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CONSUMPTION, SAVINGS AND (OVER-) INDEBTEDNESS OF PORTUGUESE FAMILIES: A MICRODATA APPROACH

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"Aqueles que passam por nós, não vão sós, não nos deixam sós.

Deixam um pouco de si, levam um pouco de nós"

Antoine de Saint-Exupéry

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Abstract

This dissertation studies the Portuguese families' indebtedness from a micro perspective, seeking to understand which characteristics of indebted households are most determinant for their different indebtedness levels. Theoretically, our analysis is based in the traditional theories of consumption and savings that explain debt from a life-cycle perspective.

Portuguese consumption habits and consequently savings kept changing over the years. The level of household indebtedness increased at a constant pace and, with the emergence of the recent economic and financial crisis, high debt levels became a problem. In this paper we present a brief description of the evolution of Portuguese economic and financial situation in latest decades, centring the description in the evolution of debt contracted to purchase the main residence, which is the key factor explaining Portuguese families' high indebtedness levels.

Using microdata from the 2010 Household Finance and Consumption Survey, we perform an econometric analysis to describe the typical Portuguese household that held debt in 2010.

To determine the factors that influence the variation of debt volumes we estimate a multiple regression model, and conclude for a positive effect of income, the level of education of the head of the household and a stable employment contract and a negative effect of age in accordance to the standard economic theory.

Key - words: Indebtedness, Over-indebtedness, Portugal, Econometric analysis

Resumo

Esta dissertação estuda o endividamento das famílias portuguesas a partir de uma perspetiva micro, procurando conhecer quais são as características das famílias endividadas mais determinantes para os seus diferentes níveis de endividamento. Teoricamente, a nossa análise é baseada nas teorias tradicionais do consumo e poupança que explicam a dívida a partir de uma perspetiva de ciclo de vida.

Recentemente, os hábitos de consumo e, consequentemente, de poupança foram sendo alterados com o passar dos anos. O nível de endividamento aumentou a um ritmo constante e, com o surgimento das recentes crises económica e financeira, os elevados níveis de endividamento tornaram-se um problema. Neste trabalho apresenta-se uma breve descrição da evolução da situação económica e financeira portuguesa nas últimas décadas, centrando a descrição na evolução da dívida contraída para a aquisição de casa, que é o principal fator explicativo dos elevados montantes de dívida das famílias portuguesas.

Com recurso a microdados do Inquérito à Situação Financeira das Famílias de 2010, fizemos uma análise econométrica para descrever o típico agregado familiar português que tinha dívida no ano 2010.

Para determinar os fatores que influenciam a variação do volume de dívida, recorremos à estimação de um modelo de regressão múltipla, e concluímos um efeito positivo do rendimento, do nível de educação do representante do agregado familiar e um contrato de trabalho estável e um efeito negativo da idade de acordo com o padrão da teoria económica.

Palavras-Chave: Endividamento, Sobreendividamento, Portugal, Estudo Econométrico

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1. Introduction

At the dawn of the financial crisis, Portuguese families were very much in debt with the level of indebtedness standing at 130% of disposable income. Households' indebtedness started being significant during the 1990s, in the growth phase of the credit market accompanied by falling interest rates and rising real incomes. During this period, the uncertainty level was relatively low in view of the stability of the workforce.

The global economic and financial crisis of 2007/2008 produced a landmark change in the economic cycle that Portuguese households were living, complicating the families' fragile financial situation. The restrictions on the access to credit that were to come were seen as a consequence of a previous excessive level of consumption that resulted in a high level of borrowing by Portuguese households. The consumption and indebtedness excesses together with a rise of public deficits and public debt levels were taken as responsible for the introduction of austerity measures after 2011 forcing Portuguese households to a further decrease in their standards of living.

Although consumption habits may have contributed to indebtedness, it is also important to note that other factors played a central role such as low interest rates, low unemployment rates, increasing nominal salaries, a stable inflation rate, along with other macroeconomic variables. Indebtedness became a problem when the decrease in income received prevented these households from meeting their financial responsibilities, contributing to over-indebtedness and failure to meet the debt service.

This paper aims to clarify what is the major type of indebtedness of Portuguese households and to analyze the indebtedness of Portuguese families and to bring forward economic and social characteristics of Portuguese families that influence the use of credit, by analyzing the evolution of macroeconomic indicators. With an econometric analysis, we intend to identify who are the indebted families and to understand what features and what economic and social behaviours change the level of indebtedness, with a *ceteris paribus* perspective, using microdata from Portuguese Household Finance and Consumption Survey for its first wave applied in 2010. We intend to identify what kind of characteristics and household behaviour is more likely to increase the level of debt.

To understand this complex reality, we need to address the theories of consumption that explain consumer's savings behaviour and include the possibility of debt. We will explore the three more relevant theories, starting by the Keynesian disposable income theory, following Friedman permanent income theory and finishing by Modigliani's life cycle theory that divides life of household in three stages, namely young, active life and retirement and according to which households distribute income among these stages.

A characterization of the Portuguese financial sector in recent decades is provided along with a description of the evolution of consumption and savings habits of Portuguese families. Our analysis will focus on the evolution of Portuguese consumption, savings and indebtedness facing consumption as the main driver of indebtedness and therefore observing its evolution. In the years preceding the crisis, even with the increase of interest rates, the indebtedness level increased, the savings level decreased and the consumption level increased in view of the trend that had been observed since the late 90s. The evolution of interest rates is also taken into account since with the progressive liberalization of the financial sector this variable became an increasingly important determinant of the behaviour of consumption, saving and indebtedness.

To determine the factors that influence the variation of debt volumes, we estimate an econometric model, regressing debt against a set explanatory variables. In the econometric model we include variables such as age of the head of the household, education level of head of household, income of the household and real wealth of the household.

Our results point to a positive effects of income, level of education of the head of the household and employment contract. In other hand, the age of head of household has a negative effect.

This dissertation is divided into six chapters. The second chapter reviews the literature on consumption and saving and the third chapter presents an empirical analysis, which describes the evolution of the financial sector, as well as the level of savings and indebtedness of Portuguese families over the past few years. The fourth chapter presents some important results of the survey that formed the basis of this work and is intended to represent the reality of Portuguese families collected through the sample. The fifth chapter is reserved for the presentation and development of the econometric model that is used to apply the theoretical analysis above. Finally, the sixth chapter describes the

main conclusions obtained in this study and suggests possible future developments of the subject.

2. Theoretical Framework - Theories of Consumption

Consumption can be considered as "the total quantity of goods and services that people in the economy wish to purchase for the purpose of immediate consumption." (Miller, 1996)

In the traditional neoclassical theory, for each level of consumption achieved in a given time t, a level of utility is achieved. From an inter-temporal point of view, the utility is additive and is given as:

$$\mathcal{U} = \sum_{t=1}^{T} \mathcal{U}\,(C_t) \qquad (1)$$

Each consumer is subject to budget constraint, i.e., the sum of consumption cannot exceed the value of the permanent disposable income, composed of initial wealth and the sum of labour income acquired over a lifetime:

$$\sum_{t=1}^{T} C_t \;\leq\; A_0 + \sum_{t=1}^{T} Y_t \qquad (2)$$

This is currently the most generic form of consumption; however, the consumption theory was, over time, the target of developments by several authors that contributed to the literature as well.

As it is intended here to highlight the importance of household indebtedness, we will emphasize the major theories of consumption that can explain this. We will start this visit to literature with the theory of "disposable income" that was presented by John Maynard Keynes in 1936, followed by the theory of the "life cycle" of the authors Franco Modigliani and Brumberg (1954) and, finally, we will present the theory of "permanent income" developed by Milton Friedman (1957).

For Keynes, "consumption is a function of disposable income." Thus, the "disposable income" theory is a pioneer macroeconomic explanation of consumption and considers only the disposable income in the current period to determine the level of consumption in the current period, thus making a basic model to describe the consumer, using the following formula:

$$C = C_0 + C_1 \times Y^D \qquad (3)$$
$$C_0 > 0\ ;\ 0 < C_1 < 1$$

This theory shows that the income increases causing increases in consumption, but the consumption depends on the propensity to consume represented by C_1. In this model, one of the main ideas is that the marginal propensity to consume is constant and takes positive values smaller than the unit. In other words, an increase in one unit of disposable income causes a variation in consumption between zero and one.

Keynes assumes that households make their consumption decisions based on disposable income and that only the portion of disposable income that is not consumed is intended for savings. For Keynes (1936), "*the amount of aggregate consumption mainly depends on the amount of aggregate income*" and the relationship between consumption and current disposable income "*is a fairly stable function*".

Keynes also introduced the concept of average propensity to consume, as the ratio between consumption and disposable income ($C/_{Y^D} = C_0$), a relationship that diminishes proportionately with the increase in income. This hypothesis is the fact that families with higher incomes present, on average, a higher level of savings than families with lower income. Therefore, another key idea of this theory is that the higher the household income, the greater their propensity to save. Using data from the USA, Markiw (2007) concluded that the average propensity to consume was essentially stable, even with an increase in income, contradicting the Keynes' condition that as income increases, the average propensity to consume reduces.

In Keynesian theory (1936), the interest rate is considered somewhat significant in determining consumption, while income has a major role as a determinant of consumption.

Keynes (1936) argues that families with higher incomes can drive larger proportions of income for savings. Attanasio and Weber (2010) believed that a positive change in income also causes a positive change in the savings rate and the reverse is also true. However, the poorest do not necessarily save a smaller fraction of income in comparison with the rich, although there is the reverse idea. This idea is conceived because the incomes of the poorest families are slightly higher than the levels considered minimum levels of living standards. In spite of this idea, Abel (1990), Carroll, Overland and Weil (1997), Campbell and Cochrane (1999) and Ljungqvist and

Uhlig (2000) specify this argument, given that those with low levels of life in the present, through relatively high levels of savings, can achieve higher standards of living in the future. Based on this idea, Friedman (1957) develops it in his "permanent income" theory, since he considers this saving as future consumption.

The inter-temporal consumption models developed by Deaton (1991), and Carroll (1997), considers savings as a buffer (buffer-stock) to compensate for fluctuations in income. One of the main characteristics of an individual who saves this way is his level of precaution, as it will have impact on wealth accumulation. Some authors, such as Guiso, Jappelli and Terlizzese (1992) report, however, that the precautionary saving has a negligible impact on wealth accumulation. Others, such as Carroll and Samwick (1997), consider that the precautionary motive has a significant importance for the accounting of total wealth. Carroll (1992) states that precaution tends to increase savings and even Carroll (1997) also considers a saver with the concerns of the type buffer-stock, provides a goal for the percentage of total income directed toward the accumulation of wealth.

Also Modigliani (1954) presents a rational consumer who saves during his active life and uses his accumulated savings for retirement, so that he maintains the same level of consumption throughout his expected life time. Thus, low levels of these savings correspond to lower levels of consumption in the future and vice versa.

For Keynesians, individuals first opt for consumption and only the part that was not consumed is considered as savings, thus representing future consumption, as mentioned in Jappelli, Padula and Pistaferri (2008).

The authors who follow Keynes argue that the level of consumption depends on the psychological factors of the families, and so it does not make sense to consider the inclusion of other economic variables.

Miller (1996) considers that consumption, in addition to depending on disposable income also depends positively on the level of wealth, positive expectations and negatively on interest rate, by the possible increase in savings. For him, the distribution of income also influences consumption; however, this factor confronts the idea of Keynes, when he says that the marginal propensity to consume should be constant for any income.

Although the "disposable income" theory has presented several significant ideas, there are aspects that have been targeted for improvement, so that the weaknesses which were identified by the criticisms of that theory are then presented.

The average propensity to consume cannot be verified as a downward trend, as described by the theory, since despite the increase in income that has been meaningful in the last decades, this variable is relatively constant over time.

The second limitation is identified as marginal propensity to consume, wherein Milton Friedman rejects the assumption that the propensity is to remain constant. However, the reality to maintain constant consumption is characteristic of developed economies. Hall (1978) developed the Euler equation and achieved results that allowed him to identify indications that consumption is a random variable.

Another limitation of the "disposable income" theory developed by Keynes is that it is impossible to explain one of the realities in which, actually, we live, namely the consumption smoothing, i.e., the consumer wants a pattern of constant consumption over the life cycle and therefore transfers income between periods with this objective. In other words, individuals may use present income in future consumption and even use the expected future income for present consumption through debt.

Finally, the fourth limitation relates to the fact that the author of this theory does not include in its economic model a fundamental perspective, including *the price to consume today rather than consuming in the future*. This price is related to the interest rate, because depending on the variation of this rate, the cost of this consumption may be higher than consumption in the future. Specifically, if the interest rate increases, the cost of consuming today also increases, so the families that have means prefer to sacrifice present consumption and save instead. At the time this model was built, the development of financial markets was still very basic, so nowadays the economic dimension is fundamental, since most families resort to banking credit, i.e., using the expected future income for consumption in the present. On the other hand, a large part of consumption is financed with bank loans and we are faced with situations in which the level of consumption increases with reduced interest rates and this is one of the explanations for the level of indebtedness of Portuguese families.

In short, Keynes's theory has been regarded as incapable of explaining the main features of the consumption function. Miller (1996) considers Keynes's theory partially invalid

by reason of presenting the current income instead of the expected income. Whereas there are areas where the theory needs to be improved, some of the criticisms of the Keynesian consumption function come from existing empirical data, while other parts come from what the developments of the consumption theory namely through the "life cycle" theory and the "permanent income" theory.

These two theories intended to overcome the shortcomings of the Keynesian consumption theory including in their explanations new variables that are likely to influence consumption. The theories are based on microeconomic foundations, basing their model on rational decisions by consumers, and therefore, it should be considered that the marginal propensity to consume should be very low. However, among them there are some differences. For example, the "life cycle" theory gives importance to consumer choices regarding the behaviour of consumption and savings with the objective of maintaining a stable life style throughout the life cycle, taking into account changes in income arising in the same period; the "permanent income" theory enhances the estimation of the level of income that will be available to consume over a lifetime. Both the "permanent income" theory as well as the "life cycle" theory is based on three main pillars, namely the current income, wealth and inter-temporal income and the price or cost of present consumption. Assuming the existence of a budget constraint, economic agents make decisions regarding consumption and savings, taking into account not only present income but also the expected future income.

In this kind of context, uncertainty is present in many aspects, such as the value of income in each future period, which is estimated from the values of previous years, or such as the economic situation, the existence of unexpected shocks, etc. However, the value is only indicative, because the social and economic reality is constantly changing and certain changes that may occur may change this estimate. With this, the level of consumption of a particular period is calculated based on the information they have to face in future periods.

The "life cycle" theory (Modigliani, Blomberg, 1954) is to develop a model that is based on the level of income and expense in different stages of life of an individual. In this theory, life can be divided into three different phases: young, active life and retirement.

In the initial phase, or during periods of unemployment, families often resort to borrowing because they have low incomes and expenses are still high and the level of

savings is low. In early life, families have some expenses, including housing and durable goods that can be considered investment. At this stage of life, individuals are very sensitive because they have low incomes and low levels of wealth, still being too much in debt and not yet having achieved job stability and they may be more easily dismissed. Wealth levels can be confused with a higher level of income, but the level of wealth is measured by the properties of real wealth (e.g. housing) and financial wealth (financial products). For example, let us refer to the amount of mortgage which influences the value of actual wealth. The value of the mortgage will be directly proportional to the book value of the asset acquired, mostly real estate. Thus, the value of that will be included in the value of the actual wealth. Therefore, the amount of mortgage credit will increase with the value of the property. Consequently, the value of real wealth grows with the value of the property.

