FINANCIAL RISK OF URUGUAYAN HOUSEHOLDS*

RIESGO FINANCIERO DE LOS HOGARES URUGUAYOS

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Abstract

This study analyzes the financial risk of Uruguay households using the first nationally representative Uruguayan financial survey. The objective of this work is twofold. First, we simulate the impact on the finance of Uruguayan households of a negative income shock similar to the one experienced in 2002, finding that the financial risk is mild. We estimate a 175% increases in the number of households with financial burden higher than 0.75. Despite this big raise, this group is 10% of the population. Furthermore, the debt level is low in international terms. Secondly, we analyze over indebtedness among Uruguayan households. We observe that some variables are correlated with the fact of being over indebted. Nevertheless, when using the burden financial ratio as dependent variable we find that few variables can significantly explain it.

Keywords: *Financial risk, household over indebtedness, financial survey, Uruguay.*

JEL Classification: *C5, D14.*

Resumen

Este estudio analiza el riesgo financiero de los hogares de Uruguay utilizando la primera encuesta financiera uruguaya representativa a nivel nacional. El objetivo de este trabajo es doble. En primer lugar, se simula el impacto en las finanzas de los hogares uruguayos de un shock negativo a los ingresos similar al experimentado en 2002, encontrando que el riesgo financiero es leve. Estimamos un aumento del 175% en el número de hogares con carga financiera superior a 0,75. A pesar del importante crecimiento, este grupo representa solo el 10% de la población. Además, el nivel de deuda es bajo en términos internacionales. En segundo lugar, se analiza el sobreendeudamiento de los hogares uruguayos. Encontramos que algunas variables se correlacionan con el hecho de estar sobreendeudado. Sin embargo, cuando se utiliza como variable dependiente el ratio de carga financiera a ingreso encontramos que pocas variables pueden significativamente explicarlo.

Palabras clave: *Riesgo financiero, sobreendeudamiento de los hogares, encuesta financiera, Uruguay.*

Clasificación JEL: *C5, D14.*

I. INTRODUCTION

Understanding micro-level information of household assets and liabilities is a policy relevant topic for several reasons. First, it is useful to uncover the indebtedness mechanisms of households and analyze which are its main drivers. Second, it could be helpful to evaluate the impact of negative shocks, institutional frameworks or policies on the financial vulnerability of households. Third, it could contribute to understand more broadly monetary policy transmission and financial stability. The analysis of the financial balance sheet of households plays a key role from a financial stability perspective. Finally, it could be useful to identify households which are more exposed to financial risks.

This research has two objectives. The first one is to stress the self-reported financial burden of households under a harmful scenario. To do so, we predict the household income that would arise after a negative earning shock similar to the one experienced in 2002 in Uruguay. The second objective is to calculate a debt indicator; in particular, we focus on the debt services over income ratio (financial burden) and in the debt assets ratio at the household level. Based on these indicators we compute a binary variable that takes the value of one in the case of household with a ratio above 60% or 80% (these thresholds are commonly used in the literature to define over indebtedness households). These indicators will enable us to identify groups of households exposed to financial risk and also to investigate which household characteristics are predictive of household over indebtedness. We pay special attention to household labor market characteristics such as the number of unemployed household members. We identify

the main explanatory variables related to the fact of being over indebted. Finally, this analysis will enable us to find out whether there is heterogeneity across income groups.

One potential concern with indebtedness indicators such as the service debt-income or assets-liabilities ratio is related to missing data or measurement error. For instance, some members of the households can refuse to report their financial burden. Fortunately, in our dataset less than ten percent of the households did not report the financial burden. Additionally, some household members could be transitorily unemployed and their disposable income be zero leading to an alternative source of extreme values. In order to avoid this problem, we compute these indicators based on the households ability to generate income. That is, first, we estimate a Mincer equation to take into account the households capacity to generate income in the long run to honor their debts. We use the Heckman methodology to account for individuals with zero income[1]. We also consider separate regression for men/women, public/private, wage earners/self employment. Second, we predict the employment status and the income for individuals that do not report earnings. In this latter case we assume people that are unemployed or out of the labor force will become wage earners. Therefore, we are evaluation the household capacity to honor the debt in the long run.

According to the Central Bank of Uruguay (BCU (2012)) the solvency status of Uruguayan financial institutions ten years after the 2002 economic and financial crisis is characterized by two peculiarities. The first one is the capital surplus, which makes it lie loosely above the minimum required by the prudential regulation (on average twice the regulatory requirement). The second one consists on the prudential regime of statistical forecasts established by the regulator (BCU), which provides that banks take losses at the peak of the economic cycle to create a fund that allows coping with the increases in non-performing loans without raising additional capital in times of recession. The financial system report of BCU (2012) point out that the banking systems could support a stress test of crisis while, on average, support a scenario of crisis while maintaining a reasonably appropriate heritage level[2].

This study is based on the 2012 Financial Uruguayan Household Survey (FUHS). The FUHS is a module of the National Household Survey (ECH) and it was performed in the last quarter of 2012 and the beginning of 2013. The FUHS surveyed a sub-population of the ECH (about 8,000 households) and then, it will enable us to have a picture of the financial characteristics of Uruguayan households. Because the FUHS is a module of the ECH it is a nationally representative survey.

We compare the self-reported financial burden of Uruguayan households with the financial burden that results from considering a negative earning and employment shock similar to the one experienced by the Uruguay economy in 2002[3]. We also recalculate the financial burden of households under the assumption of a reduction in the public cash transfer to the poorest households. We perform this exercise because an important proportion of the disposable household income of poor household are linked to transfers and per capita real transfers fell substantially during the 2002 episode.

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[1] This is particular relevant for women.
[2] For a detailed description of the Uruguayan financial system in 2012 see BCU (2012).
[3] The GDP decreased 12% in 2002.

The results show that the financial risk of Uruguayan households is mild. Despite the fact that we estimate a 175% increases in the number of households with financial burden higher that 75% their share in the population is 10%. Therefore, we do not obtain an important increase in household financial indicators after a shock similar to the one experienced by the Uruguayan economy in 2002. This means that the lower GDP and higher rate of unemployment due to the negative shock does not necessarily imply that the financial sector should be facing a major cessation of payments scenario. Further research is required in order to analyze how unemployment shock affects decision related to acquiring debts. In particular, in order to estimate a causal effect, panel data is required.

The paper is organized as follows; in the second section we present a brief literature review related to financial risk and over indebtedness; section three describes the FUHS survey; in section fourth we present the methodology; in the fifth section results are presented and finally we conclude.

II. LITERATURE REVIEW

Because the level and composition of household debt are key elements in the analysis of financial stability it is not surprising that Central Banks in developed countries (US, Italy, Spain, etc) and in developing countries (Chile, Colombia, etc) are performing household financial surveys. Uruguay is not isolated to this trend and in 2012 the Central Bank of Uruguay performed the first household finance survey. Based on such surveys the literature analyzes the household financial vulnerability.

Herrala and Kauko (2007) use the Finland financial survey to microsimulate a model of household distress to find that households risk are low. In the case of Britain households, Del Río and Young (2005) find that the main determinant of debt problems is the unsecured debt-income ratio.

For a developing economy, Fuenzalida and Ruiz-Tagle (2009) based on the Chilean household finance panel find that the main weakness is the lost of labor income. They find that an increase of one percentage point in the unemployment rate increases the debt at risk between 0.6 and 0.8 points. Interestingly, their simulations for the debt at risk indicate that the risk is relatively limited.

A correction in the debt to service ratio is presented in Martínez *et al.* (2011) who show that increases in the unemployment rate and the debt service increase the probability of default; and income and age decrease this probability. However, they cannot find a threshold value in the debt to service ratio to predict default.

Alvaréz and Opazo (2013) analyze the case of Chile after the 2008 financial crisis. They find a negative relationship between income shocks and debt because household smooth consumption. Also, they find heterogeneity effect across households and types of debt. Also for the case of Chile, Alfaro and Gallardo (2012) analyze the determinants of default. They find that income-related variables are the only ones that scientifically can explain the probability of mortgage and consumer credit default. Interestingly, they find that social or demographic variables can explain only one type of default.

