

**DETERMINANTS OF FINANCIAL AND DIGITAL INCLUSION IN
HOUSEHOLDS: A PROBIT MODEL APPLIED TO BAHIA BLANCA
(ARGENTINA)¹**

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Abstract

The objective of this study is to provide a description of the main financial and digital instruments that the population under analysis has and uses. A set of characteristics of the head of house are considered and traditional financial instruments. Furthermore, it examines the possession of bank and non-bank credit instruments, distinguishing between vulnerable and non-vulnerable neighborhoods in the city of study, and then delves into the socioeconomic determinants of the possession and use of these financial and digital instruments. The methodology applied is descriptive and explanatory using probit models. The results highlight the need to facilitate access to formal financial instruments, harness the reach being generated by digital services, and emphasize the importance of promoting financing programs to meet the credit demands of the lower-income population.

Key Words: Financial inclusion – Digital finance – Households

JEL Code: O16 - D14 - C19

1. Introduction

Financial inclusion involves achieving universal access to useful and affordable financial products that meet the financial needs of individuals and businesses, including services such as transfers, payments, savings, credit, and/or insurance, provided in a responsible and sustainable manner.

An inclusive financial market promotes savings, investment, and productive development of an economy. It enables households to smooth consumption, cope with unexpected health expenses or unemployment, and invest in productive projects, education, or housing (Yakubi et al., 2022; Sharma, 2016; Corrado and Corrado, 2015; Collins et al., 2009; Burgess and Pande, 2005). Greater financial inclusion implies a

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reduction in financial costs in terms of time and transaction security for everyday operations, better channeling of savings into increased investment, output, and employment (Goel and Sharma, 2017; Cull et al., 2014), especially for the lower-income population, those with less education, and the younger generation, who are particularly excluded from the formal financial system (Allen et al., 2016; Demirguc-Kunt et al., 2012).

The United Nations considers the extension of access to financial services worldwide as part of its Sustainable Development Goals (SDGs). It argues that financial inclusion promotes access to services for managing unexpected expenses, supporting productive entrepreneurship, facilitating investment in education, health, and housing, thus reducing income inequalities, gender gaps, and poverty. Therefore, financial inclusion, along with microfinance and new financial technologies, is closely linked to the achievement of the SDGs.

During the years 2020 and 2021, in the context of the COVID-19 pandemic, financial and digital inclusion became crucial instruments for safeguarding public health. The use of cash as a means of payment involves increased person-to-person contact, both in financial institutions and in places of purchase/sale and service payment, leading to crowded spaces that posed a risk to public health. Additionally, economic aid transfers during this time were channeled through the banking or digital system (such as e-wallets) to avoid gatherings, even though many people did not have access to a bank account. This accelerated the process of formalizing transfers and their usage, although many people still withdrew cash upon receiving it.

Based on the importance of financial inclusion in general, this study details the context of the city of Bahía Blanca (Argentina), regarding the possession and usage of different financial and credit instruments, linking the results obtained according to the vulnerability of the city's neighborhoods. Probit regression models are also applied to the possession and usage of different financial and digital instruments, along with a potential demand variable in the face of unsatisfied credit demands in the short term, especially among lower-income households, which, if not channeled through the formal market, end up resorting to the informal market, which is more costly, insecure, and unstable, increasing household vulnerability.

Although the sector has been very dynamic in recent years, the Argentine microfinance market, which focuses on meeting the credit needs of this population group, is very limited compared to other countries in the region (Marr et al., 2014).. The latest report from the Argentine Network of Microcredit Institutions (RADIM, 2019) highlights that the total number of users barely reaches 100,000 borrowers, while, for example, in Peru, it exceeds 5 million (MIX Market, 2018). In addition to its limited development, there is a significant concentration of Microcredit Financial Institutions (MFIs) in metropolitan areas, with 65% of them located in the city of Buenos Aires and greater Buenos Aires (Tauro et al., 2021), and there is no specific microcredit organization in the city of Bahía Blanca.

It follows from the previous arguments the importance of promoting the growth of the social credit market to stimulate the creation and expansion of social economy ventures, generate employment, income, and local economic development, especially in smaller

cities, such as the case of Bahía Blanca. To achieve this goal, it is important to understand the characteristics of households with potential demands, i.e., the number of people who have access to formal financial services and those with unsatisfied short-term credit demands.

The structure of this article is as follows: the second section presents a literature review related to the impact of financial inclusion and social credits on the economy. The third section provides the data used and a descriptive overview of it. The fourth section, presents the main determinants of ownership and use of financial instruments. Section seven, present the results obtained and section eight the conclusions arrived.

2. Literature Review

Since the 1990s, the importance of financial development for economies has been studied, as it promotes industrial and business development, improving productivity and capital accumulation. Following this line of thought, many authors have explored the link between financial inclusion and economic development (Jauch and Watzka, 2015; Beck et al., 2007; Levine, 2005).

One such study is the work of Demirguc-Kunt et al. (2017), who analyze the empirical evidence on the use of financial services and their contribution to inclusive growth and economic development in various countries around the world. They found that financial inclusion increases formal savings, promotes investment and expansion of the domestic market, thus fostering economic growth. Allen et al. (2016) analyzed key variables for financial inclusion in 123 countries worldwide. In terms of macroeconomics, they found that countries with a higher proportion of the population included in the financial system have lower financial costs, stronger legal rights (regarding customer protection laws and bankruptcy regulations), and more stable political environments.