In the intermediate stage of life, people have higher incomes and therefore, the likelihood of borrowing is lower. This phase will also have higher levels of financial wealth, which also helps to reduce this probability. Spending on debt service will also be reduced and the instalments already mostly include amortization of capital rather than interest payments.

In the third phase, the debts will be (almost) settled. Wealth is also acquired by accumulation of lifelong savings and disposable income will be higher. In this model, Modigliani and Blomberg (1954), consider that the average propensity to consume can only grow in situations where wealth grows faster than income. At this stage of the life cycle, the probability of default of responsibilities is greatly reduced, as this reduces with increasing age.

However, in the Modigliani's theory, the permanent income is entirely constant, *ceteris paribus*, and this component is strongly influenced by the level of wealth compared with income.

The theory which follows develops the concept of permanent income.

In the "permanent income" model, Friedman (1957) assumes that the average propensity to consume is stable over time and therefore, also the saving rate will be stable. The main assumption of this model is that individuals prefer to consume in a smoothly distributed way, through their savings and loans, rather than consumption

being volatile. The assumption of rationality of individuals is central to this theory and transverse to modern consumption theories.

Friedman (1957) believes that consumers have a preference for consumption smoothing as opposed to volatility, because consumers try to allocate the income throughout life. So, the author defends that consumption should depend on the permanent income and he avoids that consumption depends directly on present income and on other variables with erratic behaviour.

The level of consumption, according to the "permanent income" theory (Friedman, 1957) is determined by the sum of initial wealth with the sum of income expected to be received over the lifetime.

Decisions about the levels of consumption and savings are taken by the households, given their preferences between current and future consumption, but are also based on exogenous variables, such as levels of interest rates and the permanent income corresponding to budget constraint. However, the timing constraint on consumption means that the inter-temporal consumption (left side of equation) must be equal to inter-temporal income (right side of the equation):

$$C_t + \frac{C_{t+1}}{1 + r_t} = Y_t + \frac{Y_{t+1}^e}{1 + r_t} \qquad (4)$$

This budget constraint can vary only in three cases: if there is a change in current income; a change in the expected future income; or, a change in interest rates. An increase in the interest rate implies an increase in the cost of consuming today, so there is an incentive for saving and reduction of loans to those who are in debt, as they become more expensive.

On the other hand, consumer preferences are also included in the determinants of consumption factors. Take into account the cost of consume now or in the future, consumers have preference for consumption in the present.

Milton Friedman believes that the consumption patterns of households are determined primarily by variations in permanent income. However, higher standards of living are the cause and consequence of the slight increase in permanent income. Thus, Friedman (1957) concluded that a temporary change in income does not cause major changes in the pattern of household consumption. The average propensity to consume decreases temporarily when income increases temporarily, above permanent income. When

income increases permanently, the impact on the level of household consumption is proportional, since consumption is a constant proportion of permanent income:

$$C = c * Y^P \quad (5)$$

However, we can draw from this that families with higher incomes have a lower marginal propensity to consume than those with lower incomes. In the "permanent income" theory, the key variable of the consumption is household wealth and it includes tangible assets, such as real and financial assets but also intangible assets, such as wealth acquired through education and experience. These factors turn out to be crucial to achieve a better income level. Based on all these factors, it is possible to estimate the level of future income.

The level of income may vary continuously or only during a transitional phase. Therefore, Friedman (1957) includes the transitional income as a new term of the "permanent income" theory.

The transitional income is equivalent to the amounts expected to be received in the future and it is calculated as the difference between permanent income and current income. The transitional income can take high values when the current savings are high. Thus, the income is considered an extra income, as happens during a temporary salary increase.

Campbell and Deaton (1989), West (1988) and Flavin (1993) consider that there is an excess of sensitivity and consumption smoothing when consumption depends on the unexpected impact on income. When households have an "abnormally high" income, they tend to save and when they have an "abnormally low" income, they have to rely on their previous savings or, if they are not constrained in their access to credit, they have to use credit to maintain the level of consumption. This has lead authors such as Krueger and Perri (2006), Brown (2004) and Rajan (2010) to argue that governments should facilitate the access to credit to counterbalance the growing inequalities in income.

In the event that the current income is lower than the permanent income, it means the permanent savings level is negative. By the analyses in Bunting (2009), in the United Sates the savings rate has shown a long decline in a period between 1985-87 and 2005. Bunting (2009) states that neither the "life cycle" theory nor the "permanent income" theory can explain this fact. The author considers the behaviour of savings depending

on the income level. In his example, households in the 20 percent highest income group did not change their savings since 1985-87 until 2005. The lowest 80 percent of households reduced the savings and the savings rate, in the same period of time.

Both Modigliani (1974) and Friedman (1957) worked the models in average terms, in order to facilitate analysis. However, Bunting (2001) believes that it would be useful to disaggregate data in order to examine if any demographic differentiation and influence exists, since each individual has different levels of income, lifetime and expectations.

In short, the consumption theory was target of developments in order to it is better adapted to the current reality. However, the criticism to the Keynes's theory was instrumental in the creation of new theories, previously presented.

3. Empirical Analysis: Savings and Indebtedness of Portuguese Families

3.1. Transformations of the Financial Sector

Portugal joined the European Union in 1986, and with it the process of financial liberalization, initiated in 1984, was also extended to families. The first step of this process began with the possibility of extending private initiatives to financial sector, namely the entrance of several new private banks into a market until then nationalized. This process developed the financial sector through the introduction of new and more complex financial products, and which required more financially literate economic agents, to attain good financial management of their resources and financial responsibilities.

The 1990s were also marked by the development of the Portuguese economy (Alexandre, Conraria, Bação, Portela, 2011). During the process of financial development, Portugal assisted to a reduction of restrictions on the access to credit through an easing of the criteria demanded for credit concession, in a context marked by the low credit risk. The development of new and more complex financial products and services accelerated this progress.

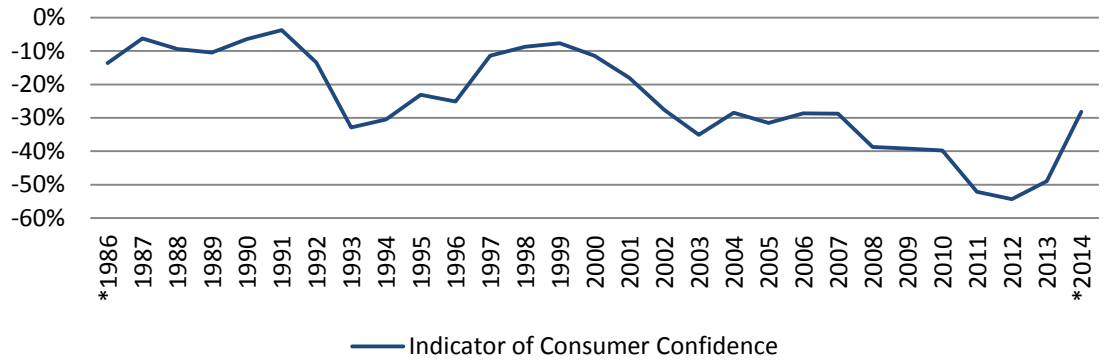
Since the analysis carried out by financial institutions was not very demanding, the range of families who managed to obtain credit increased, including families with low incomes (Farinha, Lacerda, 2010; OEC, 2002). The difference in the analyses performed by banks was justified with causes such as the increase in competition in the banking market and the introduction of new models of risk evaluation (Castro, Santos, 2010). These changes on the models of risk evaluation were implemented over time and, more intensely, during the years of the crisis, pushing the Portuguese families to an increased vulnerability to changes in interest rates and income levels. After the mid-2008, the tightening of credit supply increased, as indicated by Castro, Santos (2010).

Given the new conditions, and the positive expectations regarding the future, Portuguese families borrowed heavily, and in particular, asked for home loans, benefiting from the opportunities of easy access to credit and low interest rates.

The expectations of economic agents, in general, influence the future economic activity, causing the German Chancellor, Angela Merkel, to announce that "50 percent of the economy is psychology."

Based on Figure 1, the consumer confidence indicator shows Portuguese consumers have demonstrated a sharp decline in consumer confidence since 2000, recording the lowest level in 2012 since the entry in the European Union.

Figure 1. Indicator of Consumer Confidence,
Percentage, Portugal, 1986-2014



Source: Banco de Portugal (annual average calculated by author) * Data without completed year

It should be noted that, both in the 1990s and in the following years, there was an aggressive boost in consumption. Financial institutions encouraged the credit, offering small loans with pre-approved conditions sent to the client in order to make it easier and faster to access. This strategic model encouraged Portuguese families' indebtedness. This type of debt was based on the prospects that Portugal would continue to grow at the rate that it had grown so far and would reach the levels of richer countries. Families trusted to achieve levels of future income that would allow them to meet their financial responsibilities of contracting credit and, as such, private consumption increased dramatically reaching the highest levels in a percentage of disposable income, represented in Figure 1.

According to Farinha and Lacerda (2010), the development of this sector was also related to the entry of new financial institutions into the banking market and thus to greater competition between banks, which increased credit supply and, the access to credit by a larger number of families. Other factors which also contributed to the rapid

evolution of the financial system were the liberalization of interest rates, the extinction of credit limits and the liberalization of capital movements in the early 1990s.

Connected to the decrease in both the rate of inflation and the interest rates, the reduction of transaction costs also helped in the expansion of the credit market, a process that had its roots mainly in technological developments. On the other hand, this development also resulted in an intensification of the relations between Portuguese families and Portuguese and international financial institutions.

Subsequently, the introduction of the euro led to the submission of all Euro Zone members to the European Monetary Policy. The banking market was framed in a similar market to an oligopolistic market, so banks had some market power to determine the "price of the money", i.e., the interest rate.

Since the entry in the Euro Zone, in Portugal, each bank determines its interest rate to apply in deposits and credit operations and this decision is dependent upon to have excess or deficit of reserves. The interest rate value apply in credit operations takes into account the interest rate of the interbank money market, profit margin and the risk premium. This interest rate would be higher than the interest rate of the interbank money market. In operation of deposits, the interest rate is also based in the interest rate of the interbank money market but lower than it.

Castro, Santos (2010) concluded that the participation of Portugal in the Euro Zone has had a negative impact on the difference between current interest rates and the interest rates on the monetary market. With this change, the credit market also changed, including the increase in the supply of credit, caused by increased competition by adding new financial institutions to operate in this market. The large dimension of the credit market was a result of the reduction of barriers to entry for new interveners to act in this sector.

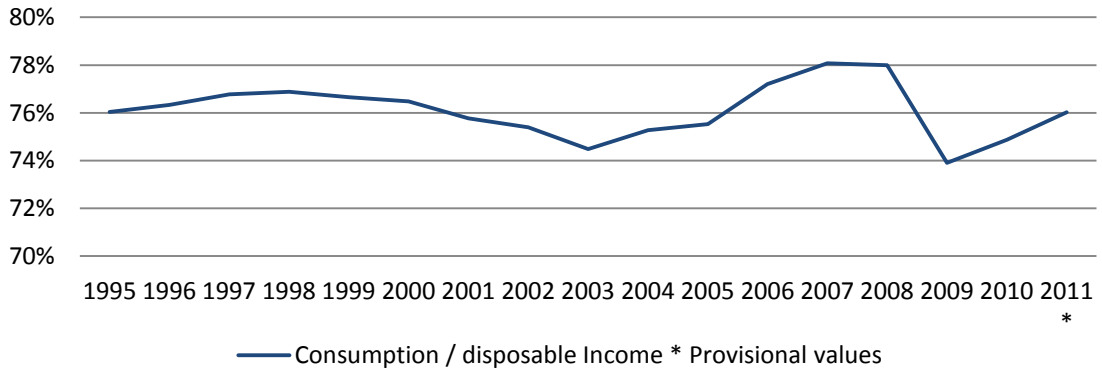
In parallel, the process of economic integration has encouraged the Portuguese authorities to try to achieve better living standards converging to EU families (Alexandre, Conraria et al., 2011). To achieve this objective, most families had to ask for loans, a process that was facilitated by the Monetary Union. The harmonization of financial services contributed to the low level of interest rates that occurred later, further guaranteed by maintaining inflation at low values (European Parliament, 2010). This new process has influenced the increase of credit agreements, allowing Portuguese

families access to a larger range of goods and services. In the 1990s, despite the value of income was still growing, families included in their budget new costs related to new consumption habits with the credit expansion. Santos, Costa and Moreira (2011) reported that the weight expenditure on food as staple goods decreased increasingly but goods as second and third needs increased significantly the weight in the total household budget. Specifying, expenditures in sectors such as hotels and restaurants, health, education, recreation and culture increased their share of total expenditure, while expenses such as food, clothing, footwear, household equipment, furniture and home and transport reduced their weight on the total expenditure. The proportion of expenditure on housing was high, increasing since 2000, and in 2005 and 2006, its importance increased significantly (Santos Costa, Moreira, 2011).

In some cases, as disposable income was not enough to make ends meet and desired investments, families opt by debt way to acquire the goods and services. Credit for house purchase became the primary determinant of the level of indebtedness of Portuguese families. Over time the use of credit for the purchase of second home, for the purchase of durable goods as cars and electric appliances and access to credit for leisure, including holiday and wellness services can also be found. (Alexandre, et al., 2011).

Consumption corresponds to the majority use of all disposable income, representing values always higher than 70% in nominal terms, as can be seen in the following figure. The analysis focuses on the period 1995 - 2011, which allows analyzing the evolution from a pre-accession period to the Euro. Therefore, since 1995, the trend is significantly increasing until 1998, but until the year following the entry into circulation of the new currency, the trend was downward. The weight of consumption on disposable income grew since 2003 until 2007. In 2009, as an effect of the crisis, the weight of consumption on disposable income had the biggest drop of the period between 1995 and 2011, despite maintaining levels above 70%. Subsequent to 2009, the upward trend seems to evolve to a similar rhythm of the previous period.

Figure 2. Consumption/Disposable Income,
Percentage, Portugal, 1995-2011



Source: Banco de Portugal (own calculations)

3.1.1 Evolution of Interest Rates after joining the Euro

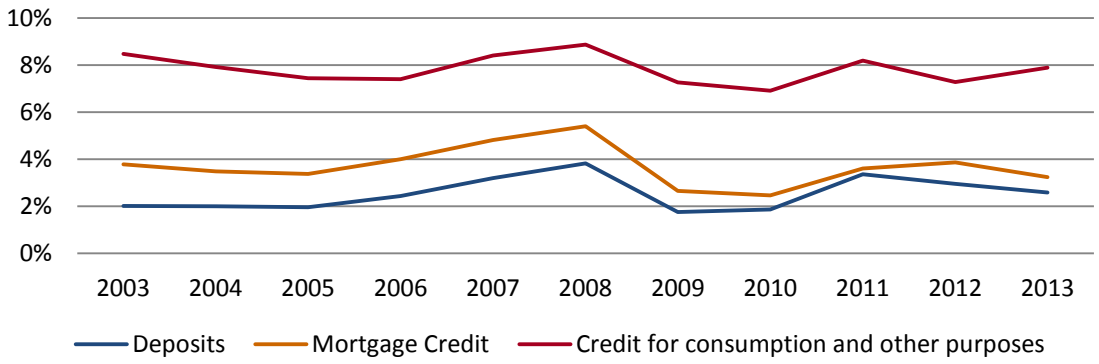
When families apply for a loan, one of the key aspects to take into consideration is the value of the interest rate, since its variation over the years affects the sustainability of the debt service.

