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DISSERTATION**

DETERMINANTS OF HOUSEHOLD DEBT REFINANCING
IN PORTUGAL

FILIPA CALADO MINA

SUPERVISION:

PROFESSORA DOUTORA ELSA MARIA NOBRE DA SILVA
FONTAINHA
PROFESSOR DOUTOR JOÃO PAULO TOMÉ CALADO

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Acronyms and Abbreviations List

ASF – *Autoridade de Supervisão de Seguros e Fundo de Pensões*

BdP – *Banco de Portugal*

CMVM – *Comissão de Mercados de Valores Mobiliários*

CRBP – *Central de Responsabilidades do Banco de Portugal*

DECO – *Associação Portuguesa para a Defesa do Consumidor*

DNBHS – Dutch National Bank Household Survey

DTI – Debt to Income

ECB – European Central Bank

FIIAH – *Fundos de Investimento Imobiliário para Arrendamento Habitacional*

GAS - *Gabinete de Apoio ao Sobre-endividamento*

GOEC – *Gabinete de Orientação ao Endividamento dos Consumidores*

HAMP - Home Affordable Modification Program

HARP - Home Affordable Refinance Program

IFIC – *Instituições Financeiras de Crédito Especializado*

OECD – Organization for Economic Cooperation and Development

PARI – *Plano de Ação para o Risco de Incumprimento*

PERSI – *Procedimento extrajudicial de Regularização de Situações de Incumprimento*

PD – Default Probability

PSID – Panel Study of Income Dynamics

RACE – *Rede de Apoio aos Consumidores Endividados*

SILC - Statistics on Income and Living Conditions

US – United States

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Abstract

This research aims to contribute for the explanation of the determinants of the renegotiation of the debt by the households. The over-debt and default of the Portuguese households has a dramatic increase in the last years. For example, in a period of three years (2013-2015) the financial institutions in Portugal started more than one million of renegotiation agreements in a total of more than 3,000 million of euros and with a default rate of 23%. Contrasting with the actual importance of the debt renegotiation by the households, there is a gap in the theoretical and empirical literature about the issue. This study, based on a unique microdata data set from a Portuguese credit counseling office, contributes to fill that gap because describes the characteristics and analysis the behavior of a set of households that use the credit counselling and decide or not to renegotiate their debt. Moreover, this research also presents a synthesis of the legal framework under which the refinancing is done in Portugal.

Adopting a binary model where the dependent variable is renegotiating (or not) the debts, different kind of explanatory factors were tested: economic and financial, socio-demographic and behavioral. The results suggest factors that have a positive contribution to the negotiation: income and wealth, education, family size and being female. By contrary, some other factors are more likely to decrease the probability of renegotiate: ability to pay, being divorced and age of household representative.

Keywords: Debt refinancing; households; financial institutions; credit counseling.

JEL CODE: E60, G21, G28, H31

Introduction

The debt of Portuguese families has reached in recent years a very large dimension. For example, between 2013-2015 the bank credit institutions have raised 1.094.108 cases under the program PERSI (Extrajudicial Procedure for the Regularization of Default Situations) corresponding to a total amount of household debt of 3,129 million of euros and with a default ratio of 23% (Banking Conduct Supervision Report, 2015:69).

This dissertation aims to contribute to the explanation of households' debt refinancing behavior in Portugal. It studies the reasons for the renegotiation of contractual relations between households and financial institutions. All the (re)negotiations have more than one side, and refinancing the household debts is no exception. Households and financial institutions have different reasons, motivations and resources for participating in the renegotiation process. Our research focuses on one side of the refinancing process: the perspective of the households. However, to have a better understanding of the household behavior we also have to present and explain the context of the decisions (e.g. the legal framework of the refinancing, the macroeconomic conditions) and the financial institutions activity in this field.

In Portugal, the *Decreto de lei nº 227/2012* created two compliance schemes of debt refinancing: the Action Plan for Default Risk (PARI) which aims to establish a set of preventive measures; and the Extrajudicial Procedure for the Regularization of Default Situations (PERSI) establishing detection measures and regularization measures for household credit default.

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In Europe, detailed information about refinancing debt is not public, and consequently, the empirical studies about refinancing are very scarce. Two examples: (i) the European Union Statistics on Income and Living Conditions (EU – SILC) for Portugal do not include information about re-financing the debt by the households; the Household Finance and Consumption Survey (HFCS) conducted by the European Central Bank (ECB) includes questions about refinancing issue, but there are no published results regarding to the answers and data obtained from those questions (Machado, 2012). In the US and Canada there are some empirical studies about the process and behavior of refinancing by households. For US, most of them based on Home Affordable Modification Program (HAMP) and Home Affordable Refinance Program (HARP). The HAMP and HARP are federal government programs to help homeowners to avoid foreclosure and stabilize the nation's housing market. The HAMP offers a modification of the current loan in order to avoid foreclosure. The HARP, offers a complete refinance into the lowest available mortgage rates. That means closing out the old mortgage and getting a new one. Canner et al (2002) show the determinants of refinancing and the types of refinancing. Hurst & Stafford (2002) and Campbell (2006) study the factors that affect the decision to refinance the cost and benefits of that decision for the household. Agarwal et al. (2012) and Tracy & Wright (2012) investigate for the US the federal government programs for refinancing and how they impact on debt renegotiation: Haughwout et al (2010) examine the success of debt renegotiation. These studies were crucial to develop our research. However, the examination of the success of debt renegotiation, one of the motivations for this research is not possible given at the data available.

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The vicious cycle Credit-over and debt-default is experienced by many households. In some cases renegotiation is a way to exit from that vicious cycle, but in other cases it is also likely that renegotiation contributes to maintain and reinforce the cycle. Consequently, our research should analyze the phenomena of credit, over debt and default to have the full understanding of renegotiation of debt. During the last years in Portugal, household borrowing has increased considerably and there was also an increase of overindebtedness and the default situations (Marques et al, 2000). Within the period 2010, July to 2016, July, the default increase 1,2 pp and 5,8 pp in mortgage and consumption credit, respectively (BPstat, 2015). The reason for this can be attributed to factors of different nature from financial behavior and literacy to financial deregulation in credit system and easy credit practices (Haas, 2006; Marques et al, 2000). The share of the financial debt in the disposable income of the Portuguese households increased from 55% in 1995 to 138% in 2015 (OECD, 2015). This large increase combined with a decrease of household savings, the recent economic crises and other factors created the conditions for the default. The household default, affect differently the households depending on the household characteristics (Costa, 2012) and has an impact on financial institutions performance (Hunt, 2007).

Our empirical analysis uses household microdata from a unique dataset ("*Informação em matéria de Crédito e Gestão do Orçamento Familiar*") for the period 2012 to 2016 provided by financial counselling office GOEC. The empirical methodology of analysis includes a descriptive part and the construction of an econometric model to estimate the factors that affect the probability of debt refinancing.

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The added value of this study is: (i) for the first time, as far as we know, microdata to investigate the behavior of refinancing decisions by the households in Portugal are used; (ii) explore new factors of explanation of the renegotiation including financial behavioral variables; (iii) illustrates how an administrative database can be used for research purposes in a domain where there is no information collected and available from the household surveys like those produced by Eurostat or ECB.

This dissertation is organized into four sections. *Section 1* presents a literature review on debt refinancing demand, by household and debt refinancing supply, by financial institution. It also includes the basic concepts associated to refinancing like over-debt and default. *Section 2* characterizes the database used (GOEC) and presents the methodology. *Section 3* shows and discusses the results about the determinants of debt refinancing by the households. *Section 4* presents the main conclusions of the study and suggests future research avenues.

1 Literature Review of Debt Refinancing and Institutional Framework

This review mainly includes the literature about decisions of refinancing by the households and the relevant legal framework under which the financial institutions work. As referred in the Introduction, there is a gap in the theoretical and empirical literature about the debt renegotiation. Here will be referred to household, overdebt and the default (see the bibliography resume of refinancing debt in Appendix A).

In point *1.1* the potential explanatory factors are presented by categories, such as: economic and financial factors (e.g. income), socio demographic reasons (e.g. education) psychological and behavioral explanations (e.g. willingness to pay) and

supply side elements (e.g. ability to pay¹). In point 1.2 the recent legal framework of debt refinancing by households is presented. The rules about the household evaluation by the financial institutions are discussed and associated with the different kind of renegotiation contracts. The decision about refinancing, which received until now few attention from the literature has as three main references in our study: Hurst & Stafford (2002), Canner et al (2002) and Campbell (2006). Hurst & Stafford (2002) do an empirical research of a sample 1,448 households in the US for the period 1991- using panel data from the Study of Income Dynamics (PSID), a large scale longitudinal study of US Households starting in 1968. Canner et al (2002) use a sample of 3,003 households, obtained from six surveys of consume realized by the University of Michigan Survey Research Center, for 2001 to 2002. Campbell (2006) using American Housing Surveys for 2001-2003 shows that the younger, smaller, better educated, better off, owners of more expensive houses, and being white, were more likely to refinance their mortgages. Next, in point 1.1.1 based on those three articles and in other literature, each of the factors of debt refinancing demand will be presented. The following points do a brief literature review about: optimal decision of debt refinancing (1.1.2), debt refinance omission and commission errors (1.1.3). The credit counseling has a key role in the process of renegotiation and is examined in point 1.1.4.

From the perspective of the supply of refinancing (financial institutions) and wherever possible linked with the Portuguese case, the following topics are summarized: prevent

¹ The variable "ability to pay" can be interpreted from the point of view of supply (banks have to assess the financial capacity of households to analyze the granting refinancing, see point 1.2.2) and demand. (households' financial capacity influences demand for debt refinancing, see point 2.2 and 2.5)

and detective default actions plans (1.2.1), indicators of the households financial difficulties (1.2.2), evaluation of the ability and willingness to pay (1.2.3), types of debt renegotiation (1.2.4) and impairment, degrees of debt refinancing and traceability of refinancing loans (1.2.5).

1.1 *Refinancing Demand: Households*

1.1.1 *Factors of debt refinancing demand*

Income

A **homeowner's income** plays a key role in the decision to refinance (Canner et al, 2002). Homeowners with relatively low incomes were less likely to refinance, perhaps because their credit histories are more likely to be impaired (Canner et al, 2002) and Hurst & Stafford (2002). Hurst & Stafford (2002) conclude that it is the permanent income, not the current income that affects the decision of refinancing. They also conclude that changes in the current income may have influence if the household has weak liquid assets.

Education and Financial Literacy

Individuals (or households) with higher level of **education** are sometimes asserted to be more aware of, or have more access to, refinancing opportunities, making them more likely to refinance (Canner et al, 2002). Borrowers who are likely to be more financially sophisticated or have more financial literacy make smaller errors of commission and omission of refinancing debt (see the point 1.1.3). Refinancing errors, both of commission and omission, are also smaller when a borrower refinances for the second time. There is some evidence that this might be related to the level of a borrower's financial sophistication (Agarwal et al, 2013). An empirical study for US

about the problem of failure of households to refinance, find some evidence that less financially savvy households (e.g. those that are less educated and less wealthy) are systematically more likely to fail to refinance and thus disproportionately lose out on savings when interest rates decline (Keys et al, 2014). Campbell (2006) converges with this, when identify the poor and the less educated as those who do more frequently wrong financial decisions.

Household Size, Children, Age and Civil Status of the Homeowner

Campbell (2006) and Canner et al (2002) show that the **household size** and **the number of children**, respectively, are positive determinants of debt refinancing. The greater number of household members and children increased, the more need to obtain money to finance home improvements or education expenses.

