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Who holds credit cards and bank accounts in Uruguay? Evidence from Survey of Uruguayan Households Finances

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In this paper we analyze households access to financial services such as credit cards and bank accounts. We use data available from the first stage of Survey of Uruguayan Households Finance (SUHF1) and ECH 2012. We estimate univariate and bivariate probit models for bank account and credit cards holdings. Evidence indicates that households' income, education level and working status are the main determinants of the probability of holding credit cards and bank accounts in Uruguay. In addition, we perform a counterfactual exercise which allows us to predict the effect of making compulsory to pay salaries through the financial system. Our prediction is that bank account and credit card holdings would increase at around 6 and 4 percentage points, respectively.

JEL: C25, D12, D14.

Keywords: financial inclusion, household finances, bivariate probit estimation

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Resumen

El objetivo de este trabajo es analizar el acceso de los hogares uruguayos a servicios financieros tales como tarjetas de crédito y cuentas bancarias. Se emplearon datos disponibles luego de la primera etapa de la Encuesta Financiera de los Hogares Uruguayos (EFHU-1) en conjunto con la Encuesta Continua de Hogares de 2012.

Mediante la estimación de modelos probit univariado y bivariado se analizan los determinantes de la tenencia de cuentas bancarias y tarjetas de crédito. La evidencia empírica sugiere que el ingreso, el nivel de educación y la situación laboral de los miembros del hogar son los principales determinantes de la tenencia de estos instrumentos. Adicionalmente, se realiza un ejercicio contrafactual para predecir el efecto derivado de la obligatoriedad de pagar salarios a trabajadores dependientes a través de medios de pago electrónicos. El resultado del ejercicio indica que las proporciones de hogares con cuentas bancarias y tarjetas de crédito se incrementarían 6 y 4 puntos porcentuales, respectivamente.

Palabras clave: inclusión financiera, finanzas del hogar, probit bivariado

1. Introduction

Families' access to financial services is still very heterogeneous in many developing countries, despite recent efforts towards household's financial inclusion. The proportion of households outside the mainstream financial services remains quite high and families' access to those services has proved to be unequal among households.

Households financially included are able to take advantage of the facilities related with the use of financial services, namely: a broad access to credit market, the possibility of use alternatives means of payment and a better management of household's assets. For instance, households lacking of bank accounts or credit cards, aren't able to establish good credit records which restricts access to credit market. This problem lead them to search for funds in informal markets and consequently pay higher interest rates, reach only short term funding and be exposed to predatory or even illegal lending practices. Lack of funding is among the principal problems for many families, especially poor ones, mainly because is seen as a mechanism that keeps families in a negative circle of poverty (Bhattacharya and Stanley: 2008). Banks and other financial services firms also play major role in payment system by providing households different alternatives to cash such as credit cards, debit cards or cheques, which enable the user to make payments and in some cases borrow money automatically without paying interest. Finally, financial inclusion also enables households to safely preserve assets. Those savings can act either as cushions during downturns or be a good investment option for households (Rhine, Greene and Toussaint-Comeau: 2006).

To the extent that financial inclusion brings households many advantages at the time of managing family's finances, many governments of developing countries are carrying out policies to promote financial services among population. In addition to improve household's welfare, those policies can help to develop local financial system and discourage tax evasion. A well-developed financial system can contribute to promote savings and reallocates resources more efficiently, contributing positively towards investment and development. Also, it is important to notice that household's financial inclusion can also stimulate formality in many economic activities, since mainstream financial services are subject to regulation framework. Households can take advantage of being formally included to financial system by having a broad access to social security

services. Also, governments can benefit from the increase in formality due to a reduction in tax evasion and thus an increase in revenues.

Uruguay, a small Latin American open economy shows a very heterogeneous access to basics financial services despite ongoing government's efforts to promote financial inclusion. The proportion of households outside the mainstream financial system remains quite high and firms and households rely heavily on cash and informal services to perform economic transactions. It is also important to notice that access to financial services remains unequal, despite being Uruguay quite homogeneous in most cultural characteristics such as language, ethnic origins and religious beliefs. Until recently, Uruguay also lacked of a database with financial information about households which allow studying who are the households financially excluded/included and which are the factors of financial exclusion/inclusion. Recent survey conducted by INE and DECON, "*Survey of Uruguayan Household Finances*" (SUHF), consist a reliable and representative database which includes financial, socio demographic and economic data.

The goal of this paper is to study financial exclusion/inclusion in Uruguay by analysing which household's characteristics determine the probability of holding two basic financial instruments: credit cards and banks accounts. Our study is close to that of Caskey (1981) for U.S. card holders and Tan, Yen and Loke (2011) for credit card holders in Malaysia (Tan, Yen and Loke: 2011). In addition, we perform an exercise to assess the effectiveness on household's financial inclusion of a recently announced government measure in which becomes mandatory for employers to pay wages through bank accounts and other financial instruments.

Firstly, we estimate univariate probit models for credit cards and bank accounts and analyze which household's characteristics are significant to determine the probability of holding these financial instruments. Afterwards, we estimate a bivariate probit which accommodates the presence of endogeneity and improve the reliability of the results by explicit taking into account the correlation between the unobservable components of the two equations.

