072 (0.0201)	-0.0138 (0.0203)	-0.0138 (0.0203)
	Four inhabitants	-0.0071 (0.0211)	-0.0117 (0.0213)	-0.0117 (0.0213)
	Five inhabitants	-0.0042 (0.0224)	-0.0092 (0.0226)	-0.0092 (0.0226)
	Six inhabitants or more	0.0386 (0.0247)	0.0345 (0.0249)	0.0346 (0.0249)
Head of household characteristics				
Education				
	Basic	-0.0370 (0.0290)	-0.0430 (0.0295)	-0.0431 (0.0295)
	Upper secondary	-0.0503 * (0.0301)	-0.0562 * (0.0306)	-0.0563 * (0.0306)
	Bachelor or equivalent	-0.0853 *** (0.0298)	-0.0929 *** (0.0303)	-0.0929 *** (0.0303)
	Postgraduate	-0.1166 *** (0.0325)	-0.1273 *** (0.0326)	-0.1273 *** (0.0327)
Marital Status				
	Single	-0.0360 ** (0.0158)	-0.0335 ** (0.0158)	-0.0335 ** (0.0158)
	Other	-0.0001 (0.0125)	0.0012 (0.0124)	0.0012 (0.0124)
Sex				
		-0.0255 ** (0.0104)	-0.0256 ** (0.0103)	-0.0256 ** (0.0103)
Observations		7,942	7,942	7,942
Pseudo R ²		0.0331	0.0483	0.0483

Note: Standard errors are shown in parentheses. *, **, and *** correspond to the significance level of 10%, 5% y 1%, respectively.
Source: Authors' elaboration based on data from ENFIH 2019 (INEGI, 2021).

Table 3 examines the impact of certain household attitudes toward credit cards on the probability of default. It only considers households that have credit cards. Model (4) includes the number of credit cards a household has as an independent variable. In this regard, it is found that adding one additional credit card increases the probability of defaulting for three months or more by 1.22%, in contrast to Landaberry (2018) for Uruguayan households. On the other hand, model (5) considers the effect of whether a household maintains credit card debt as an explanatory variable. Households that are indebted through this instrument increase their probability of defaulting by 17.14% compared to households that do not have credit card debt. This finding differs from that obtained by Godwin (1999) for American households. Finally, model (6) incorporates the average credit card debt balance. It shows a positive relationship between this variable and the probability of household debt default. Increasing the average balance by 1% boosts the probability by 3.27%.

Table 3: Marginal effects of credit cards on the probability of Mexican household debt default.

	(4)	(5)	(6)
Household characteristics			
Amount of TDC by household	0.0122 *** (0.0024)		
TDC debt (Having debt = 1)		0.1714 *** (0.0230)	
TDC average balance (ln)			0.0327 *** (0.0044)

Table 3: Marginal effects of credit cards on the probability of Mexican household debt default. (continued).

Income (ln)	-0.0304 *** (0.0063)	-0.0256 *** (0.0062)	-0.0223 *** (0.0066)
Debt (ln)	0.0244 *** (0.0025)	0.0288 *** (0.0025)	0.0213 *** (0.0031)
Average age	-0.0016 *** (0.0004)	-0.0015 *** (0.0004)	-0.0017 *** (0.0004)
Household size			
Two inhabitants	-0.0250 (0.0215)	-0.0242 (0.0213)	-0.0152 (0.0216)
Three inhabitants	-0.0103 (0.0227)	-0.0111 (0.0224)	0.0017 (0.0229)
Four inhabitants	-0.0099 (0.0237)	-0.0082 (0.0235)	0.0086 (0.0240)
Five inhabitants	-0.0054 (0.0251)	-0.0019 (0.0249)	0.0151 (0.0257)
Six inhabitants or more	0.0440 (0.0277)	0.0483 * (0.0276)	0.0667 ** (0.0285)
Head of household characteristics			
Education			
Basic	-0.0470 (0.0334)	-0.0469 (0.0329)	-0.0607 * (0.0360)
Upper secondary	-0.0617 * (0.0346)	-0.0564 * (0.0341)	-0.0732 * (0.0373)
Bachelor or equivalent	-0.1082 *** (0.0342)	-0.1011 *** (0.0338)	-0.1238 *** (0.0369)
Postgraduate	-0.1406 *** (0.0366)	-0.1323 *** (0.0363)	-0.1566 *** (0.0395)
Marital Status			
Single	-0.0378 ** (0.0175)	-0.0348 ** (0.0177)	-0.0242 (0.0198)
Other	0.0008 (0.0138)	0.0001 (0.0138)	0.0090 (0.0150)
Sex	-0.0288 ** (0.0115)	-0.0285 ** (0.0114)	-0.0279 ** (0.0123)
Observation	6,177	6,177	6,128
Pseudo R ²	0.0431	0.0515	0.0565

Note: Standard errors are shown in parentheses. *, **, and *** correspond to the significance level of 10%, 5% y 1%, respectively.