According to Hurst & Stafford (2002), the **age of the householder** in 1989 in US with credit refinance (45 years old was the mean) it was lower than the average of the householder age without credit refinance (52 years old). The effect of age is identified by Canner et al. (2002) who states that older homeowners are less likely to refinance because they may have less time to recoup the transaction costs.

Civil status of the borrower impacts on refinancing. Hurst & Stafford (2002), without providing any explanation for the results obtained, show that a largest share (85%) of borrowers who refinanced were married. Because the couples earning families have in general higher income (or even wealth) can explain their results in the perspective of supply explanations. Also show that being divorced between 1991-1996, isn't statistically significant to explain the debt refinance.

Employment Status

Surprisingly, **unemployment** situation did not reveal any statistical relevance to explain refinancing decision and the same happens with **liquid assets** (Hurst & Stafford, 2002). However, when both variables are combined in a multiplicative way they proved that jointly affect the refinancing decision (Hurst & Stafford, 2002). Poor families with low wealth are more harmful by unemployment (assumed to be temporary) because wealth functions as a cushion for income breaks, frequently unexpected, caused by unemployment.

Health status is important in particular if there are laws that regulate the refinancing rights for particular health conditions. For example, in Portugal, the *Decreto de Lei nº 227/2012*, oblige the banks to make the debt refinancing in case of an aggravated illness, even if the families do not have any financial inability to pay.

Social Interactions and Trust

Georgarakos et al (2013), show that social **interactions** have influence on the household debt decision. The empirical study, based on the Dutch National Bank Household Survey (DNBHS), identifies households that consult family, friends, and contacts about own financial decisions and that can be borrowed from their social circle. Ferrão (2013) who studied European households before and after the recent crisis demonstrates, based on a large panel sample, that there was a decrease in the share borrowed from banks and, at the same period there was an increase on share of loans obtained from families and friends.

Even households that do not consult their social circle, may still be influenced by that circle's observable behavior, when deciding whether to take out a loan and how much to borrow. So, Georgarakos et al (2013) suggest that social interactions can have a

positive effect on the renegotiation of credit, because households are exposing to social environment. The hedonistic behavior theory explains this (Vandone, 2009).

Mortgage Rates

Agarwal et al (2012) concluded for US's borrowers, that when they **expect increasing mortgage rates** have an incentive to refinance quickly. Over the course of the 1990s, and in later years of the last decade in particular, millions of homeowners took advantage of lower mortgage interest rates and higher home values and refinanced their mortgage loans (Brady et al, 2000). For many of them, the decision to refinance was motivated by a desire to reduce their monthly mortgage payments (Brady et al, 2000). The debt refinancing, reducing the monthly mortgage payments and making the loans more affordable, allows a consumption smoothing benefit for the households (Hurst & Stafford, 2002; Haughwout et al, 2010).

1.1.2 Optimal decision of debt refinancing

The optimal decision of debt refinancing is when the net present value of the interest saved exceeds the cost of refinancing (Agarwal et al, 2007). This is hard to calculate because of the combination with fixed refinancing costs and the random variation in interest rates (Badariza et al, 2016). So, to decide whether to refinance, a borrower must trade off the gains against the costs of doing it. The borrower has costs of refinancing, when the interest rate of refinanced the debt is strictly less than the interest rate of debt without refinancing (Agarwal et al, 2013).

In Portugal, refinancing costs are virtually equal to zero, because according to *Decreto de lei 227/2012 artigo 8 nº1*, it is not allowed to charge initial fees for renegotiation of contract terms, with the exception of expenditure in conservatories, notarial registries

or taxes. However, the refinancing cost can be raised along the credit maturity. Families with financial difficulties and high probability of default (PD), are more expensive for the financial institutions, and therefore the refinancing costs are higher (higher interest rates). Hurst & Stafford (2002) had evidenced that riskier borrowers (e.g. household with unemployed members and with financial distress) pay higher interest rates. Determining when the option to refinance is “in the money” a complicated function of factors, including the remaining maturity of the initial mortgage and the expected path of future interest rates (Agarwal et al, 2013).

1.1.3 Debt Refinance errors (omission and commission errors)

Agarwal et al (2013) reports that to refinance optimally, households should avoid incurring in two kinds of errors: the omission and the commission errors. The omission errors are generated by the incorrect choice of the moment to debt refinancing. The commission's errors are generated by the incorrect choice of debt refinancing interest rates. Borrowers need to choose the interest rate differential at which to refinance and, when that differential is reached, they need to take the steps to refinance before rates change again. The optimal differential is where the interest saved by refinancing equals the sum of refinancing costs and the option value of refinancing (Agarwal et al, 2013).

Agarwal et al (2013) using panel data, a research raises to a question: “*Why do borrowers make mortgage refinancing mistakes?*” and find that approximately 59% of the borrowers refinance sub optimally, with 52% of the sample making errors of commission (it means choosing the wrong rate), 17% making errors of omission (it means, waiting to long to refinance) and 10% making both type of errors. Additionally,

they proved, that financially sophisticated households make smaller mistakes. The mistakes are also smaller when a households refinances for the second time in a process of learning from their own mistakes. Badarinza et al (2016) based on Danish data on household suggests that, households with lower income, lower education and more age made more often mistakes.

1.1.4 The Credit Counseling

Many families have financial illiteracy, so they don't know how to expose their financial difficulties to the banks. Credit counseling agencies have a key role in this mediation, because they seek to understand the financial situation of families, through the analysis of monthly expenses, monthly savings, monthly financial expenses and monthly net income. They can for example prepare a letter to the banks, with debt renegotiation proposal, which is adjustable to the current financial capacity of the householders.

More and more consumers to seek help from the counseling professionals and it has positive effects on the solution and prevention of over-indebtedness (Masilo & Rankhumise, 2014; Haas, 2006). In Portugal several public and private organizations have activity in the field of credit counselling.

In Portugal, financial institutions may not accept renegotiations proposals, but they are required to identify consumers PARI and PERSI (see point 1.2.1 for details about these programs) and execute the respective action plans. In Portugal there are several entities who provide credit and financial counselling. In 2011 it was created the *Plano Nacional de Formação Financeira – Todos Contam* [National Plan for Financial Education - Everybody Counts], by three financial supervisors, *Comissão do Mercado*

de Valores Mobiliários (CMVM) [Securities and Exchange Market Commission], Banco de Portugal-BdP [Portuguese Central Bank] and *Autoridade de Supervisão de Seguros e Fundo de Pensões (ASF)* [Insurance and S Pension Fund Supervisory Authority]. This plan aims to promote financial education in schools (preschool, primary and secondary education) and adult education and training. The private institution *Defesa do Consumidor*, DECO² created in 2000, the *Gabinete de Apoio ao Sobre-Endividado (GAS³)* [Support Office to overindebted] in Lisbon and other offices in different locations in Portugal. These offices made available a free service of credit counseling and financial consumer protection, serving also as a mediator between consumers and entities.

Portuguese Govern implemented *Rede de Apoio ao Consumidor Endividado*, RACE [Support Network to Indebted Consumer], composed of several entities whose objectives are to inform, advise and assist consumers with defaults and / or financial difficulties⁴.

The empirical analysis of this research focuses on database provided by one of the network entities of RACE, the *Gabinete de Orientação ao Endividamento dos Consumidores (GOEC)*[Guidance Office to Indebtedness Consumer], created in 2006 to provide credit counseling service to households and to define credit agreements between financial institutions and households in ISEG, *Instituto Superior de Economia e Gestão*. GOEC activity depends on *Fundo do Consumidor*⁵ funding. Since 2014 until now (June 2016) GOEC had a total of 3574 contacts, 1488 processes were opened (it

² <https://www.deco.proteste.pt/institucionalemedia>

³ <http://gasdeco.net/>

⁴ <http://cliente bancario.bportugal.pt/pt-T/Credito/ApoioSobreEndividamento/RACE/Paginas/RACE.aspx>

⁵ <http://www.consumidor.pt/>

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includes treatment of debt distress which includes legal analysis of the proposals and consumer monitoring credit institutions) and 47 contacts only for information.

The GOEC provides consumers a questionnaire to assess the financial situation of the households. The answers to those questionnaires, in paper, (*Ficha Técnica para avaliação Financeira*) have been registered in digital format in an anonymized way in a total of 439 consumers (households) (Appendix B).⁶

1.2 Debt Refinancing Supply: Financial Institutions

1.2.1 Prevent and detective default actions plans.

The deterioration of economic and financial conditions and increasing default, led the Portuguese authorities to promote legislation about debt refinancing, in order to reduce the over indebtedness. The *Figure 1* summarizes the chronology of the legal framework.

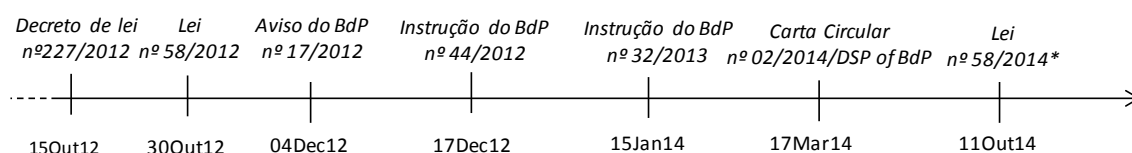


FIGURE 1 – Legislation Timeline of Debt Refinancing in Portugal.

Notes: The* represent the first amendment of Lei nº 58/2012.

Source: Author's elaboration.

The *decreto de lei nº 227/2012*, instructs financial institutions to establish preventing actions plan for early detection of families in default and maintain control within consumers who have financial difficulties (by program PARI) and the regularization of contracts in defaults within families, through debt renegotiation proposals (by program PERSI).

⁶ Only 332 questionnaires exist in the database when this research started.

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All PARI and PERSI credits are formalized as **refinanced contracts**. According to the *Instrução nº 44/2012 do BdP*, financial institutions are required to report these kind of contracts. The PERSI refinanced contracts efficiency is measured by the ratio on PERSI loans without failures over the total of refinanced contracts PERSI (BdP, 2015). During the period 2013-2015, the efficiency ratio of PERSI process, for mortgage and for consumption credit was respectively 55% and 40% (*Table I*). This ratio had increased in mortgages (42% in 2013 and 66% in 2015) and in consumer credit (34% in 2013 and 42% in 2015). This means that at least half of the refinanced credits are adjusted to the financial capacity of the household (BdP, 2015).

TABLE I

Number of process by PERSI Program in period 2013-2015 in Portugal.

| General System - PERSI | | 2013 | 2014 | 2015 | Total |
|------------------------|------------------------------------|---------|---------|---------|-----------|
| Mortgage | Process started | 181.655 | 123.594 | 132.108 | 437.357 |
| | Process completed | 165.406 | 118.214 | 129.013 | 412.633 |
| | Process completed without Defaults | 69.516 | 71.198 | 85.238 | 225.952 |
| | Efficiency ratio* | 42,0% | 60,2% | 66,1% | 54,8% |
| Consumer credit | Process started | 657.948 | 539.041 | 569.577 | 1.766.566 |
| | Process completed | 590.642 | 508.209 | 572.664 | 1.671.515 |
| | Process completed without Defaults | 198.636 | 226.955 | 242.298 | 667.889 |
| | Efficiency ratio* | 33,6% | 44,7% | 42,3% | 40,0% |

Notes: The * represent Efficiency ratio (Process completed without Defaults /Process completed)

Source: Table adapted by the author based on Banking Conduct Supervision Report (2013,2014 and 2015). (BdP, 2015).