Results show that households with higher income are more likely to hold credit cards and bank accounts. Education and working status are the other main determinants. A key result of the model is that households whose head receive their wage through bank accounts are

more likely to hold credit cards. Taking into account last result, we perform an exercise to assess whether the recent government measure to make compulsory for employers to pay wages through bank accounts is effective to improve households' financial inclusion. Results indicate that both probability of holding a credit card and a bank account increase under that scenario.

The rest of the paper is organized as follows. Next section briefly describes Uruguayan financial system. Section 3 analyzes households' socio demographics and economical characteristics. Section 4 includes a brief revision of previous literature. Section 5 and 6 contains the empirical model and results. In final section we conclude.

2. Uruguayan financial system

The Uruguayan financial system is mainly composed by banks, but other financial institutions also play a major role by providing other financial services that are also commonly supplied by banks.

Banks represents a substantial proportion of financial market in Uruguay. They play major role in payments system, foreign exchange markets, money market and credit for families and firms. Bank fundings is quite important especially for local firms because local capital markets lack of development. Ten different private (200 branches) and a public bank (122 branches) constitute the commercial banking system. In December 2013 credit to non-financial sector was at around 13 billions U.S dollars, representing 24% of GDP, while deposits amounted 25 billions U.S dollars accounting for 45% of GDP. Total assets of banking system were at around 34 billion U.S dollars while liabilities were 32 billion U.S dollars. Banking system is also quite concentrated: public commercial bank holds one third of the outstanding loans to non-financial sector and almost 45% of total deposits. In addition to commercial banks, there is a public mortgage credit bank which holds mortgage credits of at around 1.5 billion U.S. dollars and deposits of 700 million U.S. dollars in December 2013. Bank loans for families were 5.1 billion U.S. dollars in December 2013, which represents around 2,200 U.S. dollars per capita, considering only population over 18.

In last years, loan interest rates have remained quite high in relation to saving interest rates. Average loan interest rates for credits up to one year of maturity in local currency is at around 18% for firms and 30% for families, while saving interest rates is 6%. Local annual inflation has remained around 9%.

Families and firms preference for foreign currency at the time of keep savings safely is high: 75% of deposits are denominated in U.S. currency. Recent international context of lower interest rates have kept savings rates in U.S. currency in levels historically lows. For instance, since 2011, saving interest rate for deposits up to one year of maturity is located at around 0.3%. On the other hand, loan rates in U.S. currency are located in 5% for firms and 6% for families.

In addition to banks, there are also non-banking institutions such as savings institutions and credit unions. This type of firms, which also take deposits from public, represents a low proportion of market. On the other hand, there are firms that don't take deposits from public, although they lend money. They are quite extended, since there are 11 firms with branches across the country. At December 2013 these firms together hold a credit portfolio of 800 million U.S. dollars. The latter are very important, especially for low income families because they become an alternative to bank borrowing.

There are also others institutions such as currency exchange companies and firms who carry on different financial services like transfer of remittances, currency exchange and money transfers. According to Central Bank data there are 55 registered currency exchange companies and 26 firms who carry similar financial services. There are also firms which main activity consists in collect bills such as public services bills, health care bills, taxes, credit card bills, etc. Note that all those services are commonly supplied by banks in other countries. Lack of automatic transfers among banks and limited geographic network of commercial banks could explain this fact. Conversely, considering all firms of this type there are 1,071 spots across the country, also reaching small towns and villages. During 2013 these firms collected 15 billion U.S. dollars and make payments for 5 billion U.S dollars. In the same period, direct debit payments through bank accounts amounted 1.5 billion U.S dollars.

Finally, financial system also account for other institutions like off-shore banking, pension funds administrators and insurance companies. Off-shore banking institutions are banks

exclusively for foreign citizen in order to trade foreign assets and represents a small proportion of total financial system. Pension funds administrators are quite important, since they manage a total fund of 10 billion U.S. dollars in September 2013 and take part in money markets, foreign exchange markets and even in the modest capital markets.

3. Data

We use data from the first stage of the *Survey of Uruguayan Household Finances (SUHF1)*, collected by the official “Instituto Nacional de Estadística (INE)” and DECON. The *SUHF1* was conducted as an additional module in the 2012 edition of the “Encuesta Continua de Hogares (*ECH*)” of INE. This survey is a reliable and complete database which includes socio-demographic, economic and financial information about households. Socio-demographic information includes age, gender, working status, education level of households’ members, etc. Economic and financial information encloses households’ assets holdings and liabilities and their values, households’ income and the use of different mean of payments.

[Insert Table 1 here]

Table 1 shows some descriptive statistics about household’s bank accounts holdings (checking or savings account). Proportion of households owning bank accounts is 49%, and around 77% of those who have an account also hold credit cards. The proportion of bank accounts holders is higher the higher household’s income and the higher the household’s head education. Also, working status matters, since proportion of households owning a bank account is higher for those households whose head is an employee. On the other hand, the proportion of households accounting for credit cards is higher than the proportion of households owning a bank account, suggesting a deeper penetration of credit cards. Last result is not surprising because in Uruguay there are other financial institutions apart from banks which supply credit cards, but not bank accounts. According to data, the proportion of households accounting for credit cards is 62% while around 60% of those households also have bank accounts. Similar to bank account holdings, the proportion of households holding credit cards increases with income. A life-cycle pattern is observed for

both bank accounts and credit cards. The proportion of households owning accounts and credit cards increases as the households' head ages until age 65, and then it decreases.