The value of the interest rate is composed, in large part, by the costs of raising funds, either from the European Central Bank, the financial markets or even their customers through the resources in deposits and other investments (Castro and Santos, 2010). The interest rate is also determined by two types of risk. These include credit risk based on the overall state of the economy and the risk of the interest rate, corresponding to the risk of the differential between the interest rate to receive from granted loans and the interest rate to pay for obtaining funds can assume negative values.

In the convergence period for accession to the Euro Zone, interest rates had a sharp drop, caused by the underlying criteria for the process of disinflation and reduction of nominal interest rates.

Figure 2 shows the evolution of interest rates since joining the Euro in the period between 2003 and 2013, where we verify that the level of interest rates charged on consumer credit was always higher than the interest rates charged on housing credit.

Figure 3. Interest Rates Deposits and Loans (by purpose),
Percentage, Portugal, 2003-2013



Source: Pordata

Although the levels of interest rates were different depending on the type of credit, in Portugal, they had similar behaviour over the previous decade, because all are subject to variances in the Central Bank reference rates.

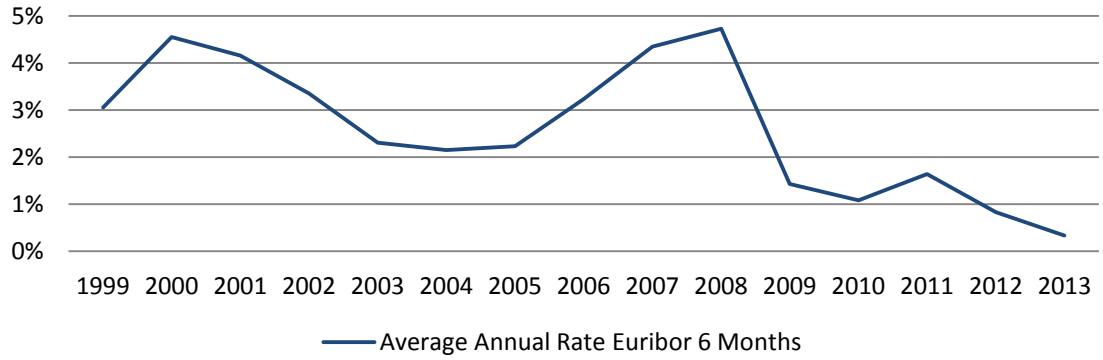
Since the early 2000s, interest rates for both types of credit seemed to show a slight downward trend. The period between 2005 and 2008 is then marked by a growing trend in the level of interest rates and, after 2008, by a sharp fall in these rates with higher incidence in interest rates on mortgage credits. In 2008, interest rates reached their highest values between 2003 and 2013 as depicted in the Figure 2. After the crisis, in Portugal, interest rates were fluctuating and, in 2011, interest rates recorded another increase with the implementation of the "Memorando de Entendimento" in Portugal by international and European organizations. In the previous figure, we consider that 2008 was the year of change, i.e., from 2003 to 2008 there was relative stability in the levels of the several interest rates. The increased volatility in interest rate levels was caused by an accrual of the uncertainty and it was felt after the 2008 crisis.

Since there are several differences in interest rates, we can analyze the evolution of these based on *Euribor* maturity of six months. The *Euribor* (6 months) is the reference rate for the large majority of financial transactions so, functioning as an index rate, influences the final rate of operations. Thus, this analysis seems important to us.

The 6 month *Euribor* underwent several fluctuations over the 15 years shown in Figure 3, below. Since joining the monetary union, the 6 months *Euribor* showed a decreasing trend until, in the years preceding the financial crisis, it began to increase, reaching the highest value in the year 2008. The following year, showed a significant drop and, since

then, has had a decreasing behaviour, having values very close to zero in the year 2013, its lowest value historically.

Figure 4. Average Annual Rate Euribor 6 Months,
Percentage, 1999-2013

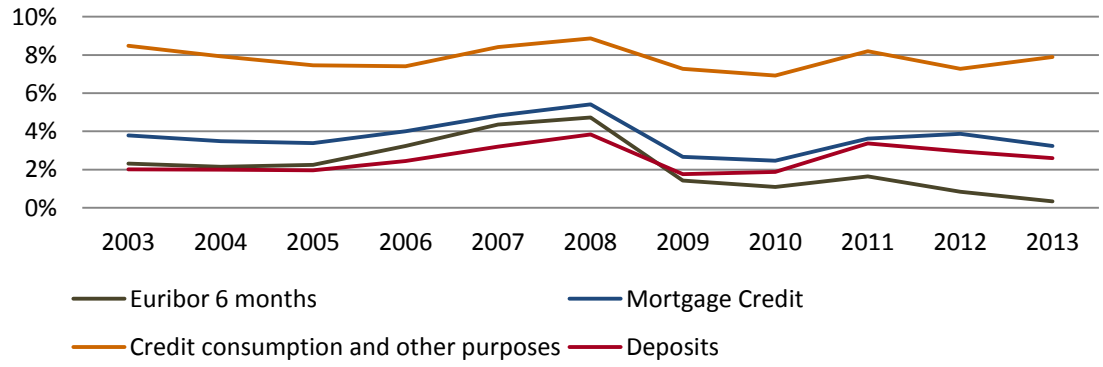


Source: Banco de Portugal (own calculations of annual average)

Thus, we conclude that the interest rate was unstable over the 14 years represented in the previous figure.

From 2003 until 2013, both lending rates and deposit rates were following the behaviour of the 6-month *Euribor*. Over these 10 years, the interest rate on consumer credit shows a great difference regarding the 6-month *Euribor* because the spreads are high in this credit segment. However, all other rates seem to follow the evolution of the reference rate, and with very similar values. Since 2009, there has been a tendency to increase the differential between the reference rate and the interest rates on mortgage loans and deposits. The interest rate on mortgage loans is the one that definitely moved away from the *Euribor* rate, given the constant increase in the value of spreads.

Figure 5. Evolution of Interest Rates,
Percentage, Portugal, 2003-2013



Source: Pordata and Banco de Portugal

On the other hand, since the year 2009, the level of consumption in percentage of disposable income rose again. In 2008, the national economy as well as international suffered an imbalance in the financial sector with the start of the economic and financial crisis and interest rates reached the highest level according to the previous figure. Regarding the level of consumption, it remained similar to the previous year; however, in 2009, it reached very low values compared to those seen previously.

Comparing Figure 2 to Figure 3, we notice that between 2003 and 2005, when interest rates declined slightly, the percentage of income directed towards consumption increased slightly. However, between 2005 and 2008 the level of consumption on disposable income continued to grow even with the increase in interest rates. The reverse situation occurred in 2009 because a significant decline in interest rates caused a significant drop in the level of consumption on disposable income. We can conclude that, in general, when the interest rate increases, the share of consumption on disposable income also increases, with the exception of 2008, when interest rates reached their highest values, but the fall in the level of consumption in income was only found in the year 2009 and with a significant impact.

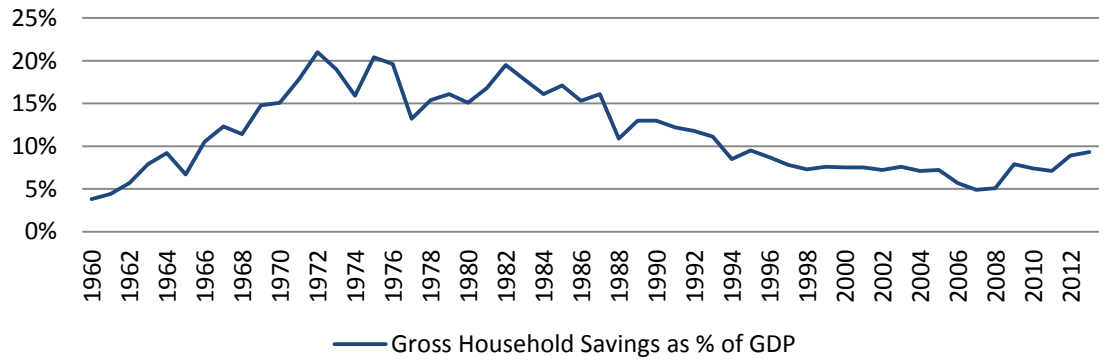
3.2. Evolution of Savings

The savings rate is the percentage of disposable income that is not consumed. This percentage has varied over time.

In Portugal, there is a high level of inequality in the distribution of savings, i.e., only 20% of Portuguese households are responsible for 90% of total savings, and families with the highest income can produce savings with higher values (Alexandre, et al., 2011). There is a group of families for whom the level of saving is negative. The savings rate in Portugal seems to be non-linear with the level of income.

The Portuguese savings rate has been fluctuating over the past five decades (Figure 5), reaching high values in some periods. In the 1960s, this rate showed an upward trend, slightly inverted beginning in the 1970s, by the down of the process of financial globalization. It seemed to stabilize a bit in the early 80s of XX century, but accelerated the pace of decline since the early 1990s and remained similar until the outbreak of the global crisis in 2007. The maximum value recorded for this rate occurred in 1972, when it represented 21% of disposable income, in gross terms.

Figure 6. Gross Household Savings as % of GDP,
Percentage, Portugal, 1960-2012



Source: Pordata

The behaviour of the savings rate during the 1980s and early 1990s is usually explained by the strong economic growth that took place in that period and the development of the "welfare state" that has occurred and that permitted a convergence with the level of income of the average European Union countries. To complement these events, the nominal stabilization of the Portuguese economy was also witnessed by reducing both

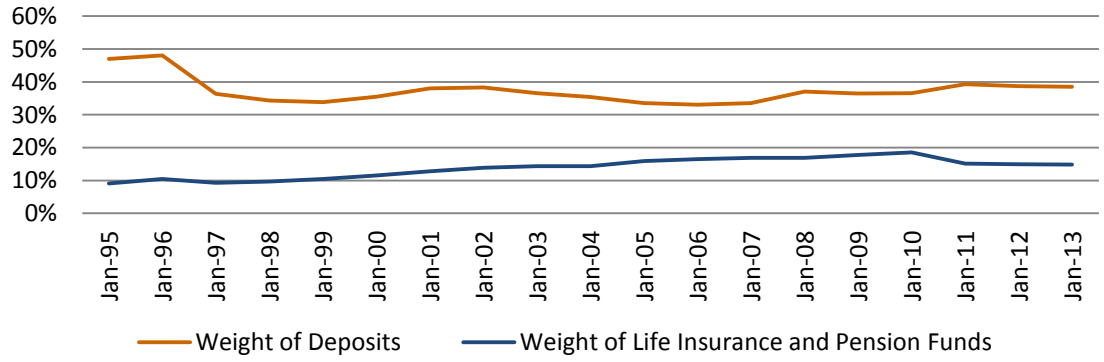
the interest rates and the inflation rate. This was achieved by meeting the convergence criteria for joining the EEC, which requested that the level of inflation was at 2%.

A significant reduction in the savings rate during and subsequent to the 1990s was caused by the reduction in interest rates. With low interest rates, credit agreements increased and families opted by reduced savings and increased consumption, thus generating a high growth of household wealth. Yet, the disinflation process was also one of the causes for the low savings.

Another factor explaining the reduction in the savings rate is a guaranteed income during the retirement period through the public distribution system at the Institute of Social Security. Thus, families had no need to worry about an accumulated income as they could maintain similar levels of consumption in the period related to retirement.

From 1990, more or less continuously, Portuguese families' savings rate were increasingly lower, (Figure 6), and concerns with the increasing their level of debt started to emerge. The level of debt also contributed to the increase of wealth. Real wealth has increased, largely through acquisition of property and its valuation perspective. The financial assets of Portuguese families also showed a rising trend with a very fast rhythm during the 1990s, and investments in deposits were the most sought from the range of available financial assets, as can be seen in Figure 7. With the passage of time, diversification of financial assets was more noticeable. Other significant applications were the life insurance and pension funds, since, on the one hand, life insurance is mandatory when formalizing a housing loan, and having real estate assets presented an increasing trend in the portfolio of families. Pension funds have gained importance, since the early 1990s, and worked as a complement to the public system (Farinha, and Noorali, 2004).

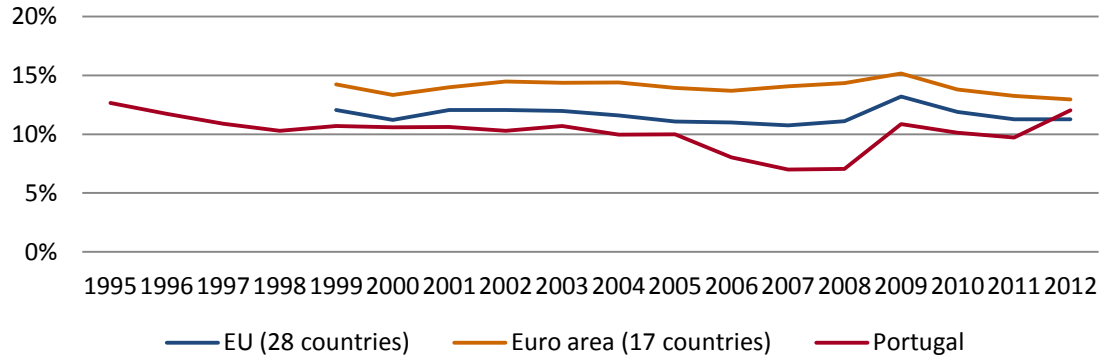
Figure 7. Weight of Deposits, Life Insurance and Pension Funds in Total Financial Assets, Percentage, Portugal, 1995-2013



Source: Banco de Portugal (own calculations)

Between 2006 and 2007, the savings rate fell sharply for reasons of fiscal consolidation, but was followed by a rapid recovery in the following years to the initial levels, at roughly 10% of disposable income in the year 2009. This year, the savings rate showed a slight increase, which can be explained in part by the strong increase in government transfers to households (Alves and Cardoso, 2010). At this stage, Portugal was going through an economic and financial crisis and it was implementing a plan of austere financial adjustment. Thus, saving was promoted because the consequences of the crisis were feared and therefore, people tried to acquire new habits of saving, causing the savings rate to evolve positively. We can verify this reality described by Figure 8, which also confronts the levels of saving rates in Portugal with the average in the European Union (28 countries) and the average in the countries that make up the Euro Zone. Despite the decline over several years in history, the household savings rate in Portugal has some resemblance to the Euro Zone, although it is lower over the years shown in the following figure.

Figure 8. The Gross Saving Rate of households in % of disposable income, Percentage, 1995-2012



Source: Eurostat

In short, the savings rate had a growing trend until the 1970s and, later, the trend was downward until 2008, with the beginnings of the economic and financial crisis. After the year 2008, the positive trend in the savings rate can be considered as a reversal of the downward trend, essentially since Portugal joined the European Union.

3.3. Indebtedness of Portuguese Families

> "(...) The concept of household indebtedness is normally associated with credit commitments, including consumer credit (for procurement of goods and services) and housing loans, the latter constitutes the main source of borrowing by Portuguese families." (OECD, 2002)[1]

Credit is part of modern economies, serving, according to economic theory, to smooth consumption patterns over time. Families with low incomes, who are in debt in the present, hope that may pay this debt, in the future, whether or not their income has increased. This behaviour follows an inter-temporal optimization of utility and may have a reverse pattern if agents anticipate a reduction of future income, as can happen with the phase of the life cycle that corresponds to the retirement period.