1.2.2 Indicators of households financial difficulties

According to *Instrução nº 32/2013 BdP*, the term **financial difficulties** have to do with households that have loans in default or if not, it can be mostly sure that they will come to a risk. The **Indicators of the household financial difficulties** are established by that instruction such as: (i) defaults in the *Central de Responsabilidade de Crédito do Banco de Portugal* (CRBP) in the last 12 months; (ii) check uses without balance; (iii) constant use of more than 95% of the plafond; (iv) activation of internal alert levels; (v)

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increased impairment coverage level; (vi) delivery active in settlement; (vii) qualitative incidences, such as tax debt, expectation of insolvency, lawsuits, salary overdue, pawn on bank accounts, loss of income and unemployment.

Financial difficulties can be avoided by policy measures for the prevention and management of over-indebtedness. Vandone (2009:76) classifies them into two types: “responsible borrowing” measures and “responsible lending” measures.

Responsible borrowing measures, mainly consist of financial education and debt counselling services designed to raise awareness about the implications on debts and to help individual fix level on debts that do not lead to financial difficulties.

Responsible lending, includes structured measures such as: mandatory disclosure, and transparency requirements from financial intermediation regarding the terms and conditions of loans; appropriate credit scoring procedure; flexible approach to early warning signs of indebted households in difficulty; establishing a fixed interest rate with a maximum limit, when lending to a customer.

In Portugal, according to the *Aviso nº 17/2012 artigo 5º do BdP*, financial institutions should estimate household financial **ability to pay**, through the following inputs: age, wage, job, monthly expenses and default with Banks and tax.

Agarwal et al (2013), Guiso & Sodini (2013: 1503-1505), Pliska (2006) and Bennett et al (1999) indicates that there are households with ability to pay, but, when interest rate fall, they communicate to banks their financial difficulties, in order to take advantage for a better contractual conditions (e.g. low interest rates). To prevent this **opportunistic behavior**, financial institutions must request from the households who want to renegotiate the debt, the documental evidence such as: documentation

proving unemployment, salary reduction, monthly expenses, debts and defaults. Analytical tools can be used too in order to identify the consumer profile of who can pay or can't pay (Hunt, 2007). This information allows characterizing the household **financial capacity** that will determine the new conditions of the renegotiation of credits adjusted to their needs. The financial ability and the willingness to pay, the key factors to define the consumer profile, will be discussed in next point.

1.2.3 Household profile: ability and willingness to pay

The household profile (ability and willingness to pay) determines the type of refinancing scheme.

The **ability to pay** is measured by the Debt-to-Income - DTI ratio, computed by the cost of the loan payment (including principal, interest, taxes and insurance) as a share of the income. It is a measure of the ability of a borrower to make his scheduled payments. When DTI ratios are very high, borrowers will have difficulty to maintain the cash flow required to make their mortgage payments in the face of any income or spending shocks (Haughwout et al, 2010). The computation of a proxy for the DTI ratio and variables associated using Portuguese data will be explained in point 2.2.

The **Willingness to pay** is an important predictor of mortgage default. A summary of the borrower's record of repayment on previous obligations – is a strong predictor of future performance (Haughwout et al, 2010).

1.2.4 Types of debt renegotiation in Portugal

The main and most common types of debt renegotiation used by financial institutions in Portugal that fits the household repayment capacity are: (i) introduction of residual

value, (ii) extension of the term, (iii) introduction of grace period and (iv) changes in spread/interest rate.

(i) The residual value is the deferring of capital for the last monthly payments. This type of renegotiation is suitable for consumers with no current financial ability but who have expectations that will have future earnings to settle the debts. According to the *decreto de lei nº 58/2012 artigo 11º*, the mortgage must have a maximum residual value of 30% of the amount owed.

(ii) The extension of the term allows reducing the monthly payment. The maturity of the average refinanced mortgage (again weighted by the value of the outstanding balance) was twenty-nine months longer than that of the original average mortgage (Canner et al, 2002). According to the *decreto de lei nº 58/2012 artigo 12º*, the maximum term is 50 years from the time of hiring and the deadline must be before 75 years of age of the borrower.

(iii) The grace period determines that the individual does not pay the loan capital expenditures. This type of renegotiation is suitable for consumers who are unemployed and seeking employment during this time. With this type of renegotiation, financial institutions cannot analyze the financial behavior of consumers for the payment of the loan capital expenditure, just in interest payments. There is a higher probability of default risk, so financial institutions increase interest expenses and reinforce the provisions of these operations. According to the *decreto de lei nº 58/2012 nº 11*, the mortgage grace period must have a minimum of 12 months and maximum 48 months.

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(iv) The **reduction of interest rate** is preferred to be renegotiated by householders, because the advantages are more visible and have a better impact on householders living conditions.

In Portugal, since the beginning of PERSI regime in 2013, the main type of renegotiation of mortgage is the introduction of a grace period of capital (5,444 PERSI's cases in 2013). Despite having been decreasing to 1 966 PERSI cases in 2015, mortgage continues to be the dominant type of refinancing. In the case of credit to consumption, in the period 2013-2015, the predominant type of refinancing is the residual value and then the extension of the term. *Table II* informs about the relative importance of each type of refinancing by two types of debt.

TABLE II

Numbers of debt refinance process, by type, in period 2013-2015, in Portugal.

| Types of Debt Renegotiation | Mortgage | | | Consumer credit | | | Total | | | Variation % (2013-2015) |
|-----------------------------|----------|-------|-------|-----------------|-------|-------|-------|-------|-------|----------------------------|
| | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 | |
| Residual Value | 1.020 | 349 | 477 | 8.808 | 5.509 | 7.174 | 9.828 | 5.858 | 7.651 | -22% |
| Extension of the term | 2.282 | 869 | 726 | 6.613 | 6.281 | 2.374 | 8.895 | 7.150 | 3.100 | -65% |
| Grace Period | 5.444 | 3.313 | 1.966 | 1.829 | 774 | 504 | 7.273 | 4.087 | 2.470 | -66% |
| Changes in interest rates | 528 | 293 | 228 | 3.184 | 4.516 | 1.716 | 3.712 | 4.809 | 1.944 | -48% |
| Others* | 6.456 | 3.915 | 2.768 | 2.868 | 1.740 | 1.477 | 9.324 | 5.655 | 4.245 | -54% |

Notes: The * represents the other types of debt refinancing includes own plans for debt repayment.

Source: Table adapted by the author based on Banking Conduct Supervision Report (2013,2014 and 2015).

1.2.5 Evaluation of Weak Financial Capacity: Duration and Severity

Financial institutions to adjust the best type of refinancing, should characterize the deterioration of the payment capacity, which is measured through two parameters, duration and severity. Duration is a subjective parameter defined by time of permanency of the weaknesses of financial capacity. Severity is an objective parameter that quantifies of the reduction in the payment's capacity. It is difficult to evaluate duration and severity. For example, in our research, because the information is

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referred to a given moment (no panel data is available in GOEC database) it is impossible to assess the evolution of weak financial capacity, both in loss of value, and either in duration. One of the future avenues of research is to carry out this analysis.

Renegotiation typology can be defined based on the criteria severity and duration. The matrix in *Figure 2* defines four situations based on the two criteria. (i) Cell at the top left represents longer duration and lower severity of the weak financial capacity, so the most appropriate type of renegotiation are the extension of the term and the introduction of the residual value, to dilute the responsibilities in time. (ii) The cell bottom right represents high severity of weak financial capacity and lower duration. In this case the more suitable type of renegotiation is immediately to reduce the financial burden by reducing interest rates or the introduction of a grace period, which avoids the principal payment in the first periods. (iii) When the duration and severity of weak financial capacity are high, the debt becomes unrecoverable and it is not viable to refinance. It corresponds to the top right cell. iv) Finally, when both severity and duration are lower, is recommended that the household indebt make additional efforts to meet the credit obligations.

| | | | |
|-------------------------------------|---|---|--|
| Duration of weak financial capacity | + | Renegotiation Types: Extension of the term Residual Value | The refinancing option is not viable. |
| | - | It is preferable to resort to additional efforts by the household to meet payment commitments | Renegotiation Types: Changes in interest rates Grace Period |
| | | - | + |
| | | Severity of weak financial capacity | |

FIGURE 2 – Renegotiation debt types based on Duration and Severity of weak financial capacity.
 Source: Author elaboration, based on appendix IX of Circular 4/2004, Bank of Spain about “Credit Risk”.

1.2.6 *Banks: Impairment, degrees of debt refinancing and traceability of refinancing loans*

Refinanced loans have a higher probability of default (PD) than the other loan, so financial institutions are forced to increase provisions for these type of loans. In Portugal, through the recent calculation of the impairment, regulated by *Carta Circular 02/2014 / DSP do BdP* the provisions have to be increased and consequently the profits are negatively affected. To avoid significant reductions in profits, financial institutions may distinguish refinanced loans by degrees of impairment.

The traceability is regulated in Portugal by the *Instrução nº 32/2013*, according which the financial institutions data systems should keep a record of the loans which have been refinanced, in order to identify them as cases in which the customer has had difficulties. Banks systems must be able to know the historical program of all refinanced contracts, as for dates, function, details and links to other contracts.

2 Empirical Analysis

2.1 *Data Base, Sample, Variables Construction and Methodology of Analysis*

The empirical analysis of this research mainly uses the database provided in its raw format by the Portuguese counselling credit office, the GOEC already referred to on point 1.1.4. The database was built based on the information collected by the document "*Ficha Técnica para Avaliação Financeira*" [Technical Data Sheet for Financial Evaluation] (from now on referred to as survey or questionnaire)(GOEC, 2016). The data collected by the sheet includes factual information (e.g. education) and behavioral information (e.g. "Intention to resolve the financial situation").

Appendix B shows the GOEC's *Ficha Técnica para Avaliação Financeira* [Technical Data Sheet for Financial Evaluation] and the variables created based on it. For our research, the key information collected is obtained through the question: “*What type of resource you want to use to solve your [financial] situation?*”. The multiple choice and non-mutually exclusive alternative answers are: “*(i) Renegotiating debt with banks, (ii) use of credit counseling, (iii) use of other credit companies that carry out the consolidation and renegotiation of credits*”. With this information it was possible to build the dependent binary variable (renegotiation or not).

The original and raw sample includes a total of 332 observations, for the period between 2012 to 2016 (last observation, April 2016). After a detailed inspection of the original file with the completely anonymized and raw data set and the identification of missing values, errors and odd data, the final sample was reduced to 289 observations. The database presents several limitations, such as: short period of available data (GOEC created in 2006 but with data available for the period 2012-2016), missing values, errors, inconsistency of given responses and lack of knowledge about the debt typology. The regular contact with the Coordinator and the members of the GOEG, made possible the clarification of many doubts about the content of the file, the collection of the data and the characteristics of the users of the counseling office. The information collected and the know how and experience of the GOEC members were also essential in the process of recodification of the variables and the creation of new ones (see Appendix C and D).

A share of 56% of the households (N=162) marked renegotiation as at least one of the ways to use to solve the financial situation [of debt]. The remaining 44% households

(N=127), did not marked the *renegotiation* and instead selected the alternatives *use of credit counseling, or/and use of other credit companies [financial companies]*⁷ that carry out the consolidation and renegotiation of credits.

The main variables created for the empirical analysis are defined in Appendix C. The dependent binary variable (*refinanced*) was previously defined. The next point presents two new variables, willingness and ability to pay (*willpay, abltpay*), proposed by us and with the theoretical bases presented in point 2.2 of this research. The independent variables potentially explanatory and presented in Appendix C and D are: income (*Income_detail, inc_Q, lninc_100_cap* and *incap_Q*), education (*educ1*), household size (*cohabit* and *famzise1up*), number of children (*chld* and *chld1*), age (*ageHO*), gender (*fem*), marital status (*mrrd* and *div*), employment status (*empl, effctv* and *laborforce*), resource of credit (*creditresource*), credit in *Instituições Financeiras de Crédito Especializado (ific)*, lack of control (*enddeflt*), financial difficulties (*dbtfindif*), recourse to credit card (*crdcard*), annual savings (*real_save*), ability to pay (*abltpay*) and budget management (*bdg_mng*)⁸.