A recent study using the same dataset that us finds that a set of socio-economic variables can significantly explain household debt in Uruguay (Mello and Ponce (2014)).

With regard to the issue of over indebtedness, Ruiz Tagle *et al.* (2013) find that it increases with income. They also find that there is a substantially change in the debt burden of poor individuals when considering the earning capacity of the households. Therefore, the uncorrected debt burden indicators may hide the true ability to pay. We will take this fact into account in the impact estimation of a negative income shock.

Finally, D'Alessio and Iezzi (2013) analyze the determinants of over indebtedness of Italian Households. They find that over indebtedness is not only related with income but with poverty.

III. DATA

In order to undertake this research, we used two datasets: 1) the yearly Uruguayan National Household Survey *(Encuesta Continua de Hogares*, ECH) from 2001 to 2012, which is conducted by the National Statistical Office of Uruguay (*Instituto Nacional de Estadística,* INE); 2) the Financial Household Survey (*Encuesta Financiera de los Hogares Uruguayos,* EFHU), which is carried out by INE-BCU jointly with the Economics Department of the Social Sciences Faculty of Uruguay.

The ECH has been the main source of socio-economic information about Uruguayan households and their members at the national level since 2006, when it started to include rural areas. Prior to this year, the ECH only covered urban areas of the country. To have a comparable sample throughout the different years, we defined our sample unit as urban areas of more than 5,000 inhabitants of each department, which represents more than 80% of the total labor force in the department and, therefore, is representative of the whole work force in each of them.

Moreover, the selected sample is composed of male and female private wage earners and unemployed between 25 and 60 years old. We exclude public employees, entrepreneur, self-employed and inactive individuals. The ECH has information on monthly salaries net of social security and income taxes of each household member. We focus on the salaries from the main occupation. To construct the real hourly wage rate we divided the net real monthly salary by 4.28 times the number of hours worked in the main occupation.

The first edition of the EFHU was carried out in the last quarter of 2012 and in the first quarter of 2013 and it gathers financial information of households including debts, mortgage, other debts, the price of self-reported assets and other related financial issues[4]. Because the ECH in 2002 only include households in urban areas with more than 5,000 inhabitants, we restrict the analysis to this population[5].

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[4]   See Sanroman *et al.* (2013) for a detailed description of the database.
[5]   Note that only around the 5% of the Uruguay population is located in rural areas.

TABLE 1

CONSISTENCY BETWEEN DATA FROM EFHU AND BCU

	EFHU	BCU
Ratio of mortgage debt to bank financial debt	0.73	0.77
Ratio of bank credit to non-bank credit	0.29	0.28
Ratio of non mortgage debt in national currency	> 0.91	0.94

One concern is the consistency between the data from EFHU at the household level and the data from the Office of the Superintendent of Financial Institutions from the Central Bank based on information from financial institutions. Table 1 is based on Banco Central del Uruguay (2014) and EFHU and shows an important consistency between both sources of information.

According to the EFHU, approximately 90% of indebted families have manifested that more than 90% of the debt is denominated in domestic currency (consistent with BCU). Also, the ratio of mortgage debt to bank financial debt is 73% and 77% for EFHU and BCU respectively. On the other hand, the ratio of bank to non-bank credit is 29% and 28% respectively. Therefore we can conclude that the data from EFHU based on households is consistent with the data that report the financial institutions and also that non formal financial sources are relative small.

Table 2 shows summary statistics of several variables for the selected sample period of the ECH and also for the EFHU. One out of five households had taken credit for housing. However, sixty percent of them had already canceled their loan. The percentage of households with debts not related to housing is 37. Moreover, one in twelve household did not pay in full amount the credit card balance. Therefore almost half of the households (42%) do not have financial debts.

Next, we focus on the households' financial burden. The EFHU gathers information of monthly financial burden which is self-reported by one member of the household (usually the household's head)[6]. One common problem in the literature is to find missing data for the debt burden variables. However, in our sample only 9% of the households report missing values in the debt burden question. Therefore, in our case, the missing value problem is not an important issue. One drawback of this variable is that it is in discrete intervals. The level of household debt and financial burden is low in international terms (Alvarez and Opazo (2013)). For example, the share of households with financial burden higher than 50% is only 6%.

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[6]   The question related to self-reported financial burden and also the answers. In particular, the question is stated as follows: What percentage of the monthly household income is allocated to pay your own debts (including mortgage related to your main property); Answers: 1. Less or equal than 25% of the household income; 2. Between 26% and 50%; 3. Between 51% and 75%; 4. More than 75%; 5. Do not know?

TABLE 2

SUMMARY STATISTICS

ECH 2001-2012 (N=213,955)		
	Mean	S.D.
(ln) real hourly wage (UY pesos of 2010)	4.12	0.81
Education	9.78	3.69
Experience	24.14	11.25
Age	39.92	10.02
Share of females	0.51	0.50
Share of Montevideo	0.53	0.50
Fraction of full-time	0.62	0.48
EFHU 2012 (N=7,181)		
Credit for housing	20.58%	
Cancel credit for housing	12%	
Mortgaged as security for liabilities	6.35%	
Debts not related with housing	36.81%	
Not paid the full amount of the credit card balance last month	8.45%	
Financial burden		
To 25%	23.20%	41.35
Between 26% and 50%	12.12%	
Between 51% and 75%	4.50%	
More than 75%	1.53%	
Holding bank account	47.11%	
Holding other financial assets	1.11%	
	Mean	S.D.
Price of house – self-reported in USD	35,444	81,022
Price of other properties – self-reported in USD	12,549	85,247
Price of vehicles – self-reported in USD	4,119	13,225
Price of business – self-reported in USD	11,914	305,064
Amount of other bank debts in USD	1,580	12,179
Amount of other debts with other institutions in USD	418	3,685
Amount of debts with private in USD	127	2,861

IV. METHODOLOGY

The aim of this research is twofold. First, we compare the self-reported financial burden by Uruguayan households from the EFHU with the financial burden that result from considering a negative earnings shock similar to the one experienced in the 2002 crisis. Second, we identify over indebtedness households and find out the main explanatory variables related to the fact of being over indebted.

FIGURE 1

EVOLUTION OF THE AVERAGE (LOG) REAL HOURLY WAGE RATE
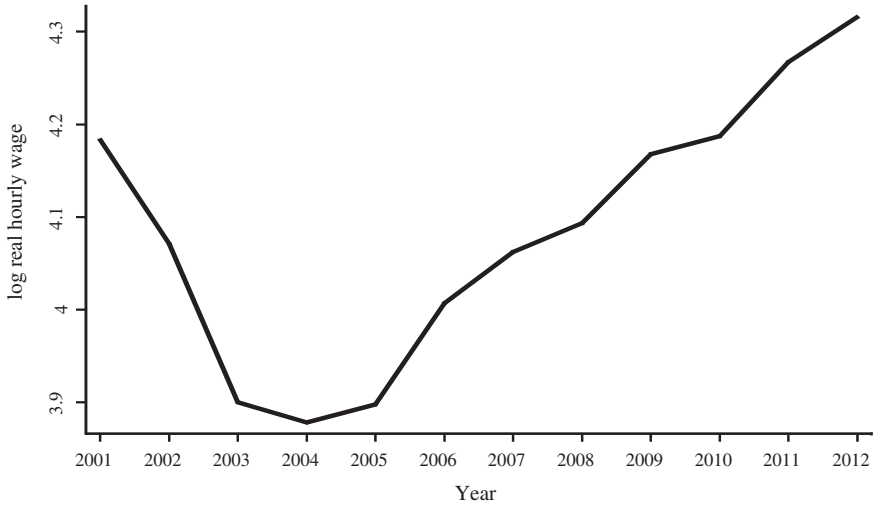
Figure 1 shows the evolution of the (log) real hourly wage for the period 2001-2012. We observe a steep fall between 2001 and 2003, which is linked to the deep economic and financial crisis experienced by the Uruguayan economy in 2002. After 2004 the real hourly wage rate starts to recover and increases until the end of the period under analysis. In order to evaluate this adverse scenario, we consider an (augmented) Mincer real wage equation including a dummy that accounts for the crisis period. Furthermore, since we are including unemployed individuals in our selected sample, we use the two stage Heckman method to correct for selection bias. Because we are estimating a Mincer equation to predict household wages we are evaluating the capacity of households to honor its debt in the long run.

