The determinants of Over-indebtedness: case study in Portugal

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Abstract:

In Portugal the discussion over the problem of over-indebtedness is of the public domain. Crucial to inform any policy initiative in this respect is the understanding of the main characteristics of the consumers in non-compliance with debts namely with respect to their consumption pattern, education, sector of activity, etc, in addition to the identification of lenders main characteristics. The present paper is a first attempt to investigate the determinants of over-indebtedness and identify the methodological questions that arise in this type of field surveys centered on the household. The results show that the most important factors that should be considered in analyzing over-indebtedness are: sector of activity of the head of the householder; financial charges ratio over the household revenue; consumption expenses value; estimative of the financial needs of the household; and household employment composition. These findings are particularly important for policy purposes. First, they reveal the relevance of conducting field studies on a smaller geographical scale such as municipalities as we identified some determinants of over-indebtedness have a regional character. Second, the significance of the households' perceptions regarding their financial situation demonstrates the urgency of implementing policies to increase households' literacy level.

I. Introduction

Over-indebtedness is the result of economic decisions by two types of agents: consumers and financial institutions in general. In addition it results from the economic conditions where the agents take their decisions, in particular the economic environment for the consumer.

The over-indebtedness may be active, if it results from deliberate actions of the debtor, or it may be passive if it results from unforeseeable circumstances such as divorce, health conditions, unemployment, etc.

To identify the problem of over-indebtedness we compute some indicators. The degree of financial effort compares the financial costs of the consumer to his disposable income for a given time period or moment. Contrary to some other studies, the unit of analysis is the household. This choice accommodates the fact that consumers have debts from a variety of sources including financial and non-financial. Moreover, previous studies have shown that the relationship of consumers with financial institutions is multiple in the sense that the consumer usually has a main financial institution but also has business with other institutions both in terms of loans and also investments.

Before going into more detail in our empirical analysis it is important to clarify some issues. First, consumer loans are a legitimate and current practice in market economies. In fact, as suggested by Dunkelberg and Stafford (1971) credit smoothes the consumption path. Young families use credit with presumably high costs as they expect high rates of return from investing in household durables, training and education. House loans constitute an investment that satisfies one basic need of any human being. On the other hand, consumption loans enable some consumers to buy certain goods that otherwise they would not be able to acquire. However, it is important that financial institutions have perfect information for approving credits and it is important that the consumers have all the information to take a calculated decision.

House loans are long-term loans that have the mortgaged house as the guarantee of payment; consumer loans, on the other hand, are short term unsecured loans and the only guarantee of payment is the consumers' income, which in most cases is just the wage.

Society may deal with the problem of over-indebtedness in two distinct ways. Over-indebtedness may be a permanent non-compliance with payment of legal debt and

consequently it must be addressed within the judicial system. On the other hand, it may constitute a temporary problem that demands renegotiation, extra-judicial agreements, or a negotiated solution that balances the interests of the lender and the borrower. The first approach is usually adopted by financial institutions as a last resort, as the second usually comes to terms sooner and avoids some social costs for the state, for example subsidized rents and other kinds of support.

The options referred are reflected in alternative legal regimes to deal with consumers' debt problem. One option is designated by *fresh start* adopted in the US which consists of the following. After the legal execution of the debtor's patrimony almost all debts are forgiven and no fraction of future income is kept.[1] In the *re-education* system, after the execution of the debtor's patrimony, a fraction of the consumer's future income is kept to continue payment of the standing debts. The implementation of the re-education option has struggled with some problems as typically the consumers in bankruptcy, have very low incomes also in addition to higher difficulties in being integrated in the labor market. One important implication of bankruptcy laws is their effect on consumers' ability to deal with uncertain facts of life, such as divorce, unemployment, and medical conditions, and with uncertainty regarding the intertemporal allocation of income.[2]

In Portugal the discussion over the problem of over-indebtedness is of the public domain, however it appears not to be as serious as in other countries. Nevertheless it is urgent and important to trace the main characteristics of the consumers in non-compliance with debts namely with respect to their consumption pattern, education, sector of activity, etc. In addition it is important to trace lenders main characteristics. The knowledge of these characteristics for both lenders and borrowers enables a comparison with other countries and may give some insights of which regulatory regime would be more effective to deal with the problem of over-indebtedness in Portugal. The present paper is a first attempt to investigate and identify the methodological questions that arise in this type of field surveys where the unit of analysis is the consumer and not the financial institutions. Our case study is over a municipality in the north of Portugal. The paper is structured as follows. The next

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[1] Not all debts are redeemable. Exceptions include: recent income taxes, alimony and child support, government supported educational loans, and incomes from illegal activities. Finally, homeownership is not protected consequently the home may be used to pay some debt.

[2] Livshits, McGee, and Tertilt (2006) empirically evaluate these relationships comparing the two alternative bankruptcy laws in the US to the situation with Germany.

section reviews the economic principles guiding the consumers' behavior regarding financial decisions of consumption and investment. Next we turn to the characterization of the sample and to the of data collection process. Section IV is dedicated to the empirical analysis of the determinants of consumers' over-indebtedness. Section V concludes the paper with some concluding remarks.

