

The determinants of Uruguayan households' indebtedness¹

Miguel Mello Costa (BCU)

Jorge Ponce (BCU)

Abstract

We study the determinants of households' indebtedness using a new dataset on the financial situation of households in Uruguay. We find that variables that are related to the access to financial services have a large impact on the households' indebtedness decision. This result may be used to evaluate the potential impact of a recently enacted legislation imposing the formalization of the payment of wages through bank accounts. We also find that the households' indebtedness level is positively correlated to the fact that the loan is granted by a bank. The level of the financial burden is positively correlated to the facts that the loan is granted by a bank, that it is a mortgage loan and that it is denominated in local currency.

JEL: G11

Keywords: indebtedness decision, indebtedness level determinants, Uruguay, household's level data.

¹ Opinions and views in this paper are entire responsibility of their authors and do not represent the institutional position of the Central Bank of Uruguay. Authors acknowledge the comments and suggestions by Fernando Borraz, Gerardo Licandro and Rodrigo Lluberas.

1. Introduction

In this paper we study the determinants of the Uruguayan households' indebtedness. More precisely, we identify key characteristics of Uruguayan households and of their relationships with the financial system that determine (i) the decision of acceding to some kind of credit, (ii) the size of the loan, and (iii) the resulting financial burden that the credit imposes as a proportion of the households' monthly income.

Our analysis is of interest for several reasons. First, it allows the identification of potential barriers for households to access to financial markets and in particular to bank credit. Second, beyond the low structural indebtedness level of Uruguayan households there is a growing non-banking credit sector that deserves deeper analysis. Our analysis allows a better understanding of the risk associated to household's credit in Uruguay, a segment of credit which has shown very dynamic in the recent years. Third, the results may be used to evaluate potential impacts of a recently enacted legislation imposing the formalization of several payments, which include wages and salaries, through bank accounts.

The analysis is based on a new dataset which is representative of all households in Uruguay. The dataset merges two types of information: data on the characteristics of households which is collected in a regular basis through a Continuous Household Survey by Instituto Nacional de Estadísticas (INE), and data on the general position of assets, liabilities, and the use and knowledge of financial services by households. The latter data were first collected in Uruguay during the second semester of 2012. The combination of the data from this financial section with the characteristics of households allows us to study the characteristics of households that better explain the use of credit, the level of indebtedness and the financial burden. In this respect, this is one of the first studies using household's level financial data for Uruguay in this kind of analysis.

We first study the indebtedness decision by households. We identify the characteristics of households that determine whether or not a given household

holds some kind of credit. We use Probit and Logit econometric models for this purpose. We find that variables that are related to the access to financial services by households, in particular those that account for some prior relationship with banks and for the use of credit and debit cards as means of payment, have a large impact in the households' indebtedness decision. More precisely, the combination of having bank accounts and using cards as mean of payment increases the probability that a given households decides to request a loan by approximately 20 percentage points. This figure may be consider as a benchmark to evaluate the potential impact of a new legislation imposing the formalization of the payments of wages and salaries through bank accounts: other things equal, each five new work relationships that are formalized through the payment of wages via bank accounts one of them would request a bank loan.

Other variables that account for the employment situation of the members of households do also have a positive and significant impact on the probability of requesting loans. In particular, if at least one of the members of a household is a public servant, then the probability that the household request a loan increases by 10 percentage points. A possible interpretation for this finding is related to the better position that public servants have in order to access to bank loans with respect to employees in the private sector. The former group of employees may access to special lines of credit which are provided by state-owned commercial banks which and are not available to the private sector employees.

Hence, putting together the two previous results we conclude that having access to financial services increases the probability that a given household decides to request a loan by around 30 percentage points.

Other variables that are related to the income distribution of the households also increase the probability of requesting loans but with a much smaller marginal impact. If a household is characterized as poor according to its income level, then the probability of requesting a loan is reduced by 8 percentage points. In addition to that, we find some evidence that households are less prone to request credit if they do not really need it. More precisely, having savings in a bank account reduces the probability of requesting a loan by about 10 percentage points on average.

Next we study which are the characteristics of the Uruguayan households that better explain their indebtedness level. In so doing we apply the methodology proposed by Heckman (1979) in order to correct for the potential selection bias. In particular, in a first stage a selection equation is estimated considering as independent variables those that we have found statistically significant for the decision of requesting a loan. In a second stage the households' indebtedness level is regressed on a set of covariates.

We find that households' indebtedness level is positively and significantly determined by the fact that the loan is granted by a bank. No-bank credit is directly related to consumption or credit card lines which are, in general, of small amounts. Bank credit also includes mortgages, car and loans for other appliances which require larger amounts of credit. We also find a positive and significant relationship between household wealth and its indebtedness level, although this relationship is much weaker than the previous one.

In Uruguay, households may have access to credit in local currency, on CPI indexed currency and also in US dollars. We find that the percentage of debt denominated in local currency has a negative and significant impact in explaining the total indebtedness level of households. In general, relatively large amount loans are either denominated in CPI indexed currency and US dollar. This kind of loans correspond to mortgages and car ones, while relatively small loans are denominated in local currency and are granted to finance current expenditures and credit card lines.