The probability of participation in the credit market increases with the level of income and real wealth, in particular, the main dwelling, and the probability decreases with the level of financial wealth. The age of the head of the household also influences the probability of participation in the debt market, i.e., the probability decreases with advancing age (Costa and Farinha, 2012).

The ease with which Portuguese families could participate in the credit market was one of the causes of indebtedness and hence, the large percentage of families that went into default due to the lack of capacity to cope with debt service, led to restricting lending to low-income families.

Although there are great and diverse inequalities between Portuguese citizens, social inequalities in their ability to pay the debt are increasingly noticeable in the Portuguese context, being considered a new type of inequality by Santos, Costa et al. (2011).

Next, a description of some variables which allow the portrayal of the indebtedness of Portuguese families will be presented.

[1] Free translation by the author. Original reference: "(…) O conceito de endividamento dos particulares está normalmente associado aos compromissos de crédito, nomeadamente crédito ao consumo (para aquisição de bens e serviços) e crédito à habitação, este último constitui a principal fonte de endividamento das famílias portuguesas."

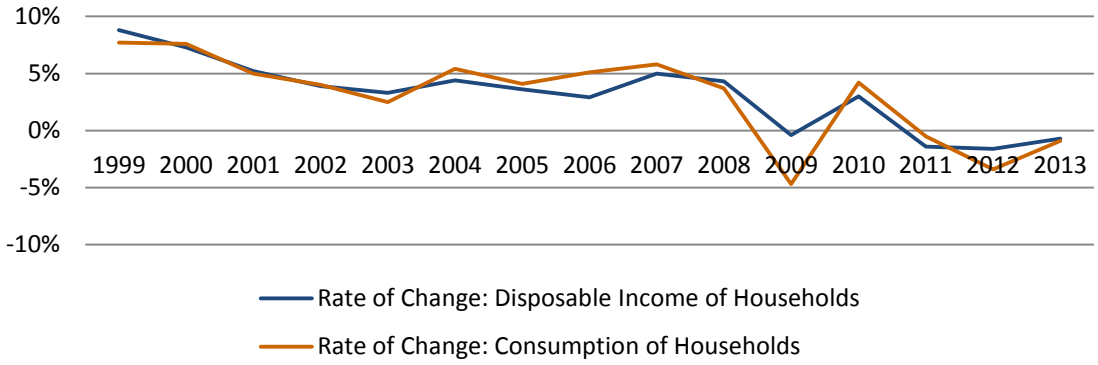
3.3.1. Evolution of Debt

In Portugal, there was a rapid credit growth, since 1990s, and despite the high level of indebtedness of Portuguese families, the level of default over time has not been high, which can be represented by a cultural factor, i.e., there is a "high propensity of Portuguese families to pay off their debts "(Santos, Costa et al., 2011).

This level of debt seems to be mainly driven by the need to ask for credit for purchase of homes, even in the early 2000s, as confirmed by the analysis of Figure 10, resulting in there not being a sufficiently developed market for rental properties (Neves, 1998).

Since 1999, debt ratios have grown faster than the growth rate of disposable income rhythms, as can be concluded by analyzing Figure 9. Therefore, since the growth rate of consumption is higher than the growth rate of income, rate debt will also increase at a rapid pace.

Figure 9: Rate of Change: Disposable Income and Consumption - Households, Percentage, Portugal, 1999-2013



Source: Pordata

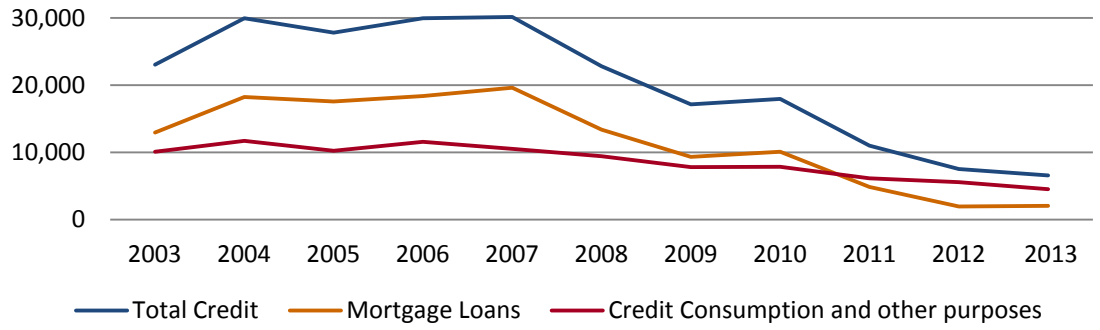
With the evolution of the financialization process, namely the introduction of the euro, households were trying to reach new and higher standards of consumption, partly by way of debt, because the variation in income was mainly lower than the variation in consumption (Figure 9).

Until the economic and financial crisis, the effort rate of households was considered accessible, i.e., 30% of disposable income was directed to debt service (Costa and Farinha, 2012). However, this effort rate was steadily growing, driven largely by the required austerity policies and the increase in *Euribor* interest rate, which was verified

by the year 2008 (Figure 4), making it difficult for the Portuguese families to service its debt. Nevertheless, the level of debt can be measured by three indicators, namely by the debt service to income ratio, the debt ratio on income and the debt ratio on wealth (Costa, Farinha, 2012).

Since the early of 2000s, the debt level has grown and, in the 2008 crisis collapse, Portuguese families had high levels of debt that were mainly the result of the practice of purchasing their own home, as confirmed by the analysis of Figure 10, resulting in there not being a sufficiently developed market for rental properties (Neves, 1998).This was seen as a form of saving and generational transfer of assets by these households.

Figure 10. Amount of new lending to households by type of purpose and total, Million Euros, Portugal, 2003-2013



Source: Pordata

This debt, classified as excessive, led to the emergence of public statements such as "Portuguese families are living beyond their means." Excessive debt was appointed as responsible for the difficulty in overcoming the financial crisis, which has revealed the weaknesses of an economy indebted to the outside world. These limitations resulted from the difficulty in stimulating the economy through the increase in consumption. Besides Portuguese economy debt had mainly origin overseas, the public debt crisis, which erupted in 2010, became worst these difficulties. The majority of consumption is financed via debt, but the families being in limit situation has no chance to ask more credits.

After the emergence of the crisis, the level of debt (Figure 10) began to decrease, but this behaviour of families was one factor that contributed to the decline of the Portuguese economy. Despite the decline in interest rates, both supply and demand for credit reduced. For families, expectations about the future deteriorated and on the credit supply side, there was a higher degree of caution as to credit agreements beyond the

normal impact on supply, caused by a reduction in the interest rate, by macroeconomic theory.

Taking into account the recent development of the financial sector previously mentioned, in 2013, only 37.7% of the total Portuguese agents participated in the credit market, while the participation of the Euro Zone population was already 43.7% (ECB, 2013). With this, we can see that Portugal was relatively close to the Euro Zone average. Thus, the characteristics of how people finance their expenses and investments are similar between Portugal and the Euro Zone average total debt. When analyzing by the type of credit, in Portugal, 26.7% of households have mortgages, while only 18.3% of households have no mortgage. When the same analysis is done, but for the Euro Zone, the situation is reversed, and the percentage that has no mortgage (29.3%) is higher than that which has mortgage (23.1%).

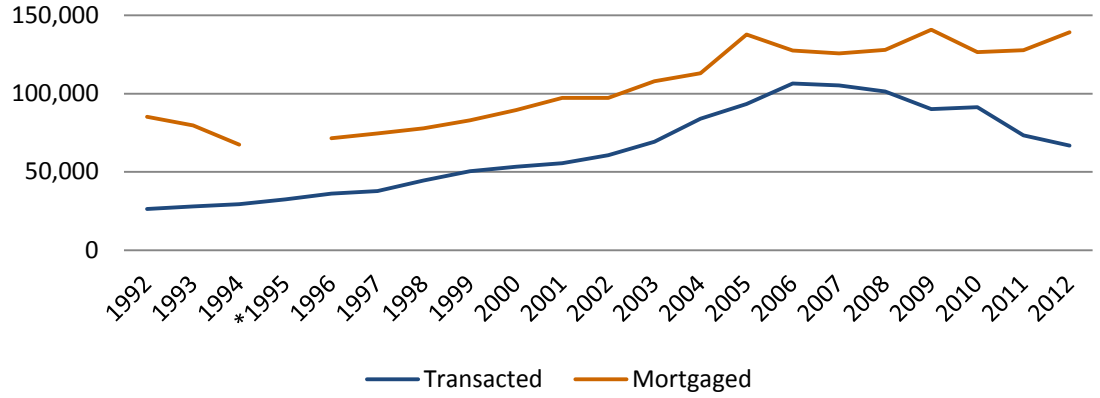
3.3.1.1. Mortgage Loans

Mortgage loans is the credit category with greater relevance in total loans, representing about 80% of total credit in Portugal, but this type of credit is decreasing, since 2008, as we will analyze ahead. In 2009, only 30% of Portuguese households had responsibilities with mortgage loans (Santos, Costa et al., 2011). In the post-crisis years, mortgage loans presented an increasing level of default, as we will verify ahead. This type of credit is quite sensitive, since it is exposed to fluctuations in interest rates over the long term, because it is subject to variable rates. Mortgage credit is contracted for a long period of time and there is great uncertainty with respect to the behaviour of variable interest rates.

The rapid growth in mortgages during the 1990s was associated with, on the one hand, the weaknesses in the existing rental housing market (Neves, 1998) and, on the other hand, with the low credit risk associated with this type of credit mortgage. As this type of loan has a mortgage as collateral, and is considered a major asset, it is less likely that families will fail to meet their financial responsibilities, because otherwise they would lose the mortgaged property. During the 1990s, the risk of unemployment was considered reduced, a sentiment that lasted until 2007/2008, and it was expected higher future incomes, considering the trend of the national and European economy. The use of

credit was also consequence of high and rising asset prices, namely housing prices, which have been increasing until the economic and financial crisis, as can be seen from Figure 11.

Figure 11. Average prices of realties,
Euros, Portugal, 1992-2012



Source: Pordata *****Without data: Mortgaged realities

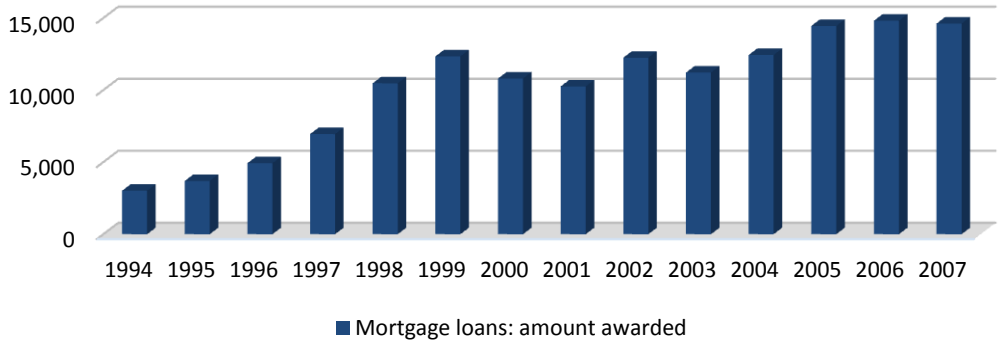
During the 2000s, the growth rate of housing loans slowed down, leading to a reduction of investment in this sector. After 2008 the housing loans verified a very sharp decline.

Matias (2002) points out the elimination of the subsidized loan scheme on housing loans that occurred in 2002 as one of the factors that influenced the high drop in mortgage loans. According to the author the slowdown in economic activity and hence the instability in the labour market caused a "difficult household access to the credit market."

Figure 12 characterizes the level of household debt by the amounts granted during the last two decades. As can be seen in this figure, the housing loans show an increasing trend until the beginning of the economic and financial crisis. During the 2000-2003 international and domestic crisis there was a slight decrease, but it quickly regained its upward trend, although with lower growth rates. From 2005 to 2007, the growth rate was almost null.

The amount of indebtedness by mortgage loans grew until the year 2007 (Figure 12) and, consequently, the value of household wealth also grew. Thus, the mortgage debt and real assets are correlated, as described in Costa and Farinha (2012), in which the value of the debt will be greater than the value of real estate.

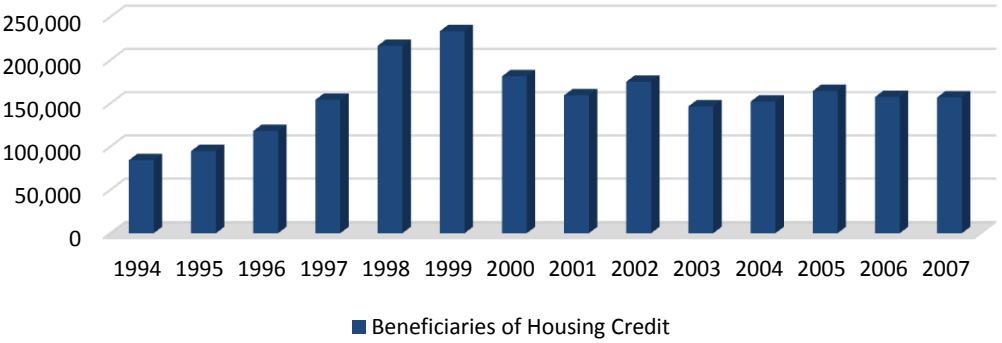
Figure 12. Mortgage loans: amount awarded
thousands Euros, Portugal, 1994-2007



Source: Pordata

Analyzing the housing loans by the number of families to whom they are granted, we can see through the Figure 13 that, until the year 1999, these were growing, and then, were decreasing until the year 2003, subsequently returning to the growing trend, but in 2006 the trend showed a slight downward trend again.

Figure 13. Beneficiaries of Housing Credit,
Number of Individuals, Portugal, 1994-2007



Source: Pordata

In recent years, new contracts of mortgage loans have suffered a significant decline. In 2008, at the start of the economic and financial crisis, there was the year with the highest negative growth rate since 2003, behaviour that verifies in Figure 14, shown ahead. The year 2012 was the one which registered the lowest value of new contracts of mortgage loans since 2003. However, in 2013, a very slight increase was revealed, nevertheless, not meaning a recovery.

Figure 14. Mortgage loans: new contracts
Million Euros, Portugal, 2003-2013



Source: Pordata

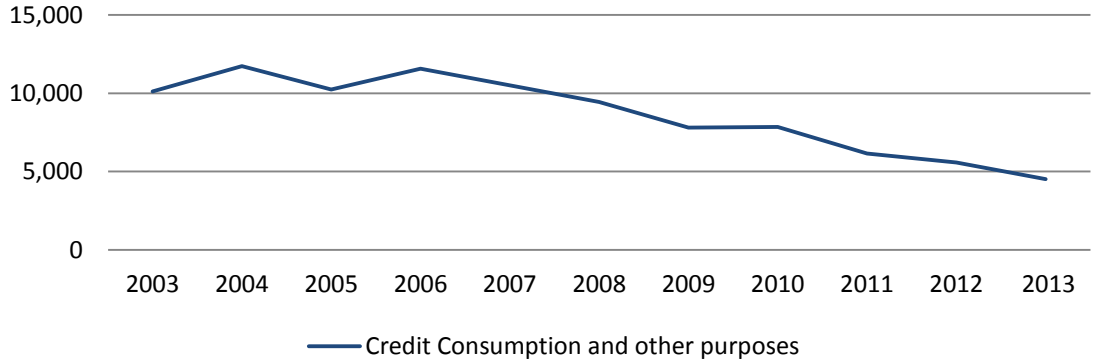
3.3.1.2. Consumer Credit

Consumer credit includes various classes of credit as car loans, credit cards, and other credits. Personal loans, credit cards and bank overdrafts are credit lines for other non-specified types of consumption. During the 1990s, consumer credit showed a progressive acceleration. The main type of credit to household consumption was car loans.