Table 1 also provides some descriptive statistics on the co-variables included in the empirical model. Household income is around 2,500 U.S dollars on average, being the mean fifth quintile income around six times income of the average of the first quintile. We use indicator variables for education level, working status and being formally included in the labour market. Data shows that the proportion of households whose head achieved a secondary school degree is relatively low (39%), as well as the proportion of those who have a college degree (8%). Around half of the households' heads are employees and 74% of employees are in the private sector. Around 16% of the households' heads are not formally included in labour market, while only 24% and 38% of those households own bank accounts and credit cards, respectively. An indicator variable for household whose head is employee and receives their salary through bank deposits is also included. Around 57% of employees receive their salaries through bank deposits.

We also use indicator variables for age, being afro-descendant, gender, housing tenure, business holdings and residence in Montevideo (capital city). The proportion of households whose head is afro-descendant is 4%, almost 70% of them lack of bank accounts and nearly half of them lack of credit cards. Half of the population is located in Montevideo, 70% of households who live in Montevideo own credit cards, while only 55% of households located outside the capital city hold that instrument.

4. Background

Datasets including information on household finance and wealth were rare two decades ago. The Italian Survey of Households Income and Wealth (SHIW) and the U.S. Survey of Consumer Finances (SCF) are the earliest antecedents of this type of surveys. During the '80s and '90s researchers began to study households' access to financial services using data from these datasets. In recent years there has been a rapid increase in the number of countries that collect information about households' finances, being Uruguay one of those that started to conduct such type of surveys.

At first, the researches were aimed to study credit card holdings mainly because of the quickly spread of that instrument and the unequal access among population. Using data from a survey conducted in Minnesota, Caskey (1981) estimated a Tobit model for the number of credit cards accounts held by households (Caskey, 1981). He found that income, age, working status and owning a bank account significantly determine the number of credit cards owned by households. Similar approach was recently used by Tan, Yen and Loke (2011) in order to search for the determinants of credit cards holdings in Malaysia. Their results were similar to those of Caskey (1981).

Other studies used probit models in order to analyze the determinants of credit cards and bank accounts holdings. Hogarth and O'Donnell (2000) analyzed households bank account holdings using data from the SCF 1995 wave. They concluded that income, education, housing tenure and ethnic origins were significant for holding a bank account. They also estimated the probability of holding other financial assets such as credit cards or mortgage loans for those who own bank accounts. Indeed, they simulated the probability of holding other assets for those households who doesn't hold bank accounts, and concluded that the demand for other assets would increase in the case that those households became owners of bank accounts. Finally, in Hogarth, Anguelov and Lee (2005), found similar results using data from different waves of the SCF (1989-2001). Rhine, Greene and Toussaint-Comeau (2006) estimated a bivariate probit for the probability of being unbanked and probability of using check-cashing services in US. Bivariate probit allow authors to take into account unrestricted correlation between unobservables of these two equation.

Similar than previous literature we use probit and biprobit models to analyze which household characteristics influence the probability of holding bank accounts and credit cards.

5. Empirical model

We estimate limited dependent variable models (LDV) in which "*holding a credit card*" and "*holding a bank account*" are the dependent binary variables. Let y_1^* and y_2^* be latent variables, and let us define $y_2 = 1(y_2^* > 0)$, being y_2 a relevant variable for y_1^* . It is possible to write down the latent model as:

$$(1) y_1^* = z_1 \delta_1 + \alpha_1 y_2 + u_1$$

$$(2) y_2^* = z \delta_2 + v_2$$

Where (u_1, v_2) are independent of z , follow a bivariate normal distribution with zero mean and unit variance and $\rho_1 = \text{corr}(u_1, v_2)$,

$$\begin{pmatrix} u_1 \\ v_2 \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 1 & \rho_1 \\ \rho_1 & 1 \end{pmatrix} \right)$$

We observe $y_1 = 1[y_1^* > 0]$ and y_2 as previously defined. Notice that if ρ_1 is different from 0 (u_1 and v_2 are correlated), estimates of δ_1 and α_1 using a univariate probit for y_1 in (1) will be inconsistent due to y_2 is endogenous. Endogeneity could arise because of the presence of unobservable components that simultaneously influence the likelihood of bank account and credit card holdings. Firstly, we assume that ρ_1 equals 0 and estimate two unrelated probit models. Afterwards, we address the issue of endogeneity by estimating a bivariate probit model for the probability of holding at least one credit card and a bank account. The model is estimated by maximizing the joint likelihood. In this context the indicator variable of whether the household head receives his salary through a bank deposit is the instrument, and acts as the exclusion restriction. Thus, this variable belongs to z but not to z_I .

6. Results

To study financial inclusion in Uruguay we analyze which households' characteristics are determinant for holding credit cards and bank accounts. It is not unusual for households who are financially included to remain in a circle in which holding certain financial instruments can lead to hold others. For example, households owning bank accounts also hold credit cards, or easily borrow to finance durable or non-durable consumption. Also, access to information about profitable investments in the financial market could be easier for included people.