2.2 Willingness and Ability to Pay Measurement

The Debt to Income ratio DTI indicates the time (in years) that the household needs to pay the debts of the household, assuming that household net income (annual) remains constant across time and there is no inflation. The repayment debt (in years) was computed as follows: the total amount of debt (*debt_value*) divided by the net annual

⁷Information about Credit Institutions and Financial Companies is available at Central Bank webpage: <https://www.bportugal.pt/en-US/Supervisao/Pages/Legislacaoenormas.aspx>

⁸ Other variables were created but not presented here because the results obtained from them were not relevant or statistically significant.

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income of the household (*net_annual_inc*) (Appendix D). Because of the missing data this ratio cannot be computed for all the sample but only to 260 households.

In order to compute the variable ability to pay (*abltpay*), the subsidiary variables are: average of life expectancy (*avlifeexp*) and Debt-to-Income ratio (DTI) or time to repay the debt. The life expectancy for each debt owner for whom the age and sex are known from the GOEC survey is calculated applying the Mortality Tables for Portugal published by Statistics Portugal [*Instituto Nacional de Estatística*], for the period 2012-2014, for men, and women (INE, 2015).

The ability to pay binary variable is calculated as follows. Keeping everything else constant, if the period of debt repayment is shorter than the average life expectancy of the household representative, there is still time to pay the debt and therefore the ability to pay variable takes the value 1 ($DTI < avlifeexp \Rightarrow abltpay=1$). If the period of debt repayment is longer than the average life expectancy of the household representative, there is no time to meet debt service and, therefore, the variable ability to pay takes the value 0 which means that the household does not have ability to pay. ($DTI > avlifeexp \Rightarrow abltpay=0$)

The results for our sample is: the share of the households with debts and for which the age of the representative is not missing (N=247) that has ability to pay (*abltpay=1*) is very high 94% (N=231).

The willingness (*willpay*) to pay is measured based on the answers to the Yes/No question “B.13. – *Do you have intention to resolve the financial situation?*” (see Appendix B). A large share (91%) of the households who answer this question and have with debt declared to have willingness to pay.

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In accordance with the two criteria, the ability and the willingness to pay, there are four household profiles categories displayed in *Table III*, following the classification presented in the *Table II* in point 1.2.4. The valid observations to applicate both criteria are 245. The profiles are: profile 1, with ability and with willingness to pay; profile 2, without ability but with willingness to pay; profile 3, with ability and without willingness to pay; and profile 4, without ability and without willingness to pay.

TABLE III

Sample Household profile

| | Household profile | | Sample | Type of Debt Renegotiation |
|-----------|-------------------------------|-----------------------------------|--------|--|
| | Ability to pay (abltpay=1) | Willingness to pay (willpay=1) | | |
| Profile 1 | Yes | Yes | 212 | Residual value Extension of the term Grace period |
| Profile 2 | No | Yes | 30 | Change in spread/interest rates |
| Profile 3 | Yes | No | 3 | Household don't have financial difficulties, so it shouldn't be renegotiated credit. |
| Profile 4 | No | No | - | No refinancing debt because the consumer won't pay. |

Source: Author's elaboration

The predominant profile is profile 1 (N=212) which corresponds to 87% of valid answers. Profile 2 is the second in importance but only with 12% of total. The debt refinancing is the best solution for credit recovery in profile 1 and profile 2, because consumers are willing to pay the debt. The debt refinancing in profile 1 and profile 2 can be assumed by four different types of refinancing, which discussed in point 1.2.4. The profile 3 includes only 3 cases, and represents an insignificant share (1.2%). They are consumers who *don't have* financial difficulties, and so financial institutions *will not* refinance the debt. Maybe they represent consumers that want to take advantage of more favorable conditions of credit renegotiations and have a behavior studied in the literature as referred to in point 1.2.2.

The zero result for profile 4 is easily understandable given the role of the GOEC and the rules of the renegotiation. Refinancing is not the solution to correct the defaults because the debt is unrecoverable.

2.3 *Modelling the Debt Refinancing*

Wooldridge (2006: 583) recommends that when population is small, the dependent variable is discrete and has normal distribution properties, the binary model is the most appropriate. Consequently, the model selected based on the size of the sample and the nature of the relevant variable is the Probit model which the general form is:

$$(1) \quad P(\gamma = 1|x) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_K)$$

Where γ is the dependent variable, j is the number of set of explanatory variables x , G is the standard normal cumulative distribution function (taking values strictly between zero and one: $0 > G(z) < 1$ for all values of the parameters and K is number of regressors β considered in the analysis.

The explanatory variables that will be tested are socio demographic variables (income, education, family size, children, age, gender, marital status, being employed, being effective and being labor force) and financial behavior variables (resource of credit and credit card, credit in IFIC, lack of control, having financial difficulties, having annual savings, ability to pay and budget management). Appendix C and E provide the description and descriptive statistics of these variables. Table V and Appendix F show the models tested. The results of the models tested are presented in point 2.5.

2.4 *Descriptive Statistics*

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2.4.1 Socio demographic and economic characteristics

The groups of households that take the decision of refinancing are predominant in higher incomes quartiles (*Figure 3*). The average income of the households who want to refinance (€ 1 131) is 38% higher than the mean of the income of the households that declared not having renegotiation in mind. (€ 822) (Appendix E). This can be explained because the bargaining power in the renegotiation also depends on the income and wealth of the households.

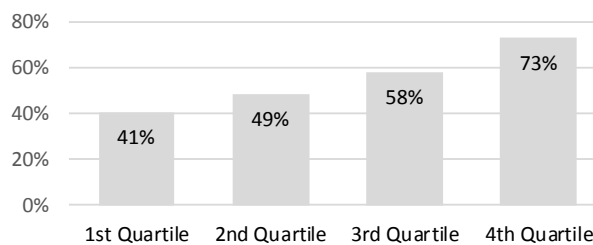


FIGURE 3 – Percentage of debt refinance decision, by quartile of income.

Source: Author's calculation, based on GOEC data.

There is a tendency for the level of debt refinancing decision to increase with **education** or instruction (Cole et al, 2014). *Figure 4* shows that more educated households, are more informed about the rights and advantages of debt refinancing and in general have more financial literacy or financial sophistication (Appendix E).

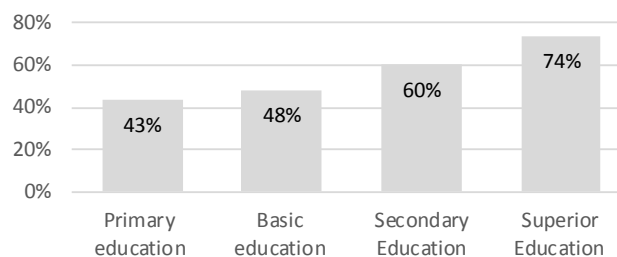


FIGURE 4 – Percentage of debt refinance decision, by level of education.

Source: Author's calculation, based on GOEC data.

The comparison of the relation between refinance, income and education also suggests a strong association between education and income established for long in the economic literature and where the theory of human capital plays a key role. This results also suggest to take into consideration the multicollinearity problem in the modelling of refinancing determinants.

The refinancing households are larger (*cohabit*) have more children (*chld*), because larger family, has more current expenditure, so the refinancing debt is useful to smooth consumption. There is a slight predominance of women (54%) in the refinancing families (Appendix E). One possible explanation is because women, compared with men, are more risky averse (Madeira, 2012; Charness & Gneezy, 2012), so tend to be more preventive

Other characteristics of the representatives of the household who declared the wish of refinancing are: 59% are married and about one fifth are divorced; 89% belong to the labor force, 71% are employed and from those 66% have a permanent labor contract (Appendix E).

2.4.2 Financial Behavior Measurement

Individual Behavior towards consumption, debt and saving decisions are associated with economic theories of permanent income and lifecycle (Friedman, 1957; Modigliani & Brumberg, 1954). According to these theories, consumers tend to decide consumption taking into account the expected income, they save during the active life and use these savings after retirement, there by maintaining living standards stable over time. However the increase in average life expectancy has led to requirements

related to the quality of life for seniors and unexpected financial requirements that influence retirement planning (Frade, 2007).

However, the household members also take financial decisions that are apparently not rational (Stango & Zinman, 2009; Campbell et al, 2011). Debt decisions are largely influenced by the impulsiveness of individuals (Ottaviani & Vandone, 2010). The qualitative information collected from GOEC about the population that contact the office is in line with this statement.

To characterize the appropriateness of financial behavior 7 binary variables were created: (i) credit resource (*creditresource*); (ii) have credit in IFIC (*ific*); (iii) lack of control (*enddeflt*); (iv) credit due to financial difficulties (*Dbtfindif*); (v) recourse to credit card to purchase (*crdcard*); (vi) annual savings (*real_save*) and (vii) ability to pay (*abltpay*). The method used to build each of these variables from the GOEC's database is presented in Appendix C and D. The descriptive for the variables are presented in Appendix E. Next, some additional arguments are provided to justify the building of the financial behavioral variables.

The nature of credit institutions influences the likelihood of consumers becoming over-indebted. Silva (2014) suggests that to own credit with the ***Instituições Financeiras de Crédito Especializado (IFIC)***, compared to traditional banks, increases the likelihood of indebtedness. The IFIC are not part of the network of banking Institutions. IFICs provides credit with higher interest rates, because their customers often are more likely to default and, because of that, could not be financed in the traditional banking. The variable have credit in IFIC (*ific*) is based on question "B.3

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What type of financial institution that normally use?" About one third (35%) of the households that renegotiate use IFIC to obtain credit (Appendix E).

Gathergood (2012) , using a database of 1 234 UK households, shows that the lack of self-control and financial illiteracy of individuals and families are positively associated with the failure of credit responsibilities. In this sense, we created the variable lack of control (*enddeflt*) to test the influence of this on debt refinance. The variable lack of control (*enddeflt*) was created through the question "B.9 Reason for non payment of debts in arrears" in Appendix B and recoded as Appendix C. The variable *enddeflt* = 1, when household answers that have default for lack of control on consumption and *enddeflt* = 0, when household answers that have default for reasons that are exogenous such as reduction of income, worsening credit costs, loss of employment, death of a household member, divorce and disease.

According to Appendix E, only 20% of families who refinance, responded that the default is the results of lack of control on consumption.

The use of credit justified by **financial difficulties** (*Dbtfindif*) was built based on the question "B.7 What are the reasons that lead to resort to credit?" The variable *Dbtfindif* is equal to one , when household answer that they use credit due to financial difficulties or to pay other debts and *Dbtfindif* =0, when household answer that they use the credit for consumption. Most of the households (72%) who want to refinance inform that the reason is to overcome financial difficulties or to pay other debts.

The variable about **recourse to credit card** to purchase (*crdcard*) was built based on question "B.4 What kind of payment used in their purchases?". One fifth of the

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households who want to refinance the debt uses credit card for the payment of current expenditures. It means that they are increasing (even temporarily) their debt.

The binary variable **net annual savings** (*real_save*), is 1 if they save and zero if not. It was obtained combining the available information about income and expenditures, and is not a full accurate measure but only a proxy measure of the *savings*, by following formula (see Appendix C):

$$(2) \quad \text{real_net_save} = \text{net_annual_inc} + \text{annual_save} - \text{annual_financ_charges} - \text{annualExp}$$

According to our calculation, 38% of the households that want refinancing are able to save any amount.