Consumer credit is a loan segment that presents a higher risk to the creditor entity, as it is not secured by any mortgage. Interest rates and spreads are high and much higher when compared to those applied to mortgage loans. Typically, this type of credit is granted to a fixed interest rate, with the disadvantage of not being able to benefit from a possible reduction in the market interest rates (Santos Costa et al., 2011), but with the privilege of not being subject to a possible rise in the same market interest rates.

Between 2003 and 2006, the amount of new contracts for consumer loans showed some fluctuation; however, after 2006, the trend decreased significantly until 2013, with the exception of 2010, in which the amounts were maintained from the previous year.

Figure 15. Consumer credit and other purposes: new contracts in amounts, Million Euros, Portugal, 2003-2013



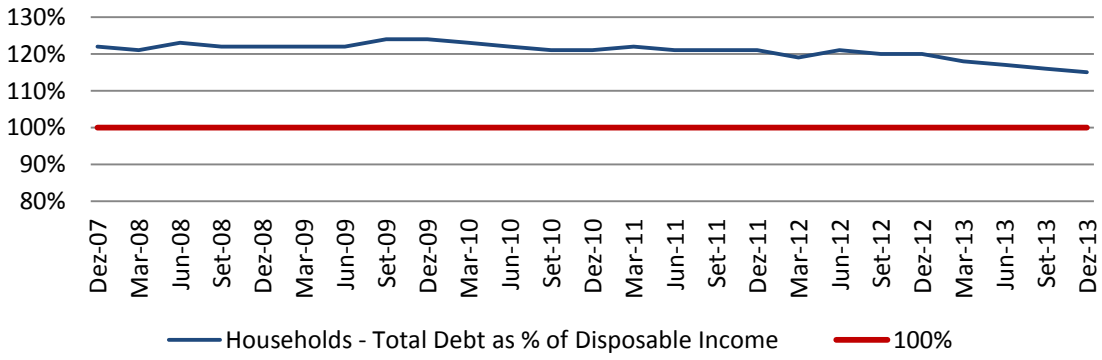
Source: Pordata

On the other hand, the decrease in consumer credit is associated with decreased consumer confidence, so for precautionary reasons, families tend to reduce consumption and increase savings rate, as already mentioned.

3.4. Over-indebtedness and Default of Portuguese Families

As there is no official definition of debt, we can consider that families are over-indebted when they have difficulties in paying their debts or upon entry into default, whether by mortgage loans, loans with no mortgage, personal loans, credit cards, lines of credit, bank overdrafts and even household expenses bills. On the other hand, when families enter into administrative processes, such as bankruptcy, they are also considered to be over-indebted. Over-debt can be analyzed by the weight of debt in total disposable income (Figure 16).

Figure 16. Total household debt as % of household disposable income,
Percentage, Portugal, 2007-2013



Source: Banco de Portugal

Unplanned debt is caused by lack of conditions to meet financial responsibilities caused by not expecting adversity during the analysis.

The usual causes for over-indebtedness are unemployment of one or more members of the household, but with the financial crisis, wage cuts, unpaid commissions and overtime and, in more extreme cases, non-payment of wages, temporary phases of break in unemployment, for example, sickness absences or temporary layoff, are other factors to the over-indebtedness of households, [Nunes, Natalia (2014) head of the Support Office Over-Indebted DECO. Lisboa.] In this type of analysis, the situation in employment, i.e., the type of employment contract; is a very important variable in the context of the credit market, especially in the case of housing loans, because it is engaged in a long-term perspective taking into account the current and future income. Therefore, these expectations vary depending on the type of employment contract, as an

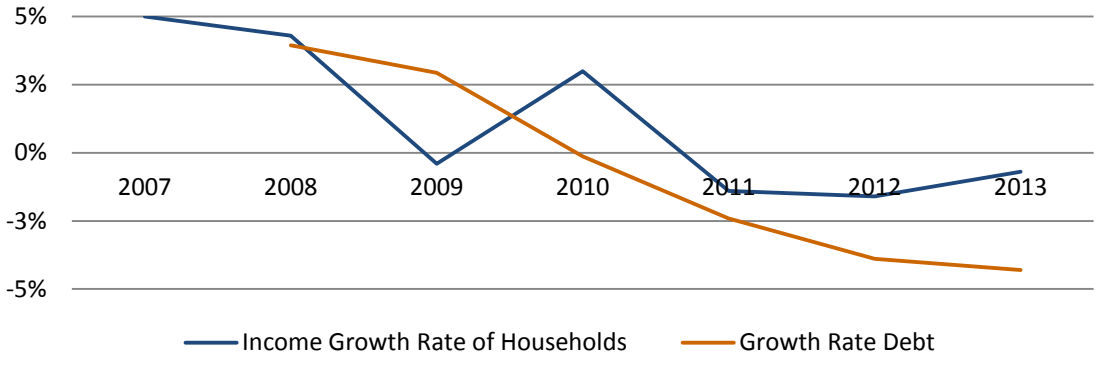
indicator of stability or not. On the other hand, the self-employed have greater difficulties in accessing credit because of the volatility of their incomes (Costa and Farinha, 2012).

When we see cases of over indebtedness, the appearance of difficulties to meet the debt service is almost inevitable and the probability of default is increasing. Farinha and Lacerda, (2010) report that credit cards are often used to reduce the probability of default in other types of credit, with the main focus on mortgage loans. Therefore, a behaviour characterized by a more intensive use of the credit card can be a strong indicator of a family's financial difficulties because they use their credit cards as a resource to overcome these difficulties in the payment of debt service of other credits. Despite the access to debt by indebted households becoming narrower, consumer credit has increased because normally the amounts are low, even with high interest rates.

The use of this type of credit to meet financial difficulties is not considered as an effective option because the result will be a total and constant triggering of default on several loans.

However, with the crisis, the debt began a downward trend. The growth rate of disposable income also had a decreasing trend, but after 2010, could be higher than the rate of growth of debt, as can be seen by the following figure.

Figure 17. Growth Rates: Disposable Income and Indebtedness,
Percentage, Portugal, 2007-2013



Source: Pordata and Banco de Portugal (own calculations)

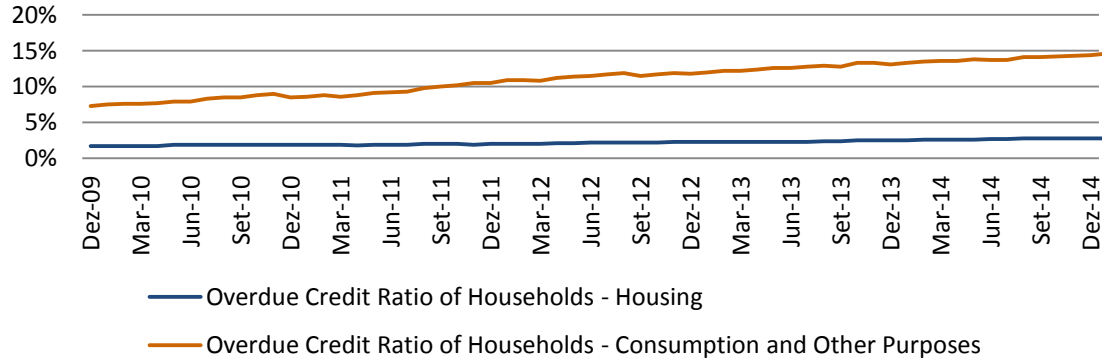
In 2010, 69% of borrowers are holders of mortgage loans, and more than 90% of the mortgage has associated collateral. However, cases which households need greater personal guarantees suggest that the probability of default is relatively high, as

described in Farinha and Lacerda (2010). This type of guarantee is most common in consumer credit.

Based on data from Banco de Portugal, Santos et al. (2011) observed that the ratio of default in consumer credit is constantly growing and showing a tendency to increase further.

However, as published by Banco de Portugal, the level of non-performing loans for consumption and other purposes is greater than on mortgage loans, showing a significant difference between them, represented in Figure 18.

Figure 18. Ratio of Overdue Credits by households and by type
Percentage, Portugal, 2009-2014



Source: Banco de Portugal

The segment of consumer credit has a higher probability of default because it offers greater ease of access and, in particular, credit cards. The amount of this credit type is less than in mortgage credit and families would achieve easier the approval from financial institutions. In these cases, lower income families also can achieve credit, but it is more probably to fail meet responsibilities with it. However, the higher the credit amounts on credit cards, the higher the probability of default.

On the other hand, the use of the credit card to meet financial difficulties in other credits, which they consider a priority, increases the probability of default, because the result will be a constant default on several loans, since they are already in a vulnerable financial situation.

Therefore, the materialization of credit risk is correlated with the amount of financial charges with debt service and vice versa. Until the 2008 crisis, the default ratio associated with housing loans was stable but later, this ratio became greater, both in mortgages credit as in consumer credit, and consumer credit shows a continuous growth

trend (Santos et al., 2011). Since the austerity policies imposed by the International Monetary Fund (IMF) and the European Union (EU) reduced the level of disposable income, and consequently, deteriorated the economic and financial situation of families, the default ratio has tended to grow, as a consequence of the economic and financial crisis.

In a period of economic recession, changes in income and in interest rates hampered the budgetary and financial management of many families living this reality. So, in 2009, in Portugal, the weight of household debt in disposable income had already reached 130%, the maximum historically value and one of the largest within the Euro Zone. Given the economic context, this value decreased to 126% in 2011, primarily due to reduced demand for credit (Costa and Farinha, 2012).

Table 1 – Weight of household debt in disposable income

2009	2011
130%	126%

4. Characterization of Indebtedness of Portuguese families

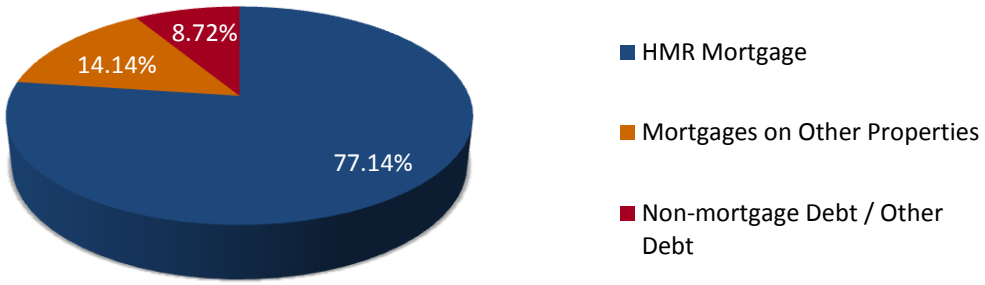
Based on the data from the *Inquérito à Situação Financeira das Famílias (ISFF)* of the Instituto Nacional de Estatística, realized in 2010, a description of a representative sample of the Portuguese reality will be made, in the same year, regarding the level of debt and its purpose.

This survey included a total of 4404 households, but only 1585 of them had debt in 2010, representing approximately 36% of our sample. In this selection were included all households from the survey population with some type of debt.

Thus, by analyzing the following figure, we find that, according to the survey results, most of the debt, i.e., 77% of the total value of financial liabilities of households, corresponds to the loan for the acquisition of Household Main Residence (HMR). This sample reflects well this reality, because the data of survey confirm the empirical data before presented.

The second highest value corresponds to mortgage loans with other types of properties, representing approximately 14% of total debt in the sample of Portuguese families in the year 2010. With respect to other debt it only represents almost 9% of total debt. Thus, we can conclude that, in 2010, Portuguese families are in debt primarily due to charges to the main dwelling, which represents more than ¾ of the total debt.

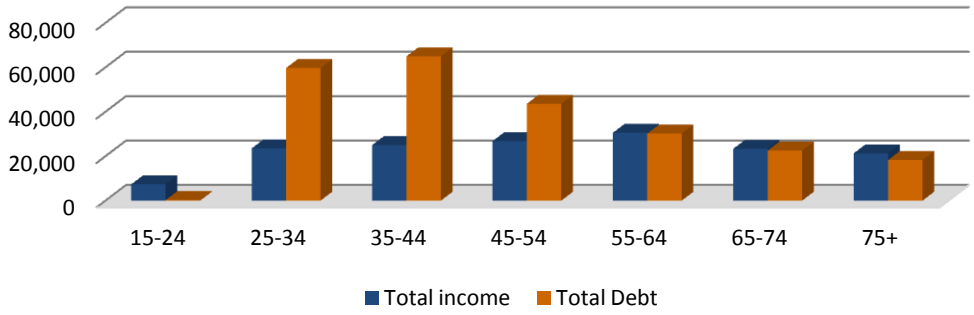
Figure 19. Total Responsibilities of Families,
Percentage, Portugal, 2010



Source: INE – ISFF (own calculations)

Now, the level of income will be compared with the level of debt by age group. By analyzing the next figure, the evolution of both indicators follows the same logic of the "life cycle" theory, i.e., the level of income increases with age, up to the age group of 60-64, and there is a negative evolution after this age. The level of debt increases with age up to the 30-34 age group, and after that, it will decrease to low levels.

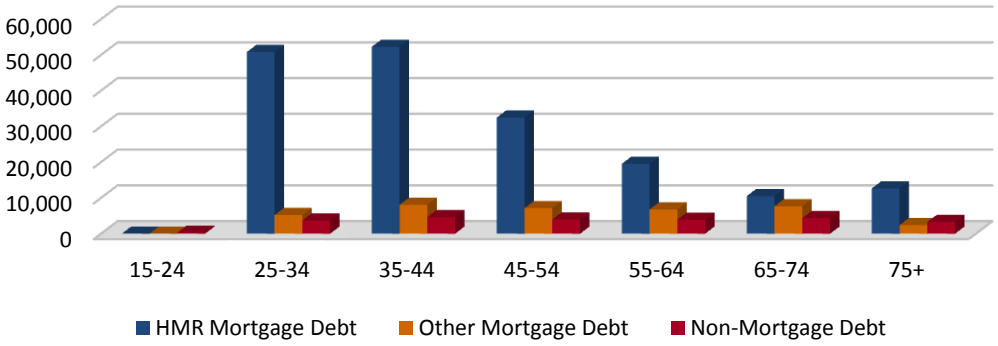
Figure 20. Average levels of total income and total debt per age group,
Euros, Portugal, 2010



Source: INE – ISFF (own calculations)

When analyzing the performance of various types of debt over the life of individuals we conclude that the debt related to Household Main Residence (HMR) shows the behaviour of a negative parabola (see Figure 21). This behaviour means that the "life cycle" theory is applied in the Portuguese reality. We can draw from the figure, in all age groups, families have a high indebtedness caused, mainly, by home acquisition.