The selection equation is:

$$E_i^* = \gamma_0 + \gamma_1 K_{i.o-6} + \gamma_2 K_{i,7-12} + \gamma_3 S_i^* + \gamma_4 Exp_i^* + \gamma_5 Exp_i^{*2} \tag{1}$$
$$+\gamma_6 Crisis + \gamma_7 S_i^* Crisis + \gamma_8 X_i + u_i$$

and the wage equation is:

$$Ln(w_i) = \beta_0 + \beta_1 S_i^* + \beta_2 Exp_i^* + \beta_3 Exp_i^{*2} + \beta_4 Crisis + \beta_5 S_i^* Crisis + \beta_6 X_i + \varepsilon_i \tag{2}$$

where i is individual; E^* is latent employment, $Kids_{0-6}$ is the number of children between 0 and 6 years old in the households; $Kids_{7-12}$ is the number of children between 7 and 12 years olds in the households; $ln(w_i)$ refers to the log hourly real wage rate of the individual i; S_i^* represents the true years of education; exp_i * denotes potential years of working experience and its square allows account for decreasing returns to this type of human capital accumulation; $Crisis$ is a dummy variable that takes the value of one between July of 2002 and July 2003[7] and zero otherwise (this variable compares the crisis period with the non-crisis period); X is a set of controls that includes marital status, whether the member is the head of household, dummies for each department to account for demographic characteristics that affect the determination of wages and dummies for working sectors; finally, ε is an idiosyncratic error term.

Furthermore, similarly to Sanroman (2006), we include the interaction of the $Crisis$ dummy with the number of years of education to analyze the effect of the crisis by schooling level. Also we include the interaction of the $Crisis$ dummy with industry dummies to allow for the possibility of sectors being affected differently by the crisis. The estimation of the Mincer equation captures the capacity of individuals to generate income in the long-run. It is possible that some household members are not working and with zero wage. However, that does not mean that the can not obtain a wage if they decide to go to the labor market.

As usual in the literature we use as instruments for the exclusion restriction, the number of children between 0 and 6 years old and the number of children between 7 and 14 years old. We expect these variables to be correlated with the decision to work or not but not with the wage.

We have to stress that we only estimate using the Heckman method for private workers since public workers have tenure and are not affected by the negative employment shock. In addition, public workers present different characteristics compared with other type of workers such as greater job stability. Therefore, for public workers we estimate an OLS wage equation. Additionally, the wage equation is estimated separately for male and female since they have different earning profiles. This allows us to deal with different labor market conditions or differences in their reservation wages.

From an econometric point of view the estimation of equation (1) presents some issues which are commonly discussed in the returns to schooling literature. First, we do not have information about the true number years of education and then this leads to the usual measurement error problem which generates a downward bias in the OLS estimator. On the other hand, we lack information about ability which introduces an additional source of endogeneity. In this latter case, since ability is usually considered to be positively correlated with number of years of education, endogeneity leads to an upward bias. Therefore, the coefficient on schooling is an upper bound because it captures the effect of ability and schooling. Hence, these two traditional sources of endogeneity go in opposite directions and if these two sources of bias are of similar size these concerns are at least minimized.

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[7]   We choose this period to maximize the significance of the *Crisis* dummy.

Empirical research in the returns to schooling field has dealt with these problems using different approaches (see Sanroman (2006) for a deeper discussion). Ideally, we would like to have a panel in order to control for time invariant unobserved ability and also a relevant (and reliable) instrument to tackle the measurement error problem. However, in this analysis we lack of both a longitudinal dimension and also an instrument and hence, we rely on both biases being of similar size. Finally, it is important to point out that: first, mitigating one of these problems could even increase the size of the bias; second, our ultimate objective is to generate a new adverse scenario and not to estimate the true impact of the return to schooling.

Estimating equations (1) and (2), we predict wages for private workers and unemployed individuals (between 14 and 60 years old) in the EFHU-2012 survey, assuming that the dummy *Crisis* takes the value of one for this selected sample. We also considered the change in the probability of employment. Therefore, in the crisis scenario we are considering that individuals receive a lower wage but also they have a lower probability of employment. Since we are also considering unemployed people a further assumption made is that unemployed individuals would get a job with a certain probability in the private sector. Then, we compute the household income using the predicted vector of earnings. As mentioned above we assume that the crisis impacts the earnings but not the employment status of public workers. In the case of individuals who are entrepreneurs, self-employed or inactive in the labor market, their wage rate remains unchanged.

First, we calculate the predicted change in wages using the employment probabilities from equation (1),

$$\Delta w_i = (\hat{w}_{c,i}\, \hat{p}_{c,i} - \hat{w}_i\, \hat{p}_i) \qquad (3)$$

where $\hat{w}_{c,i}\, \hat{p}_{c,i}$ are the predicted wages and employment probabilities in the crisis scenario and $\hat{w}_i\, \hat{p}_i$ are the same variables in non-crisis period, that is, when the *Crisis* variable takes the value of zero. The term Δw_t is negative but its magnitude varies across individuals. As mentioned above, we assume that the crisis impacts the earnings but not the employment status of public workers. In the case of individuals who are entrepreneurs, self-employed or inactive in the labor market, their wage rate remains unchanged.

Then, we compute the household income that results after considering this negative earning shock. We define the predicted household income, which is the one that result from considering this negative earning shock, as follows,

$$predicted\ husehold\ income_h = household\ income_h + \sum_{i.h}^{N_h} \Delta w_{i,h} \qquad (4)$$

where h denotes households and N_h is the number of household members at household h. The predicted income is equal to the actual household income plus the sum of the

negative shock to earnings that each household member would have received in case of a crisis.

Finally, we recalculate the financial burden using this predicted household income in (4) as follows,

$$New\ financial\ burden = reported\ financial\ burden * \left(\frac{household\ income}{predicted\ household\ income} \right) \quad (5)$$

As mentioned in previous section, self-reported financial burden is in discrete intervals. Therefore, in order to construct the "new financial burden" we opt to choose the mid-point of each interval. Alternatively, we assigned a random draw from the reported interval to each household, but results are similar. Based on the reported financial burden and the new financial burden, it is possible to compute a matrix of transitions to see how the households move from one financial burden category to another after the negative shock.

Because one of the main concern in a crisis is employment loss and the previous scenario only estimate a change in the employment probability as an additional stress test we allow for unemployment in the crisis. Based on the employment selection equation (1) we estimate the cutoff point of the employment probability for unemployed individuals in the 2002 crisis. Therefore, in this new stress scenario we assign to unemployment in the EFHU 2012 to all the individuals with an employment probability lower than the average employment probability of unemployed workers in 2002-2003.

With respect to our second objective, we construct a ratio of household debt over assets. We consider assets and not income since the former represents a stock similarly to debts which is also a stock[8]. The EFHU gathers information at the household level of housing debt and other types of debt not related to housing. Concerning housing mortgage debt, we multiply the numbers of month the household have to pay time the monthly payment. With respect to other debts, we consider the amount of other bank debts, debts with other type of institutions, debts with private, and the amount which left unpaid with the credit card. As household assets we consider the self-reported price of the house, other real Estate, vehicles, business, savings in the bank account and savings in other financial assets such as bonds, treasury bills, shares, etc. After calculating this ratio, we identify the over indebtedness households as those who have a ratio debt-assets above 60% following previous literature (Ruiz Tagle *et al.* (2013)). After that, we estimate binary models to find out which household characteristics are related to the fact of being over-indebted mainly focusing in labor market characteristics such as the number of unemployed household members. We perform as a robustness check the same analysis for the financial burden ratio using the ordered probit model.