We also find that total indebtedness is negatively and significantly correlated to bank savings. Hence, the level of households' bank savings do not only reduces its willingness to request a bank loan but also the size of the loan once it has been requested. These results may be interpreted as evidence of prudential behavior on the access to credit loans by Uruguayan households.

Finally, we turn to the study of the determinants of households' financial burden which is defined as the amount of household's monthly income that is used to pay debts. We find that the financial burden is positively and significantly determined

by the fact that the credit has been granted by a bank and by the fact that it is a mortgage loan. This result is not surprising since mortgage loans are only granted by banks and represent the largest proportion of households' indebtedness. However, we also find that the percentage of debt denominated in local currency has a positive and significant impact in explaining the financial burden. This result is more puzzling and needs further research since it may be the case that small loans that are granted in local currency target low-level-income households determining over-indebtedness in this segment. However, Uruguayan households have a low level of debt. Despite the recent large increase in lending to households the household sector's financial liabilities were around 11 percent of GDP in 2012, a far lower ratio than in industrialized countries.

The rest of the paper is organized in the following way. Section 2 revised related literature. Section 3 describes the dataset. Section 4 contains the empirical analysis and the main results of the paper. Section 5 presents some concluding remarks. In the Appendix we present a more detailed description of the data, summary statistics and complementary results.

2. Related literature

The decision by a household to request a loan, as well as the size of the loan, may depend on both supply and demand side factors. In this paper we first analyze the determinants of Uruguayan households' participation in the credit market. We use probabilistic models in order to evaluate the characteristics that better explain the households' indebtedness decision. This type of approach has been used, for example, by Blundell and Gizycki (1992) to estimate credit demand and supply in Australia, and to relate credit behavior to economic activity.

Since this is the first approximation to this topic using a recently ensemble dataset, there are no direct related literature for the case of Uruguay. There are several papers that are close to ours that use data for other countries. Nieto (2007) analyses changes in Spanish household credit and finds a positive correlation between

household borrowing and real spending, gross wealth and the repayment period in the long run. In the short run, the indebtedness decision is negatively correlated with credit costs and the unemployment rate. Costa and Farinha (2012) find similar results for Portugal. In addition to that, they identify young and low-income sectors as the more vulnerable to credit risk. Using data for Italian households, Magri (2002) finds that regional factors are very relevant in order to explain the access to credit to the point that these factors are even more important than income factors. Instead, the level of debt depends crucially on the households' wealth level. Alvarez and Opazo (2013) use panel data for Chilean households and find that there is a negative and increasing relationship between income shocks and changes in consumption debt. They provide an interpretation for this finding which is based on the willingness of households for consumption smoothing during financial crises periods. They also find empirical evidence that when income falls, the indebtedness with banks increases but the indebtedness with non-bank creditors decreases. Japelli et al. (2010) suggest that higher debt levels significantly increases the sensibility of credit risk to macroeconomic shocks.

3. The Dataset

In this paper we use two complementary databases produced by the Instituto Nacional de Estadísticas (INE): the Continuous Household Survey (CHS) and the Financial Uruguayan Household Survey (FUHS), both for 2012. The CHS has been conducted since 1981. Meanwhile, the FUHS was first conducted in 2012 as an additional module to the CHS. The methodology of the CHS is available in the website of INE.² A complete description of the FUHS is in Sanroman et al. (2013).

The collection of financial data from households through the FUHS's module in the CHS has a series of advantages. First, the definition of household is the same in both surveys. This fact simplifies the merge of the surveys and guarantees full comparability. Second, it allows us to have very rich information about the finance situation of households as well as other socio-economic characteristics. Third, the

² As for September 9, 2014 in <http://www.ine.gub.uy/biblioteca/metodologias/ech/metodologiaech.htm>

sample has been selected to be representative of all the households in the country. Forth, the ratio of non-response is very low since the FUHS profits from the well established reputation of the CHS and INE.

The FUHS assesses data on the general position of assets and liabilities of households as well as on the knowledge and use of financial instruments. The data contents can be decomposed into the following relevant categories:

- Real estate and related debt (particularly home ownership, other property assets and mortgage debt);
- Other liabilities of any nature;
- Saving, primarily related to bank accounts and other financial assets;
- Possession and use of financial services and products;
- Use of financial services as means of payment;
- Household debt and perceived financial burden.

The possibility of merging the CHS with the FUHS allows us to analyze the heterogeneity in the behavior of these financial factors in subsets of households, which are defined according to their characteristics and those of their members. From the combination of the two surveys we obtain a dataset of 8321 household observations that have responded to both surveys. The dataset contains information as to develop a series of variables that may be classified into the following categories:

- Dependent variables referring to decisions concerning the individual about requesting loans, the level of indebtedness and the financial burden of the debts;
- Variables related to access to financial services, such as the existence of a link to the formal financial system, the existence of economies of scope between financial instruments and the employment status of the householder;
- Variables related to wealth, income and other households' characteristics;
- Variables that characterize the household such as number of members, the amount of children, the region, education, age, etc.