Figure 21. Average of Amount of Debt
(by Type of Debt and by Age Group), Euros, Portugal, 2010

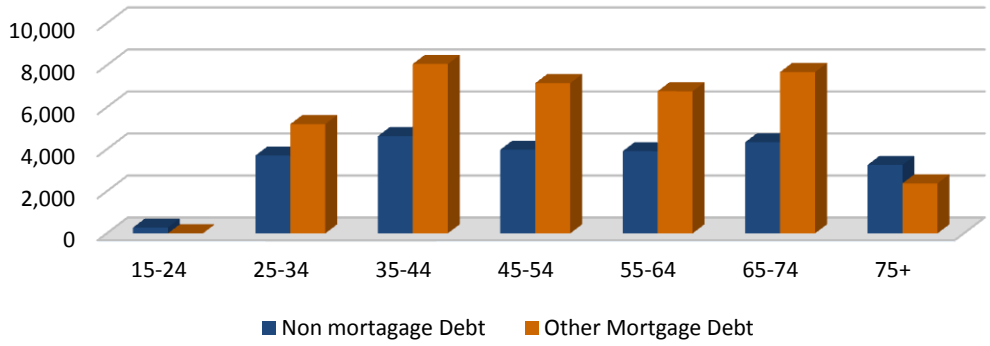


Source: INE – ISSF (own calculations)

We will focus on the evolution of mortgage debt related to other real estate as well as non-mortgage debt shown in Figure 22. Now, analyzing mortgage debt on other properties, it reaches higher values when the head of the household is inserted in the age

groups of 50-54 and 65-69 years old, typically associated with a second home; for example, when the debt with the main housing is almost settled. However, in Figure 22 there is a small exception to this pattern, because in the age group of 35-39, these types of debt values are also significant.

Figure 22. Average of Non-mortgage debt and other mortgage debt
Euros, Portugal, 2010

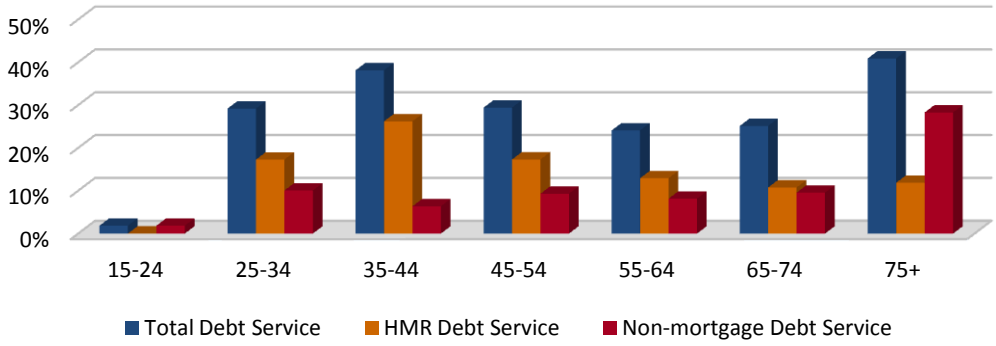


Source: INE – ISSF (own calculations)

Next, we will verify the weight of the debt service in the household monthly income per age group.

As we can analyze by the next figure, in almost all age group, the ratio HMR debt service to monthly income, in average terms, is a higher weigh comparing to other ones. In the first age group, this does not verify, because having HMR debt is not usual. The last age group is overvalued because there is households with more 85 years old that have low incomes and, consequently, high service debt. If we do not consider the last age group, the highest total debt service is verified in households with age between 35 and 44 years old. The same happens if we only analyze the HMR debt service, and without consider the last age group; the non-mortgage debt service is highest in the age group of 25-34 years old. We conclude that these results are in accordance to the empirical data in which refers the HMR debt service assumes a highest weight in the available monthly income in most age groups.

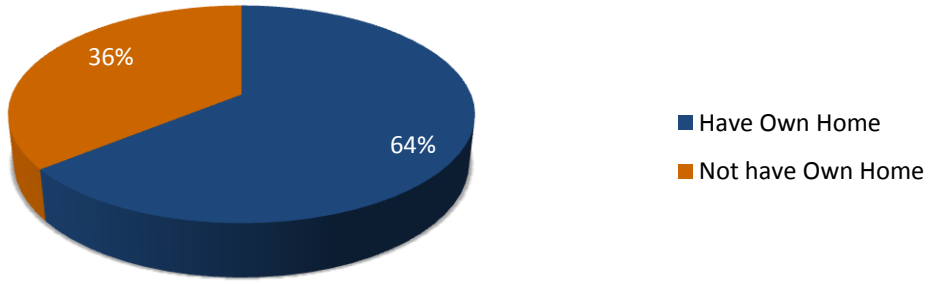
Figure 23. Average Ratio of Debt Service to monthly income per debt type and age group, Percentage, Portugal, 2010



Source: INE – ISSF (own calculations)

In Portugal, there is a habit to have own home, and we will understand if this reality apply to many families. So, in our sample of population with debt, 64% of households have own home, as we can see in the next figure.

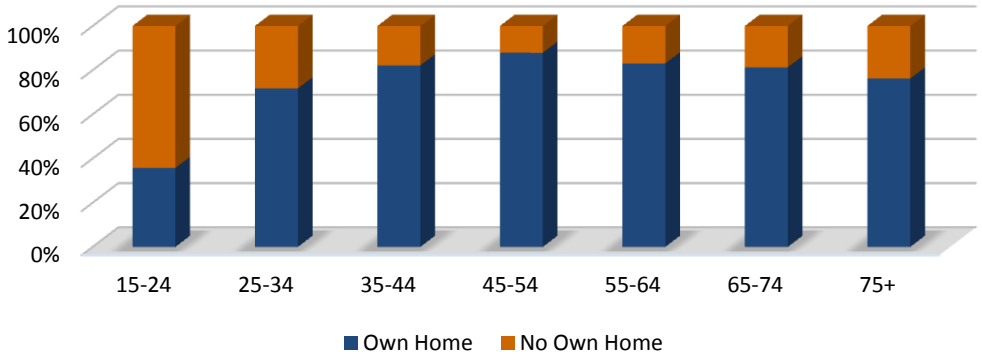
Figure 24. Population with and without Own Home, Percentage, Portugal, 2010



Source: INE – ISSF (own calculations)

But we can analyze the households with and without own home by age group and it is represented in the Figure 24. The higher percentage of households without own home is in the age group of 20-24 years old. However, the behaviour of the percentage of households with own home is similar to the HMR debt values and the "life cycle theory". This happens because the HMR debt and own home are interlinked.

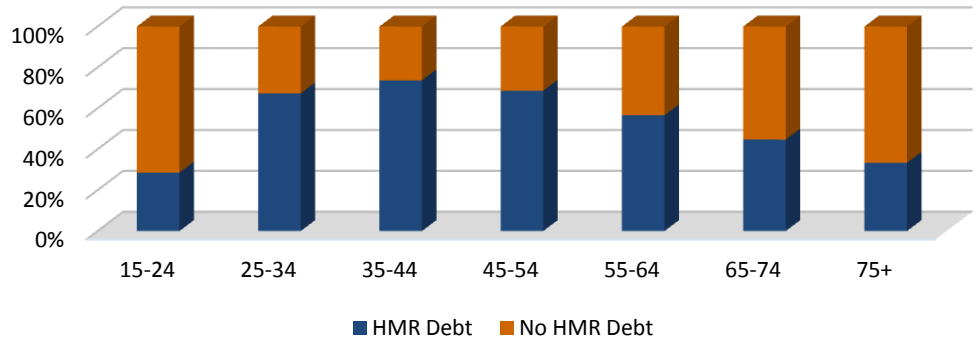
Figure 25. Families with and without own home,
Percentage, Portugal, 2010



Source: INE – ISSF (own calculations)

Next, we will combine this analysis with the percentage of people that having HMR debt (Figure 25). So, we can retire that until to the age group of 40-44 years old the percentage of households with HMR debt is increasing and after that is the inverse. So, we can conclude that mainly of own homes is acquired by the mortgage debts.

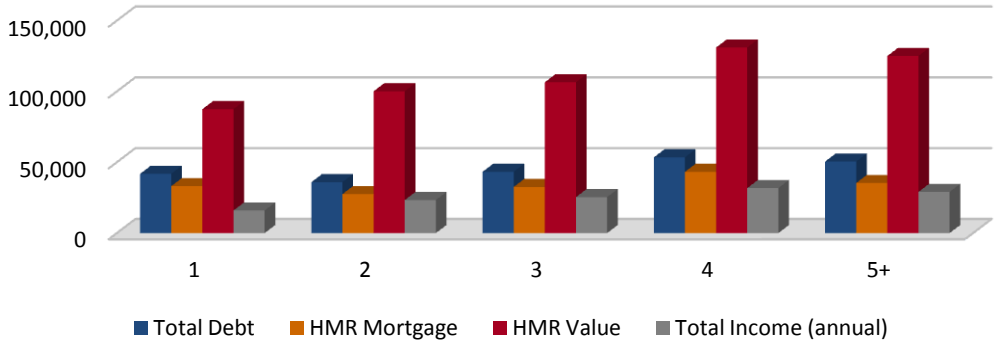
Figure 26. Families with and without HMR Debt,
Percentage, Portugal, 2010



Source: INE – ISSF (own calculations)

Other component of the data base is the household size, and we will analyze the main variables per household size, based on Figure 26. As it will be expected, as higher the household size as higher the values. Nevertheless, in households with four, five or more members, the average amounts of total debt, HMR debt, income and HMR levels is similar between them. The HMR value is increasing with the household size and it will be expected because more members need more space and it increases the value of the home.

Figure 27. Debt, HMR debt, income and HMR levels in average terms, per household size, Euros, Portugal, 2010

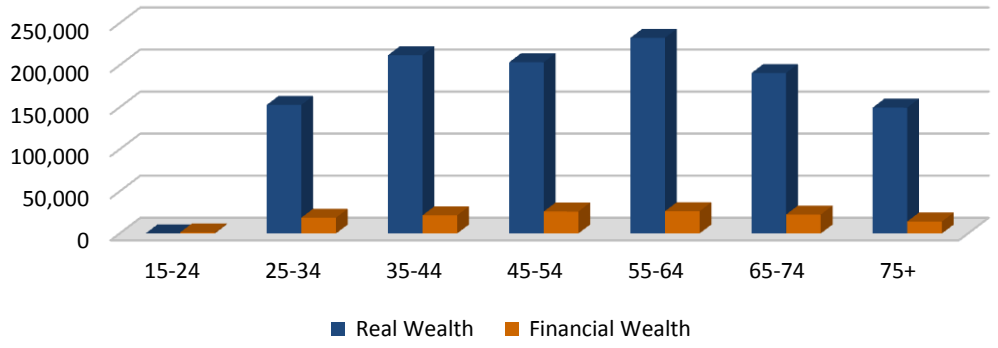


Source: INE – ISSF (own calculations)

Both levels of real wealth and financial wealth present behaviour as a parable throughout life, as we can verify in the figure below. In the beginnings of life, the real wealth level is increasing because debts are being paid and the financial level also increasing because total income also increases.

In the last part of life, real wealth decrease and it may be explained by change for a smaller home because the household size reduces. In some cases, in these ages, people help financially their sons and many families start to share their patrimony with their sons. By these reason, financial wealth decrease in these last two age groups.

Figure 28. Averages of Real Wealth and Financial Wealth, by age group, Euros, Portugal, 2010



Source: INE – ISSF (own calculations)

5. The Explanatory Factors of Debt (thousands of Euros) - Econometric Approach

In this chapter we built an empirical model to characterize Portuguese household indebtedness trying to define factors of the head of the household and factors of the household that influence the amount of debt in a household.

The chosen methodology is a Log-Lin model, because we pretend to do an analysis in percentage variations with changes on each variable, individually.

We regress the level of indebtedness against a set of explanatory variables within which we include socio-economic features. However, this chapter tries to realize what inherent characteristics of Portuguese families influence their high level of indebtedness.

5.1. Sample

In order to analyze this issue we have chosen an econometric analysis using a database obtained from the Portuguese Household Finance and Consumption realized in 2010 by the Instituto Nacional de Estatística in partnership with Banco de Portugal. This survey was applied to a representative sample of the Portuguese population. The sample that we analyze contains 4404 observations, but only 1585 of the total 4404 surveyed households will be used, because we chose only households with debt.

5.2. Model Specification

The General Linear Model (GLM) relates an endogenous and dependent variable with several exogenous and explanatory variables of the dependent variable. This relationship aims to determine whether there is a statistically significant relationship between the independent variable and each of the explanatory variables. This relationship is quantified by the constant value estimated by the model. This value is designated by parameter ($\boldsymbol{\beta_n}$) and it measures the impact in the endogenous variable caused by the variation of one unit in each of the explanatory variables, *ceteris paribus*.

This type of model assumes a linear relationship between the endogenous variable and the respective explanatory and independent variables.

The study of a possible relationship between the variables aims to quantify economic relations through the estimated coefficients.

The model assumes the following structure:

$$\mathbf{Log\ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + u_t}$$

The exogenous variable in the debt model is the value of debt. The dependent variable ***Log (Debt)*** refers to the total debt of household in logarithm terms in order to facilitate its interpretation, once the level of debt assumes high values and by this way the scale is reduced. The set of exogenous variables that identify specific characteristics of the head of the household are *Age,* a dummy variable for *Married,* dummy variables for *Higher Education*, *Contract*, *Employed* and *Unemployed* and variables that relates to the household, such as *Monthly Income*, *Real Wealth* and dummy variables *Home Ownership, 3 elements, HMR Debt (only), Positive Net Wealth,* and *Heritage* .

The variables composed by the product of two variables, namely *Monthly Income * Higher Education, Married * 3 elements, Home Ownership * Contract, Unemployed * HMR Debt (only)* and *Real Wealth * Heritage* intend crossing characteristics of the head of the household with the family characteristics, essentially.

There are cases in which variables are more easily interpreted as dummy variables namely when the variable represents a state, for example, having higher education or not having higher education, that is considered relevant in our study and it makes sense be interpreted in qualitative terms.

We include in the model an error term (u_t), a random variable that includes all other factors that influence the dependent variable but which are not specified in the model because they are unknown.

5.3. Model Estimation

5.3.1. The model

The econometric model intends to relate the logarithm of the household debt level with various explanatory factors considered which will be shown next.

The econometric model of debt is defined as:

$$\textit{Log (Debt)} = \beta_0 + \beta_1 * Age + \beta_2 * Higher\ Education + \beta_3 * Employed + \beta_4 * Contract + \beta_5 * Monthly\ Income + \beta_6 * Monthly\ Income*Higher\ Education + \beta_7 * Married*3\ Elements + \beta_8 * Home\ Ownership + \beta_9 * Home\ Ownership * Contract + \beta_{10} * High\ Value\ Home + \beta_{11} * Unemployed*HMR\ Debt\ (only) + \beta_{12} * Positive\ Net\ Wealth + \beta_{13} * Real\ Wealth * Heritage + u_t$$

To explain the amount of debt in thousand Euros, we include in the model as variables characteristics of the individual, namely age, the education level, and occupational status. In order to characterize the occupational status, we use in the model variables which specify if a person is employed or not and if has an indefinite employment contract, for example. The variable *Age* will be studied as a continuous variable, once it is the age of the head of the household and in all ages it is possible to have debt.

In other hand, the educational level will be studied as a dummy variable, because the high education level is differentiator in the amount of debt. So, we interest by know if the head of the household has the High Education or not has High Education.

In order to characterize the occupational status we will use dummy variables, namely Employed, Unemployed and Contract. As it is a status, the possible hypotheses are or the status applies or not applies.

Next, we will detail the meaning of the all variable which will be included in the model.

According to the theory, age is an important determinant of the debt level, whereas with increasing age the amount of debt tends to reduce, resulting from debt has been paid over the years. Additionally, financial institutions do not grant credit in huge amount as easily to people with advanced age. The variable in the model is called ***Age***.