II. Theoretical Setting

According to the Life-Cycle / Permanent Income model by Ando and Modigliani (1963), consumers choose an optimal path of consumption for their lifetime; consequently younger consumers are relatively more indebted relative to future income than middle aged consumers that tend to save for retirement. Thus the chosen consumption level is based on total expected income over the consumers' life years and it does not depend on the income available at any particular moment. Notice however that at any moment the income available for a family depends on past income and not on future potential development of the family's income. The result is that in a perfect information world with no uncertainty and perfect foresight there is no over-indebtedness according to this model. All over-indebtedness comes from negative unexpected external shocks that reduce consumers' permanent income. In the face of this external cost two situations may take place. Either the consumer is able to adjust his consumption pattern to the new income level and continue satisfying his financial compromises; or the consumer is not able to accommodate the shock by adjusting his consumption pattern and is unable to pay his debt including the present value of the interest in debt. This case is designated by "permanent bankruptcy".

To empirically test the life-cycle model we need to collect data on individual's opinions on whether they find themselves in difficulties for paying financial loans and other types of loans, or if they consider themselves in over-indebtedness. In addition, information on consumers' allocation of income between consumption and savings is important. A final analysis of over-indebtedness by education level and age of the head of the family (defined as the person that contributes the most to the family's income) may give some insight about the life-cycle theory at the family level.

In referring to family over-indebtedness and not to the individual level we should expect some differences.

In particular, we expect individuals in the same age group to have similar behavior with respect to the debt in different income levels. We should also expect significant differences in the probability of incurring in over-indebtedness for individuals with different characteristics relative to the characteristics of the group. It is not clear that we can find significant differences in the ratios debt/wealth or debt payment/income. Such a measure of permanent income based on the age is based on subjective notions of observed behavior and not on objective criteria such as the risk of non-compliance with debt, assuming that such a measure can be computed and is stable among groups of income and time. Moreover although we could compute sustainable levels of debt according to income level, it is not easy to forecast future income or its variation in turn of some central tendency.

According to the permanent income model we expect consumers in the same income group to have similar debt ratios in the same age group. We should nevertheless expect a decrease in the proportion of individuals with payment difficulties as income increases. Finally according to this model of behavior if consumers do not exhibit myopic preferences or liquidity constraints, we should find a U-shaped curve between the ratio of consumption relative to income and to age.

Underlying the permanent income/life cycle model is the assumption that consumers face no liquidity constraints. However, there is some evidence that such constraints do exist and it is important to determine how they affect, if at all, consumers' decisions regarding consumption and savings. Cox and Jappelli (1993) classify a household as constrained if they report having been denied credit or if the household has in the past though that if they applied for credit it would have been denied. They find that the probability of being unconstrained increases with age, permanent income and net wealth. Larger households and households living in less densely populated areas are less likely to be unconstrained. Finally, they found that the desired debt increases with age until the household head reaches mid thirties and then declines.

Domowitz and Sartain (1999) study household decisions to file for bankruptcy in the US using household level data. They find that the main determinants to file for

bankruptcy are medical expenses and credit card debts, together with home ownership. These variables also explain the choice between filling under the *fresh-start* option or the *re-education* option.

In the empirical work that follows a family is considered in over-indebtedness if it reports to have difficulty in paying its debts and/or loans, or if its' financial debt payments are higher than its income. After classifying the families according to this criterion we analyze the characteristics of each of the two groups according to family income and age of the head of the family. If the distribution of the proportion of over-indebted by these variables agrees with theory predictions we may be reasonably confident of the reliability of our measure. We then add the other dimension of the life-cycle theory, the ratio of consumption/income relative to age, which should exhibit a U-shaped curve. In addition we compare the ratio of consumption/income among the groups of over-indebted and not over-indebted, and the connection between these and the head of family's age and family income.

An important issue in applied research using questionnaires is the quality and reliability of the information collected. Assuming that self-reporting is an appropriate procedure to truthfully reveal information may not be a widely accepted practice. However, as explained in the next section, there is some evidence that for some information self-reporting reveals information very closely related to the truth. For other type of information, such us financial information, we should expect some biases as we discuss in the next section.

III. Empirical model

The Sample

The questionnaire was administered by trained interviewers during January and February 2005. Overall 676 families were interviewed with a total of 2146 individuals, all interviews took place at the household residency. The sample was randomly selected from a pre-defined set containing areas from the municipality that were judged representative by local political leaders. Table 1 contains information on the distribution of the sample by *freguesia* (a smaller administrative division of the municipality). In total 676 families were interviewed, which represents 5.66% of the total number of families in the municipality. The representation by *freguesia* (the smaller administrative unit) was between 4 and 7%. In total we collected information on 2146 individuals with a reasonable geographical representation.