The creation of the variable ability to pay (*abltpay*) was detailed in point 2.2..

2.5 Results and Discussion

Table IV briefly summarizes the factors that impact on refinancing according to the relevant literature. Several models were tested. Those which revealed higher explanatory power are presented in *Table V* (three models). Additional estimations are included in Appendix F (seven models).

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TABLE IV

Statistical significance and signal expected from the independent variables tested in Probit model and the literature reviewed.

| Independent Variables | Models | | Review Literature | |
|--|--------------------------|------|--|---------|
| | Statistical Significance | Sign | Authors | Sign |
| Income (<i>inc_Q, lninc_100_cap</i>) | *** | + | Hurst & Stafford (2002), Canner et al (2002) | + |
| Education (<i>educ1</i>) | *** | + | Canner et al (2002) | + |
| Household size (<i>cohabit</i>) | ** | + | Campbell (2006) | + |
| Number of Children (<i>child</i>) | * | + | Canner et al (2002) | + |
| Age (<i>ageHO, ageq, age_g</i>) | * | + | Campbell (2006), Canner et al (2002) | - / inc |
| Gender (<i>fem</i>) # | * | + | | |
| Marital Status (<i>mrrd</i>) # | ▪ | inc | Hurst & Stafford (2002) | inc |
| Marital Status (<i>div</i>) # | ** | - | Hurst & Stafford (2002) | inc |
| Employment Status (<i>emp, effctv</i>) # | ▪ | inc | Hurst & Stafford (2002) | inc |
| Resource of Credit (<i>credresource</i>) # | ▪ | inc | | |
| Credit in IFIC (<i>ific</i>) # | ▪ | inc | | |
| Lack of control (<i>enddeft</i>) # | ▪ | inc | | |
| Financial difficulties (<i>Dbtfindif</i>) # | ▪ | inc | | |
| Recourse of Credit Card (<i>crdcard</i>) # | ▪ | inc | | |
| Annual savings (<i>real_save</i>) # | * | + | Hurst & Stafford (2002) | + |
| Ability to pay (<i>abltpay</i>) # | *** | - | Hurst & Stafford (2002), Canner et al (2002) | + |

Notes: The ▪, *, **, *** represent no significance, significance on the 10%, 5% and 1% levels, respectively. The signs +, -, inc represent the positive, negative and inconclusive influence of the independent variable in the refinancing demand factors model. # indicates a dummy variable. In the independent variables column in parenthesis is the variable designation used in the regressions.

Source: Author's calculations based on the GOEC data and the literature review.

Income (*inc_Q*) and **education** (*educ*) are the best predictors for debt refinancing option for solving the financial debt problems. Because both phenomena are associated and to avoid multicollinearity issues (Menard, 2002), they are included in separate models: education in model 1 and income in model 2 and 3.

Model 1 is the models which includes education variable that shows better quality of prediction. The increase by one level of education⁹ assuming the other variables have the mean values, increases the probability of selecting refinancing by 16%. These results converge with Canner et al (2002).

⁹ The number of years of education does not exist in the database. The level of education is the available alternative information.

The **household size variable** (*cohabit*) is also a good predictor as it was already proved by Campbell (2006). In our results, a increase of the household by one member increases the probability of refinancing demand by 6%.

Our results for the age are mixed: in model 1 the age affects positively the refinancing decision, result which isn't similar to Campbell (2006); in the other tested specifications the effect is not statistically significant. Similar results are obtained by Canner et al (2002).

The marital status effect depends on the type of marital status. For **divorced** (*div*), comparing with other marital status, probability of refinancing decreases around 13%. For married (*mrrd*) the results were not statistically significant (using the variable alone and combined with gender, age or children).

The results show that being **female** (*fem*) is a good predictor for debt refinancing and that the probability of debt refinance demand increases by 12% if the respondent is a women. There is a large strength of literature that demonstrates that women are more risk averse than men (Hartog et al, 2002; Christelis et al, 2010; Jianakoplos & Bernasek, 1998; Jianakoplos & Bernasek, 2006; Laakso, 2011; Barber & Odean, 2001; Croson & Gneezy, 2009; Madeira, 2012; Dohmen et al,2009). Having risk averse, it tends to develop prevent to solve potential or current financial problems, namely debt problems in financial institutions.

The **wealth**, indirectly evaluated by having net savings (*real_save*) increases the probability demanding financing by 12%. Hurst & Stafford (2002), prove that the wealth is statistically significance for refinancing only when there is a decrease of financial assets values or a permanent unemployment.

Haughwout et al (2010) indicate that the **ability to pay** variable is a good predictor for initial default, but they do analyses if this variable is explanatory of debt refinancing. Our outcomes display that the ability to pay (*abltpay*) is negatively associated with refinancing. In fact, results show that the probability of debt refinance decreases by 32% if the household have ability to pay. This is an expected effect because according to *Instrução nº 32/2013 do BdP*, banks only refinance debt to households with financial difficulties status, it means, without ability to pay.

Model 2 includes income as a predictor of refinancing demand. An increase of the income by one unit (a quartile) increases the probability of refinancing by 15%. Previous literature has similar results of Hurst & Stafford (2002) and Canner et al (2002).

The results of Model 2 for divorced, female and ability to pay are similar in sign and value to those obtained with Model 1.

Model 3, in line with Canner et al. (2002) proved the relevance of the number of children in the household. Note that in this case, and differently from Model 2, the income is measured by the income percapita in a log form (units 100 euros) (*lninc_100_cap*). Model 3 includes divorced variable (*div*) like the other two models. However, a new predictor shows positive impact: the way that the household budget is (*bdg_mng*). The demand for refinancing increases 28% when the budget is managed by the person who answer the survey compared with the situation that the budget is managed by other member of the household or in a shared form (see Appendix C for the definition).

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TABLE V

Results from The Probit regressions tested – Marginal effects after Probit.

Dependent variable: Resource to debt refinance (Refinanced) #

| Independent Variables | Model 1 | | Model 2 | | Model 3 | |
|--|---------------|--------|---------------|--------|---------------|--------|
| | dy/dx | st.dev | dy/dx | st.dev | dy/dx | st.dev |
| Income (<i>inc_Q</i>) | | | 0,151 *** | 0,036 | | |
| Income (<i>lninc_100_cap</i>) | | | | | 0,116 ** | 0,054 |
| Education (<i>educ1</i>) | 0,156 *** | 0,039 | | | | |
| Household size (<i>cohabit</i>) | 0,064 ** | 0,030 | | | | |
| Number of Children (<i>child1</i>) | | | | | 0,109 * | 0,662 |
| Age (<i>ageHO</i>) | 0,005 * | 0,004 | | | | |
| Divorce (<i>div</i>) # | -0,134 * | 0,093 | -0,143 * | 0,093 | -0,243 ** | 0,102 |
| Gender (<i>fem</i>) # | 0,123 * | 0,071 | 0,122 * | 0,072 | | |
| Ability to pay (<i>abtpay</i>) # | -0,315 *** | 0,091 | -0,391 *** | 0,062 | | |
| Annual savings (real <i>save</i>) # | 0,123 * | 0,075 | | | | |
| Budget management (<i>bdg_mng</i>) # | | | | | 0,280 *** | 0,083 |
| Number of Households | 218 | | 215 | | 175 | |
| Pseudo R² | 0,1029 | | 0,0983 | | 0,0708 | |
| Correctly Classified | 71,10% | | 68,37% | | 64,57% | |

The Table 5 present 3 specifications of the probit regressions tested. The dependent variable takes the value 1 if household refinance debt, and zero otherwise. Because of correlation between education and income, Model 1 use the variable of education and Model 2 use the variable of income. The Model 3 show that the number of children is statistically significance.

Notes: *, **, *** represent no significance, significance on the 10%, 5% and 1% levels, respectively; # indicates a dummy variable. In the independent variables column in parenthesis is the variable designation used in the regressions.

Source: Author's calculations based on the GOEC data.

Same additional explanatory variables about financial behavior were also tested: resource to credit (*creditresource*), credit in IFIC (*ific*), lack of control (*enddeflt*), financial difficulties (*Dbtfindif*) and recourse of credit Card (*crdcard*). All these phenomena were not statistically significant. The size of the sample is a big constrains to explore the potential explanatory power of those factors. This could be a future line of research to develop.

3 Conclusion and Future Research

This thesis analyses the demand for the debt refinancing by the households and the context of that demand, namely the legal frame work that rules the renegotiation between households and financial institutions. The empirical work is based on a

unique database made available by a credit counselling organization in Portugal (the GOEC). To modelling the option of the households for refinancing (or not) Probit models were estimated.

The empirical results can be summarized as follow:

(1) **Income** and **Education** have a strong and positive influence in debt refinance decision. These results are expected and converge with the majority of literature.

(2) The **household size** and the **number of children** impact positively on in debt refinance option. Greater households, have higher costs, so increase the probability of debt refinance, to smooth consumption. The result of the majority models tested and majority of literature show that importance.

(3) The **age** (*ageHO*) has positive influence in the refinancing the debt, according to some tested models. Our result does not converge with literature, which shows that age of the representative of the household has a negative effect on the the debt refinance probability, because increasing age, reduces the time available to recover the refinancing costs.

(4) Being **female** (*fem=1*) increases the probability of debt refinance. Females are more preventive, so they look for solutions to over indebtedness, such as debt refinancing.

(5) Being **divorced** has a negative impact on debt refinancing. Being married (*mrrd*) isn't statically significant.

(6) The **Ability to pay** (*abltpay*) has a negative influence in debt refinance. This can be explained by the restrictions imposed by renegotiation rules (for example the *Instrução nº 32/2013 do BdP*).

(7) Converging to most of the literature, the net saving (*real_save*) used as a proxy for wealth, is in general statistically significant to explain the debt refinance demand.

(8) Empirical evidence was not found about several factors that were expected to contribute to the explanation of debt refinancing. The case are: being married (*mrrrd*), being employed (*empl*), having an effective contract (*effctv*), being in the labor force (*laborforce*), frequency of resource to credit (*creditresource*), credit in *Instituições Financeiras de Crédito Especializado* (*ific*), lack of control (*enddeflt*), financial difficulties (*dbtfindif*) and recourse to credit card (*crdcard*).

Limitations:

This research has several limitations. The surveys about household debt collect very sensitive information. An the problem of missing data exists even when the data are collected in large scale by Eurostat (Eurostat, 2010) or European Central Bank (Machado, 2012). The quality of the database is not an exception. Surveys about financial situation (and in particular indebtedness), assume embarrassment to the respondents and require levels of financial literacy that do not exist in the population in general. Many inconclusive results are affected negatively by the data quality.

But there is also a data bias because the consumers who go to GOEC for credit counseling have indications of strong financial difficulties, so the study of households undertaking the debt renegotiation will not focus on those in a better financial situation than the consumers registered in GOEC.

Additionally, the information collection instrument is directed to the study of debt and is not a specific inquiry about renegotiation.

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The model could be developed further by testing other explanatory variables and using more sophisticated econometric methodologies.

We are aware of these limitation but we hope to contribute for shading more light on the refinancing process.

Future Research:

During the research process, several avenues for future research were identified:

- (I) To analyze the success of each type of debt refinancing. For the different types of debt refinancing (introduction of residual value, extension of the term, introduction of grace period and changes in spread / interest rate), to check agreements and doing the follow up of the results (reduction or increase of debt). This research question was the preliminary objective of this work, but the absence of chronological data did not allow to do it.
- (li) To examine the fragile financial capacity of households who wish to refinance the debt through the two parameters: duration and severity (section 1.2.5) and following the performance across time.
- (lii) To study in more deep the financial behavior in the households with new data and variables.