The *SUHFI* provides valuable information about household finances and their access to the financial services, while *ECH* includes a rich set of information on the economic and socio-demographic characteristics of Uruguayan households and their members. That

allows us to include a complete set of covariates in our empirical models. Controls include family's income, and age, gender, education level and working status of the household's head. Also, household size, housing tenure and regional dummies for residence are included. In addition, we include dummies for the size of the city, and an indicator of whether the household head works in the informal sector and of whether he or she is afro-descendant. Finally, we use an indicator of whether the household head receives his salary through a bank deposit.

However, many factors that influence households access to the financial system could not be observable. For example, it is not possible to observe if a particular household asked for a credit card or obtained it in the context of aggressive promotions. Also, social networks play an important role for the access to financial services. Moreover, despite the Uruguayan government has recently initiated a financial education program, most of the people do not know how to follow financial markets evolution, face difficulties to evaluate the costs of financial services, or do not understand the benefits of being financially included. That is particularly important in Uruguay due to a lack of financial market depth and penetration.

[Insert table 2 here]

[Insert table 3 here]

The univariate probit estimations show that the household income, age, education level, gender and working status, significantly influence the likelihood of holding credit cards. Table 3 shows the marginal effects evaluated at the average sample values of covariates. Results indicate that one percent increases of household income rises the probability of holding a credit card by 0.31 percentage points.

Also, education influences the probability of credit card holdings. Including threshold dummy variables for each education level (elementary school omitted) we find that the probability of holding a credit card increases by 7.0 percentage points if the household head has at least some secondary with respect to those who only achieved elementary school. However, our results show that the probability of holding credit card does not significantly change among those who have at least some secondary grade approved.

We included a set of dummy variables for age, the omitted category is the cohort of those aged 35 to 50. A hump-shaped “life-cycle” pattern is observed (table 3): those households whose head are younger than 20 years or older than 80 are less likely to hold credit cards. Results also indicate that the probability of owning credit card increases by 4.5 percentage points if the household head is a woman, being no significant the effect of being a single mother. The household size effect is also significant and negative. That could be rationalized by the fact that in Uruguay numerous families are more likely among the poorest. Table 3 also shows that households living in rural areas, small towns or villages are less likely to hold credit cards. Finally, households whose head is afro-descendant are less likely to hold credit card; the probability of holding a credit card decreases around 8.0 percentage points for afro-descendant.

Households whose head is formally employed are more likely to hold credit card, which is an expected result because formal workers easily fulfil requirements to hold credit card. Concerning working status, we find that households whose head is inactive or retired are less likely to hold credit cards, but there are not significant differences between public or self-employed and private employees (the omitted category is private employee). Table 3 shows that housing tenure is not a significant determinant of credit card holdings.

Estimation results of the univariate probit model for *bank account holdings* suggest that households’ income, education level, age and working status significantly determine bank account holdings. Table 5 shows marginal effects on the probability of holding bank accounts evaluated at the average sample mean of covariates. As expected, probability of holding bank accounts increases with household income: a one percent increase in household income increases probability of holding bank accounts by 0.33 percentage points. Notice that this figure is very close to that of the influence of income in credit card holdings.

[Insert table 4 here]

[Insert table 5 here]

Like in credit card model, threshold dummies for education are included, but in the model for bank accounts the probability of having a bank account significantly increases with each additional educational level achieved. Moreover, the magnitude of marginal effects is

large: 4.2 and 4.6 percentage points for some secondary and completed high-school, and 7.3 and 5.2 for tertiary and college respectively.

We do not find a clear cut life-cycle pattern when analyzing results for bank account holdings. However, evidence suggests that some cohort pattern could be present. The probability of holding at least one bank account is lower for those under 20 years old and higher for those aged between 20 and 35, or between 65 and 80, in comparison with those who are aged 35 to 65. However, the marginal effect is small, at around 5 percentage points. As in the credit card model, the household size negatively affects the probability of holding a bank account. Unlike credit card model, gender, residence and ethnic origins are non-significant to determine probability of holding bank accounts. In particular, the result that being afro-descendant is significant for credit cards but not for bank accounts brings some evidence about discrimination in the market.

Also, working status is significant to determine the probability of holding a bank account. Table 4 shows that compared with private employees, households whose head is employee at the public sector or is self-employed are more likely to hold bank accounts, while households whose head is inactive are less likely to hold one.

In addition, we include in both univariate models an additional dummy covariate (*Dsalary*) that indicates whether the household head receives his or her salary through a bank account, and add the dummy variable of having a bank account in the univariate model for credit cards.¹ Including these variables does not alter previous results about other covariates in the probit for credit cards, except in case of retired people (this dummy is not significant now). Little changes are observed in the model for bank accounts concerning working status: households whose head is retired, public employee, inactive or self-employed are now more likely to hold bank account than private employees.

The covariate *Dsalary* plays a key role in our work. In addition of being a relevant factor to determine bank account and credit card holdings, it is related with one of the targets of the Law of financial inclusion that is currently under discussion in the Uruguayan parliament.

¹ Despite it is necessary to have a bank account to receive salaries through banks, 21% of households who receive salaries in this way declared no to hold bank accounts. That could be rationalized by the fact that some household does not make use of the bank services apart from earning salaries, and can be interpreted as lack of financial literate.