Furthermore, Sahay et al. (2015) conducted a study for 88 countries to examine whether financial inclusion has a positive impact on economic growth, controlling for factors such as initial per capita GDP, education, or the presence of systemic banking crises. They found that this effect is significant when the level of development or financial depth is included, as the marginal effect of increasing financial inclusion on growth declines with higher levels of economic development.

On the other hand, Han and Melecky (2013) found that during global financial crises, economies with a higher degree of financial inclusion have a lower risk of systemic crises within the financial system. The authors explain that the diversification of deposits among various agents allowed for more stable total deposits, enabling better credit recovery, investment, and economic activity. Thus, promoting the creation of inclusive and secure institutions that provide efficient and timely services to excluded population groups is what leads to considering financial inclusion as a source of economic stability.

Regarding the use of basic services such as access to a financial account, it is a key element for storing money, receiving and making payments. It facilitates the daily activities of households, improves their ability to make future plans, and cope with short-term shocks. Furthermore, individuals who have access to a bank account are more likely to use other financial services such as savings plans, loans, and insurance to start or expand businesses, invest in education and health, manage risks, and cope with financial

crises, reducing their social, employment, and economic vulnerability (Iglesias and Mejía, 2018; Roa, 2013; Collins et al., 2009).

In Argentina, access to and use of bank accounts has increased over the years, currently reaching 98.5% of adults with at least one account, according to the Financial Inclusion Report of the Central Bank of the Argentine Republic (BCRA, 2022). Additionally, it is highlighted that half of the adult population has at least one financing arrangement in the extended financial system, including credit cards, non-bank purchasing cards, and other non-financial credit providers that report their portfolios to the regulatory authority, which is the Central Bank of the Argentine Republic.

While financial inclusion appears to be strong in terms of ownership of bank or virtual accounts, there is a challenge in terms of recognition of account ownership and usage. In the latest Global Findex survey by the World Bank, it was found that only 72% of respondents in Argentina reported having a bank account (Global Findex, 2021). Furthermore, the Financial Capability Report for Argentina in 2017 highlighted lower levels of financial planning, knowledge, and usage of a wide range of financial services compared to other countries in Latin America (Iglesias and Mejía, 2018).

Similar results have been found in various studies analyzing different regions of the world, indicating that young people, those with lower income levels, education, and informal employment, have lower levels of financial inclusion (Orazi et al., 2023; Martinez et al., 2020; Carballo et al., 2016; Zinz and Weill, 2016; Tuesta et al., 2015; Fungáčová and Weill, 2015).

One way to promote financial inclusion, particularly among the population with lower resources, which gained popularity in the early 21st century, has been through the promotion of Microfinance Institutions (MFIs), especially in developing countries. Organizations such as Non-Governmental Organization (NGOs), cooperatives, mutuals, and even private institutions have focused on meeting the financial needs of individuals excluded from traditional financial markets, such as those with lower incomes, lower levels of education, the unemployed, or those with higher levels of informality in employment.

The most emblematic case of these institutions is that of those dedicated to microcredit, pioneered by the Grameen Bank in 1976, under the premise of being a social and solidarity bank for the poor and women in remote areas. Since then, various business models of MFIs, both private and public, have emerged, with some being highly successful while others have not met the proposed expectations and, at times, their mission has been distorted (Mersland and Strøm, 2010).

Although it is difficult to establish a definition that encompasses all schemes, microcredit typically refers to small-scale loans with solidary, group, or community guarantees, short-term in nature, intended for individuals and low-income households to start or expand productive enterprises, or to invest in durable goods or housing.

In Argentina, the microfinance market is underdeveloped. Estimates of the potential demand for microcredit suggest that only around 3% of this demand has been met by MFIs in the major urban areas of the country, according to the Argentine Social Debt Survey (EDSA) conducted by the Argentine Catholic University (UCA) in 20 urban

sectors, which included a module on financial inclusion in 2011 (Grandes, 2014). Even in the city of Bahía Blanca, it is estimated that up to 32% of low-income households would like to request a microcredit in the future, but they will not find a suitable offer to meet their needs from the formal market (Orazi et al., 2023).

In other words, there is ample room for the development of microfinance institutions to meet the financial needs of the population excluded from the formal market, and it is evident that there are obstacles that limit their growth in the country.

Tauro et al. (2021) conducted a descriptive analysis of microcredit offerings in Argentina, where they warn about the limited development of MFIs in the country and the high concentration of clients, with 10% of the institutions serving 80% of the total borrowers.

They also mention the significant concentration of MFIs in metropolitan areas, with 65% of them located in Buenos Aires City and Greater Buenos Aires. In this characterization of MFIs in Argentina, they also highlight the development challenges on the supply side, such as the lack of appropriate regulation, financing, and national support, especially during periods of inflation or macroeconomic instability.

Given the mentioned diversity, scarcity, and concentration of the financial market in Argentina, although it reflects the existence of obstacles to its development, it also represents an opportunity to identify and meet unmet demands, particularly for services targeting low-income populations and smaller cities in the interior of the country.

3. Data

The data is obtained from the Survey of the Project of the Executive Unit (EPUE-2021), done in the city of Bahía Blanca during December 2021. The survey database constitute the most extensive one for the city. The EPUE-2021 achieved unprecedented coverage of the city's most vulnerable neighborhoods, making the obtained results representative of the entire population of Bahía Blanca².