The dummy variable ***Married*** pretends to distinguish the impact on the debt value of a married representative person in comparison to the other ones. When a head of the household is married, the income is higher but the necessities also are higher and there exists another type of future perspectives. But, be married also has impact because there is sharing of expenses between the couple.

The variable ***Higher Education*** presented in the model is a dummy variable. The education level is important since individuals endowed with higher levels of education have more and better knowledge to analyze the consequences of the debt, for example. The variable *Higher Education* assumes value one when the head of the household has the higher education level and it assumes value zero when the head of the household has not the higher education level.

When a person has this education level, we assume that she has more knowledge to deal with the financial market. Even the education level is in different area, this part of the academic way endows of reasoning skills. And, normally, this people have higher financial literacy levels than other ones and they want know more and more. However, the financial crisis, which occurred in the late 2000s, sparked interest in increasing knowledge in this area. As in Portugal the financial literacy level is not high, and to bridge this gap, financial training programs were created with the aim of raising this knowledge in order to follow the development of the financial sector.

With the objective of studying the employment status of the head of the household, we include two dummy variables, namely ***Employed*** and ***Unemployed***. The employment status of the head of the household is very important since it is an indication of stability or otherwise of the financial situation of the household. The fact of having an employment contract increases the level of household indebtedness, as there is greater security in having future earnings to meet debt service. When the head of the household is employed, the variable *Employed* assumes value one and when he does not be employed the variable assumes value zero. If the head of the household is unemployed, the variable *Unemployed* assumes value one and value zero if he does not be unemployed.

Therefore, the ***Contract*** is also a dummy variable, which aims to assess the impact of the individual to have an employment contract. When the head of the household is unemployed, the debt increases by necessity to obtain resources for their needs day-to-

day, resorting to credit. This variable assumes value one if the individual has an employment contract and it assumes value zero if the individual has not it.

On the other hand, there are variables included in the model that relate to common characteristics of the household, such as the household monthly income, the value of its real wealth and its financial wealth, among others.

The ***Monthly Income*** is very important to the value of the debt, since it is based on this that credit institutions approve or not the granting of credits. If the monthly income is high, it is expected to its level remains similar in the future and thus, it is possible to pay the debt, so it can reach higher debt values. But households with medium income have access to credit and they also have expectations that their income level will be maintained. The difference is the lower amount of credit granted.

In the case of a low monthly income, it is expected to its level remains similar. For these families, the credit value is conditioned by their income level, since the capacity to pay the debt is much smaller. It is important to note that families who do not have debt are not included in this analysis.

Theoretically, the education level influences the monthly income and, therefore, we consider important to emphasize the impact of the monthly income of a head of the household with higher education in the total debt. The ***Monthly Income * Higher Education*** variable is calculated by the product between M*onthly Income* and *Higher Education* and it intends to measure the difference in the debt level between the impact of the monthly income of a family with higher education and without higher education.

A dummy variable ***HMR Debt (only)*** identifies families who have only mortgage debt for home acquisition. Thus, we analyze the difference on the total debt by the fact of household has only mortgage debt. So, to interpret this variable we need know that it only assumes value one if family has only household main residence debt or zero if it does not verify.

The dummy variable ***Home Ownership*** characterizes families have their own housing and we intend to verify the effect on the debt level in the case of the household have own home. The use of this variable aims to specify the impact of home ownership on the value of the debt, i.e., if the Portuguese families are mainly indebted for the acquisition of this real asset. When household has own home the variable assumes value one and if household does not have own home, the variable is zero.

When there is at least one household member with an employment contract is a sign of greater economic and financial stability. Therefore, we intend to evaluate the difference between the debt level of a family who has own home and an employment contract and the remaining families based on the ***Home Ownership * Contract*** variable.

The dummy variable ***High Home Value*** is used to distinguish households which have their household main residence with a net worth equal to or greater than 350,000.00€. We intend to analyze the impact on the debt level when the household main residence has the characteristic mentioned above. The choice of this component arises from the need to discover whether the social classes who purchase this type of housing with recourse to credit to achieve these properties. This variable assumes value one when families with home which value equal to or greater than 350,000.00€ and zero, otherwise.

The size of the household requires, firstly, higher daily expenses and therefore requires higher financial resources and better managing the household budget, but it may be necessary to resort to credit in order to meet the costs of day-to-day. Moreover, a larger number of elements that make up the household can be a barrier to accessing credit because there will be a greater difficulty to pay the debt.

The model will determine what kind of relationship exists between the level of debt and the size of the household. The variable *3 Elements* is a dummy variable that characterizes households composed by three persons. This variable is one when household is composed by three elements and it is zero in other cases. In recent years, in Portugal, households are usually composed by three elements and the tendency is the couples have only one child (INE, 2013). But in the sample used to construct the model may be find households with other relationship.

The model also includes the variable which crosses households with married representative individual and households with 3 elements and it is defined as ***Married * 3 Elements***.

The Net Wealth is the difference between the total assets of the household, with the exception of professional and public pensions, and the total household responsibilities. Thus, the net wealth may take positive, negative or null values. Therefore, this variable takes the value one only when the net wealth is positive and zero when the net worth is zero or even negative. The impact of this differential will be assessed in the model as a

dummy variable called ***Positive Net Wealth***, i.e., the effect on the level of debt when households have positive net wealth.

The ***Real Wealth*** variable quantifies the value of the real assets of the household, such as the own home, cars, etc. With this variable, we pretend to analyze its impact on the total debt.

In some cases, part of the household wealth is heritage from the family and it could influence the debt value. So, the ***Heritage*** variable will study this reality.

5.3.2. Results and discussion

In the model all regressors have *p-values* below the 5% significance level, and by the *t test*, we conclude all regressors have significance in the endogenous variable explanation.

By analysis of the *F test* presented in the table below, we conclude that at least one of explanatory variables in the model is significant for the explanation of the logarithm of the debt, since the null hypothesis is rejected.

The set of exposed exogenous variables in the model explains approximately 33% of the logarithm of the debt level, as the dependent variable, based on the analysis of the value of R^2 (Adjusted) = 0.325527. Although the model presented above explains only 33% of the total variance of logarithm of the Portuguese families' debt amount in thousands of Euros, the model is statistically significant with a confidence level of 95%.

Table 2 – Model performance indicators

R-squared	0.331063
Adjusted R-squared	0.325527
F-statistic	59.80776
Prob. (F-statistic)	0.000000

In order to analyze the functional form of the model we use the Reset test[2] and we conclude that this model is specified, because the *p-value* (0.2774) is greater than 0.05, accepting the null hypothesis.

To check the quality of the model, it is also required a study on the relationship between the variables. However, by the analysis of the correlation matrix[3], we can be seen that there is perfect collinearity. The strong collinearity is designated when correlation between variables is equal or higher than |0.8| and it also does not check in any of the relationships between the model variables.

The analysis of the model also includes the study of the variance of the errors, as they can be homoscedastic (H_0) or heterocedastic (H_1). Therefore, we used the *White test* (no cross terms)[4] and we conclude that the model shows heteroscedastic errors by the *p-value* = 0.0000, in other words, the variance of the errors does not have a constant nature, representing a problem for the analyzed model.

The solution for this problem will be estimating the model corrected by White's robust standard errors[5].

In this model, there is no errors autocorrelation, by the analysis of the Breusch-Godfrey Serial Correlation LM Test[6].

By the central limit theorem, as the observations number is higher, errors follows a normal distribution[7].

After exposing the variables of the model, we present the results of the final model, namely the coefficients of the explanatory variables and the respective standard errors.

In table 2, we present our estimations' results.

[2] See the Reset Test in the Annex 2.
[3] See the Correlation matrix in the Annex 3.
[4] See the White Test in the Annex 4
[5] See the Final Model (with White's robust SE) in the Annex 5.
[6] See the Breusch-Godfrey Serial Correlation LM Test in the Annex 6.
[7] See the Normality of Errors in the Annex 7.

Table 3 – Output: Debt Level (percentage variations)

Variable	*Log (Debt)*
Age	*-0.036146 ** (0.004487)*
Higher Education	*0.889316 ** (0.178221)*
Employed	*0.722742 ** (0.153278)*
Contract	*-1.120214 ** (0.244613)*
Monthly Income	*0.000119 ** (4.18E-05)*
*Monthly Income * Higher Education*	*-0.000155 ** (5.13E-05)*
*Married * 3 Elements*	*-0.330978 ** (0.169774)*
Home Ownership	*1.655670 ** (0.188883)*
*Home Ownership * Contract*	*0.853985 ** (0.241250)*
High Home Value	*0.600832 ** (0.196062)*
*Unemployed * HMR Debt (only)*	*0.766480 ** (0.194953)*
Positive Net Wealth	*-0.902401 ** (0.164390)*
*Real Wealth*Heritage*	*4.30E-07 ** (2.79E-07)*
Constant	*10.29728 ** (0.299492)*

** - These symbols indicate that the coefficients are statistically significant at 5 percent confidence level.

After presenting the results of the parameters (β_n), we will present below the interpretation of each value associated to the respective explanatory variable. All interpretations of variables will be done in a *ceteris paribus* perspective; it means that the analysis will be done with change in the analyzed variable but other ones will be remain constant.

Our results indicate that the age of the head of the household has a negative impact on the variation of the debt amount, as in literature, since over the years the debt value is being amortized. Based on the results of the model, the one-year increase in the age of the head of the household causes a negative percentage change of 0.0361. In accordance with the life-cycle model, the debt value increase in the first cycle and part of the

second one and after that debt value decrease with adding age. Aging increases the prudence and therefore reduces the debt. There is still a restriction on access to credit imposed by the system.

If the head of the household has higher education, the debt level takes a positive percentage change of 0.8893.

When the head of the household is employed, the percentage change in the debt amount is positive, particularly in 0.7227, and as described in the literature, they have greater capacity to meeting liabilities. The existence of an employment contract implies a negative percentage change of 1.1202 in the debt amount, and, although not according to the theory, the variable is statistically significant. If the head of the household is currently unemployed and have only debt incurred for the acquisition of the household main residence, the debt amount takes an increase of 0.7665 percentage points, by the analysis of *Unemployed*HMR Debt (only)* variable.

By this way, we can conclude that the professional situation is very important to the debt analysis, because it determines the level of capacity to meet the respective responsibilities.

An increase in the *Monthly Income* level causes a positive change in debt level of 0.0001 percentage points. The product between the variables *Monthly Income* and *Higher Education* also has a negative impact on total debt of the household, meaning that the monthly income of a household whose head has higher education has a negative effect of 0.0002 percentage points in the total amount of debt.

The dummy variable *Positive Net Wealth* indicates that households with positive net wealth have a negative impact of 0.9024 on the percentage variation of the total debt amount comparing to the other ones. It happens because the amount of total debt reduces and, consequently, the total wealth value increase.

The dummy variable *Home Ownership* indicates that a household with own home has a positive impact of 1.6557 on the percentage variation of the total debt amount comparing with the other ones. As described in the literature, the level of debt is largely made up of mortgage debt, so having home increases the volume of the debt.

The value 0.6008 presented by the dummy variable *High Home Value* measures the impact on the percentage variation of the total debt amount compared to the other ones. If the home value is high, the amount of debt to contract for the purchase will also be

high. However, the value of debt increases by 0.8540 percentage points, when a household has own home and the head of the household has an employment contract, because there is an expectation of financial stability to purchase own home by way of long-term debt. These expectations are transverse as to the financial institutions which granted the credit as well to families. In a household composed by 3 elements whose head is married, the value of the debt has a negative percentage change of 0.3310 compared to other households, by *Married * 3 Elements* variable. This behaviour is explained by the concept of *per capita* income, i.e., once the total income is shared by 3 elements, and the value of *per capita* income is low. Households with low income can only borrow low debt amount.

The product between the variables *Real Wealth* and *Heritage* is significant. This variable presents a positive impact on the logarithm of the debt value. However, the difference from this impact between households with inheritance and without inheritance is almost null, and by this reason is not important its interpretation.

Conclusion

This thesis studied the indebtedness of Portuguese families based on microdata from the Portuguese Household Finance and Consumption, seeking to characterize socioeconomically these families.

To achieve this objective we revised the theories of consumption that explain consumer's savings behaviour. Once we studied the Portuguese families' financial situation in 2010, we analyzed the evolution of the financial sector in Portugal and the Portuguese economy as a part of the European Union and the Euro Zone.

We intended to describe a period when financial market conditions changed abruptly, stimulating households to raise indebtedness levels for consumption purposes exploring the households' expectations of further economic growth. We were also concerned with the subsequent effect caused by the emergence of the 2008 economic and financial crisis that lead to a historical maximum of 130% of debt level in percentage of disposable income achieved in 2009.

Nowadays, home buying can be seen as an investment, since for several years the resources are channelled to the property that it translates into household real wealth. Since the early of the XXI century, the prices of houses increased at a faster rhythm and, consequently, the amount of mortgage debt increased at the same time. The evolution of the real state sector led to conclude that the households' high debt level is caused by the purchase of own home, since the large majority of households have to ask for credit to do it converting the housing credit into the greater portion of the total debt of Portuguese families. New contracts to mortgage debt have decreased since 2009 and regarding to the consumer credit, new contracts also decreased though the consumer credit level has been decreasing since 2006. The debt decrease in the last years, but it does not influence, necessarily, the consumption level because the change rates of the consumption and of the disposable income have a similar behaviour along 2000s. However, the consumption level in percentage of disposable income presented a small volatility after 2003 until the crisis. In 2009, the consumption percentage of disposable income had a fall and in order to compensate it, the savings rate in percentage of disposable income had a significant increase, but it had had a constant evolution.

Turning to microdata we found that about 77% of household responsibilities correspond to debt contracted for housing acquisition while around 64% of indebted population owns their main residence. Consequently, mortgage loans are the main contributor to the amount of total debt of Portuguese families, throughout most age classes.

We concluded that the level of financial liabilities exceeds the total income level of the household until the age group of 45-54 year old of the head of the household and the amount of debt has reached the highest values when the head of the household is in the age range of 35-44 years old.

In order to portray the type of families who are in debt we develop an econometric model where the dependent variable is the debt level and we use characteristics of Portuguese families as explanatory variables, such as age, monthly income, education level, and employment status. The model is significant in explaining the debt level through part of factors that influence it, and based on these results, we can conclude that there is economic relationship between the debt level and its explanatory factors. In our model, the age of the household head has a negative impact on the percentage variation of the debt amount.

According to our model, higher education, being employed, the level of monthly income, owning a home and a high home value have positive impact on the percentage variation of the debt amount and they confirm the effects on the volume of debt explained in economic theory. The type of employment contract is one of the principal factors for contracting credit, but by our results, an employment contract has a negative impact on the percentage variation of the debt amount.

By the model, the monthly income of the household whose head has higher education has a negative impact on the percentage variation on the debt amount. This effect seems contradictory because both variables monthly income and higher education have positive effects when analyzed individually. So, if both variables have positive effects individually, it will be acceptable that when they are combined they have positive affect also. By this way, this result does not confirm the theory and it does not make sense because a household with these characteristics has better conditions to ask for debt.

This issue is recent and this paper pretends to develop it, analyzing the Portuguese indebtedness and its evolution in the last years, in particular, after the economic and financial crisis of 2007. In this study, we are faced with some limitations, such as a lack

of historical data because this situation is recent. For our model, we feel the need of data of consumption level and the age of all members of household in order to study the consumption standards in function of the type of families.