That Law would make compulsory to pay salaries through bank accounts or other similar instruments available in local financial system, as one of the measures to promote financial inclusion and discourage tax evasion.

As expected, households whose members receive their wage through bank account are more likely to hold both bank accounts and credit cards. Precisely, probability of holding a bank account and a credit card increases by almost 36 and 10 percentage points respectively, if the households head perceive wage through bank accounts. Moreover, when the bank account variable is included in the model for credit card we find that its marginal effect is around 10 percentage points while the dummy *Dsalary* remains highly significant and its marginal effect is at around 6 percentage points. However, those figures can not be interpreted as the expected increase in the proportion of households holding credit cards for various reasons. Firstly, making compulsory to pay wages through bank deposits would affect only formal employees. Secondly, “*bank account*” could be endogeneous in the model for credit card. Aiming to consistently estimate such effect we perform a counterfactual exercise using bootstrapping techniques and estimate a bivariate probit to control for endogeneity.

As previously explained, we expect that the unobservables of both equations (credit cards and bank accounts) are correlated. To allow for unrestricted correlation between these unobservables we estimate a bivariate probit model, the covariates in the univariate models are included.

[Insert table 6 here]

Table 6 reports the bivariate probit estimates, and shows that unobservables are correlated. Results for the dependent variable “*credit cards*” slightly change in comparison with the univariate model: in the bivariate model only those aged more than 80 are less likely to hold credit cards and family size is now not significant at the 5th level. On the other hand, some variables are more significant and the magnitude of their influence is stronger than in the univariate model. That is the case of the variables afro-descendant; the dummy which indicates that the household head is a single female with children; and working status, now we observe that inactive and retired people are less likely to hold credit cards. Concerning the equation for “*bank account*” the results of the bivariate estimation do not show differences with respect to the univariate model which includes *Dsalary* as a control.

[Insert table 7 here]

Figures in table 7 correspond to average effects on the joint probability of holding both a credit card and a bank account. Household income, the education level, age, and working status of household head are significant to determine the joint probability of holding both. Also, the joint probability increases with education level of household head. Households whose head is younger than 20 years old or older than 80 are less likely to hold both instruments. Household size and home residence are both significant to determine probability of holding both instruments. Numerous households are less likely to hold these instruments but living in large cities affects positively the likelihood of holding both credit card and bank accounts. Finally, households whose head is afro-descendant are less likely to hold both instruments.

Results also show that working status is important at the time of holding credit cards and bank accounts. Firstly, working in formal economy affects positively the likelihood of holding both instruments. Secondly, inactive households' head are less likely to hold both instruments. Also, being self-employed affects positively probability of holding both instruments.

Finally, as previously mentioned we perform a counterfactual exercise to asses the potential effect of becoming mandatory for employers to pay salaries through bank deposits. In order to estimate such effect we first proceed to impute the value 1 to the *Dsalary* covariate for all those formally employed, afterwards we compare observed with predicted average probabilities. In order to obtain a confidence interval we use the bootstrap method running 1000 replications. Results of different models are shown in table 8.

[Insert table 8 here]

In the univariate models, the 95th confidence interval for the effect of the measure on the proportion of bank accounts holders is between 5.2 and 6.5 percentage points, while same figures for credit card holders are 0.9 and 2.2. In comparison with the univariate, in the bivariate model the effect on bank accounts remains unchanged but the effect on credit cards increases substantially. This is because the bivariate model is able to capture the indirect effect of the measure in credit card holdings through its effect over bank account holdings. The 95th confidence interval for the effect on credit card holdings in the bivariate

model is between 2.6 and 6.9 percentage points. Notice these latter figures are well below the average partial effect of 10 percent points reported in table 3. Finally, we find that an increase of between 3 and 4 percentage points on the proportion of households owning both bank accounts and credit cards could be expected.

7. Concluding Remarks

In this paper we analyze households access to financial services such as credit cards and bank accounts. We use data available from the first stage of Survey of Uruguayan Households Finance (SUHF1) and ECH 2012, which provide us data on households' finances and their socio-demographic and economic characteristics. Aiming to study the determinants of financial inclusion, we estimate univariate and bivariate probit models for bank account and credit cards holdings.

Results indicate that households' income, education level and working status are the main determinants of the probability of holding credit cards and bank accounts in Uruguay. The higher household income the higher the probability of holding credit card or/and bank accounts. The probability of holding bank accounts monotonically increases with education level; but for credit cards we do not find differences among who have at least some secondary. Households whose head are formally employed and works in the public sector are more likely to hold credit cards and bank accounts. Also, families living in small towns or villages are less likely to hold credit card and bank accounts. Gender and ethnic origins are not significant determinants for bank account holdings although they are for credit cards. Credit card holdings are more likely if the household head is a woman, but are less likely for afro-descendant.

Employees who receive their wage through bank accounts deposits are more likely to hold bank accounts and credit cards. Such result motivates us to perform a counterfactual exercise to estimate the isolated impact of making compulsory to pay salaries through bank accounts or other similar instruments. That measure is included in a Law for promoting financial inclusion, currently under discussion in the Uruguayan parliament. The Law also includes other measures towards financial inclusion and development of the financial system which are not addressed in this paper. Among others, would enforce other people

apart from employees (like independent professionals) to receive earnings through financial institutions. Also, the Law allows for tax rebates for those who pay with credit or debit cards. Our results focused on the effects on employees, indicate that bank account and credit card holdings would increase at around 6 and 4 percentage points, respectively.