Source: Authors' elaboration with data from ENFIH 2019 (INEGI, 2021).

For the control variables, consistency was found across the six models, although some differences were noted in comparison to the existing literature. In Mexico, single household heads or households headed by males register a lower probability of default. Regarding gender, the literature suggests that women tend to show greater debt compliance. However, in some cases, does not distinguish between women who are heads of household and those who are not.

The results show consistency across the models in Table 3, which measure the impact of household attitudes towards credit cards on the probability of household debt default. In this sense, increasing either the level of debt or the number of credit cards in a household negatively influences its finances, as they increase the risk of default. This may primarily refer to the fact that debt associated with this type of instrument is one of the first to be defaulted upon when the household faces financial stress, given that there is no collateral to back it up. Kim (2020) notes that as mortgage burdens increase, households tend to hold on to their homes and default on unsecured loans. Selling a home generates transaction costs, so households choose to default on the unsecured debt and relax their budget constraint.

In terms of access to the debt market through credit cards or mortgage debt, the results show that access through secured debt does not increase the risk of default. This finding is relevant because while credit cards are an easier way to access the financial system, they are also a more expensive instrument that defaults more frequently. In this sense, financial inclusion policies should provide financial education to individuals, aiming to enhance their household financial management and enabling them to benefit from credit without incurring financial stress, thereby contributing to a more robust financial system.

5. Conclusions and recommendations

It is well known that credit cards are one of the most used debt instruments in Mexico (Trejo-García et al., 2016). In this sense, 47% of Mexican households have at least one credit card (ENFIH, 2019), so analyzing its impact on household financial management becomes a highly relevant issue.

Considering the objective of this study, empirical evidence suggests that credit cards increase the probability of household default. In this sense, more credit cards per household, having unpaid balance, or the rise in the average balance are indicators that Mexican households struggle to manage this instrument, thereby increasing their risk of default.

The control variables mostly show the expected signs, supported by the literature. Income, the average age of the household, and a higher level of education decrease the probability of default. However, if total household debt increases, so does the risk of defaulting on credit obligations.

It is essential to note that a significant limitation of this article is the lack of longitudinal data to measure household credit utilization patterns in Mexico. However, the period between 2020 and 2022 could pose problems to the estimates, as the COVID-19 pandemic that occurred during these years could contaminate the results with outliers. Additionally, another limitation is related to the potential endogeneity problem associated with access to credit. Given that, its analysis requires more complex modeling techniques; this issue represents a line of future research that could be addressed using more recent and detailed datasets.

Ultimately, this research provides a foundation for examining financial inclusion policies centered on guaranteed loans, which aim to reduce the probability of default among Mexican families and enhance individuals' quality of life by facilitating the purchase of decent homes.

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Appendix

Table A1: Descriptive statistics.

Household characteristics	Obs	Mean	Std. dev.	Min	Max
Debt default (Default = 1)	8,694	0.13	0.34	0	1
TDC per household	17,765	1.13	1.63	0	16
Debt in TDC (Tenure =1)	17,765	0.38	0.49	0	1
Average in TDC balance (ln)	6,299	8.21	1.21	0	13.71
Debt in mortgage credit (tenure =1)	17,765	0.15	0.36	0	1
Income (ln)	17,002	11.72	0.93	6.40	16.33
Debt (ln)	10,221	9.91	1.96	0	16.38
Average age	17,760	37.56	17.39	8	97
Household size					
One inhabitant	17,765	0.15	0.36	0	1
Two inhabitants	17,765	0.21	0.40	0	1
Three inhabitants	17,765	0.20	0.40	0	1
Four inhabitants	17,765	0.21	0.41	0	1
Five inhabitants	17,765	0.13	0.34	0	1
Six inhabitants or more	17,765	0.10	0.29	0	1

Table A1: Descriptive statistics. (continued).**Head of household characteristics**

Marital Status						
Common-law union or married couples	17,760	0.65	0.48	0	1	
Single	17,760	0.10	0.30	0	1	
Other	17,760	0.25	0.43	0	1	
Education level						
Not educated	17,718	0.06	0.23	0	1	
Basic	17,718	0.52	0.50	0	1	
Upper secondary	17,718	0.18	0.38	0	1	
Bachelor or equivalent	17,718	0.22	0.41	0	1	
Postgraduate	17,718	0.03	0.17	0	1	
Sex (Male = 1)	17,765	0.68	0.47	0	1	

Source: Authors' elaboration with data from ENFIH 2019 (INEGI, 2021).