Table 1_Population and sample composition by *freguesia*

	Number of families (population)	Streets (Sample)	Families (Sample)	Individuals (Sample)	Percentage of families in population
Trofa	11945	217	676	2146	5.66
1_Alvarelhos	943	19	66	217	7.00
2_Bougado (Santiago)	2102	47	102	355	4.85
3_Guidões	603	21	30	99	4.98
4_Covelas	491	15	17	54	3.46
5_Muro	620	11	25	80	4.03
6_Coronado (S. Romão)	1312	19	91	289	6.94
7_Coronado (S. Mamede)	1364	32	68	200	4.99
8_Bougado (S. Martinho)	4510	53	277	852	6.14

The sample was randomly selected and stratified by resident population in the *freguesia*. The selection of households to be interviewed in each *freguesia* was defined as follows. Taking the geographical centre of the *freguesia* as the starting point we defined, together with local agents, representative areas of the *freguesia*. In each area we started interviewing the first house and then interviewed every 5 houses in the predefined interviewing track. After completing the first round of interviews, we checked the geographical composition of the sample by *freguesia*. Although, the households to be interviewed were informed in advance by mail that had been selected for take part in this study and of the general objectives of the research, some refused to take part. Those households that did not explicitly refuse to participate but missed a scheduled interview twice were excluded from the sample. To overcome these non-responses we conducted the second round of interviews. The second round was conducted within the 2 month period.

The questionnaire was composed of nine groups of questions. The first five groups are intended to characterize the building and the house where the household lives; the composition of the household with respect to age, number of members, education, occupation, etc. It took about 10 minutes to complete this part of the questionnaire. The last four groups of questions were on income, consumption expenditures, financial responsibilities and savings. The completion of the last part took around 20 minutes.[3]

Most families in the final sample live in separate houses, and only 18% live in rented property. Overall, 36.3% pay house mortgage, and two thirds acquired a new house (Table 2A).

Table 2A: Characteristics of the residency

Variable	Percentage	Variable	Percentage
Separate house	42.87	Own property	43.38
House in urban area	20.55	Own property with financial responsibilities	36.30
Apartment	34.06	Rented	18.46
Other	2.51	Acquired new residencies	59.51

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[3] The questionnaire is available from the authors upon request.

		Acquired used house	27.68

The vast majority of the individuals live with their families (95.2%), only 1.54% live alone. Average household size is between 3 and 4 individuals. In total, 4.85% of the respondents live in a household that is composed by at least one individual with some physical or mental impairment (the degree of impairment is 68% below full abilities, on average- table 2B). Overall, 76.4% of respondents have over 18 years old (the age varied between 2 months and 91 years).

Table 2B General composition of households

Variable	Percentage
Live with family	95.20
Live alone	1.54
Size of household	3.65
Number of members with less than 18 years old	24.84
Number of members with more than 18 years old	76.42
At least one family member has some physical or mental impairment	4.85
Degree of impairment	68.37

In order to evaluate the financial needs of the households we included a series of questions on the ownership of assets that may be related with loans and financial responsibilities. Households with a car represent 80,7% of the sample, and 40,7% own a computer, however only 21,4% have internet connection and only 23,4% have cable TV. On the other hand 8% of the households have a second house (Table 2C).

Table 2C: Equipments

Variable	Percentage
Household with second house	7.95
Mobile phone	82.2
Cable TV	23.4

Computer	40.9
Internet access	21.4
Car	80.7

Saving habits are an important variable to characterize the risk of a household to be in over-indebtedness. Around one third of the households increased their savings in the last 12 months, however 12,4% received some in-kind help also in the last 12 months. If we consider household production[4] as a form of saving, then the percentage of households with savings in the last year increases to 46,8%. With respect to insurance, which constitutes a safeguard against negative unpredictable events, around 76% of the respondents subscribes at least one insurance contract and 20% have some kind of banking savings plan (Table 2D).

Table 2D: Savings

Variable	Percentage
Has savings	36.8
Receives help	12.4
Saves by household production	46.8
Subscribes a savings plan	20.0
Subscribes insurance	76.1
Increased savings in last 12 months	11.63

Besides, the present situation of the household regarding revenues, expenses and financial responsibilities, we propose that subjects' perceptions of their own financial situation may constitute an important determinant of the risk to be in over-indebtedness. To evaluate households' perception of their financial situation we included a series of alert indicators and found that approximately 83% of the households state that they are able to balance their accounts. However, a careful examination of the situation reveals a different picture. For example, 36% of the households state having difficulties paying the utilities at the end of the month (water, electricity, gas, etc.), 10% state that it is in fact impossible to

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[4] Household in-kind savings include gardening, farming activities and textile activities, for example.

meet their commitments regarding utilities. For 16% it is difficult to pay the local property tax, and 3.4% say it is difficult to pay the annual income tax. With respect to living standards, 33% of the households say that they are not able to keep the house warm, half the households don't have financial capacity to do one week of vacations a year and around 12 % cannot manage to eat fish or meat once a week. Finally, 47% is not able to substitute an appliance if it breaks and approximately 63.14% cannot buy any furniture (Table 2E).