While this study will focus on specific issues related to household financing in the population of Bahía Blanca based on the type of neighborhood and the use of financial instruments, it is worth noting that there is a wide range of socioeconomic variables available for the general population. These variables include food security, housing situation, social networks, and open government, at the individual level for each household member.

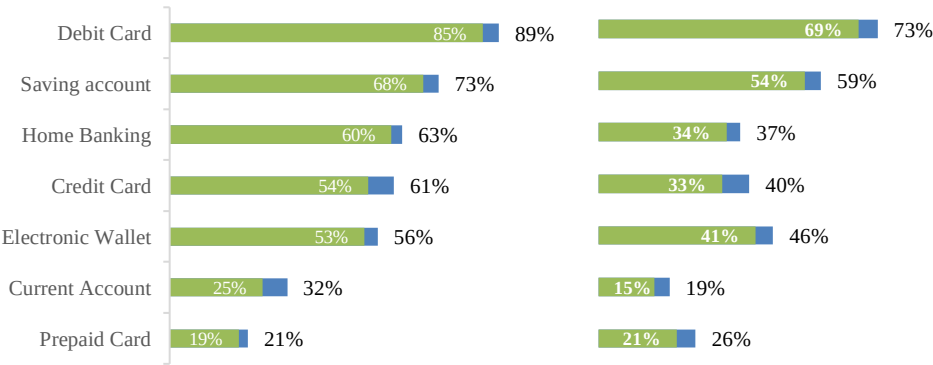
The city under analysis is Bahía Blanca, a locality of around three hundred thousand inhabitants located in the southern province of Buenos Aires, Argentina. It serves as a center for social and economic activities in a region with significant productive capacity. The city is characterized by its port, industrial sector, and universities, and it is experiencing population and territorial expansion, which brings new challenges in terms of infrastructure, access to services, and the functioning of specific markets. In Bahía Blanca, some sectors benefit from access to healthcare, education, consumer markets,

² The survey does not include the locality of Cabildo or the surrounding rural areas.

and financial services, while others experience poverty, marginalization, vulnerability, and exclusion. The information collected from households in Bahía Blanca was used to classify the financial instruments used, distinguishing them based on whether the households belong to a vulnerable or non-vulnerable neighborhood.

In Graph 1, the percentages of households that possess and use a range of financial instruments are presented, excluding credit instruments, which are analyzed separately.

Graph 1: Percentage of ownership and usage of financial instruments by neighborhood type.
Non-Vulnerable neighborhood (NVN) Vulnerable neighborhood (NV)



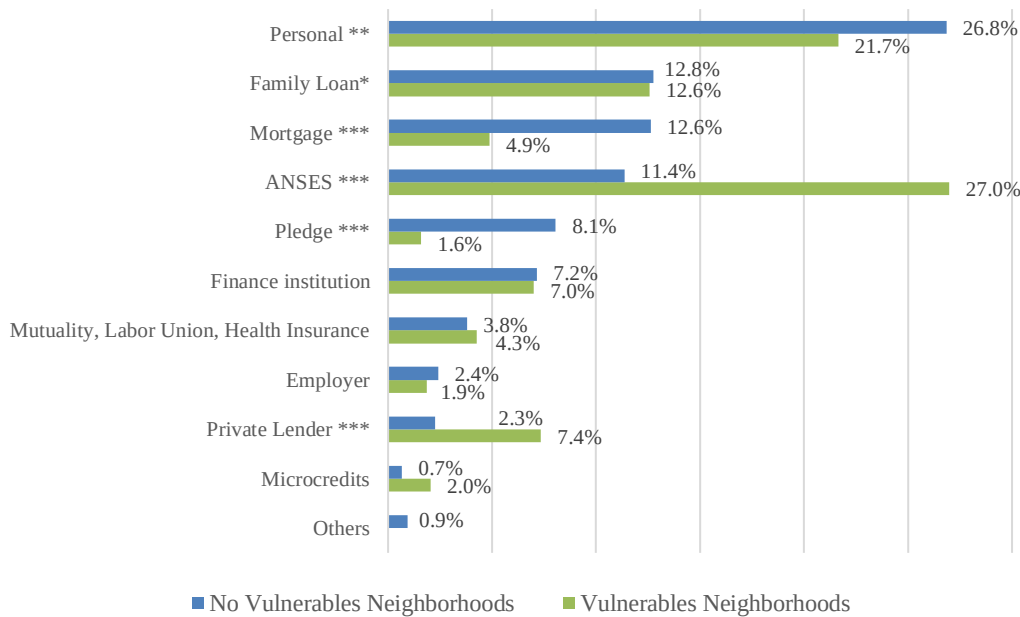
Source: Own elaboration. Note: The differences between vulnerable and non-vulnerable neighborhoods are statistically significant at the 99% level (except for prepaid cards, which are not significant).

As shown in Graph 1, the order of participation in the surveyed financial instruments is the same for all neighborhoods, but the percentage of ownership and usage is always higher in non-vulnerable neighborhoods, except for prepaid cards.

Debit cards and savings accounts are the most well-known and used financial instruments among households in Bahía Blanca. Specifically, 89% of the population in non-vulnerable neighborhoods have debit cards, and 85% report using them. In comparison, 73% of households in vulnerable neighborhoods have this instrument, and 69% of them state that they use it. The remaining analyzed instruments follow the same pattern based on whether households belong to vulnerable neighborhoods, with statistically significant differences in ownership and usage.