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[8]   We also analyze the financial burden ratio.

V. RESULTS

Table 3 shows the results of the estimation of equation (1)[9]. The first three columns show the OLS estimates for the full sample and for males and females separately without controls by industry. We observed that the return to schooling is around 11% for both males and females while when we include additional controls it reduces to 10% approximately (column 4 to 6). Concerning the effect of the crisis on earnings, we observed that the 2002 economic downturn has lead to a decrease of 21% in the wage rates in the full sample case. Interestingly, when we split the sample by gender, these result only remains for males (35% decreases in earnings) while in the case of females the coefficient associated with *Crisis* dummy is negative but not statistically significant. The result is similar when adding controls. Moreover, the interaction of the *Crisis* dummy and years of schooling is positive and statistically significant for the male sample. That is, the crisis has relatively increase the private returns to education to high educated males and this could be related to the fact that high educated individuals are less affected by the negative shock compared with low skilled individuals who are more likely to experience an employment loss and a decrease in their wage rate after a negative shock in earnings.

TABLE 3

ESTIMATION OF THE MINCER EQUATION. ORDINARY LEAST SQUARED ESTIMATION

	All	Male	Female	All	Male	Female
Education	0.108***	0.113***	0.111***	0.100***	0.105***	0.099***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Crisis dummy (CD)	–0.211***	–0.345***	–0.047	–0.208***	–0.303***	–0.080*
	(0.021)	(0.030)	(0.029)	(0.037)	(0.065)	(0.048)
Education x CD	0.010***	0.020***	–0.003	0.006***	0.013***	–0.005
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Experience	0.021***	0.027***	0.019***	0.020***	0.025***	0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience2	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.566***	2.555***	2.527***	2.757***	2.773***	2.794***
	(0.010)	(0.015)	(0.015)	(0.012)	(0.019)	(0.017)
Observations	209.645	108.329	101.316	209.645	108.329	101.316
R^2	0.271	0.275	0.275	0.292	0.297	0.297
Adjusted R^2	0.271	0.275	0.275	0.292	0.297	0.297
Control by department	Yes	Yes	Yes	Yes	Yes	Yes
Control by sectors	No	No	No	Yes	Yes	Yes
Control by sectors x CD	No	No	NO	Yes	Yes	Yes

Note: All regressions include a marital status dummy variables and also a binary variable that takes the value of one when the member is the household herad. * significant at 10%; ** significant at 5%; significant at 1%.

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[9]   We estimate the regressions without population weights. Their inclusion does not change the results. These results are available upon request.

The Heckman two stage procedure results are quite similar to the OLS estimates, which could be related to small selected sample bias (see Table 4.a). Table 4.b shows the fist stage of the Heckman methodology, that is, the probability of being employed. As expected, the correlation between employment and having kids at home is negative and statistically significant. Also, the correlation between employment and education is positive. In this case, the *Crisis* dummy impact both males and females negatively and significantly.

Table 5 presents the results of the estimation of equation (1) using quantile regression methods. For males, we observe that return to schooling increase slightly from around 10% in the first decile to 13% in the ninth decile. For females, there seems to be an increasing pattern. These results are in line with those in Sanroman (2006). We have to point out that in this case we find a negative effect of the *Crisis* dummy on the wage of female workers. However, the effect of the crisis is only negative and statistically significant for middles class female workers. We observe that the effect of the crisis is around a 30% reduction in the first 5 deciles and after the sixth decile it increases reaching a 40% reduction in the ninth decile.

TABLE 4A

ESTIMATION OF THE MINCER EQUATION - HECKMAN METHOD

	All	Male	Female	All	Male	Female
Education	0.104***	0.111***	0.108***	0.095***	0.103***	0.094***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Crisis dummy (CD)	–0.143***	–0.283***	–0.021	–0.132***	–0.219***	–0.034
	(0.023)	(0.040)	(0.031)	(0.037)	(0.069)	(0.048)
Education x CD	0.008***	0.019***	–0.003	0.005**	0.012***	–0.006*
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Experience	0.020***	0.026***	0.019***	0.019***	0.024***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience^2	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2,725***	2,666***	2,600***	2.937***	2.925***	2.931***
	(0.026)	(0.052)	(0.034)	(0.026)	(0.053)	(0.035)
Lambda mills ratio	–0.313***	–0.292**	–0.114**	–0.355***	–0.395***	–0.211***
	(0.046)	(0.131)	(0.047)	(0.046)	(0.129)	(0.047)
Observations	241,832	119,665	122,167	241.832	119.665	122.167
Control by department	Yes	Yes	Yes	Yes	Yes	Yes
Control by sectors	No	No	No	Yes	Yes	Yes
Control by sectors x CD	No	No	No	Yes	Yes	Yes

Note: All regressions include a marital status dummy variables and also a binary variable that takes the value of one when the member is the household herad. * significant at 10%; ** significant at 5%; significant at 1%.

TABLE 4B

FIRST STAGE OUTPUT OF HECKMAN'S METHOD

	All	Male	Female	All	Male	Female
Children [0,5] in hhd	–0.069***	–0.026***	–0.105***	–0.069***	–0.026***	–0.105***
	(0.005)	(0.009)	(0.007)	(0.005)	(0.009)	(0.007)
Children [6,13] in hhd	–0.094***	–0.019***	–0.110***	–0.094***	–0.019***	–0.110***
	(0.004)	(0.007)	(0.005)	(0.004)	(0.007)	(0.005)
Married - cohabit	0.224***	0.381***	0.029***	0.224***	0.381***	0.029***
	(0.007)	(0.013)	(0.010)	(0.007)	(0.013)	(0.010)
Head of household	0.462***	0.370***	0.232***	0.462***	0.370***	0.232***
	(0.007)	(0.012)	(0.011)	(0.007)	(0.012)	(0.011)
Education	0.036***	0.021***	0.056***	0.036***	0.021***	0.056***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Crisis dummy (CD)	–0.464***	–0.558***	–0.411***	–0.464***	–0.558***	–0.411***
	(0.013)	(0.020)	(0.018)	(0.013)	(0.020)	(0.018)
Experience	0.012***	0.011***	0.017***	0.012***	0.011***	0.017***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Experience2	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.384***	0.651***	0.150***	0.384***	0.651***	0.150***
	(0.023)	(0.035)	(0.031)	(0.023)	(0.035)	(0.031)
Observations	241,832	119,665	122,167	241,832	119,665	122,167

Note: All regressions include control by department. * significant at 10%; ** significant at 5%; significant
at 1%.

Figure 2 compares the distribution of the new vector of the (log) household real income predicted from the Heckman estimation with and without transfers, with its actual distribution. We observe a left shift in the distribution of the predicted household income (green and red line) which is mainly driven by the negative earning shock similar to the one experienced in the 2002 crisis. It is important to point out that this scenario is rather conservative since we are assuming that the crisis only has affected negatively wage earners but not self-employed individuals and pensioners. Figure 3 shows the density of the financial burden under this negative shock.