Table 2E Financial situation

| Variable	Percentage
Budget=expenses	82.62
Effort degree (Financial commitments/income)	30.9
Impossible to pay the house rent	3.40
Impossible to pay the loan	6.94
Impossible to pay utilities	10.07
Impossible to pay credit purchases	2.80
Impossible to pay local property taxes	1.44
Impossible to pay income tax	0.79
Impossible (at least one of the above is true)	25.44
Difficult to pay house rent	7.50
Difficult to pay the loan	22.04
Difficult to pay utilities	35.55
Difficult to pay credit purchases	4.61
Difficult to pay local property taxes	16.31
Difficult to pay income tax	3.40
Difficult (at least one of the above is true)	89.42
Ability to do one week of vacations per year	48.56
Ability to keep the house warm	67.19
Ability to do one week of vacations in another place	31.13
Ability to substitute any furniture	36.86

Ability to substitute household appliances	53.12
Ability to buy new clothes	81.31
Ability to eat fish or meat at least once a week	87.65
Ability to have friends for dinner at least once a month	65.84

Regarding financial compromises: 22% experience difficulties in paying banking loans and 5% experience difficulties paying the credit card balances (approximately 7% e 3% find impossible to pay bank loans and credit card balances, respectively). As table 2_E shows, 25% of the households experience some kind of financial inability and 90% experience some difficulty of the ones considered. Moreover 30.9% of the household income is necessary for paying all financial compromises. This number is higher than the national average for 2000, which may come from some specificity of the municipality of Trofa or of the sample. However we have no data to test this hypothesis.[5] Further empirical research on other municipalities is called for in order to evaluate the claim.

Regarding educational level, approximately 40% of the individuals have four years or less of schooling, another 40% have between 4 and 12 years. Considering the highest degree attained, the vast majority of the individuals only have the primary education completed. Only a very small percentage of the individuals have completed the compulsory education (9 years). On average, sample individuals have only 7 years of schooling, which is bellow the minimum compulsory education, and almost one third has only the primary education.

Graph 1: Years of Schooling

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[5] According to Farinha (2004), the national average effort level in 2000 was 13.38%.
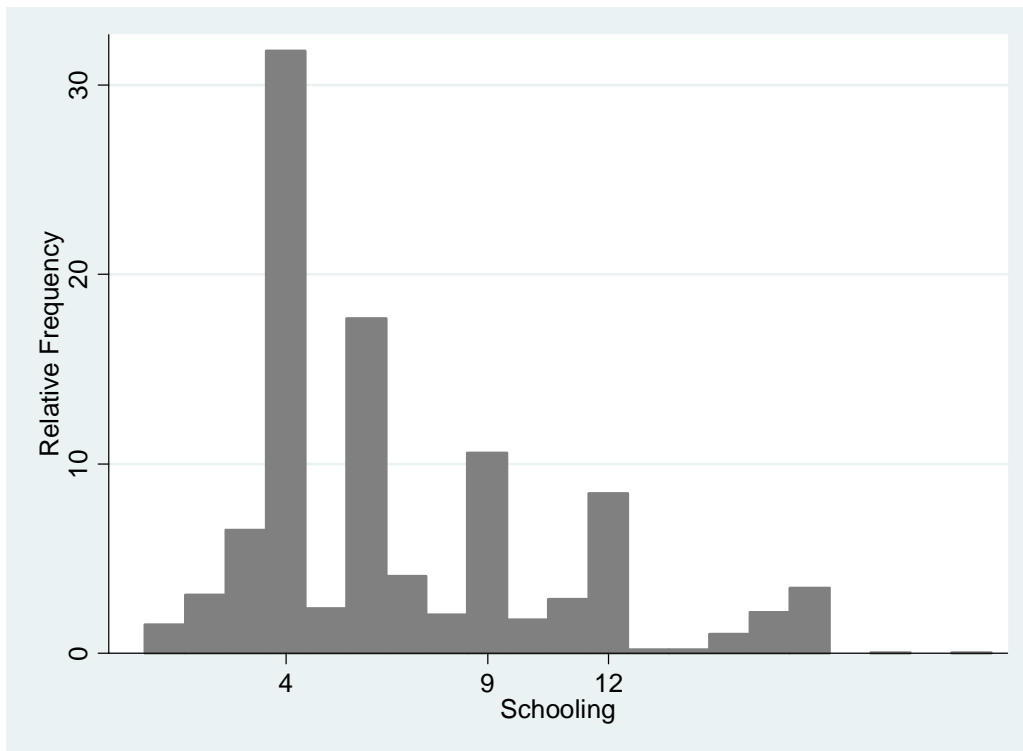
To characterize the distribution of occupations by sector of activity we use the INE[6]'s classification. Graph 2 shows that approximately 50% are "Technicians, workers in handmade jobs and similar"; Second most frequent is "Technicians and middle level skilled occupations; administrative personnel and similar occupations" (approximately 20%), the remaining 30% are uniformly distributed among the other categories considered.