Additionally, information was collected regarding the different types of loans requested by households and their purpose. Both past and current ownership of the instrument were considered. Graph 2 displays the percentage of ownership for each type of loan by neighborhood type.

Graph 2: Percentage of credit ownership by neighborhood type.



Source: Own elaboration. Note: The differences between vulnerable and non-vulnerable neighborhoods are statistically significant at 99% (***), 95% (**), 90% (*).

Personal loans are the most widely used type of credit in households in Bahía Blanca (3,203 households in VN and 23,860 in NVN, with a statistically significant difference between the different types of neighborhoods in the city. ANSES loans are a financing tool with a high percentage of ownership by vulnerable households in Bahía Blanca (3,991 in total), as well as financing through lenders (1,087).

According to the characteristics of the issuers of financial credits, they were grouped into two categories:

Bank Credit (BC): includes personal, mortgage, or auto loans.

Non-Bank Credit (NBC): includes loans from unregulated institutions such as ANSES, employers, mutual funds, unions or social security organizations, municipal microcredit, NGOs or religious entities, and loans from informal lenders.

The importance of this classification lies in the fact that the first category is regulated by the BCRA (Central Bank of the Argentine Republic), and therefore can be considered part of the formal economy, while the second category is not subject to regulation. In Graph 3, the percentage of credit ownership is presented according to the neighborhood of residence of the households.

Graph 3: Percentage of credit ownership by type

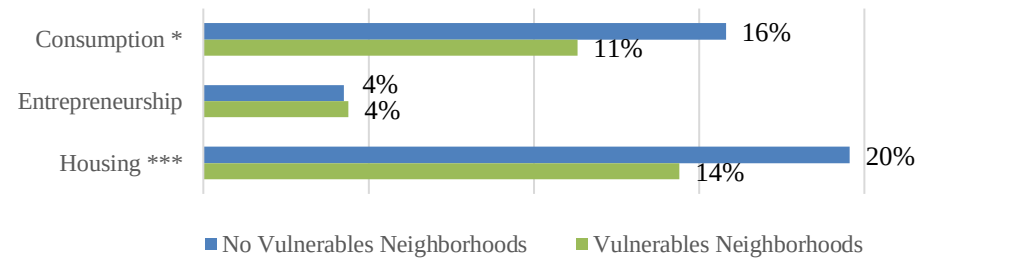


Source: Own elaboration. Note: The differences between vulnerable and non-vulnerable neighborhoods are statistically significant at the 99% level.

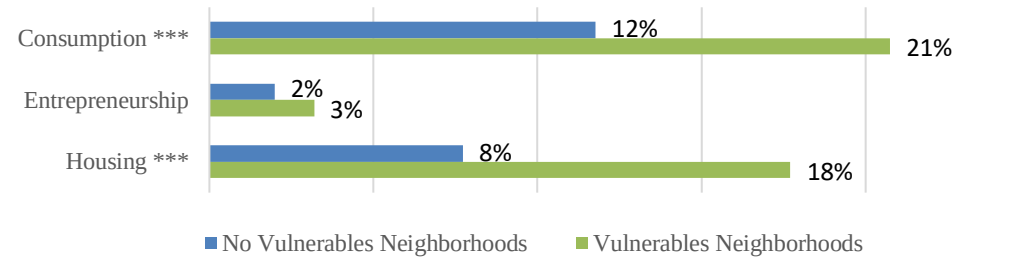
It can be observed that there are no significant differences in the overall population regarding the ownership of different types of credit. However, when analyzing the data according to different neighborhoods, significant differences are observed in the percentage of households with or had bank loans between vulnerable neighborhoods (23%) and non-vulnerable neighborhoods (36%).

Graph 4: Purpose of credit instruments

Credit Bank



Non- Credit Bank



Source: Own elaboration. Note: The differences between vulnerable and non-vulnerable neighborhoods are statistically significant at 99% (***), 95% (**), 90% (*).

On the other hand, 37% of households in vulnerable neighborhoods report having non-bank loans, compared to 22% of households in non-vulnerable neighborhoods. In order to understand the potential employment generation from the funds requested, information was collected regarding the purpose of the loans, distinguishing between

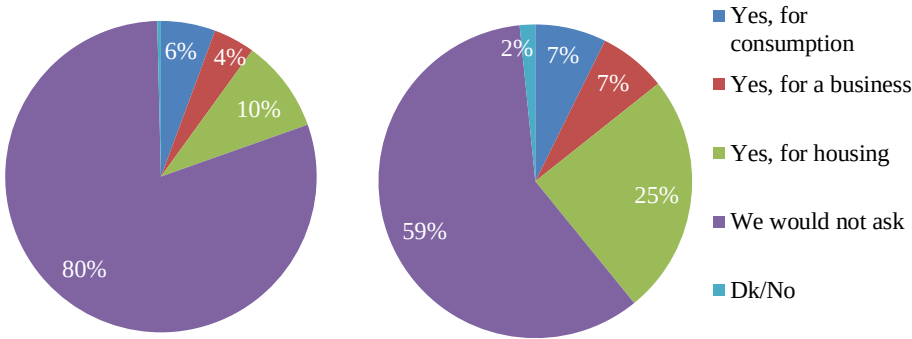
consumption, entrepreneurship, and housing. Graph 4 shows the utilization of different types of credit according to whether they are bank loans or non-bank loans.