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Appendix A – Bibliography Resume of Refinancing Debt

| Author Publication date | Source/Data/Sample | Objective | Question Research | Methodology | Main Results |
|--|--|---|---|--|---|
| Agarwal & Driscoll & Laibson (2007) | National Bureau of Economic Research | Analytically model demonstration of mortgage refinancing when the current mortgage interest rate falls below the original rate. | "When should Borrowers refinance their mortgages?" | Analytically model demonstration | "Borrowers refinance mortgages to change the size of their mortgage and/or to take advantage of lower borrowing rates." |
| Agarwal & Chomsisengphet & Amromin & Piskorski & Ben David & Seru (2012) | Mortgage Metrics US data set from the Office of the Comptroller of the Currency (OCC); Jul08 - Dec10; N= 34 million mortgages. | Examine the ability of the government to influence debt renegotiation by Home Affordable Modification Program (HAMP) | What is the policy Intervention in Debt Renegotiation? | Statistical and Descriptive Analysis and Econometric Model | "Federal and state government efforts were aimed at encouraging mortgage renegotiations through loan modifications instead of foreclosing loans." |
| Agarwal & Rosen & Yao (2013) | First-lien prime mortgages that are securitized by Fannie Mae or Freddie Mac; 1998-2010; N= 271 216 mortgages. | Measure the economic value of the reduction in payments using the mortgage interest rate change from the initial mortgage to the refinance. | Why do borrowers make mortgage refinancing mistakes? | Descriptive Analysis and Econometric Model | "The moment ideal of the refinance is when the net present value of the interest saved exceeds the cost of refinancing. "; "the errors of commission in choosing the refinancing rate and of omission in the timing of refinancing are correlated with borrower sophistication."; "Borrowers appear to learn from the refinancing process. Refinancing errors, both of commission and omission, are smaller when a borrower refinances for the second time. There is some evidence that this might be related to the level of a borrower's financial sophistication." |
| Brady & Canner & Maki (2000) | Surveys of Consumers, University of Michigan Survey Research Center, Mar, April, May 1999; N = 1500 households | Estimates, of changes in monthly payments resulting from refinancing's, the amount of funds homeowners raised in the process, and how homeowners used the funds. Also presented are rough estimates of the aggregate effects of refinancing on the U.S. economy, including the effects on consumption spending. | What are the effects of recent mortgage refinancing? | Statistical Analysis and Descriptive Analysis | "Three factors that most commonly lead to changes in mortgage payments: a change in interest rates, a change in maturity, and a change in outstanding balance."; "on average, refinancing homeowners lengthened the maturity of their mortgage." |
| Campbell (2006)* | American Housing Surveys; 2001-2003; N = 7 610 households in 2001 and 9 749 households in 2003 | Summarizes the empirical and theoretical challenges faced by researchers studying household finance. | Evidence that households understand their own limitations and avoid financial strategies for which they feel unqualified. | Econometric Model | "The results show that younger, smaller, better educated , better off, white households with more expensive houses were more likely to refinance their mortgages between 2001 and 2003." |

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(Continuous)

| Author Publication date | Source/Data/Sample | Objective | Question Research | Methodology | Main Results |
|---|--|--|---|--|---|
| Canner & Dynan & Passmore (2002)* | Surveys of Consumers, University of Michigan Survey Research Center, Federal Home Loan Mortgage Corporation, Home Mortgage Disclosure Act data in Jan02– Jun02; N = 3 003 households. | This article presents estimates, based on recent survey findings, of the incidence of refinancing, the changes in terms and conditions of mortgages after refinancing, the amount of funds homeowners raised in the process, and the ways in which homeowners used the funds. It also provides comparisons with previous surveys of refinancing activity and a statistical analysis of the relative importance of different determinants of refinancing and the amount of home equity liquefied during refinancing. Finally, it gives rough estimates of the effects of recent refinancing on the U.S. economy, including the effects on aggregate consumption spending. | What is the determinants of refinancing? | Statistical and Descriptive Analysis and Econometric Model | "the decision to refinance was motivated by a desire to reduce their monthly mortgage payments, either by obtaining a lower interest rate or by extending the maturity of their mortgage."; " homeowners who have relatively large mortgage balances have a greater propensity to refinance because the potential interest savings are more likely to exceed the transaction costs associated with refinancing. "; " Homeowners who have refinanced their mortgages tend to have more mortgage debt than those who have not. "; " importance of various factors that may influence a homeowner's propensity to refinance, including the household's income and mortgage status, demographic characteristics, and expectations for the future. "; "The reasons that most homeowners refinance is to reduce their monthly mortgage payment, importance of interest rates, homeowners income, employment, age, education and the presence of children under 18 years of age in the home". |
| Georgarakos & Haliassos & Pasini (2013) | Dutch National Bank Household Survey (DNBHS); N = 4 500 households | Investigate the influence of social interactions and comparison effects on borrowing behavior. | Can concern with relative standing, which has been shown to influence consumption and labor supply, also increase borrowing and the likelihood of financial distress? | Descriptive Analysis and Econometric Model | "clear potential for social influences on household borrowing behavior. "; |
| Haughwout & Okah & Tracy (2010)* | FirstAmerican CoreLogic's (FACL) LoanPerformance ABS. Using data on subprime modifications that precede the government's Home Affordable Modification Program (HAMP); N = 330 724 loans. | Examine how the structure of a mortgage modification affects the likelihood that the modified mortgage re-defaults over the next year. | What determines which mortgages get a modification? | Statistical and Descriptive Analysis and Econometric Model | "Borrower payment behavior is affected by several factors, which can be classified into three broad categories: Incentive scenarios to pay, willingness to pay and ability to pay."; "As a result of the modification process, most of the delinquent loans had their payment status improved."; "In general, mortgage modifications are offered to borrowers evidencing some signs of distress. "; The success of refinancing is when received a monthly payment reduction, were moved to "current" status after the modification, and for which at least three months of post modification payment history is available. "loan modification programs will likely be more effective in limiting foreclosures and avoiding "lockin" if they are attentive to borrower incentives to pay." |
| Hunt (2007) | TrenData, Census Bureau, The Nilson Report and Federal trade Commission. | Literature Review | Why should economic scholars study the consumer debt collection process? | Descriptive Analysis | "Technology to identify customers who can not pay and customers who can pay and do not pay."; "Unsuccessful debt management that leads to regulatory intervention."; "Indicators of failure in debt management are: Excessive billing credits uninsured, Difficulty in distinguishing creditors without ability to pay and ability to pay and not pay, Consumers with difficulty to be declared insolvent."; |

Determinants of Household Debt Refinancing in Portugal

(Continuous)

| Author Publication date | Source/Data/Sample | Objective | Question Research | Methodology | Main Results |
|---------------------------------|---|--|--|--|--|
| Hurst & Stafford (2002)* | Panel Study of Income Dynamics; N = 1 448 households | This paper documents the extent to which homeowners use housing equity to smooth their consumption over time. Theoretically and empirically, a key distinction can be drawn between those refinancing their home mortgage to improve their wealth position from those who had a consumption smoothing motivation to refinance. | What is the factors that affect the decision to refinance? | Statistical Analysis, Descriptive Analysis and Econometric Model | "two reasons why a household may choose to refinance: to receive a lower stream of mortgage payments and "consumption smoothing"; "if the household did not to refinance, their consumption would be much less than their post-refinancing consumption."; "The factors that affect the decision to refinance are the change in house value, marital status, number of children, permanent income measure, age of the household head, education, race, region ". |
| Keys & G. Pope & C. Pope (2014) | CoreLogic Academic Research Council (CLARC); N = 1 000 000 observations | Analyzes the failure of households to refinance their mortgage when interest rates decline, despite substantial monetary benefits from doing so. | What is the importance of refinance households failure? | Statistical Analysis and Descriptive Analysis | "Our results suggest the presence of information barriers regarding the potential benefits and costs of refinancing. Expanding and developing partnerships with certified housing counseling agencies to offer more targeted and in-depth workshops and counseling surrounding the refinancing decision is a potential direction for policy to alleviate these barriers for the population most in need of financial education." ; "In addition, the magnitude of the financial mistakes that households make suggest that psychological factors such as procrastination, trust, and the inability to understand complex decisions are likely barriers to refinancing. " |
| Tracy & Wright (2012) | Federal Reserve Bank of New York; Sample of prime adjustable-rate mortgages; N = 173 267 loans. | Estimate the expected reduction in credit losses that would result from improvements to the HARP program. | How this mortgage payment reduction will affect the likelihood that the borrower defaults subsequent to the refinance? | Statistical Analysis, Descriptive Analysis and Econometric Model | "...there has been little research on the sensitivity of default risk to ability or inability of borrowers to exercise the option to refinance." "...the Home Affordable Refinance Program (HARP) was announced by the U.S Department of Treasury as part of a suite of housing relief programs. HARP sought to reduce obstacles to refinancing such that borrowers with high loan-to-value (LTV) ratios could gain increased access to the lower prevailing market rate for prime conforming fixed-rate mortgages." |

Notes: The * represents literature reviewed about factors of refinancing debt demand.

Source: Author's elaboration based on literature used.

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Appendix B - GOEC Survey - Transcript (in English) of the content of the document “*Ficha Técnica para Avaliação Financeira*”

| Survey Questions* | | Answer Option |
|-------------------|--|--|
| - | Process number (<i>ID</i>) | (Number) |
| - | Period (<i>Period</i>) | (Year) |
| - | Source of income (<i>SIncome</i>) | (i) salary, (ii) Pension, (iii) Rents, (iv) Others. |
| - | Net monthly remuneration household (<i>Incomedetail</i>) | (Amount) |
| A.1. | Gender (<i>Gender</i>) | (i) Female, (ii) Male |
| A.2. | Household size number of cohabitants (<i>cohabit</i>) | (Number) |
| | Household size number of children (<i>chld</i>) | (Number) |
| A.3. | Household Age: Holder (<i>AgeHolder</i>), Spouse (<i>AgeSpouse</i>), children (<i>AgeChild1</i> , <i>AgeChild2</i> , <i>AgeChild3</i> , <i>AgeChild4</i>), and others members of household (<i>AgeOther1</i> and <i>AgeOther1</i>) | (Number) |
| A.4. | Region (<i>Region</i>) | (i)North, (ii) Center, (iii) Lisbon, (iv) Alentejo, (v) Algarve, (vi) Açores, (vii) Madeira. |
| A.5. | What is your marital status? (<i>Marital_Status</i>) | (i) not married, (ii) married, (iii) Divorced, (iv) widower |
| A.6. | What is your level of education? (<i>Education</i>) | (i) 4th year, (ii) 5th-6th year, (iii) 7th-9th year, (iv) 10th-12th year, (v) Technician, (vi) university, (vii) Post graduation or superior |
| A.7. | What is your laboral situation? (<i>Emplstat</i>) | (i) Full time, (ii) part time/casual, (iii) independente, (iv) Retired, (v) Unemployment, (vi) Domestic, (vii) Student, (viii) Voluntary, (ix) Other |
| | Unemployment Allowance (<i>Unemployment</i>) | (i)No, (ii) Yes. |
| | Monthly unemployment allowance (<i>MUnempl</i>) | (Amount) |
| | Starting date of the Unemployment Benefit (<i>SdateUnemplo</i>) | (Date) |
| | Date End of the Unemployment Benefit (<i>FdatUnemplo</i>) | (Date) |
| A.8. | What type of employment relationship? (<i>ContUnempl</i>) | (i) Effective, (ii) contract for a fixed term, (iii) contract term or precarious, (iv) part-time contract, (v) No contract |
| A.9. | Professional Occupation (<i>Occup</i>) | (i) Undifferentiated, (ii) skilled workers, (iii) superior technical, (iv) employer, (v) executive, (vi) Other. |
| B.1 | Who manages the family budget (<i>Budget</i>) | (i) Own, (ii) other person, (iii) jointly. |
| B.2 | How often saves ? (<i>Frqsaf</i>) | (i) Every month, (ii) between 4 to 12 months per year, (iii) Annually, (iv) Never. |
| B.3. | What type of financial institution that normally use? (<i>FinInt</i>) | (i) Banks, (ii) financial corporations, (iii) Other institutions |