Table 6 shows the actual distribution of the monthly household's financial burden by quintiles. We compare the actual distribution with the one that result from assuming an adverse scenario as explained above and also a case without considering government transfers to household from social policies (conditional cash transfers and in-kind transfers). This latter case is motivated by the fact that during a recession we can think that government will attempt to reduce expenditures and one possibility is to cut transfers from social policies. Overall, we observed a slight shift to the right of the financial burden distribution when comparing column 1 with column 2 of each quintile. That is, in general, there is an increase in the proportion of household that reported a financial burden between 51% and 75% and also with more than 75%. For example, the percentage of households with financial burden greater than 75% increases from 3.7 to 7.75 (and to 8.76 with the elimination of the transfers). The highest raise

TABLE 5

ESTIMATION OF THE MINCER EQUATION. QUANTILE REGRESSIONS

	Q10		Q20		Q30		Q40		Q50 HECK_m_c1	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Education	0.101***	0.105***	0.098***	0.102***	0.101***	0.103***	0.104***	0.106***	0.108***	0.108***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Crisis dummy (CD)	-0.329***	0.044	-0.338***	-0.050	-0.304***	-0.087***	-0.300***	-0.074***	-0.299***	-0.039
	(0.097)	(0.063)	(0.049)	(0.034)	(0.032)	(0.032)	(0.020)	(0.027)	(0.028)	(0.027)
Education x CD	0.016**	-0.012*	0.018***	-0.004	0.015***	-0.001	0.016***	-0.002	0.017***	-0.005*
	(0.008)	(0.006)	(0.005)	(0.003)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
Experience	0.021***	0.013***	0.021***	0.013***	0.023***	0.016***	0.024***	0.017***	0.026***	0.018***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.039***	1.974***	2.357***	2.294***	2.485***	2.417***	2.572***	2.500***	2.648***	2.594***
	(0.023)	(0.041)	(0.018)	(0.025)	(0.014)	(0.019)	(0.014)	(0.019)	(0.011)	(0.014)

	Q60		Q70		Q80		Q90	
	Male	Female	Male	Female	Male	Female	Male	Female
Education	0.112***	0.110***	0.115***	0.113***	0.120***	0.116***	0.127***	0.118***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Crisis dummy (CD)	-0.318***	-0.035	-0.352***	-0.045*	-0.394***	-0.050*	-0.433***	-0.053
	(0.029)	(0.032)	(0.030)	(0.027)	(0.034)	(0.030)	(0.050)	(0.035)
Education x CD	0.018***	-0.004	0.022***	-0.003	0.025***	-0.002	0.029***	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.002)	(0.005)	(0.003)
Experience	0.029***	0.021***	0.031***	0.022***	0.033***	0.023***	0.037***	0.026***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Experience2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.714***	2.676***	2.789***	2.766***	2.888***	2.882***	3.019***	3.069***
	(0.012)	(0.014)	(0.014)	(0.017)	(0.019)	(0.019)	(0.024)	(0.026)

Note: All regressions include a marital status dummy variables, a binary variable that takes the value of one when the member is the household head and controls by department. Number of observations: 108,329 for the male case and 101,316 for the female case.* significant at 10%; ** significant at 5%; significant at 1%.

FIGURE 2

DISTRIBUTION OF THE ACTUAL AND PREDICTED (LOG) HOUSEHOLD REAL INCOME
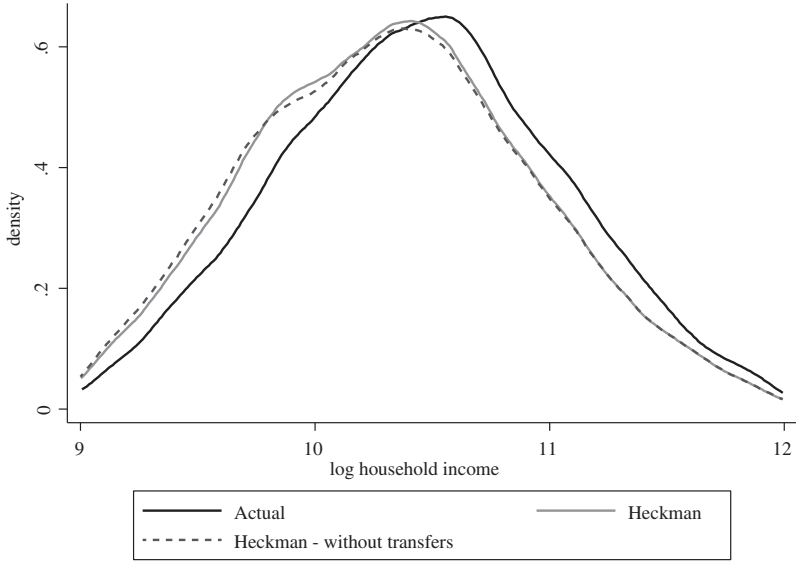
FIGURE 3

MONTHLY HOUSEHOLD'S FINANCIAL BURDEN ANALYSIS. HECKMAN.
WITHOUT UNEMPLOYMENT
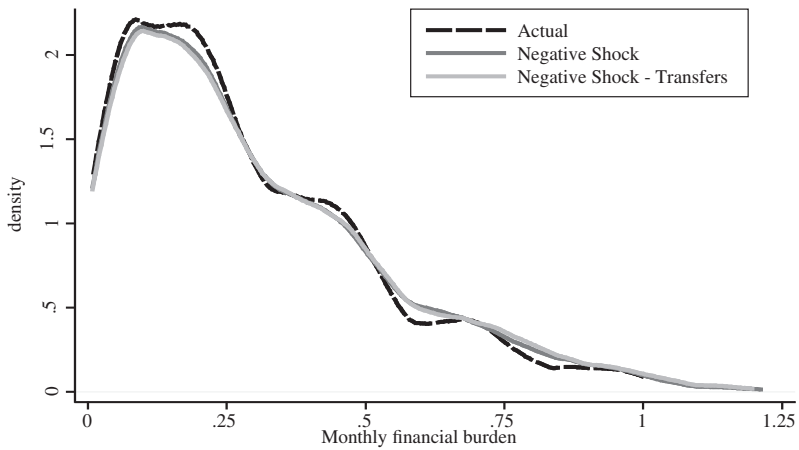
TABLE 6

ANALYSIS OF SELF-REPORT HOUSEHOLDS' FINANCIAL BURDEN. HECKMAN

	1st Quintile			2nd Quintile			3rd Quintile			4th Quintile			5th Quintile			Total		
	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers
To 25%	52.89	50.37	47.76	52.99	49.25	48.20	54.99	49.92	49.92	60.03	53.79	53.79	60.38	50.00	50.00	56.11	50.64	49.93
Between 26% and 50%	30.17	28.54	28.36	32.19	28.29	28.59	32.57	29.49	29.19	24.62	23.95	23.78	25.96	29.23	29.23	29.30	27.90	27.83
Between 51% and 75%	11.73	14.93	14.18	11.23	14.52	14.07	9.37	13.21	13.36	11.97	13.49	13.32	10.19	12.31	12.31	10.88	13.71	13.48
More than 75%	5.21	6.16	9.70	3.59	7.93	9.13	3.07	7.37	7.53	3.37	8.77	9.11	3.46	8.46	8.46	3.70	7.75	8.76

	Education Environment [0,6]			Education Environment [7,9]			Education Environment [10,12]			Education Environment >12			Total		
	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers
To 25%	56.39	53.27	52.34	53.90	48.20	47.15	55.63	51.40	50.81	59.64	50.25	50.08	56.11	50.64	49.93
Between 26% and 50%	28.35	26.79	27.10	30.27	29.34	29.10	30.08	25.58	25.47	27.84	30.31	30.15	29.30	27.90	27.83
Between 51% and 75%	12.15	14.49	13.24	11.06	13.50	13.39	10.34	14.07	14.19	10.05	12.69	12.85	10.88	13.71	13.48
More than 75%	3.12	5.45	7.32	4.77	8.96	10.36	3.95	8.95	9.53	2.47	6.75	6.92	3.70	7.75	8.76

in financial risk is observed for households in the fifth quintile. Interestingly, when we also do not consider transfers (column 3), there is greater shift to the right, mainly, for the first quintile. We observe an important increase in financial risk of low income households when we remove the transfers. Furthermore, we present the distribution of financial burden by levels of education environment. The financial risk is the highest for households with education attainment between seven and nine years of schooling. The results show a quite similar picture. Despite the fact that there is an overall increase in financial risk because of the shock its magnitude is lower than in 2002.

We also estimate the transitions matrix for the case of the financial burden ratio after a negative shock by income quintile (see Table 7). The previous results remains, that is, we observe a mild increase in financial risk after the negative income shock.

The previous results can be explained by the reduction in household indebtedness from 28% at the beginning of 2004 to 16% in 2012. The public transfer plays an important role in the decline of the first quintile household indebtedness.

As mentioned above, one of the main concerns in a crisis is employment loss and the previous scenario only estimate a change in the employment probability. Therefore, as an additional stress test we allow for unemployment in the crisis. In this new stress scenario we assign to unemployment in the EFHU 2012 to all the individuals with an employment probability lower than the average employment probability of unemployed workers in 2002-2003.