It can be observed that the intended purposes for bank loans are predominantly for consumption and housing, with both cases being mostly used by households in non-vulnerable neighborhoods. In contrast, concerning the purposes of non-bank loans, it is evident that the primary purpose is for consumption (21%), followed by housing (18%), and in both cases, they are predominantly used by households belonging to vulnerable neighborhoods.

Based on the idea of inquiring about the potential of Bahía households to acquire external financing, they were asked if they would request any type of financing and its destination.

Graph 5 shows the distribution of responses obtained by neighborhood and according to manifested use. As can be seen, 80% of households in non-vulnerable neighborhoods would not request external financing. Only 10% of the houses would request it for housing, 6% for consumption and 4% for a business.

Graph 5: Potential demand of credit
Non-Vulnerable neighborhood (NVN) - Vulnerable neighborhood (NV)



Source: Own elaboration.

Compared to vulnerable neighborhoods, only 59% of households would not request financing, so there is more need for financing. Where 25% will request financing to assigned it to housing while smaller percentages (7%) would allocate it for a business and the same percentage would request it for consumption.

It can be seen that there are greater unsatisfied demands for credit among households in vulnerable neighborhoods. Although the descriptive statistics give us an idea of the distribution of the variables, a probit model is presented below to understand the socio-economic characteristics that statistically determine the probability of possession and use of the different instruments and also potential demand.

5. Methodology

In this work we apply Probit regressions (Long y Freese, 2001) to understand the statistical significance of the influence of different socioeconomic profiles of households in the city on the ownership and use of various financial and digital services. We include a potential credit demand variable to identify households that are more likely to demand such services and may not find suitable offers in the short term in the city.

The Probit model is estimated by defining a latent variable y^* , which is linearly related to the explanatory variables, through the following model:

$$y^* = x_i\beta + \mu \quad [Equation 1]$$

Also, an observed variable is defined and is related to the latent variable y^* as follows:

$$y_i \begin{cases} 1 & \text{si } y_i^* > 0 \\ 0 & \text{si } y_i^* \leq 0 \end{cases} \quad [Equation 2]$$

Therefore, the probability that the event will occur is defined as:

$$\Pr(y_i = 1/x_i) = \Pr(y^* > 0/x_i) \quad [Equation 3]$$

Substituting (Equation 1) and rearranging the terms we obtain:

$$\begin{aligned} \Pr(y_i = 1/x_i) &= \Pr(\mu > (-x_i\beta/x_i)) \\ &= F(x_i\beta) \end{aligned} \quad [Equation 4]$$

Where $F(.)$ is the normal cumulative distribution function.

For this work, the probability that the individual is included in the formal financial system is modeled based on the following specification:

$$P(Y=1/x_i) = P(\alpha + \beta_1^* \text{Female} + \beta_2^* \text{Age_Q2} + \beta_3^* \text{Age_Q3} + \beta_4^* \text{Age_Q4} + \beta_5^* \text{Age_Q5} + \beta_6^* \text{ED_Sec} + \beta_7^* \text{ED_Up} + \beta_8^* \text{Employer} + \beta_9^* \text{Self_Empl} + \beta_{10}^* \text{Professional} + \beta_{11}^* \text{Formal_emp} + \beta_{12}^* \text{Informal_emp} + \beta_{13}^* \text{Enough} + \beta_{14}^* \text{Save} + \beta_{15}^* \text{Vuln_Neight} + \varepsilon_i) \quad [Equation 5]$$

Where

Y corresponds to different variables of ownership of financial instruments, including bank account (1), debit card (2), electronic wallet (3), home banking (4), credit card (5), bank credit (6), non-bank credit (7), and potential credit demand (8).

As for the independent variables, they reflect the socioeconomic profile of the household and the head of the household (HoH), which could explain the financial and digital inclusion of households. The descriptive statistics of these variables are summarized in Table 1.

Table 1. Descriptive statistics

Variable	Description	Mean	SD.
Dependent Variables. In the house:			
SA	Saving account	67%	0.469
DC	Debit card	80%	0.401
HB	Use home banking	53%	0.499
EW	Use electronic wallets	52%	0.500
CC	Use credit cards	50%	0.500
Cred_B	Had or have a credit on a bank	36%	0.481
Cred_NB	Had or have a credit on a non-banking institution	28%	0.448
Pot_Dem	Potential demand of credits	14%	0.345
Independent variables			
Female	Female heads of household	38%	0.486
Age of the heads of household distributed by quintiles			
Age_1Q	First quintile: 37 years old or less	21%	0.409
Age_2Q	Second quintile: between 38 and 45 years old	19%	0.396
Age_3Q	Third quintile: between 46 and 55 years old	21%	0.407
Age_4Q	Fourth quintile: between 56 and 66 years old	18%	0.387
Age_5Q	Fifth quintile: more than 67 years old	20%	0.400
Maximum education level of the heads of household.			
ED_PRIM	Until primary education complete or secondary incomplete	21%	0.405
ED_SEC	Secondary education complete or upper education incomplete.	39%	0.487
ED_SUP	Upper education complete or postgraduate complete or incomplete.	39%	0.489
Employment situation of the heads of household			
Inactive	Inactive (unemployed, retired, unpaid family-worker)	27%	0.446
Employer	Partner, patron or employer	7%	0.251
Self-emp	Self-employed (no professional)	14%	0.349
Professional	Professional	3%	0.175
Formal_emp	Formal employed (with retirement contributions)	40%	0.490
Informal_emp	Informal employed (without retirement contributions)	6%	0.246
House earnings:			
Not_Enough	Are not enough	24%	0.428
Enough	Are enough	53%	0.499
Save	Are enough and can save	22%	0.412
Vul_Neigh	The house is located in a vulnerable neighborhood	18%	0.381

Source: Own elaboration based on the E-PUE 2020.