Table 1: Descriptive Statistics

Label	Variable	Unit	Obs	Mean	Std. Dev.	Min	Max
Age	edad	Units	8321	44.65569	24.1759	0	98
Anual Income (thousands USD)	y_anual	U\$D Thousands	8321	23.17014	20.33732	0	309.7537
Bank Account	cta_bcaria	Dummy	8321	0.4565557	0.498139	0	1
Bank Debt	deudas_bca~s	U\$D	8321	1532.31	11615.42	0	500000
Bank Credit	cred_bcario	Dummy	8321	0.19854	0.3989247	0	1
Bank Mortgage	cred_hipo~o	Multinomial	8321	0.1057565	0.3075442	0	1
Bank Savings	ah_bcario	Dummy	8321	0.4664103	1.100309	0	5
Baths	num_baños	Units	8321	1.162601	0.4734541	0	5
Car	automovil	Dummy	8321	0.3548852	0.4785073	0	1
Children	menores	Units	8321	0.5226535	0.9104085	0	10
Debt Decision	decis_deuda	Units	8321	0.3516404	0.4775111	0	1
Debt Thousands	deuda_mil	U\$D Thousands	8321	2.126833	13.2622	0	600
Domestic Service	serv_dom	Dummy	8321	0.107439	0.3096892	0	1
E-Banking	ebanca	Dummy	8321	0.0431439	0.2031931	0	1
Education	edu	Units	8321	8.95974	5.258138	0	30
Employee	asal	Dummy	8321	0.858791	0.3482579	0	1
Financial Assets Savings	ah_act_fin	Multinomial	8321	0.0292032	0.3400197	0	5
Financial Burden	carga_deuda	Multinomial	8321	0.6484798	0.9446715	0	4
Formal	formal	Dummy	8321	0.35813	0.4794794	0	1
Hours Worked per Week	horas_lab	Units	8321	19.18411	22.66427	0	98
House Owner	prop	Dummy	8321	0.0788367	0.2694999	0	1
House Price	p_viv	U\$D Thousands	8321	33.39853	77.651	0	2500
Household ident	hogar	Units	8321	4616.927	2664.61	1	9156
Household Income	yhog	\$U Thousands	8321	39.19616	34.40397	0	524
Income Distribution	qyhog1	Quintiles	8321	2.999519	1.415148	1	5
Income Distribution (centiles)	dist_ing_100	Centiles	8321	50.34876	29.09744	1	100
Indebtedness distribution (centiles)	dist_end	Centiles	8321	29.79041	39.55569	1	100
Indebtedness Months	end_ing_msl	%	7842	100.4071	560.6843	0	22234.79
Indebtedness Years	end_ing	%	7842	8.367254	46.7237	0	1852.9
Internet	internet	Dummy	8321	0.4696551	0.4991083	0	1
Local Currency Debt %	endeu_mn	Multinomial	8321	2.184713	2.857032	0	7
Local Currency Savings	ah_mn	Dummy	8321	0.0294436	0.1690565	0	1
Mortgage	cred_hipo	Dummy	8321	0.2005769	0.4004561	0	1
Multi employment	multiemp	Units	8321	0.5548612	0.6354138	0	7
Net Wealth	riq_neta	U\$D Thousands	8321	61.74018	339.5744	-593.6	21080
Non Bank Debt	deudas_no~s	U\$D	8321	594.5234	4594.266	0	200000
Non Workers	inactivos	Units	8321	0.8251412	0.8486826	0	5
Num of Credit Cards	t_cred	Units	8321	1.186156	1.639017	0	40
Num of Rooms	num_hab	Units	8321	3.45247	1.229517	1	12
Poverty	pobre	Dummy	7388	0.0797239	0.2708836	0	1
Public Employed	emp_pub	Dummy	8321	0.0862877	0.2808053	0	1
Region	depto	Multinomial	8321	5.935344	5.797372	1	19
Rent Price	mon_alquiler	\$U Thousands	8321	7.301307	6.026059	0	100
Total Debt	deuda	U\$D	8321	2126.833	13262.2	0	600000
Total People	personas_hog	Units	8321	2.706405	1.534842	1	14
Type of House	tipo_viv	Multinomial	8321	1.5271	0.9616529	1	5
Unemployed	desocupados	Units	8321	0.0781156	0.2976722	0	4
Wealth	riqueza	U\$D Thousands	8321	63.86702	340.0715	0	21080
Women	mujeres	Units	8321	1.436005	0.9720971	0	11

Table 1 presents the descriptive statistics and format of the variables that are included in the analysis. As it is shown in the Table there are three types of variables derived from the surveys: binary, multinomial discrete variables and continuous variables. Discrete variables, i.e. binary and multinomial, characterize attributes from the household and its members such as the number of workers, the type of dwelling, the number of the households' rooms, etc. Continuous variables are those related to amounts of money and ratios such as income, wealth, price of the house, indebtedness, etc.