Tables 8 and 9 show the results in this scenario. Table 8 shows that the percentage of households with financial burden higher than 0.75 increases 175% (from 3.71 to 10.19), and with financial burden between 0.5 and 0.75 increases 15%. The impact is the lowest for low income households because of public transfers that alleviate their financial situation. The households in the third and fourth quintile are the most affected by the loss of employment. Interestingly, the impact in financial burden is more even distributed across education categories. Additionally, Figure 4 shows the density of the financial burden under this negative shock with unemployment. As discussed above we find an increase in the percentage of households with financial burden higher than 0.75.

Table 9 shows the transitions matrix for the case of the financial burden ratio after a negative shock with loss of employment by income quintile. The previous results remains, that is, we observe an increase in financial risk after the negative income shock.

Finally, in Table 10 we analyze the determinants of being over indebted. When we analyze the debt assets ratio we find a negative and significant correlation with more than twelve years of education, age squared, paying the debt and occupant with owner permission. However, the correlation is positive and significant with having children at home, paid the home and being in quintiles 2 and 3[10]. When we analyze the burden financial ratio we find that few variables significantly explain it.

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[10] Figure 5 shows the histogram of the debts-assets ratio.

TABLE 7

TRANSITIONS MATRIX

		Actual data																		
		1st Quintile				2nd Quintile				3rd Quintile				4th Quintile				5th Quintile			
		To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%
Heckman	To 25%	98.94	1.24	0.00	0.00	98.87	0.47	0.00	0.00	95.81	0.00	0.00	0.00	95.79	0.68	0.00	0.00	90.76	0.00	0.00	0.00
	Between 26% and 50%	1.06	83.85	3.17	0.00	0.85	86.05	2.67	0.00	4.19	80.66	1.64	0.00	3.93	87.67	4.23	0.00	7.96	83.70	0.00	0.00
	Between 51% and 75%	0.00	13.66	82.54	10.71	0.28	10.70	76.00	4.17	0.00	12.26	73.77	0.00	0.28	10.27	63.38	0.00	0.64	11.85	81.13	5.56
	More than 75%	0.00	1.24	14.29	89.29	0.00	2.79	21.33	95.83	0.00	7.08	24.59	100.00	0.00	1.37	32.39	100.00	0.64	4.44	18.87	94.44
Heckman - without transfers	To 25%	98.59	1.24	0.00	0.00	98.31	0.47	0.00	0.00	95.53	0.00	0.00	0.00	95.79	0.68	0.00	0.00	90.76	0.00	0.00	0.00
	Between 26% and 50%	1.06	78.26	3.17	0.00	1.41	83.72	2.67	0.00	4.47	79.72	1.64	0.00	3.93	87.67	4.23	0.00	7.96	83.70	0.00	0.00
	Between 51% and 75%	0.00	18.63	74.60	3.57	0.28	13.02	74.67	4.17	0.00	13.21	72.13	0.00	0.00	10.27	63.38	0.00	0.64	11.85	81.13	5.56
	More than 75%	0.35	1.86	22.22	96.43	0.00	2.79	22.67	95.83	0.00	7.08	26.23	100.00	0.28	1.37	32.39	100.00	0.64	4.44	18.87	94.44
Heckman + negative earning shock to public employees	To 25%	98.94	2.48	0.00	0.00	98.87	0.47	0.00	0.00	97.49	1.42	0.00	0.00	96.63	2.74	0.00	0.00	89.17	0.00	0.00	0.00
	Between 26% and 50%	1.06	83.23	11.11	0.00	1.13	84.65	5.33	0.00	2.51	74.53	6.56	0.00	3.09	73.29	4.23	0.00	9.55	75.56	3.77	0.00
	Between 51% and 75%	0.00	14.29	69.84	14.29	0.00	11.63	68.00	4.17	0.00	18.87	67.21	5.00	0.28	21.92	53.52	0.00	0.96	18.52	67.92	5.56
	More than 75%	0.00	0.00	19.05	85.71	0.00	3.26	26.67	95.83	0.00	5.19	26.23	95.00	0.00	2.05	42.25	100.00	0.32	5.93	28.30	94.44
Heckman - without transfers + negative earning shock to public employees	To 25%	98.59	1.86	0.00	0.00	98.02	0.47	0.00	0.00	97.49	1.42	0.00	0.00	96.63	2.74	0.00	0.00	89.17	0.00	0.00	0.00
	Between 26% and 50%	1.06	76.40	7.94	0.00	1.98	83.72	4.00	0.00	2.51	73.58	6.56	0.00	3.09	72.60	4.23	0.00	9.55	75.56	3.77	0.00
	Between 51% and 75%	0.00	21.12	65.08	10.71	0.00	12.09	66.67	4.17	0.00	19.34	65.57	5.00	0.00	22.60	53.52	0.00	0.96	18.52	67.92	5.56
	More than 75%	0.35	0.62	26.98	89.29	0.00	3.72	29.33	95.83	0.00	5.66	27.87	95.00	0.28	2.05	42.25	100.00	0.32	5.93	28.30	94.44

TABLE 8

ANALYSIS OF SELF-REPORT HOUSEHOLDS' FINANCIAL BURDEN. HECKMAN (WITH UNEMPLOYMENT)

	1st Quintile			2nd Quintile			3rd Quintile			4th Quintile			5th Quintile			Total		
	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers
To 25%	52.89	52.12	49.16	52.99	51.50	51.20	54.99	51.54	51.54	60.03	58.01	58.01	60.38	52.99	52.99	56.11	53.00	52.58
Between 26% and 50%	30.17	25.75	25.05	32.19	26.05	26.20	32.57	26.85	26.39	24.62	20.24	19.90	25.96	25.43	25.43	29.30	24.90	24.64
Between 51% and 75%	11.73	13.43	13.83	11.23	13.02	12.72	9.37	12.35	12.50	11.97	11.47	11.64	10.19	12.33	12.33	10.88	12.52	12.59
More than 75%	5.21	9.70	11.96	3.59	9.43	9.88	3.07	9.26	9.57	3.37	10.29	10.46	3.46	9.25	9.25	3.70	9.58	10.19

	Education Environment [0,6]			Education Environment [7,9]			Education Environment [10,12]			Education Environment >12			Total		
	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers	Actual	Predicted	Predicted - Transfers
To 25%	56.39	53.68	52.66	53.90	49.88	49.42	55.63	52.67	52.44	59.64	57.17	57.17	56.11	53.00	52.58
Between 26% and 50%	28.35	25.51	26.02	30.27	25.17	24.13	30.08	24.19	24.19	27.84	24.88	24.55	29.30	24.90	24.64
Between 51% and 75%	12.15	13.15	12.54	11.06	12.94	13.29	10.34	12.67	12.79	10.05	11.04	11.37	10.88	12.52	12.59
More than 75%	3.12	7.67	8.78	4.77	12.00	13.17	3.95	10.47	10.58	2.47	6.92	6.92	3.70	9.58	10.19