References

Bhattacharya R. and Stanley D., “The informal financial Sector in the United States: The Role of Remittances”, *The Quarterly Review of Economics and Finance*. Vol 48 Issue 1 pp 1-21, (2008)

Caskey J. “Determinants of credit card accounts: an application of Tobit Analysis”, *Journal of Consumer Research*. Vol 8 N° 2 pp 172-182 (1981)

Hogarth J. and O`Donnell K.: “If you build it, will they come? A Simulation of Financial Product Holdings Among Low-to-Moderate Income Households”. *Journal of Consumer Policy* N° 23: pp 409 – 444. (2000)

Hogarth J., Anguelov C., Lee J. “Who has a bank account? Exploring changes over time, 1989 – 2001”. *Journal of Family and Economic Issues*, Vol 26 (1) (2005)

Rhine S., Greene W., Toussaint-Comeau M. “The Importance of Check-Cashing Business to the Unbanked: Racial/Ethnic Differences”. *The Review of Economics and Statistics*”, Vol 88, N° 1 pp 146-157 (2006)

Tan A., Yen S., Loke Y., “Credit card Holders, Convenience Users and Revolvers: a Tobit Model With Binary Selection and Ordinal Treatment”, *Journal of Applied Economics*. Vol XIV, N° 2 pp 225-255 (2011).

Table 1: Sample statistics

	<i>Descriptive Statistics</i>	<i>Bank Account Holders</i>	<i>Credit card Holders</i>
		% of households	
Percentage of Holders		49.38	62.73
Also credit cards		76.80	
Also bank accounts			60.50
Income level (U.S. dollars, annual figures 2012 prices)	Mean		
Quintile 1	10,062.0	20.43	31.90
Quintile 2	17,481.0	35.07	52.31
Quintile 3	24,611.9	48.47	65.88
Quintile 4	34,534.5	64.96	75.09
Quintile 5	62,780.3	78.00	88.51
Age	% of households	% of households	% of households
Less than 20 years	0.32	11.55	21.77
20 < years old < 35	20.37	48.68	63.44
35 < years old < 50	31.07	49.61	65.41
50 < years old < 65	26.58	51.36	66.32
65 < years old < 80	16.64	47.80	58.55
More than 80 years old	5.03	47.96	40.87
Working status			
Inactive (students, unemployed, house keepers, etc)	7.16	28.87	46.02
Private employee	37.74	46.50	68.28
Public employee	13.32	78.94	76.94
Retired	20.95	46.87	56.92
Self employee	20.82	45.26	55.19
Education level			
Elementary school achieved	100.00	49.38	62.73
High school degree not achieved	72.56	55.45	69.41
High school degree achieved	40.06	64.29	76.11
Tertiary education degree achieved (not university)	5.31	77.89	83.56
University degree achieved	8.44	79.84	87.01
Female	40.46	46.68	61.92
Location			
Montevideo	46.31	50.32	71.19
Rest of the country	53.69	48.57	55.44
Afro-descendant	3.96	30.78	49.50
Informal	16.09	24.35	37.95
Female one person household	16.56	44.90	58.91
Employee and receiving salary through bank deposit	29.61	77.14	80.70
House owner	64.16	51.58	64.97

Source: ECH and SUHF1 (2012)

Table 2: Probit estimations

Dependent Variable: credit card holding

	1	2	3
Household Income (log)	0.852*** [0.0382]	0.831*** [0.0384]	0.747*** [0.0397]
High school degree not achieved	0.195*** [0.0443]	0.198*** [0.0444]	0.189*** [0.0446]
High school degree achieved	0.00909 [0.0454]	-0.0016 [0.0455]	-0.0151 [0.0457]
Tertiary education degree achieved (not university)	0.131 [0.0899]	0.129 [0.0902]	0.12 [0.0907]
University degree achieved	0.0829 [0.0835]	0.0657 [0.0838]	0.0464 [0.0839]
Less than 20 years	-0.518** [0.255]	-0.532** [0.255]	-0.488* [0.255]
20 < years old < 35	0.0777 [0.0524]	0.0696 [0.0526]	0.0595 [0.0528]
50 < years old < 65	0.027 [0.0480]	0.0334 [0.0482]	0.0305 [0.0483]
65 < years old < 80	0.0324 [0.0697]	0.0418 [0.0697]	0.0251 [0.0700]
More than 80 years old	-0.560*** [0.0982]	-0.544*** [0.0981]	-0.552*** [0.0987]
Female	0.116*** [0.0439]	0.122*** [0.0440]	0.127*** [0.0441]
Household size	-0.0508*** [0.0138]	-0.0470*** [0.0139]	-0.0386*** [0.0140]
Rural, town or village (less than 5,000 inhabitants)	-0.132** [0.0551]	-0.116** [0.0552]	-0.116** [0.0555]
Informal	-0.415*** [0.0579]	-0.374*** [0.0584]	-0.358*** [0.0587]
Afro-descendant	-0.226** [0.0884]	-0.208** [0.0886]	-0.205** [0.0888]
Single female with children	-0.0942* [0.0538]	-0.0911* [0.0539]	-0.100* [0.0541]
Inactive (students, unemployed, house keepers, etc)	-0.424*** [0.0743]	-0.321*** [0.0769]	-0.357*** [0.0774]
Public employee	0.0618 [0.0599]	-0.101 [0.0686]	-0.122* [0.0688]
Retired	-0.215*** [0.0666]	-0.11 [0.0697]	-0.162** [0.0703]
Self employee	-0.0575 [0.0543]	0.0242 [0.0566]	-0.0242 [0.0571]
House owner	0.041 [0.0382]	0.0455 [0.0382]	0.05 [0.0384]
Employee and receiving salary through bank deposit		0.296*** [0.0592]	0.179*** [0.0611]
Bank Account			0.323*** [0.0392]
Constant	-8.341*** [0.382]	-8.258*** [0.383]	-7.458*** [0.395]
Regional dummies	Included	Included	Included
Mc Fadden Pseudo R2	0.2027	0.2055	0.2128
Correctly Classified	0.7368	0.737	0.7393
Observations	6,882	6,882	6,882