4. Empirical analysis

With the purpose of analyzing the Uruguayan households' indebtedness characteristics we estimate three models on three different dependent variables. These models refer to the decision of requesting a loan, to the level of debt relative to household income, and to the financial burden of the debt in terms of the monthly income of the household.

In a first stage, we estimate Probit and Logit models in order to explain the decision of requesting a loan. In a second stage, these models determine the decision of borrowing as the selection equation in a Heckit model (see Heckman, 1979) to explain the level of indebtedness of the households, which is approximated through the ratio between debt and annual income. In a third stage, which is independent from the two previous, we estimate Ordered Logit and Probit models in order to explain the financial burden that the debt imposes to the household. The financial burden is defined as the ratio of debt services (principal plus interest) to households' income in monthly basis.

The rationale to implement this two-stage estimation strategy can be easily explained as follows. To explain the financial indebtedness of household i , the simple OLS model would be:

$$Y_i^* = \alpha + \beta X_i + \varepsilon_i, \tag{1}$$

where Y_i^* is the indebtedness of the household i , X_i is a vector of characteristics of the household that explain the debt level, and an error term $\varepsilon_i \sim (0, \sigma^2)$. A basic selection problem arises because the sample consists only of households that have chosen to take debt and these households may differ in important ways from household that do not request credit. Theoretically, the decision of contracting a loan is derived from the maximization of some utility function which depends on credit. A household would take debt if the utility of consumption financed with debt exceeds the cost of debt which is normalized to zero for simplicity. Hence, we can model the decision of requesting a loan as an unobservable continue variable accounting for the utility of debt U_i . The selection equation for requesting a loan would be:

$$U_i = \gamma d_i + \beta_k H_{ik} + u_i, \quad (2)$$

where the utility of indebtedness, U_i , depends on the debt, d_i , and a vector of k household characteristics H_{ik} . The term u_i is assumed to be jointly normally distributed with ε_i and contains any unmeasured characteristics in the selection equation. Hence, the estimation on two-stages considering first the selection equation and second estimating Equation (1) corrects the selection bias of the simple OLS model.

4.1. The debt decision

We do not actually observe U_i . All we observe is a dichotomous variable DD_i with the value of 1 if the household decided to entry the credit market by taking a loan ($U_i > 0$) and 0 otherwise:

$$DD_i = \begin{cases} 1 & \text{if } debt > 0 \\ 0 & \text{if } debt = 0 \end{cases} \quad (3)$$

As shown in Table 2, 35% of Uruguayan households have some kind of debt with banks, non-bank financial institutions credit as well as other non-financial institutions like, for example, other households and retail stores.

Table 2: Debt Decision

Debt Decision	Freq.	Percent	Cum.
0	5,395	64.84	64.84
1	2,926	35.16	100.00
Total	8,321	100.00	

In the Appendix we show the interaction between the debt decision variable and most of the variables that account for the access to credit. In what follows we also analyze the interaction of the debt decision with income variables. Table 3 presents the interaction between the debt decision and the income distribution expressed in percentage by income quintiles. In relative terms the 4th quintile is the most likely to take debt and the lower income quintile is the less prone to take debt.

Table 3: Debt Decision and Income Distribution (percentage)

Income Distribution	Debt Decision		Total
	0	1	
Quintile 1	71.02	28.98	100.00
Quintile 2	66.77	33.23	100.00
Quintile 3	61.54	38.46	100.00
Quintile 4	59.19	40.81	100.00
Quintile 5	65.65	34.35	100.00
Total	64.84	35.16	100.00

Table 4 presents the results of the estimation of the discrete choice model for the decision of requesting a loan and its marginal effects (mfx_probit and mfx_logit).

Variables that account for the access to credit markets such as the number of credit cards in the household, the existence of bank accounts, if some of its members is a public servant, if they are formal workers (i.e. if they contribute to social security) and the number of employees in the household have a positive and significant impact. These five variables increase the probability that a household request a loan by 30 percentage points.

Table 4: Probit and Logit Estimations of the Debt Decision

	probit	logit	mfx_probit	mfx_logit
Debt Decision				
Num of Credit Cards	0.162*** (0.011)	0.311*** (0.020)	0.060*** (0.004)	0.070*** (0.005)
Bank Account (d)	0.390*** (0.038)	0.627*** (0.062)	0.143*** (0.014)	0.141*** (0.014)
Public Employed (d)	0.253*** (0.060)	0.410*** (0.100)	0.096*** (0.024)	0.096*** (0.024)
Formal (d)	-0.076 (0.049)	-0.136* (0.081)	-0.028 (0.018)	-0.030* (0.018)
Multi employment	0.064* (0.035)	0.103* (0.057)	0.024* (0.013)	0.023* (0.013)
Income Distribution	0.055*** (0.019)	0.089*** (0.032)	0.020*** (0.007)	0.020*** (0.007)
Rent Price	-0.025*** (0.004)	-0.046*** (0.007)	-0.009*** (0.001)	-0.010*** (0.001)
Bank Savings	-0.257*** (0.019)	-0.444*** (0.033)	-0.094*** (0.007)	-0.100*** (0.007)
Poverty (d)	-0.228*** (0.069)	-0.366*** (0.115)	-0.080*** (0.023)	-0.078*** (0.023)
Car (d)	-0.180*** (0.037)	-0.316*** (0.062)	-0.065*** (0.013)	-0.070*** (0.013)
Edu2	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Age	-0.002*** (0.001)	-0.003** (0.001)	-0.001*** (0.000)	-0.001** (0.000)
Region	0.013*** (0.003)	0.022*** (0.005)	0.005*** (0.001)	0.005*** (0.001)
Total People	0.030** (0.014)	0.042* (0.023)	0.011** (0.005)	0.010* (0.005)
Constant	-0.595*** (0.073)	-0.949*** (0.120)		
R-squared	0.081	0.083	0.081	0.083
N	7388	7388	7388	7388