FIGURE 4

MONTHLY HOUSEHOLD'S FINANCIAL BURDEN ANALYSIS. HECKMAN
WITH UNEMPLOYMENT
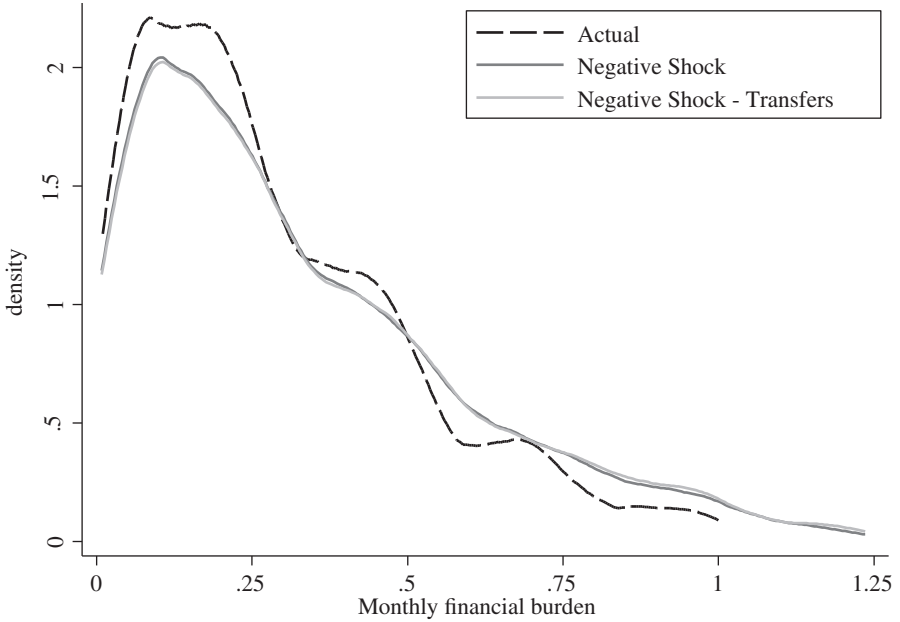
VI. CONCLUSIONS

We analyze the first nationally representative financial household survey
performed in Uruguay to study financial risk. We find that the debt level of Uruguayan
households is low in international terms. We also simulate the impact of the finance
of Uruguayan households of a negative income shock similar to the one experienced
in 2002. Interestingly, we find that the financial risks are lower than in the past. This
fact can be explained for the variability in risk variables (one limitation is that we
do not observe a complete economic cycle) and the public transfers that alleviate the
financial situation of poor households. In particular we observe a 28% reduction in
household indebtedness from 2004 to 2012. A panel data survey is required to perform
a better analysis. For example, with panel data we could understand and estimate risk
and default transitions.

TABLE 9

TRANSITIONS MATRIX (WITH UNEMPLOYMENT)

		Actual data																		
		1st Quintile				2nd Quintile				3rd Quintile				4th Quintile				5th Quintile			
		To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%	To 25%	Between 26% and 50%	Between 51% and 75%	More than 75%
Heckman	To 25%	94.37	1.24	0.00	0.00	96.61	0.00	0.00	0.00	93.52	0.00	0.00	0.00	94.66	0.68	0.00	0.00	89.49	0.00	0.00	0.00
	Between 26% and 50%	4.58	77.02	3.17	0.00	2.82	77.67	1.33	0.00	5.63	78.30	0.00	0.00	3.93	84.25	4.23	0.00	7.96	82.09	0.00	0.00
	Between 51% and 75%	0.70	15.53	74.60	7.14	0.56	15.35	70.67	4.17	0.56	11.79	68.85	0.00	1.12	13.01	59.15	0.00	1.59	10.45	81.13	0.00
	More than 75%	0.35	6.21	22.22	92.86	0.00	6.98	28.00	95.83	0.28	9.91	31.15	100.00	0.28	2.05	36.62	100.00	0.96	7.46	18.87	100.00
Heckman - without transfers	To 25%	90.46	1.24	0.00	0.00	94.63	0.00	0.00	0.00	93.52	0.00	0.00	0.00	94.66	0.68	0.00	0.00	89.49	0.00	0.00	0.00
	Between 26% and 50%	8.48	71.43	3.17	0.00	4.80	76.74	1.33	0.00	5.63	76.89	0.00	0.00	3.93	84.25	4.23	0.00	7.96	82.09	0.00	0.00
	Between 51% and 75%	0.35	19.25	63.49	3.57	0.28	15.81	69.33	4.17	0.28	13.21	68.85	0.00	0.84	13.01	59.15	0.00	1.59	10.45	81.13	0.00
	More than 75%	0.71	8.07	33.33	96.43	0.28	7.44	29.33	95.83	0.56	9.91	31.15	100.00	0.56	2.05	36.62	100.00	0.96	7.46	18.87	100.00
Heckman + negative earning shock to public employees	To 25%	95.42	1.86	0.00	0.00	97.18	0.00	0.00	0.00	93.24	1.42	0.00	0.00	95.51	2.74	0.00	0.00	87.58	0.00	0.00	0.00
	Between 26% and 50%	3.52	76.40	7.94	0.00	2.54	75.81	2.67	0.00	5.92	71.23	3.28	0.00	3.65	71.23	4.23	0.00	9.87	73.88	3.77	0.00
	Between 51% and 75%	0.70	16.15	65.08	10.71	0.28	17.21	64.00	4.17	0.56	18.40	62.30	5.00	0.56	21.23	49.30	0.00	1.91	17.16	66.04	0.00
	More than 75%	0.35	5.59	26.98	89.29	0.00	6.98	33.33	95.83	0.28	8.96	34.43	95.00	0.28	4.79	46.48	100.00	0.64	8.96	30.19	100.00
Heckman - without transfers + negative earning shock to public employees	To 25%	91.87	1.86	0.00	0.00	96.61	0.00	0.00	0.00	93.24	1.42	0.00	0.00	95.51	2.74	0.00	0.00	87.58	0.00	0.00	0.00
	Between 26% and 50%	7.07	68.94	4.76	0.00	3.11	75.35	2.67	0.00	5.92	69.81	3.28	0.00	3.37	70.55	4.23	0.00	9.87	73.88	3.77	0.00
	Between 51% and 75%	0.35	21.12	58.73	7.14	0.00	17.21	62.67	4.17	0.28	19.34	62.30	5.00	0.56	21.92	49.30	0.00	1.91	17.16	66.04	0.00
	More than 75%	0.71	8.07	36.51	92.86	0.28	7.44	34.67	95.83	0.56	9.43	34.43	95.00	0.56	4.79	46.48	100.00	0.64	8.96	30.19	100.00