The first 8 variables are used as dependent variables in different models to explain the factors that influence their ownership or use, as appropriate. They serve as proxy variables for financial inclusion, as the first 4 instruments are basic for saving or making payments and collections through the formal system, while the next 3 instruments are credit-related, allowing households to invest or cover extraordinary expenses. Credit

cards and bank credit are regulated by the regulatory entity, which in Argentina is the BCRA.

On the other hand, non-bank credit refers to credit obtained from financial institutions, credit houses, or consumer credit providers outside the regulation of the regulatory authority, which often tends to be more costly, insecure, and unstable.

Lastly, the variable of potential credit demand was constructed based on the question of whether households would apply for credit in the future. The objective of this variable is to understand the factors that explain why a household would seek credit in the short term in order to propose inclusion policies and consider the unmet financial needs of the population in the city.

The first set of independent variables describes the characteristics of the head of the household (HoH). The gender variable takes a value of 1 if the HoH is a woman. The age variable is categorized into five groups based on the proportion of household heads, ranging from younger to older, creating quintiles.

The educational level of the HoH is divided into three categories. The base category is "incomplete primary or completed secondary education." The next category includes HoHs who have completed secondary education or have incomplete higher education. The final category consists of HoHs with completed higher education or postgraduate studies, both completed and incomplete.

The occupational category is created similarly to what is used in the literature (citations). The base category includes the inactive and unemployed individuals. The next category comprises employers, partners, or owners. Self-employed individuals are further divided into non-professionals and professionals. Finally, employees are divided into formal and informal workers, with informal workers referring to those who do not contribute to social security.

Regarding family income, nominal monetary income data were omitted due to 195 missing values where respondents answered "don't know" or "refuse to answer." However, a variable representing subjective household income is considered. This variable captures whether respondents feel that their income is not enough, enough but unable to save, or enough and able to save. This subjective income variable serves as an alternative to monetary income, which often contains response biases.

Lastly, a household location variable is used, taking into account that Bahía Blanca has approximately 134 neighborhoods in total. A dummy variable was created to identify neighborhoods classified as vulnerable by the Statistics Department of the Municipality of Bahía Blanca (MBB) in 2019, based on a set of indicators related to access to education, health, and public services (REVAB, 2019). According to the data obtained as of December 2021, 18% of the surveyed households in Bahía Blanca reside in vulnerable neighborhoods.

6. Results

The marginal coefficients obtained from conducting these probit models are divided into two tables. Table 2 provides details on the determinants of basic financial and digital

instruments, while Table 3 presents the determinants of credit instruments and potential credit demand.

In Table 2, the marginal coefficients and significance of determinants of financial inclusion in Bahía Blanca can be observed in terms of access and use of various basic financial and digital instruments.

Table 2. Marginal coefficients from probit regressions of basic financial instruments

	Saving account (1)		Debit card (2)		Electronic Wallet (3)		Home banking (4)	
Female	0.053	**	0.027		-0.010		-0.005	
	(0.026)		(0.022)		(0.025)		(0.024)	
Age_2Q	0.015		-0.004		-0.130	***	-0.024	
	(0.038)		(0.033)		(0.036)		(0.035)	
Age_3Q	-0.020		0.000		-0.104	***	-0.033	
	(0.037)		(0.032)		(0.036)		(0.034)	
Age_4Q	-0.045		-0.028		-0.249	***	-0.064	*
	(0.039)		(0.033)		(0.036)		(0.035)	
Age_5Q	-0.072		-0.006		-0.373	***	-0.092	**
	(0.044)		(0.037)		(0.042)		(0.041)	
ED_SEC	0.078	***	0.080	***	0.137	***	0.179	***
	(0.028)		(0.024)		(0.028)		(0.024)	
ED_SUP	0.195	***	0.185	***	0.195	***	0.333	***
	(0.035)		(0.032)		(0.033)		(0.029)	
Employer	-0.020		-0.057		0.163	***	0.092	*
	(0.055)		(0.045)		(0.054)		(0.048)	
Self-emp	-0.082	**	-0.097	***	0.087	**	-0.029	
	(0.042)		(0.033)		(0.042)		(0.039)	
Professional	0.046		-0.018		0.057		0.241	***
	(0.082)		(0.071)		(0.072)		(0.079)	
Formal_emp	0.056		0.055	*	0.152	***	0.221	***
	(0.038)		(0.032)		(0.037)		(0.033)	
Informal_emp	-0.014		-0.083	**	0.015		-0.021	
	(0.053)		(0.042)		(0.054)		(0.051)	
Enough	0.092	***	0.094	***	0.111	***	0.144	***
	(0.028)		(0.023)		(0.028)		(0.026)	
Save	0.181	***	0.099	***	0.144	***	0.209	***
	(0.037)		(0.031)		(0.036)		(0.033)	
Vul_Neigh	-0.025		-0.045	*	-0.010		-0.074	**
	(0.031)		(0.025)		(0.032)		(0.030)	
Pseudo R2	0.082		0.110		0.193		0.269	

Source: Own elaboration. Note: The coefficients are statistically significant at the 99% (***), 95% (**), 90% (*). In parentheses, the standard deviation is included.