(d) for discrete change of dummy variable from 0 to 1

* p<0.10, ** p<0.05, *** p<0.01

The number of credit cards and having a bank account imply that the household has a prior relationship with the formal credit market. In Uruguay, being a public employee represents an advantage for accessing to credit because the state-owned commercial bank extends credit lines without collateral to public servants. In general, these credit lines are not available for private sector employees. Having a formal job and having more than one job reduces the perceived risk of the household since a better diversified income reduces credit risk. In the Appendix we show the interaction between debt decision and the number of jobs. It can be observed that there are more households with debt when they have a householder with more than one job. The number of jobs may signal a bigger effort by the household in order to fulfill its obligations and then reduce the moral hazard problem perceived by creditors.

Income related variables such as income distribution and the fact that a household owns a car overall reduce the probability of having a loan by 8.2 percentage points. Finally, other variables that represent household characteristics like the number of members, age and education have an overall impact of 1.35 percentage points over the probability of having debts.

4.2. The indebtedness level

In order to identify the determinants that better explain the financial indebtedness of Uruguayan households we estimate a Heckit model (see Heckman, 1979) with a selection Probit equation for the decision of having a loan. We define indebtedness as the ratio of total debt to annual income. Tables 5 and 6 show the main descriptive statistics for indebtedness. We also include the variable wealth³ in order to have another reference for income.

³ Wealth includes real estate properties, cars and the value of commercial and professional business. In all cases the values are provided by the survey respondent, so it may have a downward bias. The survey asks for financial savings and bank accounts, but it does not ask for balances.

Table 5: Indebtedness and components (in thousands U\$, Indebtedness in percentage)

Variable	Obs	Mean	Std. Dev.	Min	Max
Indebtedness	7842	8.37	46.72	0	1853
Total Debt	8321	2.13	13.26	0	600
Income	8321	23.17	20.34	0	310
Wealth	8321	63.87	340.07	0	21080
Net Wealth	8321	61.74	339.57	-593.6	21080

The overall indebtedness ratio is 8.4%. This is a low level of debt in an international comparison.⁴ Note that households average debt is U\$D 2130, which is approximately equivalent to the monthly income of an average Uruguayan household.

Table 6 shows the components of indebtedness across the income distribution. We observe that the fifth quintile has a higher indebtedness ratio. It can also be noted that there is a higher income and wealth concentration at the fifth quintile but with a much bigger dispersion.

Table 6: Indebtedness and components and income distribution

Income Distribution	Indebtedness	Total Debt	Income	Wealth	Net Wealth
Quintile 1	6.77 (47.55)	0.96 (5.84)	5.26 (3.70)	21.55 (59.30)	20.59 (59.27)
Quintile 2	7.35 (52.84)	0.92 (6.05)	12.77 (1.60)	21.01 (52.47)	20.08 (52.91)
Quintile 3	8.86 (40.09)	1.65 (7.56)	18.68 (1.85)	34.37 (75.11)	32.71 (75.26)
Quintile 4	7.96 (31.03)	2.15 (8.64)	26.57 (2.96)	53.94 (123.89)	51.80 (124.27)
Quintile 5	10.44 (57.57)	4.95 (25.81)	52.58 (26.69)	188.40 (728.62)	183.44 (727.98)
Total	8.37 (46.72)	2.13 (13.26)	23.17 (20.34)	63.87 (340.07)	61.74 (339.57)

⁴ The Euro zone has a ratio of 62%, Germany 37.3%, Spain 113,5% and Italy 50.3%, according to the Financial Households Survey done by the European Central Bank in 2012.

If we analyze the level of indebtedness for those who effectively decided to take a loan we can identify some differences. As Table 7 shows, the level of indebtedness is relatively higher for this group. Quintile 4 of the income distribution is the segment with the higher proportion of households holding debt (40.8%) but the indebtedness level is the lowest (19.5%). The first quintile, however, has the lower amount of households indebted but the level of indebtedness of those who have debt is relatively high (27%). The richer quintile has the highest level of indebtedness and a relatively high percentage of households with debt.