TABLE 10

PROBIT AND BIPROBIT MODEL. OVER-INDEBTEDNESS HOUSEHOLDS

	Probit						Ordered probit			
	Debt/Assets >= 0.5	Debt/Assets >= 0.75	Debt/Assets >= 0.5 *	Debt/Assets >= 0.75 *	Financial burden >= 0.5	Financial burden >= 0.75	Financial Burden <0.25	0.25 <Financial Burden <= 0.5	0.5>Financial Burden <=0.75	Financial Burden >0.75
Education environment 7-9 years	0.021* (0.011)	0.015 (0.010)	0.016 (0.010)	0.011 (0.009)	0.014 (0.018)	0.021* (0.011)	-0.038 (0.024)	0.016 (0.010)	0.014 (0.009)	0.008 (0.005)
Education environment 10-12 years	0.021* (0.011)	0.014 (0.010)	0.013 (0.011)	0.010 (0.010)	0.004 (0.020)	0.015 (0.012)	-0.033 (0.026)	0.014 (0.011)	0.012 (0.010)	0.007 (0.005)
Education environment >12 years	-0.019 (0.013)	-0.020* (0.012)	-0.025** (0.012)	-0.022* (0.011)	-0.017 (0.024)	0.000 (0.015)	0.004 (0.031)	-0.002 (0.013)	-0.001 (0.012)	-0.001 (0.006)
Head of household male	0.006 (0.007)	0.004 (0.006)	0.009 (0.007)	0.002 (0.006)	-0.035*** (0.013)	-0.003 (0.007)	0.038** (0.017)	-0.016** (0.007)	-0.014** (0.006)	-0.008** (0.004)
Head of household age	0.002 (0.001)	0.002 (0.001)	0.000 (0.001)	0.002 (0.001)	-0.000 (0.003)	0.001 (0.001)	-0.002 (0.003)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Head of household age squared	-0.000** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Number of unemployed in hhd >0	0.011 (0.013)	0.010 (0.011)	0.004 (0.012)	0.001 (0.011)	0.016 (0.023)	0.016 (0.012)	-0.036 (0.030)	0.015 (0.012)	0.013 (0.011)	0.007 (0.006)
Number of children [0,6]	0.014** (0.007)	0.013** (0.006)	0.012** (0.006)	0.010* (0.005)	-0.001 (0.013)	-0.002 (0.008)	-0.001 (0.017)	0.001 (0.007)	0.000 (0.006)	0.007 (0.006)
Number of children (6,14]	0.022*** (0.005)	0.014*** (0.004)	0.019*** (0.005)	0.013*** (0.004)	0.001 (0.011)	0.006 (0.006)	-0.003 (0.014)	0.001 (0.006)	0.001 (0.005)	0.001 (0.003)
Number of adults >=60	0.013* (0.008)	0.011 (0.007)	0.006 (0.007)	0.009 (0.007)	0.018 (0.013)	0.011 (0.007)	-0.018 (0.017)	0.008 (0.006)	0.007 (0.005)	0.004 (0.004)
Owner - paid the house	0.117*** (0.011)	0.054*** (0.009)	0.131*** (0.010)	0.075*** (0.009)	0.002 (0.021)	0.000 (0.013)	-0.050* (0.026)	0.021* (0.011)	0.019* (0.010)	0.010* (0.005)
Owner - paying	-0.104*** (0.010)	-0.088*** (0.009)	-0.086*** (0.010)	-0.074*** (0.009)	-0.020 (0.018)	-0.000 (0.011)	0.032 (0.024)	-0.013 (0.010)	-0.012 (0.009)	-0.007 (0.005)
Occupant with private paying owner permission	-0.033*** (0.009)	-0.028*** (0.009)	-0.030*** (0.009)	-0.025*** (0.008)	0.033 (0.020)	0.007 (0.012)	-0.020 (0.027)	0.008 (0.011)	0.007 (0.010)	0.004 (0.006)
Occupant with dependency relationship + public permission	-0.024 (0.010)	-0.066* (0.036)	-0.009 (0.029)	-0.048 (0.033)	0.066 (0.048)	0.016 (0.029)	-0.139** (0.060)	0.058** (0.025)	0.052** (0.023)	0.029** (0.013)
Occupant without permission	0.037 (0.031)	0.042* (0.024)	0.036 (0.027)	0.040* (0.023)	0.017 (0.061)	0.016 (0.029)	0.022 (0.090)	-0.009 (0.038)	-0.008 (0.034)	-0.004 (0.019)
Quintile 2	0.037*** (0.011)	0.028*** (0.010)	0.042*** (0.011)	0.026*** (0.009)	-0.011 (0.021)	-0.012 (0.012)	0.008 (0.028)	-0.003 (0.012)	-0.003 (0.010)	-0.002 (0.006)
Quintile 3	0.030** (0.012)	0.024** (0.011)	0.032*** (0.011)	0.021** (0.010)	-0.029 (0.023)	-0.014 (0.013)	0.028 (0.030)	-0.012 (0.012)	-0.011 (0.011)	-0.006 (0.006)
Quintile 4	0.013 (0.013)	0.006 (0.011)	0.001 (0.012)	-0.001 (0.010)	0.004 (0.025)	-0.009 (0.014)	0.044 (0.033)	-0.019 (0.014)	-0.017 (0.012)	-0.009 (0.007)
Quintile 5	0.037*** (0.014)	0.027** (0.013)	0.029** (0.014)	0.014 (0.012)	-0.010 (0.028)	-0.003 (0.016)	0.051 (0.037)	-0.022 (0.016)	-0.019 (0.014)	-0.011 (0.008)
Observations	6,443	6,443	6,400	6,400	2,949	2,739	2,969	2,969	2,969	2,969
Pseudo R2	0.198	0.155	0.209	0.161	0.044	0.050	0.025	0.025	0.025	0.025
Log likelihood	-1,648.51	-1,394.74	-1,520.30	-1,291.54	-1,175.73	-438,177	-3,031.42	-3,031.42	-3,031.42	-3,031.42
Control by department	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* significant at 10%; ** significant at 5%; significant at 1%.

FIGURE 5

DEBTS-ASSETS RATIO HISTOGRAM
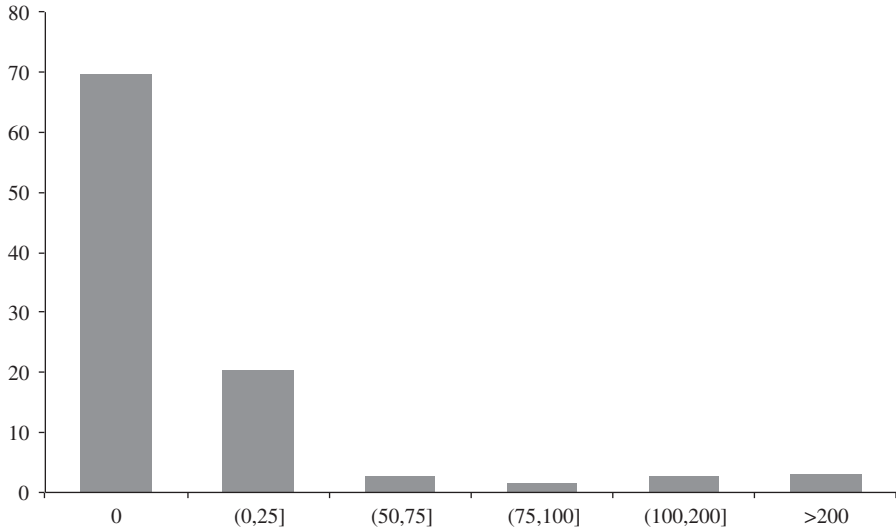
In the most adverse scenario, that replicates the 2002 crisis we estimate and 175% increase in the number of households with financial burden higher than 0.75. Despite this big increase, this group represents 10% of the population.

We find that some variables are correlated with the fact of being over indebted. However, when we analyze the burden financial ratio we find that few variables significantly explain it. Further research is necessary to understand better the determinants of the financial burden.

REFERENCES

ALFARO, R. and N. GALLARDO (2012). "The Determinants of Household Debt Default", *Revista de Análisis Económico* 27 (1), pp. 55-70.

ALVAREZ, R. and L. OPAZO (2013). "Household Debt During the Financial Crisis: Micro-Evidence from Chile", Working Paper 695, Central Bank of Chile.

BCCH (2010). "Endeudamiento de los hogares en Chile: Análisis e implicancias para la estabilidad financiera", Informe de Estabilidad Financiera, Junio, Banco Central de Chile.

BCU (2012). "Reporte del Sistema Financiero", Tercer Trimestre, Banco Central del Uruguay.

D'ALESSIO, G. and S. IEZZI (2013). "Household Over-Indebtedness: Definition and Measurement with Italian Data", Bank of Italy Occasional Paper Nº 149.

DEL RIO, A. and C. YOUNG (2005). "The Impact of Unsecured Debt on Financial Distress among British Households", Working Paper 262, Bank of England.

FUENZALIDA, F. and J. RUIZ-TAGLE. (2009). "Riesgo Financiero de los Hogares", *Economía Chilena*, 12 (2), pp. 35-53. Banco Central de Chile.

HERRALA, R. and K. KAUKO (2007). "Household Loan Loss Risk in Finland – an Estimation and Simulation with Micro Data", Research Discussion Papers 5, Bank of Finland.

MARTINEZ, F., C. MADEIRA, R. POBLETE-CAZANAVE and R. CIFUENTES (2011). "Measurement of Household Risk with the Survey of Households Finances", ISI World Statistics Congress, Dublin, Bank for International Settlements.

MELLO, M. and J. PONCE (2014). "Determinants of Uruguayan Households'indebtedness", Banco Central del Uruguay.

RUIZ-TAGLE, J., L. GARCIA and A. MIRANDA (2013). "Proceso de Endeudamiento y Sobre Endeudamiento de los Hogares en Chile", Working Paper 703, Central Bank of Chile.

SANROMAN G., J.J. CLADERA, Z. FERRE and G. SANTOS (2013). "Encuesta Financiera de los Hogares Uruguayos Informe de resultados de la Encuesta EFHU-1", Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la República.

SANROMAN, G. (2006). "Returns to Schooling in Uruguay", *Revista de Economía*, Banco Central del Uruguay, XXIII (2), pp. 172-194.