Graph 2 Distribution by occupation

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[6] INE stands for the Portuguese National Statistics Institute.
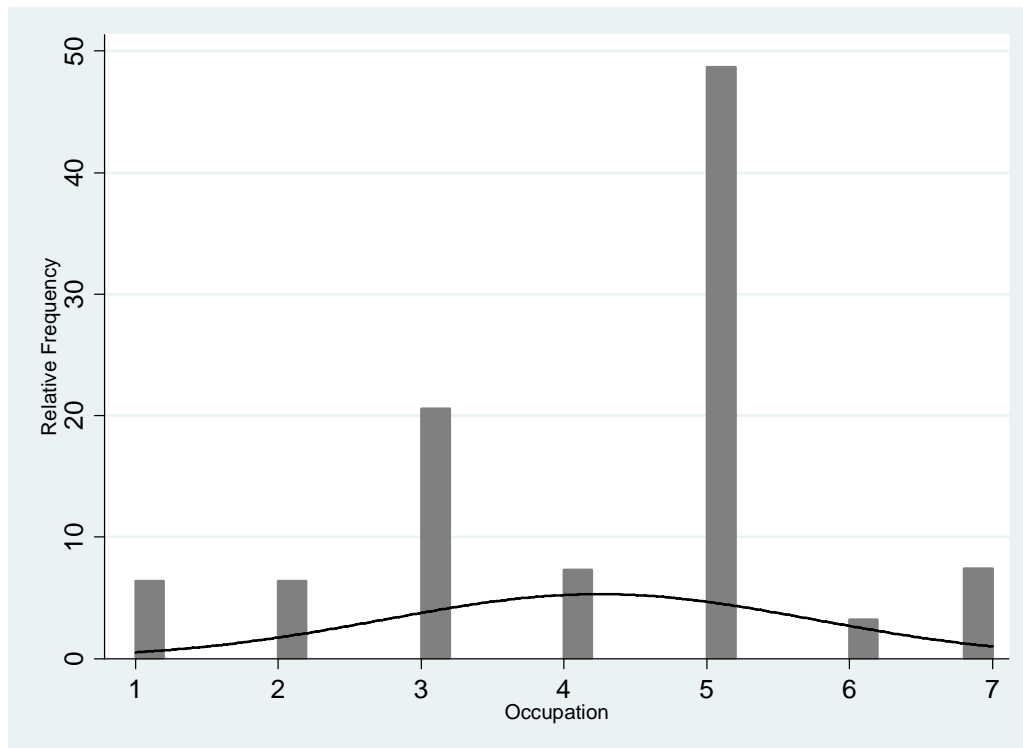
1. High Skilled occupations in Public Administration and at the management level of private firms.
2. Specialized personnel in intellectual and scientific occupations;
3. Technicians and middle level skilled occupations; administrative personnel and similar occupations;
4. Services Personnel and Sales personnel; Farmers and skilled workers in Agriculture and Fisheries;
5. Technicians, workers in handmade jobs and similar;
6. Machinery workers and workers in assembling lines;
7. Unskilled labor.

Table 3 reports that *food and beverages* is the industry which employs more workers, followed by *services, construction and public works*. Grouping economic activities in three sectors allow us to conclude that the secondary sector is the sector that employs more people.

Table 3: Employment by sector of activity (absolute values)

Activity Sector	Total
Agriculture and animal husbandry	10
Silviculture	7
Fisheries	7
Mining industries	44
Beverages and food industries	178
Textiles	40
Clothe industries and leather products	10
Shoe industry	33
Lumber and wood products	5
Printing and publishing	6
Primary metal industries	39
Fabricated metal industries	28
Industry machinery, Electronic and equipment	43
Other industries	71
Energy and water supply	31
Construction and public Works	112
Trade, restaurants and hotels	46
Transportation, warehousing, communications	27
Banking and insurance.	31
Social and personal services (it includes Public administration and education)	147
Total	*915*

The distribution by sectors of activity, depicted in Graph 3, reveals that more than half of the sampled population works in the secondary or industrial sector. Only a very small fraction works in the primary sector.

Graph 3 - Employment in the primary, secondary and tertiary sectors
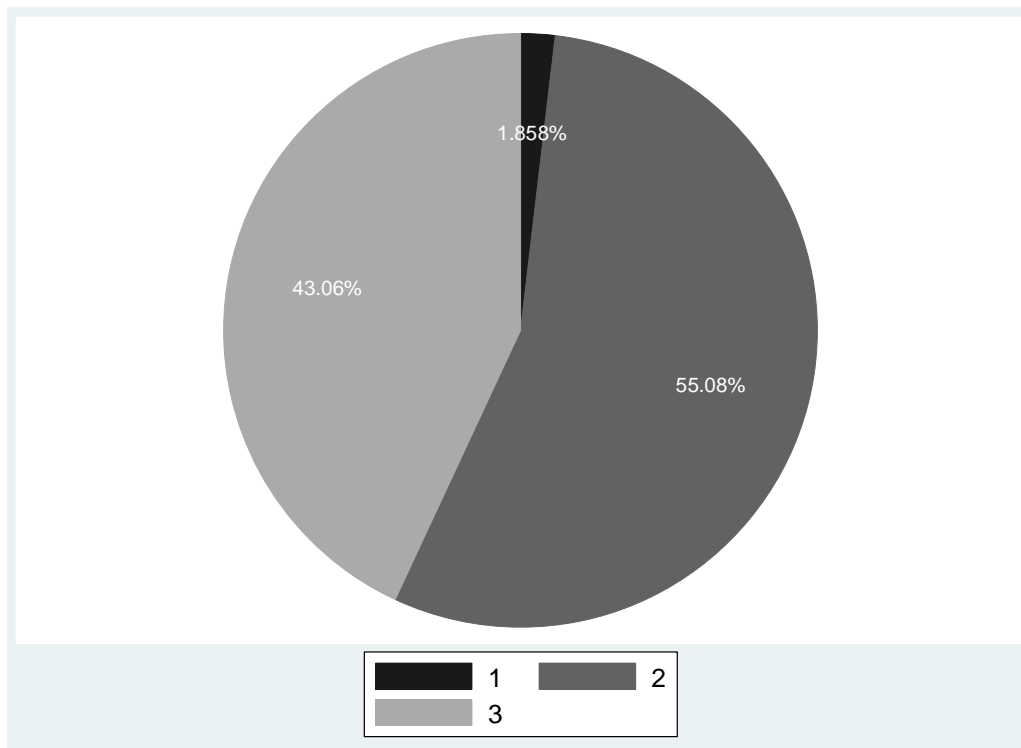
Sampling distribution between active and non active population shows that ¾ belongs to the active population and ¼ to the non active population. Overall, 8% of the population in Trofa is non-active. Non-actives include 19% students, 5% have domestic activity and 13% retirees. The sum of these three groups does not correspond to 25% of total population. The reason for this disparity may be the fact that students can be working even on a part-time or temporary activity and consequently be included in both categories. The same situation can occur with retirees.