Further possibilities to develop this work can be analyzing the impact of the level of consumption in the debt amount, where it could understand the preferences of families, which could explain the debt level. In the future, when there is a similar survey, it would be made a comparison between the two periods. On the other hand, it will be done an analysis to the factors more sensible to changes in business cycles that call into question the sustainability of debt, in order to generating knowledge to prevent it from happening in the future.

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Annexes

Annex 1 – Initial model

Dependent Variable: LOG(DEBT)
Method: Least Squares
Date: 06/06/15 Time: 00:24
Sample: 1 1585
Included observations: 1585

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.29728	0.272856	37.73881	0.0000
AGE	-0.036146	0.003874	-9.329761	0.0000
HIGHER_EDUCATION	0.889316	0.171561	5.183672	0.0000
EMPLOYED	0.722742	0.147057	4.914702	0.0000
CONTRACT	-1.120214	0.209352	-5.350864	0.0000
MONTHLY_INCOME	0.000119	2.99E-05	3.990243	0.0001
MONTHLY_INCOME*HIGHER_EDUCATION	-0.000155	4.01E-05	-3.854281	0.0001
MARRIED*HOUSEHOLD_3_INDIVIDUALS	-0.330978	0.155353	-2.130495	0.0333
HOME_OWNERSHIP	1.655670	0.159158	10.40266	0.0000
HOME_OWNERSHIP*CONTRACT	0.853985	0.201422	4.239780	0.0000
HIGH _HOME_VALUE	0.600832	0.223800	2.684681	0.0073
UNEMPLOYED*HMR_DEBT_ONLY	0.766480	0.215559	3.555775	0.0004
POSITIVE_NET_WEALTH	-0.902401	0.162374	-5.557557	0.0000
REAL_WEALTH*HERITAGE	4.30E-07	1.35E-07	3.184477	0.0015

R-squared	0.331063	Mean dependent var	9.727682
Adjusted R-squared	0.325527	S.D. dependent var	1.816628
S.E. of regression	1.491929	Akaike info criterion	3.646811
Sum squared resid	3496.815	Schwarz criterion	3.694228
Log likelihood	-2876.098	Hannan-Quinn criter.	3.664427
F-statistic	59.80776	Durbin-Watson stat	2.047439
Prob(F-statistic)	0.000000		

Annex 2 – Reset Test

Ramsey RESET Test
Equation: UNTITLED
Specification: LOG(DEBT) CAGEHIGHER_EDUCATION
EMPLOYEDCONTRACTMONTHLY_INCOME
MONTHLY_INCOME*HIGHER_EDUCATIONMARRIED
*HOUSEHOLD_3_INDIVIDUALSHOME_OWNERSHIP
HOME_OWNERSHIP*CONTRACT HIGH _HOME_VALUE
UNEMPLOYED*HMR_DEBT_ONLYPOSITIVE_NET_WEALTH
REAL_WEALTH*HERITAGE
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.644611	1570	0.5193
F-statistic	0.415523	(1, 1570)	0.5193
Likelihood ratio	0.419438	1	0.5172

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.925237	1	0.925237
Restricted SSR	3496.815	1571	2.225853
Unrestricted SSR	3495.889	1570	2.226681
Unrestricted SSR	3495.889	1570	2.226681

LR test summary:

	Value	df
Restricted LogL	-2876.098	1571
Unrestricted LogL	-2875.888	1570

Unrestricted Test Equation:
Dependent Variable: LOG(DEBT)
Method: Least Squares
Date: 06/06/15 Time: 00:34
Sample: 1 1585
Included observations: 1585

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.912670	3.709350	2.133169	0.0331
AGE	-0.020817	0.024093	-0.864033	0.3877
HIGHER_EDUCATION	0.498142	0.630632	0.789910	0.4297
EMPLOYED	0.421565	0.489828	0.860640	0.3896
CONTRACT	-0.647484	0.762663	-0.848978	0.3960
MONTHLY_INCOME	6.77E-05	8.52E-05	0.794468	0.4270
MONTHLY_INCOME*HIGHER_EDUCATION	-8.67E-05	0.000113	-0.768349	0.4424
MARRIED*HOUSEHOLD_3_INDIVIDUALS	-0.190418	0.267752	-0.711173	0.4771
HOME_OWNERSHIP	1.009582	1.014854	0.994805	0.3200
HOME_OWNERSHIP*CONTRACT	0.490673	0.598538	0.819787	0.4125
HIGH _HOME_VALUE	0.316820	0.494195	0.641082	0.5216
UNEMPLOYED*HMR_DEBT_ONLY	0.435382	0.557054	0.781578	0.4346
POSITIVE_NET_WEALTH	-0.536930	0.589765	-0.910414	0.3627
REAL_WEALTH*HERITAGE	2.06E-07	3.73E-07	0.551436	0.5814
FITTED^2	0.022154	0.034368	0.644611	0.5193

R-squared	0.331240	Mean dependent var	9.727682
Adjusted R-squared	0.325276	S.D. dependent var	1.816628
S.E. of regression	1.492207	Akaike info criterion	3.647808
Sum squared resid	3495.889	Schwarz criterion	3.698612
Log likelihood	-2875.888	Hannan-Quinn criter.	3.666682
F-statistic	55.54480	Durbin-Watson stat	2.048688
Prob(F-statistic)	0.000000		

Annex 3 – Correlation Matrix

	DEBT	AGE	CONTRACT	EMPLOYED	HERITAGE	HIGHER_EDUCATION	HMR_DEBT_ONLY	HOME_OWNERSHIP
DEBT	1	-0.260197	0.069100	0.219007	0.007672	0.179273	0.140907	0.255921
AGE	-0.260197	1	-0.446838	-0.515353	-0.085280	-0.064677	0.060983	0.071139
CONTRACT	0.069100	-0.446838	1	0.746001	0.048908	0.081787	0.012343	0.077643
EMPLOYED	0.219007	-0.515353	0.746001	1	0.021962	0.095046	0.055910	0.120690
HERITAGE	0.007672	-0.085280	0.048908	0.021962	1	-0.038617	-0.064047	-0.097118
HIGHER_EDUCATION	0.179273	-0.064677	0.081787	0.095046	-0.038617	1	0.022153	0.034981
HMR_DEBT_ONLY	0.140907	0.060983	0.012343	0.055910	-0.064047	0.022153	1	0.523504
HOME_OWNERSHIP	0.255921	0.071139	0.077643	0.120690	-0.097118	0.034981	0.523504	1
HOUSEHOLD_3_INDIVIDUALS	-0.016921	-0.039464	0.049599	0.050901	0.042495	-0.021589	-0.030453	-0.003290
HIGH _HOME_VALUE	0.269358	0.023739	-0.013259	0.097971	-0.064717	0.212195	0.048773	0.085311
MARRIED	-0.063379	0.017791	-0.051574	-0.109365	0.074133	0.085904	-0.096545	-0.152875
MONTHLY_INCOME	0.172846	0.072426	0.095316	0.133218	-0.048432	0.418324	0.084618	0.133424
POSITIVE_NET_WEALTH	0.061008	0.058254	0.051023	0.095333	-0.105609	0.070257	0.241270	0.451304
REAL_WEALTH	0.268304	0.061355	-0.107309	0.072983	-0.114432	0.240129	0.080961	0.174669
UNEMPLOYED	-0.061895	-0.067362	-0.362358	-0.485734	0.022198	-0.073651	-0.048366	-0.131322

	HOUSEHOLD_3_ INDIVIDUALS	HIGH _HOME_VALUE	MARRIED	MONTHLY_INCOME	POSITIVE_NET_WEALTH	REAL_WEALTH	UNEMPLOYED
DEBT	-0.016921	0.269358	-0.063379	0.172846	0.061008	0.268304	-0.061895
AGE	-0.039464	0.023739	0.017791	0.072426	0.058254	0.061355	-0.067362
CONTRACT	0.049599	-0.013259	-0.051574	0.095316	0.051023	-0.107309	-0.362358
EMPLOYED	0.050901	0.097971	-0.109365	0.133218	0.095333	0.072983	-0.485734
HERITAGE	0.042495	-0.064717	0.074133	-0.048432	-0.105609	-0.114432	0.022198
HIGHER_EDUCATION	-0.021589	0.212195	0.085904	0.418324	0.070257	0.240129	-0.073651
HMR_DEBT_ONLY	-0.030453	0.048773	-0.096545	0.084618	0.241270	0.080961	-0.048366
HOME_OWNERSHIP	-0.003290	0.085311	-0.152875	0.133424	0.451304	0.174669	-0.131322
HOUSEHOLD_3_INDIVIDUALS	1	-0.020216	-0.114839	-0.011833	-0.057182	-0.046850	0.008291
HIGH _HOME_VALUE	-0.020216	1	-0.070737	0.219678	0.051995	0.356363	-0.055282
MARRIED	-0.114839	-0.070737	1	-0.161803	-0.133623	-0.098543	0.040735
MONTHLY_INCOME	-0.011833	0.219678	-0.161803	1	0.145239	0.339581	-0.127982
POSITIVE_NET_WEALTH	-0.057182	0.051995	-0.133623	0.145239	1	0.137122	-0.151863
REAL_WEALTH	-0.046850	0.356363	-0.098543	0.339581	0.137122	1	-0.090176
UNEMPLOYED	0.008291	-0.055282	0.040735	-0.127982	-0.151863	-0.090176	1

Annex 4 – White Test

Heteroskedasticity Test: White

F-statistic	7.366221	Prob. F(13,1571)	0.0000
Obs*R-squared	91.06345	Prob. Chi-Square(13)	0.0000
Scaled explained SS	179.2338	Prob. Chi-Square(13)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/06/15 Time: 01:09
Sample: 1 1585
Included observations: 1585

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.796621	0.611004	2.940443	0.0033
AGE^2	0.000185	0.000112	1.648942	0.0994
HIGHER_EDUCATION^2	0.232774	0.348449	0.668028	0.5042
EMPLOYED^2	-0.601024	0.427621	-1.405507	0.1601
CONTRACT^2	0.951860	0.601636	1.582119	0.1138
MONTHLY_INCOME^2	5.26E-08	1.13E-08	4.648948	0.0000
(MONTHLY_INCOME*HIGHER_EDUCATION)^2	-4.58E-08	1.21E-08	-3.797760	0.0002
(MARRIED*HOUSEHOLD_3_INDIVIDUALS)^2	0.508520	0.448206	1.134567	0.2567
HOME_OWNERSHIP^2	-1.073155	0.458405	-2.341063	0.0194
(HOME_OWNERSHIP*CONTRACT)^2	-1.380737	0.581859	-2.372976	0.0178
HIGH _HOME_VALUE ^2	-0.713402	0.635210	-1.123097	0.2616
(UNEMPLOYED*HMR_DEBT_ONLY)^2	-1.148154	0.629321	-1.824434	0.0683
POSITIVE_NET_WEALTH^2	1.167941	0.467731	2.497036	0.0126
(REAL_WEALTH*HERITAGE)^2	1.91E-13	5.83E-14	3.279388	0.0011

R-squared	0.057453	Mean dependent var	2.206192
Adjusted R-squared	0.049654	S.D. dependent var	4.417600
S.E. of regression	4.306529	Akaike info criterion	5.766935
Sum squared resid	29136.06	Schwarz criterion	5.814353
Log likelihood	-4556.296	Hannan-Quinn criter.	5.784551
F-statistic	7.366221	Durbin-Watson stat	2.003130
Prob(F-statistic)	0.000000		

Annex 5 – Final Model (with White's robust SE's)

Dependent Variable: LOG(DEBT)
Method: Least Squares
Date: 06/06/15 Time: 01:38
Sample: 1 1585
Included observations: 1585
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.29728	0.299492	34.38253	0.0000
AGE	-0.036146	0.004487	-8.055537	0.0000
HIGHER_EDUCATION	0.889316	0.178221	4.989951	0.0000
EMPLOYED	0.722742	0.153278	4.715226	0.0000
CONTRACT	-1.120214	0.244613	-4.579530	0.0000
MONTHLY_INCOME	0.000119	4.18E-05	2.848221	0.0045
MONTHLY_INCOME*HIGHER_EDUCATION	-0.000155	5.13E-05	-3.018406	0.0026
MARRIED*HOUSEHOLD_3_INDIVIDUALS	-0.330978	0.169774	-1.949529	0.0514
HOME_OWNERSHIP	1.655670	0.188883	8.765590	0.0000
HOME_OWNERSHIP*CONTRACT	0.853985	0.241250	3.539840	0.0004
HIGH _HOME_VALUE	0.600832	0.196062	3.064496	0.0022
UNEMPLOYED*HMR_DEBT_ONLY	0.766480	0.194953	3.931612	0.0001
POSITIVE_NET_WEALTH	-0.902401	0.164390	-5.489377	0.0000
REAL_WEALTH*HERITAGE	4.30E-07	2.79E-07	1.542716	0.1231

R-squared	0.331063	Mean dependent var	9.727682
Adjusted R-squared	0.325527	S.D. dependent var	1.816628
S.E. of regression	1.491929	Akaike info criterion	3.646811
Sum squared resid	3496.815	Schwarz criterion	3.694228
Log likelihood	-2876.098	Hannan-Quinn criter.	3.664427
F-statistic	59.80776	Durbin-Watson stat	2.047439
Prob(F-statistic)	0.000000		

Annex 6 - Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.565903	Prob. F(2,1569)	0.5680
Obs*R-squared	1.142523	Prob. Chi-Square(2)	0.5648

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/06/15 Time: 01:39
Sample: 1 1585
Included observations: 1585
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003930	0.273110	-0.014390	0.9885
AGE	-6.52E-06	0.003877	-0.001681	0.9987
HIGHER_EDUCATION	-0.001415	0.171624	-0.008244	0.9934
EMPLOYED	0.007264	0.147304	0.049313	0.9607
CONTRACT	0.003279	0.209504	0.015651	0.9875
MONTHLY_INCOME	-6.11E-08	2.99E-05	-0.002042	0.9984
MONTHLY_INCOME*HIGHER_EDUCATION	4.39E-08	4.02E-05	0.001092	0.9991
MARRIED*HOUSEHOLD_3_INDIVIDUALS	0.003114	0.155424	0.020032	0.9840
HOME_OWNERSHIP	0.006977	0.159373	0.043779	0.9651
HOME_OWNERSHIP*CONTRACT	-0.011002	0.201862	-0.054505	0.9565
HIGH _HOME_VALUE	0.000968	0.223875	0.004322	0.9966
UNEMPLOYED*HMR_DEBT_ONLY	0.001198	0.215669	0.005555	0.9956
POSITIVE_NET_WEALTH	-0.003101	0.162474	-0.019083	0.9848
REAL_WEALTH*HERITAGE	-2.07E-09	1.35E-07	-0.015318	0.9878
RESID(-1)	-0.023932	0.025370	-0.943305	0.3457
RESID(-2)	0.011847	0.025427	0.465917	0.6413

R-squared	0.000721	Mean dependent var	-5.04E-15
Adjusted R-squared	-0.008833	S.D. dependent var	1.485794
S.E. of regression	1.492342	Akaike info criterion	3.648613
Sum squared resid	3494.294	Schwarz criterion	3.702805
Log likelihood	-2875.526	Hannan-Quinn criter.	3.668746
F-statistic	0.075454	Durbin-Watson stat	1.998996
Prob(F-statistic)	0.999999		

Annex 7 – Normality of Errors

Figure 1 A: Histogram - Normality Test