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Dependent variable takes value 1 if the household own at least a credit card and 0 otherwise

Omitted variables: 35 < years old < 50; private employee

Table 3: Marginal Effects after probit estimation

Dependent variables : credit card holdings

	Model 2		Model 3	
	Marginal Effects	Standard Error	Marginal Effects	Standard Error
Household Income (log)	0.310	0.014	0.278	0.015
High school degree not achieved	0.075	0.017	0.071	0.017
High school degree achieved	-0.001	0.017	-0.006	0.017
Tertiary education degree achieved (not university)	0.047	0.032	0.044	0.032
University degree achieved	0.024	0.031	0.017	0.031
Less than 20 years	-0.208	0.101	-0.191	0.101
20 < years old < 35	0.026	0.019	0.022	0.019
50 < years old < 65	0.012	0.018	0.011	0.018
65 < years old < 80	0.015	0.026	0.009	0.026
More than 80 years old	-0.213	0.039	-0.216	0.039
Female	0.045	0.016	0.047	0.016
Household size	-0.018	0.005	-0.014	0.005
Rural, town or village (less than 5,000 inhabitants)	-0.044	0.021	-0.044	0.021
Informal	-0.144	0.023	-0.138	0.023
Afro-descendant	-0.080	0.035	-0.079	0.035
Single female with children	-0.034	0.020	-0.038	0.021
Inactive (students, unemployed, house keepers,etc)	-0.124	0.030	-0.138	0.031
Public employee	-0.038	0.026	-0.046	0.026
Retired	-0.041	0.026	-0.061	0.027
Self employee	0.009	0.021	-0.009	0.021
House owner	0.017	0.014	0.019	0.014
Employee and receiving salary through bank deposit	0.107	0.021	0.065	0.022
Bank Account			0.120	0.014

Note: figures correspond to the average effects on the probability of holding a credit card

Table 4: Probit estimations

Dependent Variable: bank account holdings

	1	2
Household Income (log)	0.900*** [0.0375]	0.845*** [0.0381]
High school degree not achieved	0.0906** [0.0451]	0.107** [0.0460]
High school degree achieved	0.151*** [0.0440]	0.116** [0.0450]
Tertiary education degree achieved (not university)	0.208** [0.0850]	0.185** [0.0859]
University degree achieved	0.195*** [0.0749]	0.130* [0.0758]
Less than 20 years	-0.531* [0.297]	-0.618** [0.314]
20 < years old < 35	0.153*** [0.0516]	0.138*** [0.0532]
50 < years old < 65	0.0144 [0.0473]	0.0414 [0.0485]
65 < years old < 80	0.126* [0.0690]	0.166** [0.0697]
More than 80 years old	-0.0309 [0.0969]	0.0211 [0.0972]
Female	-0.0583 [0.0428]	-0.0389 [0.0435]
Household size	-0.0920*** [0.0138]	-0.0790*** [0.0141]
Rural, town or village (less than 5,000 inhabitants)	-0.0772 [0.0559]	-0.021 [0.0570]
Informal	-0.390*** [0.0594]	-0.253*** [0.0610]
Afro-descendant	-0.146 [0.0923]	-0.0856 [0.0943]
Single female with children	0.0472 [0.0535]	0.0577 [0.0544]
Inactive (students, unemployed, house keepers, etc)	-0.142* [0.0759]	0.272*** [0.0798]
Public employee	0.643*** [0.0585]	0.146** [0.0663]
Retired	0.0347 [0.0657]	0.449*** [0.0706]
Self employee	0.139*** [0.0534]	0.486*** [0.0577]
House owner	-0.0574 [0.0378]	-0.0452 [0.0386]
Employee and receiving salary through bank deposit		1.012*** [0.0574]
Constant	-9.514*** [0.379]	-9.460*** [0.385]
Regional dummies	Included	Included
Mc Fadden Pseudo R2	0.203	0.2372
Correctly Classified	72.25%	74.69%
Observations	6,882	6,882