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| | | |
|---------------|--|--|
| B.4. | What kind of payment used in their purchases? (<i>Kindpaym</i>) | (i) Money, (ii) Bank transfers, (iii) debit card, (iv) Check, (v) Credit Card, (vi) Others. |
| B.5. | How often using credit? (<i>Credit</i>) | (i) At least once a week, (ii) twice per month, (iii) once a month, (iv) occasionally, (v) rarely, (vi) never. |
| B.6. | a) Number of contracted credits (<i>Ndebts</i>); b) Number of mortgage loans contracted (<i>Nloans</i>); c) Number of credits cars contracted (<i>Ncars</i>); d) Number of personal contracted loans (<i>Nper</i>), e) Number of credit cards (<i>Ncards</i>); f) Number of other credits (<i>Nother</i>), g) Housing Mortgage loans Value (<i>mortgage</i>) ; h) Monthly payment of mortgage loans (<i>mortagage1</i>) | (Number) |
| B.6.1. | a) Assessed value of housing purchased on credit. (<i>hous</i>); b) Assessed value of housing purchased on credit. (<i>hous2</i>); c) Property Valuation Date (<i>prop</i>) | (Amount) |
| B.7. | What are the reasons that lead to resort to credit? (<i>Reascred</i>) | (i) Accede to essential goods, (ii) pay other debts, (iii) improve the lifestyle, (iv) ease in obtaining credit, (v) marketing, (vi) financial difficulties, (vii) help a a familiar / friend, (viii) another. |
| B.8. | Number of debt for non payment of goods and services. (<i>Ndeflt</i>) | (Number) |
| B.9. | Reason for non payment of debts in arrears? (<i>Reasdeflt</i>) | (i) Lack of control, (ii) reduction of household income, (iii) worsening credit costs, (iv) loss of employment, (v) death of a household member, (vi) divorce , (vii) disease. |
| B.10. | Total value of loans without credit housing. (<i>Ncred</i>) | (Amount) |
| | Total monthly installment of outstanding claims. (<i>Mpayment</i>) | (Amount) |
| | Number of credit without default (<i>Nwdeflt</i>) | (Number) |
| B.11. | Total monthly Expenses **(<i>Totmontexpenses</i>) | (Amount) |
| B.12. | Monthly Household Savings Household (<i>MonthSave1</i>) | (Amount) |
| B.13. | Intention to resolve the financial situation? (<i>Willpay</i>) | (i) Yes, (ii) No |
| B.14. | What type of resource you want to use to solve your situation? (<i>Reneg1</i>) | (i) Renegotiating debt with banks, (ii) use of credit counseling, (iii) use of other credit companies that carry out the consolidation and renegotiation of credits |

Notes: The * represents the names in the parenthesis are variables that have been defined to identify the survey questions. The ** represents the question nº B.11. "Total monthly Expenses" (*Totmontexpenses*) is the sum of all household monthly expenses with housing, communications, food, transportation, education, health and other expenses.

Source (original in Portuguese): "Ficha Técnica para avaliação financeira", conducted by GOEC between 2012 and 2016. The Author made the translation to English and the inclusion of the variable names.

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Appendix C - Dependent and Independent variables description

Dependent Variable

| Variable* | Description | Survey Question** |
|--|--|---|
| Debt Refinance <i>(Refinanced)</i> | For the purpose of this work, a dummy variable is assigned to those respondents who “Renegotiating debt with banks”. Refinanced=1, for those indicating that they renegotiating debt with banks [answer option (i), see next column]those indicating they use (i) and/or (ii) and/or (iii) also correspond to 1 ; and =0 for all respondents indicating that they use of credit counseling or use of other credit companies that carry out the consolidation and renegotiation of credits [answer option (ii)and/or (iii) but not option (i) see next column]. | B.14." What type of resource you want to use to solve your situation? (i) Renegotiating debt with banks (ii) use of credit counseling (iii) use of other credit companies that carry out the consolidation and renegotiation of credits." Note: the alternatives are not mutually exclusive. |

Independent Variables (socio demographics)

| Variable* | Description | Survey Question** |
|---|---|--------------------------------|
| Income <i>(Income_detail)</i> <i>(inc_Q)</i> <i>(Ininc_100_cap)</i> <i>(incap_Q)</i> | <i>Income_detail</i> - Net monthly income household. <i>inc_Q</i> - Created as variable organized in quartiles, where the 1Q ranges from 0 thru 505, the 2Q from 505 thru 746, the 3Q from 746 to 1222 and the 4Q from 1 222 thru the highest. <i>Ininc_100_cap</i> – Income per capita, divided by 100. <i>Ininc_100_cap</i> – Income per capita in quartile. | "Net monthly income household" |

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| | | |
|---|---|---|
| Education (<i>educ1</i>) | Level of education. Created as variable with following answers: primary education [answer option (i), see next column] , basic education [answer option (ii) and (iii), see next column] , secondary education [answer option (iv) and (v), see next column], and superior education [answer option (vi) , see (vii) column] . | A.6. "What is your level of education? (i) 4th year, (ii) 5th-6th year, (iii) 7th-9th year, (iv) 10th-12th year, (v) Technician, (vi) university and (vii) Post graduation or superior |
| Household Size (<i>cohabit</i>) (<i>famzise1up</i>) | <i>cohabit</i> - Number of cohabitants of the household <i>famzise1up</i> - Dummy variable that assumes the value 1 if the number of cohabitants of the household it is greater than 1 person, and 0 if have just 1 person. | A.2. "Household size number of cohabitants" |
| Children (<i>chld</i>) (<i>chld1</i>) | <i>chld</i> - Number of children of the household <i>chld1</i> - Created as variable with 3 groups: (i) household without children, (ii) household with one child and (iii) household with more than one child. | A.2. "Household size number of children" |
| Age (<i>ageHO</i>) (<i>ageq</i>) (<i>age_g</i>) | <i>age HO</i> - Based on the household representant's age, limited to respondents between 24 and 77 years. <i>ageq</i> - Indicator for age ² also constructed, which is equal to <i>ageHO</i> * <i>ageHO</i> <i>age_g</i> - Created as variable in two groups, where the <i>age_g</i> =1 , when age is from 24 to 65 years and <i>age_g</i> =0, when age is from 65 years thru the highest. | A.3. "Household Age Holder" |
| Gender (<i>fem</i>) | Binary variable where 1 is assigned to the respondents of the feminine sex. | A.1. "Gender" |
| Marital Status (<i>mrrd</i>) (<i>div</i>) | <i>mrrd</i> - Dummy variable that assumes the value 1 if the respondent is married and 0 otherwise. <i>div</i> - Dummy variable that assumes the value 1 if the respondent is divorced and 0 otherwise. | A.5. "What is your marital status? (i) not married, (ii) married, (iii) Divorced and (iv) widower." |
| Employment Status (<i>empl</i>) (<i>effctv</i>) (<i>laborforce</i>) | <i>empl</i> - Dummy variable that assumes the value 1 if employed [answer question A.7. option (i), (ii) and (iii), see next column] and value 0 if not employed [answer question A.7. option (v),see next column]. <i>effctv</i> - Dummy variable takes the value 1 if it is effective at work [answer question A.8. option (i) see next column] and value 0 if not effective [answer question A.8. option (ii), (iii), (iv), and (v) see next column]. <i>laborforce</i> - Dummy variable takes the value 1 if it is active population [answer question A.7. option (i), (ii), (iii) and (v) see next column] and value 0 if it is inactive population [answer question A.7. option (iv), (vi), (vii), (viii) see next column]. | A.7. "What is your laboral situation? (i) Full time, (ii) part time/casual, (iii) independent, (iv) retired, (v) unemployment, (vi) Domestic, (vii) student, (viii) voluntary and (iv) other." A.8: "What type of employment relationship? (i) Effective, (ii) contract for a fixed term, (iii) contract term or precarious, (iv) part-time contract and (v) no contract." |

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Independent Variables (financial behavior)

| Variable* | Description | Survey Question** |
|--|---|--|
| Resource of Credit <i>(creditresource)</i> | Dummy variable <i>creditresource</i> that assumes the value 1 if use credit [answer question B.5. option (i), (ii) , (iii) and (iv), see next column] and value 0 if not used credit [answer question B.5. option (v) and (vi), see next column]. | B.5. "How often using credit? (i) At least once a week (ii) twice per month, (iii) once a month, (iv) occasionally, (v) rarely and (vi) never" |
| Credit in IFIC <i>(ific)</i> | Dummy variable <i>ific</i> that assumes the value 1 if resource to the banks [answer question B.3. option (i), see next column] and value 0 if resource to other financial institutions that do not belong of the traditional banks groups [answer question B.3. option (ii) and (iii), see next column]. | B.3. "What type of financial institution that normally use? (i) Banks, (ii) financial corporations and (iii) other institutions." |
| Lack of control <i>(enddeflt)</i> | Dummy variable <i>enddeflt</i> that assumes the value 1 if the reason for non-payment of debt in default are exogenous to the household, so are out of the control of the household [answer question B.9. option (i), see next column] and value 0 if the reason for non-payment of debt in default are endogenous to the household, so household have control to prevent the reason for non-payment of debt in default [answer question B.9. option (ii), (iii), (iv), (v), (vi) and (vii) see next column]. | B.9. "Reason for non-payment of debts in arrears: (i) Lack of control, (ii) reduction of household income, (iii) worsening credit costs, (iv) loss of employment, (v) death of a household member, (vi) divorce and (vi) disease." |
| Financial difficulties <i>(Dbtfindif)</i> | Dummy variable <i>Dbtfindif</i> that assumes the value 1 if the reason to resort credit are related with financial difficulties [answer question B.7. option (ii) and (vi) ,see next column] and value 0 if the reason to resort credit are related to the consumption [answer question B.7. option (i), (iii), (iv), (v), (vii) and (viii), see next column]. | B.7. "What are the reasons that lead to resort to credit? (i) Acess to essential goods, (ii) pay other debts, (iii) maintain / improve the lifestyle, (iv) ease in obtaining credit, (v) marketing, (vi) financial difficulties, (vii) help a familiar / friend and (viii) another." |

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| | | |
|--|---|--|
| <p>Resource of credit card (<i>crdcard</i>)</p> | <p>Dummy variable <i>crdcard</i> that assumes the value 1 if use credit card in purchases [answer question B.4. option (v), see next column] and value 0 if not used credit card [answer question B.4. option (i), (ii), (iii), (iv) and (vi), see next column].</p> | <p>B.4. "What kind of payment used in their purchases? (i) money, (ii) bank transfers, (iii) debit card, (iv) check, (v) credit card and (vi) others."</p> |
| <p>Annual savings (<i>real_save</i>)</p> | <p>Dummy variable that assumes the value 1 if the respondent can save and 0, otherwise. The Dummy variable was raised by formula: $real_net_save = net_annual_inc + annual_save - annual_financ_charges - anualExp$. If $real_net_save > 0$ the variable $real_save = 1$, if $real_net_save \leq 0$ the variable $real_save = 0$. The variables <i>net_annual_inc</i>, <i>annual_save</i>, <i>annual_financ_charges</i> and <i>anualExp</i> are answers of question B.11. , but these were recoded, as attachment Appendix D, to make possible the exposed formula back.</p> | <p>B.11. "Monthly expenses of the household"</p> |
| <p>Ability to pay (<i>abltpay</i>)</p> | <p>Dummy variable that assumes the value 1 if the respondent have ability to pay debts and 0, otherwise. The Dummy variable was raised by calculation of following variables: repayment term debt in years (<i>DTI</i>) and average life expectancy (<i>avlifeexp</i>), as attachment Appendix D. If $DTI < avlifeexp$ the variable $abltpay = 1$, if $DTI > avlifeexp$ the variable $abltpay = 0$. The variables <i>DTI</i> and <i>avlifeexp</i> are answers of question B.11. , but these were recoded, as attachment Appendix D, to make possible the exposed formula back.</p> | <p>B.11. "Monthly expenses of the household"</p> |
| <p>Budget management (<i>bdg_mng</i>)</p> | <p>Dummy variable <i>bdg_mng</i> that assumes the value 1 if the respondent manage the family budget alone[answer question B.1. option (i), see next column] and value 0 otherwise[answer question B.1. option (ii) and (iii), see next column].</p> | <p>B .1. "Who manages the family budget? (i) Own, (ii) other person, (iii) jointly."</p> |

Notes: The * represents variables general name and in the parenthesis is the designation used in the regressions and ** correspondent question of the survey "Ficha Tecnica para avaliação financeira".