Table 7: Level of indebtedness and selection

Income Distribution	All	% that have debt	Selected by equation
Quintile 1	6.77	28.98	27.04
Quintile 2	7.35	33.23	22.13
Quintile 3	8.86	38.46	23.03
Quintile 4	7.96	40.81	19.51
Quintile 5	10.44	34.35	30.38
Observations	7842	8321	2740

Table 8 shows the results of the two-stage Heckman model estimated to explain the level of debt related to income. The main determinants of the level of indebtedness are the wealth of the household, the fact that the credit is granted by banks, the bank savings of the household, and the portion of local currency debt to total debt.

The amount of real wealth and the fact that the household has a bank credit increases the level of indebtedness. This may imply that real properties provide access to larger loans as they are used as credit collateral. On the other hand, bank savings and debt denominated in local currency reduce the level of indebtedness. Consumption credit is the most important portion of loans denominated in local currency and this type of credit usually is smaller than other loans, especially non-

⁵ In the Appendix we show the distribution of indebtedness by the portion of local currency and bank savings.

banking housing loans and credits for durable goods that are mostly denominated in foreign currency.

Table 8: Heckman model results for indebtedness level

	OLS	Heckman
<hr/>		
main		
Wealth	0.003** (0.001)	0.054*** (0.011)
Bank Credit	27.214*** (1.582)	13.321*** (4.197)
Bank Savings	-0.326 (0.473)	-4.021** (1.972)
Local Currency Deb~%	0.973*** (0.221)	-6.806*** (1.505)
Constant	0.936 (0.697)	56.605*** (10.768)
<hr/>		
Debt Decision		
Wealth		0.000 (0.000)
Bank Credit		8.424 (.)
Local Currency Deb~%		0.549*** (0.012)
Num of Credit Cards		0.053*** (0.020)
Bank Account		-0.072 (0.079)
Public Employed		-0.216 (0.134)
Formal		0.143 (0.099)
Multi employment		0.080 (0.072)
Income Distribution		0.024 (0.040)
Rent Price		-0.000 (0.008)
Bank Savings		-0.085* (0.045)
Poverty		-0.093 (0.136)
Car		0.094 (0.081)
Edu2		-0.000 (0.000)
Age		-0.008*** (0.002)
Region		0.028*** (0.006)
Total People		-0.075*** (0.029)
Constant		-2.125*** (0.155)
<hr/>		
mills		
lambda		-16.652** (6.832)
<hr/>		
R-squared	0.073	
N	7842	7387
N_cens		4767
<hr/>		

* p<0.10, ** p<0.05, *** p<0.01

Variables associated with access to credit, such as the number of credit cards, having a bank account or being a public employee are relevant in the selection equation but they do not have a significant marginal effect in the level of indebtedness.

4.3. The financial burden

The financial burden is defined as the amount of household’s income that is applied to paying debt, i.e. amortization plus interests, in a monthly basis. It can be interpreted as the cost of the debt perceived by the household. In the dataset this variable is a discrete variable derived from the question “which is the charge of debt service in terms of your monthly income?” The answer to this question is structured in intervals: 0%, less than 25%, between 25% and 50%, between 50% and 75%, and more than 75%. Table 9 shows the distribution of the answers to this question.

Table 9: Distribution of Financial Burden

Financial Burden	Freq.	Percent	Cum.
0	4,963	59.64	59.64
<25%	1,921	23.09	82.73
25% - 50%	961	11.55	94.28
50%-75%	351	4.22	98.50
>75%	125	1.50	100.00
Total	8,321	100.00	

To explain the financial burden we estimate Ordered Logit and Probit models. The financial burden is a continuous variable but we only observe discrete intervals for the variable. Suppose the underlying process to be characterized is:

$$y^* = x'\beta + \epsilon,$$

where y^* is the exact but unobservable dependent variable (the exact level of financial burden); x is the vector of independent variables, and β is the vector of regression coefficients to be estimated. Assume now that we cannot observe y^* but instead we observe the following response categories:

$$y = \begin{cases} 0 & \text{if } y^* \leq \mu_1, \\ 1 & \text{if } \mu_1 < y^* \leq \mu_2, \\ 2 & \text{if } \mu_2 < y^* \leq \mu_3, \\ \vdots & \\ N & \text{if } \mu_N < y^*. \end{cases}$$

Ordered Logit techniques will use the observations on y , which are a form of censored data on y^* , in order to fit the parameter vector β .

Table 10 presents the estimation results and the marginal effects of the Ordered Logit model. We consider households with a positive financial burden only; households without indebtedness are excluded from this analysis. The results indicate that the number of credit cards, the number of bank accounts, the level of indebtedness, having access to bank credit and holding a mortgage reduces the probability of having a low financial burden and increases the probability of having a financial burden greater than 25% of monthly income. On the other hand, having higher bank savings and having a car increase the probability of having a higher financial burden.

Looking at the results, we conclude that having a mortgage with a bank is the main determinant to explain financial burden. In general, this type of debt is associated with housing credits in local currency indexed to inflation.⁶

⁶ The Banco Hipotecario del Uruguay and the principal private banks mortgage loans in “Unidades Indexadas”, an unit of account that is indexed to inflation.