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Dependent variable takes value 1 if the household own a bank account and 0 otherwise. Omitted variables: 35 < years old < 50; private employee

Table 5: Marginal Effects after probit estimation

Dependent variables: bank account holdings

	Marginal Effects	Standard Error
Household Income (log)	0.337	0.015
High school degree not achieved	0.042	0.018
High school degree achieved	0.046	0.018
Tertiary education degree achieved (not university)	0.073	0.034
University degree achieved	0.052	0.030
Less than 20 years	-0.231	0.103
20 < years old < 35	0.055	0.021
50 < years old < 65	0.017	0.019
65 < years old < 80	0.066	0.028
More than 80 years old	0.008	0.039
Female	-0.016	0.017
Household size	-0.032	0.006
Rural, town or village (less than 5,000 inhabitants)	-0.008	0.023
Informal	-0.100	0.024
Afro-descendant	-0.034	0.037
Single female with children	0.023	0.022
Inactive (students, unemployed, house keepers, etc)	0.107	0.031
Public employee	0.058	0.026
Retired	0.177	0.027
Self employee	0.190	0.022
House owner	-0.018	0.015
<u>Employee and receiving salary through bank deposit</u>	<u>0.379</u>	<u>0.019</u>

Note: figures correspond to the average effects on the probability of holding a bank account

Table 6: Biprobit estimation

Dependent variable: bank account holding and credit card holding

	Bank Account	Credit Card	ρ
Household Income (log)	0.846*** [0.0380]	0.604*** [0.0613]	
High school degree not achieved	0.108** [0.0459]	0.167*** [0.0447]	
High school degree achieved	0.116** [0.0450]	-0.0339 [0.0458]	
Tertiary education degree achieved (not university)	0.181** [0.0854]	0.0918 [0.0900]	
University degree achieved	0.129* [0.0756]	0.0318 [0.0829]	
Less than 20 years	-0.641** [0.317]	-0.412 [0.253]	
20 < years old < 35	0.142*** [0.0530]	0.0389 [0.0528]	
50 < years old < 65	0.0383 [0.0484]	0.0239 [0.0478]	
65 < years old < 80	0.169** [0.0697]	0.00146 [0.0694]	
More than 80 years old	0.0224 [0.0972]	-0.541*** [0.0982]	
Female	-0.0407 [0.0434]	0.132*** [0.0437]	
Household size	-0.0786*** [0.0140]	-0.0260* [0.0145]	
Rural, town or village (less than 5,000 inhabitants)	-0.0201 [0.0568]	-0.110** [0.0551]	
Informal	-0.251*** [0.0608]	-0.314*** [0.0615]	
Afro-descendant	-0.0793 [0.0940]	-0.189** [0.0882]	
Single female with children	0.0638 [0.0544]	-0.107** [0.0535]	
Inactive (students, unemployed, house keepers, etc)	0.276*** [0.0795]	-0.393*** [0.0745]	
Public employee	0.151** [0.0662]	-0.139** [0.0681]	
Retired	0.450*** [0.0705]	-0.235*** [0.0663]	
Self employee	0.488*** [0.0576]	-0.103* [0.0546]	
House owner	-0.0436 [0.0385]	0.054 [0.0380]	
Employee and receiving salary through bank deposit	1.008*** [0.0574]		
Bank Account		0.807*** [0.137]	
Constant	-9.473*** [0.385]	-6.116*** [0.577]	-0.302*** [0.0942]
Regional dummies		Included	
Observations	6,882	6,882	6,882

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Omitted variables: 35 < years old < 50; private employee

Table 7: Marginal Effects after biprobit estimations

Dependent variables: bank account holdings and credit cards holdings

	Marginal effects	Standard Errors
Household Income (log)	0.340	0.013
High school degree not achieved	0.060	0.013
High school degree achieved	0.023	0.014
Tertiary education degree achieved (not university)	0.068	0.029
University degree achieved	0.041	0.025
Less than 20 years	-0.189	0.046
20 < years old < 35	0.045	0.017
50 < years old < 65	0.015	0.015
65 < years old < 80	0.044	0.022
More than 80 years old	-0.104	0.024
Female	0.016	0.013
Household size	-0.026	0.004
Rural, town or village (less than 5,000 inhabitants)	-0.027	0.016
Informal	-0.119	0.015
Afro-descendant	-0.056	0.025
Single female with children	-0.006	0.016
Inactive (students, unemployed, house keepers,etc)	-0.023	0.022
Public employee	0.008	0.021
Retired	0.060	0.021
Self employee	0.101	0.018
House owner	0.000	0.012
Employee and receiving salary through bank deposit	0.253	0.013
Bank account	0.159	0.029

Note: figures correspond to the average effects on the joint probability of holding both

Table 8: Expected effect of making compulsory the payment of wages through bank deposits

Average probabilities

	Bank account holders		Credit card holders		Both bank account and credit card	
	LL_CI	UL_CI	LL_CI	UL_CI	LL_CI	UL_CI
Univariate probits	5.25	6.59	0.89	2.18		
Bivariate probit	5.19	6.58	2.62	6.86	3.07	4.01

Note: Bootstrap standard error are obtained using 1000 replications. Figures are the lower and upper limit of the 95th confidence interval for expected increase in the percentage of holders, in terms of percentage points.