The percentage of retired people is similar with data provided by INE (National Statistical Institute). Differences in unemployment rate can be justified by different measuring criteria. The definition of unemployment used in our questionnaire includes more people than the term used by INE.

Table 4_ Employment by occupation

Variable	Percentage
Employed	66,87
Unemployment	8,25
Student	19,48
Domestic	5,49
Retired	13,00

The characteristics of our sample are compatible with results obtained by INE- 2001 Census. In addition, the random process used to choose the households provides some confidence that the sample is unbiased, and as a result we can do some statistical inference for the Trofa population.

B. Determinants of over-indebtedness

We first analyze the determinants of the over-indebtedness. A household is considered to be over-indebted if their revenues are less than the sum of all financial compromises and the current expenses of the household.

However, with respect to this variable we suspected subjects misreported their income levels and some refused to answer these questions.

Non-response and misreporting in voluntary surveys is a fruitful field of investigation. For example, Essig and Winter (2003) provide an interesting study on the issue using controlled experiments. They found that self-administered surveys have a lower item non-response rate than personal interviews in the case questionnaires regarding financial issues; moreover, administration of questions on financial assets in separate paper and pencil form lowered significantly the non-response rate. In the present application, during the first interview, the questionnaire could be left with the household head if he preferred. However, the low level of education of most of the respondents rendered this possibility not very useful, or common.

One possibility to overcome the problem of item nonresponse is to impute values for the missing observations and correct the misrepresentation. Lusardi, Coss and Krupta (2001) discuss this problem extensively and suggest some strategies to cope with the

problem. We chose to predict income levels based on individual characteristics.[7] Using the predicted values for the variable income the percentage of households in over-indebtedness is 28%.

Identifying the determinants of the probability of household going bankrupt is of the utmost importance for policy purposes. The literature, both theoretical and empirical, has identified age, education, occupation, and income, as the main forces driving households into bankruptcy. In addition to these variables we also include the households' perceptions regarding their financial situation.

Table 5: Logit results for probability of being over-indebted

Dependent Variable: over-indebtedness

	Marginal effect (total sample)	Marginal effect (with mortgage)	Marginal effect (without mortgages)
Secondary_sector*	-.1203* (.0563)	---	-.1479* (.0768)
Tertiary _Sector*	-.1344** (.0529)	-.0059 (.0068)	-.1484* (.0637)
Financial_charge ratio	.0027* (.0012)	.0007 (.0006)	.0076** (.0029)
Expenses	.0001** (.00004)	.00003 (.00004)	.0002** (.00006)
cars	.0015 (.0049)	.00054 (.00182)	-.00045 (.01)
Full Work	-.0609** (.0171)	-.0078 (.0129)	-.0973** (.02686)
Number unemployed	.0229 (.01498)	.0068 (.0086)	.02330 (.02616)
Number of retired	.01378	.0254	.00612

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[7] Income was regressed on age, sex, years of schooling, occupation, sector of activity and years of experience on the job.

people in the household	(.0161)	(.0276)	(.0277)
Enough revenue *	-.2595**	-.1033**	-.3581**
	(.04209)	(.0391)	(.0615)
Average age	.00023	-.0009	.0007
	(.0008)	(.0014)	(.00137)
	N=389 Wald chi2(10)=71.06* Pseudo R2=0.4534 P(overdebt)=.1645	N=149 Wald chi2(9)=30.79* Pseudo R2=0.5191 P(overdebt)=.094	N =240 Wald chi2(10)=55.66* Pseudo R2=0.4628 P(overdebt)=.2083

(*) Marginal effect to discrete variables (0 to 1); Standard deviations in parenthesis

*significant at 5%

** Significant at 1%

In the regression presented in the first column of Table 5, we explain the probability of a household to fall in over-indebtedness (expenses and over-charges higher than the revenue) as a function of variables related with characteristics of the household, occupation, and financial alert indicators

Globally the explanatory variables included are significant, and most are also individually significant. Moreover, if the household head works in the primary sector it is more likely to fall in bankruptcy than if the household head works in the secondary sector or the tertiary sector. In particular, working in the tertiary sector lowers the probability of entering into bankruptcy by 13,44 percentage points, relative to the household head working in the primary sector. Although our results are significant it should be mentioned that the number of households where the head works in the primary sector is much smaller

than the number of households with a head working in other sectors of activity (Table 6). Thus, a more detailed analysis of the secondary and tertiary sectors is in order.