Table 10: Ordered Logit and Probit models results for the Financial Burden

	Ord_logit b/se	P(y<25%) b/se	P(25%<y<50%) b/se	P(50%<y<75%) b/se	P(y>75%) b/se
Financial Burden					
Num of Credit Cards	0.117*** (0.021)	-0.029*** (0.005)	0.015*** (0.003)	0.010*** (0.002)	0.004*** (0.001)
Public Employed (d)	0.166 (0.109)	-0.041 (0.027)	0.021 (0.013)	0.014 (0.010)	0.006 (0.004)
Bank Savings	-0.358*** (0.053)	0.087*** (0.013)	-0.046*** (0.007)	-0.030*** (0.004)	-0.012*** (0.002)
Bank Account (d)	0.136* (0.080)	-0.033* (0.020)	0.018* (0.010)	0.011* (0.007)	0.004* (0.003)
Indebtedness	0.004*** (0.001)	-0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Bank Credit (d)	0.304*** (0.076)	-0.074*** (0.018)	0.039*** (0.010)	0.025*** (0.006)	0.010*** (0.003)
Mortgage (d)	0.169** (0.085)	-0.041** (0.021)	0.021** (0.011)	0.014* (0.007)	0.006* (0.003)
Local Currency Deb~%	0.032 (0.020)	-0.008 (0.005)	0.004 (0.003)	0.003 (0.002)	0.001 (0.001)
Car (d)	-0.269*** (0.081)	0.065*** (0.020)	-0.035*** (0.011)	-0.022*** (0.006)	-0.008*** (0.003)
Non Workers	0.032 (0.042)	-0.008 (0.010)	0.004 (0.005)	0.003 (0.003)	0.001 (0.001)
House Owner (d)	0.223* (0.131)	-0.055* (0.033)	0.028* (0.015)	0.020 (0.012)	0.008 (0.005)
McF_R2	0.031	0.031	0.031	0.031	0.031
Observations	3149	3149	3149	3149	3149

Marginal effects

(d) for discrete change of dummy variable from 0 to 1

* p<0.10, ** p<0.05, *** p<0.01

5. Final remarks

In this paper we study the determinants of the Uruguayan households' indebtedness. More precisely, we identify the key characteristics of Uruguayan households and of their relationships with the financial system that determine the decision of acceding to some kind of financial credit, the decision of the size of the loan and of the financial burden that the credit imposes as a proportion of the households' monthly income.

We find that variables that are related with the access to financial services by households, in particular the combination of having bank accounts and using cards as mean of payment, increases the probability that a given households decides to request a loan by approximately 20 percentage points. This figure may be consider a benchmark to evaluate the potential impact of the new legislation imposing the formalization of the payments of salaries through bank accounts: other things equal, each five new salary relationships that are formalized through bank accounts one of them would request a bank loan. We also find that another access variable, i.e. the fact that some of the members of a household be a public servant, increases the probability of the household requesting a loan by 10 percentage points. Hence, putting together the previous results we find that having access to financial services increases the probability that a given household decides to request a loan by around 30 percentage points.

With regards to the households' indebtedness level we find that it is positively and significantly determined by the fact that the loan is granted by a bank and by the households' wealth level, and negatively determined by the percentage of debt denominated in local currency. In addition to that, we also find that the total indebtedness level is negatively and significantly correlated to the level of bank savings of households. Hence, the level of bank savings of a households do not only reduces its willingness to request a bank loan but also the size of the loan once it has been requested. These results may be interpreted as evidence of some kind of conservative or precautionary behavior on the access to credit loans by Uruguayan households.

Finally, we find that the financial burden is positively and significantly correlated to the fact that the credit has been granted by a bank and by the fact that it is a mortgage loan, as well as other access-to-financial-services variables. This result is not surprising since mortgage loans are only granted by banks and represent the biggest size of households' loans.

References

Alvarez R. and Opazo L. (2013). "Household debt during the financial crisis: micro-evidence from Chile." Serie de Documentos de Trabajo SDT 383, Universidad de Chile

Blundell, A. and M. Gizycki (1992). "Credit supply and demand in the Australian economy." Research Discussion Paper No. 9208, Reserve Bank of Australia.

Costa S., Farinha L. (2012). "Households' indebtedness: a microeconomic analysis based on the results of the households' financial and consumption survey." Financial Stability Report, May 2014 p.133-157, Banco de Portugal.

Del Giovane P., Eramo G. and Nobili A. (2010). "Disentangling demand and supply in credit developments: a survey-based analysis for Italy." Temi di discussione No 764, , Banca D'Italia

Heckman, J. (1979). "Sample Selection Bias as a Specification Error." *Econometrica*, Vol. 47, pp. 153-61.

Jappelli, T., Pagano, M. and di Maggio, M. 2010. "Households' Indebtedness and Financial Fragility," Reviewed version of CSEF Working Papers 208, Centre for Studies in Economics and Finance (CSEF), University of Naples, Italy.

Magri, S. (2002). "Italian Households' debt: determinants of demand and supply." Temi di Discussione No. 454, Banca D'Italia

Nieto F (2007). "The determinants of household credit in Spain." Documento de Trabajo. N.º 0716 Banco De España.