It is noteworthy that, in terms of gender, having a female HoH in the household only increases the probability of having a bank account, while it is not significant for the rest of the variables. On the other hand, it is observed that as the age of the HoH increases, the probability of having an electronic wallet and using home banking decreases, which could be explained by the generational gap in technology adoption.

According to the educational level of the HoH, it plays an essential role in household financial inclusion. A higher educational level of the head of the household improves the probabilities of having all the instruments. The occupational category of the HoH proved to be a significant variable in certain cases. Households where the HoH is an employer show a positive and significant relationship with digital instrument variables, such as electronic wallets and home banking. Considering the self-employed category, there is also a higher probability of having electronic wallets, but a lower access to bank accounts and debit cards.

On the other hand, self-employed professionals increase the probabilities of using home banking only. Furthermore, formal employees are the ones who express the highest probabilities of instrument ownership. They have a higher probability of accessing debit cards, electronic wallets, and home banking. In the case of households where the HoH has informal employment, it was only significant for the lower access to debit cards.

Regarding the subjective income variables, it is observed that among families who stated that their income is sufficient, there is a higher probability of owning various instruments, and even higher if they can save.

Lastly, individuals living in vulnerable neighborhoods have a lower probability of having debit cards and using home banking. This lower access probability for households in marginalized neighborhoods may be due to structural barriers, such as lower adoption of digital payment devices by businesses in those neighborhoods or difficulties in accessing stable and fast internet (e.g., relying on mobile data).

Respect to the credit instruments and potential demand for microcredit, it can be observed in table 3 that the gender of the household head does not influence the probability of having credit instruments, at least among the households surveyed by EPUE-21.

The age of the principal provider is positively related to a higher probability of having formal credit instruments. This can be explained by the fact that with longer job tenure and payment history, individuals can access a greater variety of credit instruments. Additionally, the probability of wanting to apply for credit in the future is negative for households in higher age quintiles.

Regarding the educational level of the household head, it can be seen that it increases the probability of having credit cards but reduces it for non-bank credit and potential demand. This result is expected as households with a higher-educated household head are likely to have more information and a better employment situation, enabling them to access the formal credit card market, which is safer and has lower costs, thereby discouraging access to the non-bank credit market.

The employment status of the household head also impacts the probability of accessing the credit market. Employers have a higher likelihood of accessing formal credit and expressing a desire to apply for credit in the future, while reducing the probability of resorting to informal credit. Similarly, professionals and formal employees also have higher access to credit cards.

Table 3. Probit model estimation of variables related to the use and ownership of credit instruments and potential demand for microcredit.

	Credit Card		Cred_Banc		Cred_NB	Pot_Demand	
Female	0.024		0.034		0.020	0.012	
	(0.026)		(0.026)		(0.025)	(0.024)	
Age_2Q	0.089	**	0.078	**	-0.008	0.015	
	(0.038)		(0.039)		(0.037)	(0.033)	
Age_3Q	0.117	***	0.092	**	0.008	-0.044	
	(0.038)		(0.038)		(0.036)	(0.033)	
Age_4Q	0.136	***	0.129	***	0.015	-0.114	***
	(0.040)		(0.041)		(0.039)	(0.037)	
Age_5Q	0.105	**	0.132	***	0.061	-0.117	***
	(0.047)		(0.049)		(0.045)	(0.044)	
ED_SEC	0.097	***	-0.012		-0.055	*	-0.032
	(0.030)		(0.031)		(0.028)		(0.028)
ED_SUP	0.221	***	0.030		-0.134	***	-0.096
	(0.035)		(0.036)		(0.035)		(0.034)
Employer	0.069		0.101	*	-0.112	*	0.115
	(0.056)		(0.059)		(0.060)		(0.052)
Self-emp	-0.035		0.056		0.053		0.038
	(0.045)		(0.046)		(0.041)		(0.041)
Professional	0.165	**	0.166	**	-0.217	**	0.171
	(0.080)		(0.076)		(0.098)		(0.069)
Formal_emp	0.193	***	0.165	***	-0.006		0.088
	(0.039)		(0.041)		(0.038)		(0.037)
Informal_emp	-0.122	**	-0.131	**	0.053		0.091
	(0.061)		(0.065)		(0.052)		(0.049)
Enough	0.096	***	-0.001		-0.063	**	-0.061
	(0.030)		(0.031)		(0.028)		(0.027)
Save	0.131	***	0.025		-0.074	**	-0.081
	(0.038)		(0.038)		(0.037)		(0.035)
Vuln_Neigh	-0.095	***	-0.114	***	0.075	**	0.110
	(0.034)		(0.035)		(0.030)		(0.028)
Saving account			0.162	***	0.112	***	0.000
			(0.028)		(0.027)		(0.026)
Elec Wallet			0.012		0.002		0.033
			(0.029)		(0.027)		(0.026)
Cred_Banc							0.025
							(0.024)
Cred_NB							0.132
							(0.024)
Pseudo R2	0.121		0.074		0.051		0.084

Source: Own elaboration. Note: The coefficients are statistically significant at the 99% (***), 95% (**), 90% (*). Standard deviation in parentheses.