Table 6: Distribution of the households by sector of activity and by over-indebtedness

Sector	over-indebtedness	
	0	**1**
Primary	2	4
Secondary	172	44
Tertiary	151	27
Total	325	75

The Financial_charge ratio significantly increases the probability of the household to enter in over-indebtedness. An increase of 10 percentage points (pp) in this ratio, increases the probability of falling in over-indebtedness by 2,7 pp. The main factors that explain the probability of being in over-indebtedness are the household's current expenses (an increase of 100 euros in monthly current expenses, increases the probability by 0,1 pp). The number of unemployed or retired members of the household also has some influence in the probability but the effect is not statistically significant. The total of members of the household that work in full time have a negative and significant effect on the probability of the household to fall in over-indebtedness, as expected.

Finally, the household perception of its financial needs (*Enough revenue*) has a negative and significant effect on the probability of the household falling in over-indebtedness. This variable is very important as it includes opinion indicators which can help to make the diagnostic of over-indebtedness. Thus, a household that considers that has enough revenue to balance their budget is 25 pp less likely to fall in over-indebtedness that a household that needs more revenue to balance their expenses. It should be emphasizes that this last questions are in different stages of the interview to avoid strategic answers.

The predicted conditional probability of falling in over-indebtedness in the sample is approximately 16%, representing 399 households.

One possibility in the study of the over-indebtedness is to differentiate the households that have borrowed from banking institutions from the households without these commitments. Most banking loans are subject to mortgages which represent a significant part of the households' resources. We hypothesize that households with banking loans are obliged to have a more formal financial plan that may prevent over-indent situations. This hypothesis is analyzed in the last two columns of Table 5, where we consider the probability of falling in over-indebtedness differentiating between households with mortgages from households without.

The first evidence is that the households with mortgages have much lower probability of falling in over-indebtedness than the ones without mortgages (0.678% when compared with 7.59% if we control for the characteristics of the households, or 9.39% and 20.8% without controlling for it).

Marginal effects are similar in sign and size but the statistical significance is different. In fact, the variables that explain the probability of over-indebtedness for households without mortgages are not individually significant in the case of households without mortgages. The only exception is the own evaluation of financial needs of the household which it keeps its statistical significance and magnitude in the three regressions.

Despite the lack of significance of the variable "average age" , we cannot reject the hypothesis that the percentage of young households in over-indebtedness is statistically different than the percentage of older households in over-indebtedness. However, in the group of households with no over-indebtedness, the percentage of young households is considerably higher (Table 7).

Table 7: relation between age, over-indebtedness and borrowing

Young (<40 years)	over-indebtedness		with borrowing	
	0	1	0	1
0	113 (27.7%)	145 (53.5%)	204	54
1	295 (72.3%)	126 (46.5%)	179	242

	408	271	383	296
Total	(0.0000)	(0.1371)	(0.11)	(0.0000)

(p values to binomial test in parenthesis)

One other dimension of the relationship between age and over-indebtedness is the age's distribution inside the group with or without loans. Table 9 shows that within households with loans, the percentage of younger households is significantly higher than the percentage of older households. Within households without any loans, the age distribution is similar.

Table 8: The life-cycle hypothesis

Number of obs = 566			
F(2, 563) = 2.84			
Prob > F = 0.0595			
R2 = 0.0109			
Root MSE = 1433.4			

Expenses ratio	Coefficient	Std. error	P>|z|
Age	-63.623	27.04652	0.019
Age*age	.656601	.2763937	0.018
Constant intercept	1696.36	678.997	0.013

Moreover, according to the life-cycle hypothesis we should expect a U-shaped relationship between the ratio of current expenses to revenue and the age of the head of the household. Table 8 reports results testing the life-cycle hypothesis and we can conclude that there is strong evidence supporting this hypothesis.

Concerning the relationship between economic activity of the household head and the household propensity to fall in over-indebtedness, the results are not conclusive. Despite this general result, if we analyze the situation by the most frequent activity, we find that the percentage of households in over-indebtedness for household heads that work in the category classified as 6 (corresponding to Machinery workers and workers in assembling lines) is significantly lower than in any other economic activity.