Source: Author's construction based on the survey "Ficha Tecnica para avaliação financeira", conducted by GOEC.

Appendix D - Auxiliary variables description

| Variable* | Description | Survey Question** |
|---|--|--|
| <p>Total Debt Value (<i>debt_value</i>)</p> | <p>The variable <i>debt_value</i> is the sum of variable <i>mortgage</i> and <i>Ncred</i> [values given in question B.6. and B.10. see next column]. Exemplifying: $debt_value = mortgage + Ncred$</p> | <p>B.6: "Housing Mortgage loans Value" (<i>mortgage</i>) B.10: "Total value of loans without credit housing" (<i>Ncred</i>)</p> |
| <p>Annual financial charges (<i>annual_financ_charges</i>)</p> | <p>The variable <i>Annual_financ_charges</i> is the sum of variable <i>mortgage1</i> and <i>Mpayment</i> , multiplied by 12 months [values given in question B.6. and B.10. see next column] . Exemplifying: $Annual_financ_charges = (mortgage1 + Mpayment) * 12 months$</p> | <p>B.6. "Monthly payment of mortgage loans." (<i>mortgage1</i>) B.10. "Total monthly installment of outstanding claims." (<i>Mpayment</i>)</p> |
| <p>Annual income (<i>net_annual_inc</i>)</p> | <p>The variable <i>net_annual_inc</i> is the variable <i>income_detail</i> , multiplied 14 months [values given in the first survey question, see next column]. In Portugal the annual income equivalent to income received in 14 months. Exemplifying: $net_annual_inc = Income_detail * 14 months$</p> | <p>"Net monthly remuneration household." (<i>income_detail</i>)</p> |
| <p>Annual liquid assets (<i>annual_save</i>)</p> | <p>The variable <i>annual_save</i> is the variable <i>monthsave1</i> , multiplied by 12 months [values given in question B.12. see next column] . Exemplifying: $annual_save = monthsave1 * 12 months$</p> | <p>B.12. "Monthly Household Savings Household." (<i>monthsave1</i>)</p> |
| <p>Annual Expenses (<i>anualexp</i>)</p> | <p>The variable <i>anualexp</i> is the variable <i>totmontexpenses</i> , multiplied by 12 months [values given in question B.11. see next column] . Exemplifying: $anualexp = totmontexpenses * 12 months$</p> | <p>B.11. "Total monthly Expenses." (<i>totmontexpenses</i>)</p> |

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| | | |
|---|---|--|
| Annual Net Savings <i>(real_net_save)</i> | <p>The variable aims to estimate the value of annual net savings of households. The variable <i>real_net_save</i> is the sum of income and liquid assets, minus expenses with household and with loans.</p> <p>Exemplifying: $real_net_save = net_annual_inc + annual_save - annual_financ_charges - anualexp$</p> | |
| Repayment term Debt in years <i>(DTI)</i> | <p>(Haughwout et al, 2010) refer that the DTI it is a ratio to estimate the ability to pay of household. The DTI ratio - Debt to Income, computed by the cost of the loan payment (including principal, interest, taxes and insurance) as a share of income. If assume that the income is annual, and interest rate is constant, the DTI ratio indicates the number of years to repay the debt.</p> <p>To calculate the DTI ratio (variable <i>DTI</i>), is debt value to annual income.</p> <p>Exemplifying: $DTI = debt_value/net_annual_inc$</p> | |
| Average life expectancy <i>(avlifexp)</i> | <p>The variable life expectancy (<i>avlifexp</i>) was determined based on the Mortality Tables for Portugal, for the period 2012-2014, classified by INE, depending on age (<i>ageHO</i>) and gender (<i>fem</i>) of the respondent.</p> | |

Notes: The * represents auxiliary variables, used to calculate two independent variables: Annual savings (*real_save*) and Ability to pay (*abltpay*)

** Correspondent question of the survey "Ficha Técnica para avaliação financeira".

Source: Author's construction based on the survey "Ficha Técnica para avaliação financeira", conducted by GOEC.

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Appendix E - Means of socio demographics and financial behavior variables for those households with did and did not refinance, during the period 2012-2016.

| Independent variables | Dependent variable | | | | | |
|---|--------------------|-------|-----------------------------|--------|---------------------------------|-------|
| | Total | | Refinance (Refinanced=1) | | Non Refinance (Refinanced=0) | |
| | N | Mean* | N | Mean* | N | Mean* |
| Income | | | | | | |
| Net monthly remuneration of household (<i>Incomedetail</i>) | 284 | 994,0 | 158 | 1131,4 | 126 | 822,2 |
| Quartile income (<i>inc_Q</i>) | 284 | 2,6 | 158 | 2,8 | 126 | 2,3 |
| Household Income per capita (<i>inc_cap</i>) | 278 | 461,2 | 157 | 501,8 | 121 | 408,5 |
| Quartile Household Income per capita (<i>inc_cap</i>) | 278 | 2,6 | 157 | 2,6 | 121 | 2,4 |
| Education | | | | | | |
| Education levels (<i>educ1</i>) | 289 | 2,5 | 162 | 2,7 | 127 | 2,3 |
| Household size | | | | | | |
| Household size number of cohabitants (<i>cohabit</i>) | 283 | 2,7 | 161 | 2,8 | 122 | 2,5 |
| Number of Children | | | | | | |
| Household size number of children (<i>chld</i>) | 192 | 1,7 | 114 | 1,8 | 78 | 1,6 |
| Age | | | | | | |
| Household Age Holder (<i>ageHO</i>) | 270 | 45,4 | 155 | 45,2 | 115 | 45,8 |
| Gender | | | | | | |
| Dummy: Be female (<i>fem</i>) | 284 | 50% | 162 | 54% | 122 | 45% |
| Marital Status | | | | | | |
| Dummy: Be married (<i>mrrd</i>) | 289 | 53% | 162 | 59% | 127 | 46% |
| Dummy: Be divorced (<i>div</i>) | 289 | 23% | 162 | 18% | 127 | 29% |
| Employment Status | | | | | | |
| Dummy: be employed (<i>empl</i>) | 239 | 68% | 141 | 71% | 98 | 63% |
| Dummy: be effective (<i>effctv</i>) | 158 | 65% | 98 | 66% | 60 | 63% |
| Dummy: be active population (<i>laborforce</i>) | 285 | 84% | 159 | 89% | 126 | 78% |
| Financial Behaviour | | | | | | |
| Dummy: Use of Credit (<i>creditresource</i>) | 249 | 45% | 143 | 49% | 106 | 40% |
| Dummy: Have credit in IFIC (<i>ific</i>) | 228 | 37% | 136 | 35% | 92 | 39% |
| Dummy: Have default due to lack of control (<i>enddeflt</i>) | 246 | 16% | 131 | 20% | 115 | 11% |
| Dummy: Use of credit due to financial difficulties (<i>Dbtfindif</i>) | 251 | 71% | 142 | 72% | 109 | 70% |
| Dummy: Recourse to Credit Card to purchase (<i>crdcard</i>) | 281 | 17% | 159 | 20% | 122 | 11% |
| Dummy: Households with annual savings (<i>real_save</i>) | 289 | 36% | 162 | 38% | 127 | 35% |
| Dummy: Households with Ability to pay (<i>abltpay</i>) | 223 | 94% | 129 | 92% | 94 | 98% |
| Number of Households | 289 | | 162 | | 127 | |

Notes:

- a) for dummies variables, the mean is interpreted as a percentage.
- b) In the independent variables column in parenthesis is the variable designation used in the regressions.

Source: Table adapted by the author based on the GOEC data.

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Appendix F - Results of additional Probit models tested

Dependent variable: Resource to debt refinace (*Refinanced*) #

| Independent Variables | Model A | | Model B | | Model C | | Model D | | Model E | | Model F | | Model G | |
|--|---------------|-----|---------------|-----|---------------|-----|---------------|-----|---------------|-----|---------------|-----|---------------|-----|
| Income (<i>inc_Q</i>) | (+) | *** | (+) | *** | | | | | | | | | | |
| Income (<i>lninc_100_cap</i>) | | | | | | | | | | | | | | |
| Education (<i>educ1</i>) | | | | | (+) | *** | (+) | *** | (+) | *** | (+) | *** | (+) | *** |
| Household size (<i>cohabit</i>) | (+) | * | | | (+) | *** | (+) | ** | (+) | ** | (+) | ** | (+) | ** |
| Number of Children (<i>child1</i>) | | | | | | | | | | | | | | |
| Age (<i>ageHO</i>) | | | | | (+) | * | | | | | | | | |
| Divorce (<i>div</i>) # | | | | | | | | | | | (-) | * | | |
| Gender (<i>fem</i>) # | (+) | * | (+) | * | (+) | * | (+) | * | | | | | | |
| Ability to pay (<i>abltpay</i>) # | (-) | *** | (-) | *** | (-) | ** | (-) | *** | (-) | *** | (-) | *** | (-) | *** |
| Annual savings (<i>real_save</i>) # | | | | | (+) | ** | (+) | * | (+) | * | | | | |
| Budget management (<i>bdg_mng</i>) # | | | | | | | | | | | | | | |
| Number of Households | 214 | | 215 | | 218 | | 219 | | 222 | | 222 | | 222 | |
| Pseudo R² | 0,0983 | | 0,0902 | | 0,0957 | | 0,0902 | | 0,0845 | | 0,0845 | | 0,0786 | |
| Correctly Classified | 67,76% | | 69,30% | | 69,72% | | 68,95% | | 66,22% | | 65,77% | | 65,32% | |

Notes:

- a) ▫, *, **, *** represent no significance, significance on the 10%, 5% and 1% levels, respectively;
- b) The signs (+) and (-) represent the positive and negative influence of the independent variable in the refinancing demand factors model;
- c) # indicates a dummy variable.
- d) In the independent variables column in parenthesis is the variable designation used in the regressions.
- e) The following variables were also tested, but given the quality of the results are not included in this table:

Source: author's calculation based on the GOEC data.