Sanroman, G., Cladera, J., Ferre, Z. and Santos, G. (2013). "Encuesta Financiera de los Hogares Uruguayos Informe de resultados de la Encuesta EFHU1." Final Report of the Survey.

Stiglitz, J.E. and Weiss, A. (1981), "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, Vol. 71, pp. 393-409.

Appendix

Debt Decision and Public Employed

Debt Decision	Public Employed		Total
	0	1	
0	93.01	6.99	100.00
1	88.35	11.65	100.00
Total	91.37	8.63	100.00

Debt Decision and Bank Account

Debt Decision	Bank Account		Total
	0	1	
0	58.05	41.95	100.00
1	47.51	52.49	100.00
Total	54.34	45.66	100.00

Debt Decision and Bank Credit

Debt Decision	Bank Credit		Total
	0	1	
0	100.00	0.00	100.00
1	44.50	55.50	100.00
Total	80.48	19.52	100.00

Debt Decision and Multiemployment

Multi employment	Debt Decision		Total
	0	1	
0	66.40	33.60	100.00
1	63.51	36.49	100.00
2	61.19	38.81	100.00
3	58.14	41.86	100.00
4	60.00	40.00	100.00
5	50.00	50.00	100.00
7	100.00	0.00	100.00
Total	64.84	35.16	100.00

Debt Decision and Bank Account for those that have credit cards

Debt Decision	Bank Account		Total
	0	1	
0	40.65	59.35	100.00
1	40.07	59.93	100.00
Total	40.40	59.60	100.00

Debt Decision and Bank Account for those that do not have credit cards

Debt Decision	Bank Account		Total
	0	1	
0	74.30	25.70	100.00
1	64.74	35.26	100.00
Total	72.00	28.00	100.00

Debt Decision and Number of Credit Cards

Debt Decision	Num of Credit Cards					Total
	0	1	2	3	4	
0	51.83	23.72	12.76	5.72	3.03	100.00
1	30.24	31.03	17.66	9.91	5.52	100.00
Total	44.24	26.29	14.48	7.19	3.90	100.00

Indebtedness by interval of Bank Savings

Bank Savings	Indebtedness	Std. Dev.
0	8.777	49.283
<USD 1000	7.485	24.267
USD 1000 - USD 5000	8.636	51.210
USD 5000 - USD 15000	5.917	20.314
USD 15000 - USD 30000	2.552	10.412
>USD 30000	3.191	16.870

Local Currency Debt portion of Total Debt (for those who have debt)

Local Currency Debt %	Freq.	Percent	Cum.
0%	204	6.97	6.97
<25%	97	3.32	10.29
25%-50%	42	1.44	11.72
50%-75%	48	1.64	13.36
75%-90	55	1.88	15.24
>90%	2,480	84.76	100.00
Total	2,926	100.00	

Indebtedness and Local Currency portion of Total Debt (for those who have debt)

Local Currency Debt %	Indebtedness	Std. Dev.
0%	44.122	143.309
<25%	21.861	47.898
25%-50%	25.726	38.699
50%-75%	43.031	91.912
75%-90	56.823	184.044
>90%	21.160	64.205

Bank Credit and Bank Mortgage

Bank Credit	Bank Mortgage		Total
	0	1	
0	90.43	9.57	100.00
1	85.28	14.72	100.00
Total	89.42	10.58	100.00

Mortgages and Bank Mortgage

Mortgage	Bank Mortgage		Total
	0	1	
0	100.00	0.00	100.00
1	47.27	52.73	100.00
Total	89.42	10.58	100.00

Financial Burden and Debt Decision

Financial Burden	Debt Decision		Total
	0	1	
0	97.86	2.14	100.00
<25%	16.97	83.03	100.00
25% - 50%	15.09	84.91	100.00
50%-75%	13.96	86.04	100.00
>75%	14.40	85.60	100.00
Total	64.84	35.16	100.00

Financial Burden and Income Distribution

Income Distribution	Financial Burden					Total
	0	<25%	25% - 50%	50%-75%	>75%	
Quintile 1	67.60	18.38	9.94	3.23	0.84	100.00
Quintile 2	63.63	21.83	8.99	4.04	1.51	100.00
Quintile 3	56.31	23.98	12.50	5.17	2.04	100.00
Quintile 4	53.13	26.08	14.66	4.69	1.44	100.00
Quintile 5	57.54	25.17	11.65	3.96	1.68	100.00
Total	59.64	23.09	11.55	4.22	1.50	100.00

Financial Burden and Bank Savings

Financial Burden	Bank Savings						Total
	0	<USD 1000	USD 1000	USD 5000	USD 15000	>USD 3000	
0	3,885	242	357	226	110	143	4,963
<25%	1,544	138	141	52	24	22	1,921
25% - 50%	840	51	45	18	7	0	961
50%-75%	319	15	10	4	1	2	351
>75%	114	3	4	2	1	1	125
Total	6,702	449	557	302	143	168	8,321