Table 9: Distribution of households by Professional activity and by over-indebtedness situation

Profession	over-indebtedness				Total
	0	*%*	1	*%*	
1. High Skilled occupations in Public Administration, and at the management level of private firms	21	*67.7*	10	*32.3*	31
2. Specialized personnel in intellectual and scientific occupations;	17	*73.9*	6	*26.1*	23
3. Technicians and middle level skilled occupations; administrative personnel and similar occupations;	57	*63.3*	33	*36.7*	90
4. Services Personnel and Sales personnel; Farmers and skilled workers in Agriculture and Fisheries;	28	*77.8*	8	*22.2*	36
5. Technicians, workers in handmade jobs and similar;	171	*74.4*	59	*25.7*	230
6. Machinery workers and workers in assembling lines;	17	*85.0*	3	*15.0*	20
7. Unskilled labor.	21	*75.0*	7	*25.0*	28
Total	332	*72.5*	126	*27.5*	458

In addition, workers in categories 1 and 3 (corresponding to High Skilled occupations in Public Administration, and at the management level of private firms and Technicians and middle level skilled occupations; administrative personnel and similar occupations) have a higher percentage of over-indebtedness than other workers. Despite the

weak statistical results, there is some evidence that middle class workers have a higher propensity to be over-indebted (Table 9).

Finally, we consider the relationship between over-indebtedness and the educational level of the head of household. The results are not statistically significant and we cannot conclude for the influence of the educational level on the situation of over-indebtedness. However, we observe some variation across schooling years but there are too few observations per category to draw any meaningful comparison (table 10).

Table 10: Distribution of households by scholarship years of the person in charge by the household

Schooling years	over-indebtedness				Total
	0	*%*	1	*%*	
1	1	*20.0*	4	*80.0*	5
2	4	*57.1*	3	*42.9*	7
3	22	*51.2*	21	*48.8*	43
4	151	*55.9*	119	*44.1*	270
5	6	*50.0*	6	*50.0*	12
6	85	*70.8*	35	*29.2*	120
7	9	*64.3*	5	*35.7*	14
8	3	*75.0*	1	*25.0*	4
9	44	*71.0*	18	*29.0*	62
10	3	*75.0*	1	*25.0*	4
11	8	*66.7*	4	*33.3*	12
12	21	*60.0*	14	*40.0*	35
14	1	*100.0*	0	*0.0*	1
15	5	*83.3*	1	*16.7*	6
16	9	*90.0*	1	*10.0*	10
17	13	*65.0*	7	*35.0*	20
21	1	*100.0*	0	*0.0*	1
Total	386	*61.7*	240	*38.3*	626

<u>Conclusion</u>

The implementation of the life cycle model, in addition to the standard variables such us income, age, education, and family size, should consider empirical data on subjects' perceptions of their own considerations of falling in over-indebtedness. Closely related with the ex-post financial situation of the household is the chosen relationship between consumption and revenue and between over-indebtedness and revenue. Empirical evidence provided by the information collected on the households' situation in the municipality of Trofa suggests predictions in line with the theory.

Firstly, data shows a clear U-shape relationship between the consumption/revenue ratio and the age of the head of the household.

Moreover, younger households (less than 40 years old) borrow more than older households, and the difference is statistically significant. On the other hand, if we compare over-indebtedness frequency by age the relation is not statistical significant.

 The most important determinants of over-indebtedness are the sector of activity of the household head, the relationship between financial charges and the household's revenue, the consumption expenses, the number household members in full-time jobs and the perception of the household regarding their financial needs. The coefficients are statistically significant and have the expected sign. The number of unemployed or retired members in the household and the number of cars (this variable was included as a wealth indicator of the household) have the expected sign but have no statistical significance.

A very interesting result is the difference between households with mortgage loans and those without this kind of commitments. Despite the determinants of over-indebtedness being the same in the two groups, the level of over-indebtedness for householders without mortgages are significantly higher than those with mortgages to pay.

In sum, the most important factors that should be considered in analyzing over-indebtedness according to the results derived from the present investigation are: Sector of activity of the head of the householder (the person that contributes the most to total household revenue); Financial charges ratio over the household revenue; Consumption

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expenses value; Estimative of the financial needs of the household; and Household employment composition.

These findings are particularly important for policy purposes. First, they reveal the relevance of conducting field studies on a smaller geographical scale such as municipalities as we identified some determinants of over-indebtedness have a regional character such us the dominant sector of activity. This suggests that the problem of over-indebtedness may have a regional dimension. On the other hand, the significance and importance of the households' perceptions regarding their financial situation demonstrates the urgency of implementing more studies of this nature centered on the household.

The most important methodological challenge in field surveys is to reach an adequate balance between the quantity and the quality of the information collected. From the present application we find personal interviews to be an adequate form to deliver this type of questionnaires, as the number of households that refused to participate was relatively small. Despite this, we did face the problem of item non-response especially to financial questions. Nevertheless, the methodology used to overcome this problem proved to be adequate, as the final results are comparable to previous empirical studies.

Finally, it should be emphasized that the results presented are based on confidential information obtained by an anonymous and voluntary survey questionnaire. Despite our inability to statistically test the representativness of the sample, due to lack of information, the fact that our results follow the theory suggest that we may have some confident in the results and in the determinants of over-indebtedness in a municipality with urban and rural areas such as the municipality of Trofa.

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