On the other hand, informal employees, who do not have pension contributions, have a lower probability of having credit cards and formal credit, while still exhibiting a higher likelihood of demanding credit in the future.

Households that have sufficient income and can save tend to rely on credit cards but have a lower probability of resorting to the informal market and seeking future credit. In this context, households may view future credit as a possible economic assistance in times of income shortage, rather than something that can help them enhance their income or savings.

Households in vulnerable neighborhoods have a lower probability of accessing credit cards and formal credit. However, it can be observed that they have relied more on the informal market and have future credit demands.

Additional independent variables are included for formal and informal credit instruments to verify if it is more likely for households resorting to these markets to have electronic access to their wallets. Only the possession of savings accounts increases the likelihood of having both formal and informal credit.

Lastly, it is noteworthy that households that have resorted to the informal market are the ones most likely to seek credit in the future.

In summary, regression models of proxy variables for financial inclusion provide evidence of a market that is more frequently accessed by households whose breadwinner has a higher level of education, formal employment, and older age. This is consistent with the findings in the reviewed studies (Allen et al, 2016; Fungáčová y Weill, 2015; Martinez et al., 2020; Orazi et.al., 2023; Zins y Weill, 2016). Although the gender of the household head was not significant in this analysis, in contrast to the findings previously mentioned who analyzed the market several years ago, while this dataset is more updated.

At the same time, original variables are analyzed, such as non-bank credit and living in vulnerable neighborhoods, which yield relevant results regarding the situation of lower-income households and those with lower educational levels, who are more excluded from the formal market, thus amplifying their economic and financial vulnerability.

Lastly, the potential demand variable also shows interesting results, indicating that households with younger breadwinners, lower educational levels, and lower incomes, particularly in vulnerable neighborhoods, are the ones who would like to seek credit in the future. They perceive the credit market as a means of economic assistance in times of labor difficulties or income scarcity, rather than as a source for enhancing investments and savings for the rest of the households in the city.

7. Conclusion

This study highlights that the financially and credit-excluded population, characterized by lower educational levels, lack of formal or stable income, and living in marginalized areas, face greater barriers to access the digital financial and credit market. This creates an additional difficulty for consumption planning, carrying out family projects, initiating or expanding businesses, or securing housing, as they rely on nominal savings (which lose value during inflationary periods), loans from the informal financial market, which have high costs, or the availability of funds from family and friends.

Throughout this study, the topic of financial inclusion in households in Bahía Blanca is addressed in order to identify the number of households that are financially included and determine their level of financial inclusion based on the number of financial instruments used.

As observed, there are certain financial instruments that have a high percentage of ownership and usage, both in vulnerable and non-vulnerable neighborhoods. However, for example, considering the use of debit cards, which is the most widely used instrument among the population of Bahía Blanca, there is still 27% of households that still do not have debit cards, and only 30% use them as a payment method.

These results are more concerning when analyzing other financial instruments, such as credit cards and electronic wallets, as their adoption could reduce transaction costs, provide more secure operations, and have a direct impact on the household's ability to manage their finances, thus building a credit history that expands their financial options.

Regarding credit instruments, while each of them was analyzed in relation to their usage by households in different neighborhoods, it is observed that non-vulnerable neighborhoods make greater use of bank loans compared to non-bank loans. Conversely, households in vulnerable neighborhoods make greater use of non-bank loans.

Furthermore, when analyzing the purpose of funds, both bank and non-bank, in households of each neighborhood, it is observed that households accessing the banking system make greater use of credit for housing (20%), followed by consumption (16%), with higher proportions seen among non-vulnerable households. On the other hand, when examining the purpose of non-bank loans, they are predominantly used for consumption (20%), followed by housing, in both cases by households in vulnerable neighborhoods.

On the other hand, an index of financial inclusion is analyzed for households in Bahía Blanca, considering the utilization of various instruments. It is observed that 9% of households do not have any financial instruments. Meanwhile, 21% use one or two instruments.

It is worth noting that 38% of households are in a high level of financial inclusion, as they are considered to use five or more instruments. As expected, according to the results obtained throughout this study, the relationship between the level of financial inclusion and the type of neighborhood to which households belong remains consistent. Non-vulnerable households tend to have higher levels of financial inclusion.

Regarding the potential credit demands among the population, it is observed that unsatisfied demands are higher among households in vulnerable neighborhoods, especially for housing. This result is reinforced by the probit regression analysis, which shows that households with younger breadwinners, lower educational levels, and lower incomes, particularly in vulnerable neighborhoods, are more likely to seek credit in the future.

Reinforcing the findings from the descriptive analysis, the probit regression models support the hypotheses that households with lower educational levels, younger breadwinners, more informal employment, lower incomes, and a higher presence in vulnerable neighborhoods are further removed from the formal financial market. This

reinforces their vulnerability due to the lack of instruments to manage their finances and future investments (such as housing, education, own businesses, etc.).

The potential market has shown a significant group of households with particular characteristics that the financial market could target in the future, considering that the results indicate a desire to access credit during times of difficult employment situations or insufficient income.

In addition to this, limitations for the growth of the credit market are recognized, partly justified by the existence of a sizable informal market, deep economic cycles, and persistent inflation. These factors limit the interest of private capital and discourage the efforts of non-profit organizations to generate a solid and stable supply.

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