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# To buy or to rent? That is the question!

(Portuguese Real Estate Market on Trial)

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## ABSTRACT

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The decision of buying a house is not done in an unexpected way. The subprime crisis in the US, the European bank crisis and the third Portuguese rescue from the Troika have caused so changes in the housing and rental market in Portugal, changes which we have explored in this study. This research is based on a framework developed by Tabner (2008) in order to analyse different housing owners/investors profiles, in our case, the fully funded profile and the partially funded profile, not less important, we also analysed some qualitative approaches of owning a house, as advantages and disadvantages of the housing market and the renting market, as well, two specific cases that are linked with the housing and renting market, Airbnb and Modular construction. For the period in study, from 2000 until 2013, a fully funded consumer with a tax rate of 35% would be the financially wiser profile if bought a house, in contrast to the partially funded profile with buy-to-let intentions that, by buying a house, with a market price of 100,000€ would yield a negative NPV of 51,500€, meaning that instead buying a house, this profile, for the period in study should rather have chosen to rent a property.

## ACKNOWLEDGEMENTS

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The work that could be seen in the below pages only were possible due to a number of people that have helped me and supported me whenever I need, so I would like to start, by thanking to my supervisor, Professor Ricardo Reis, who has always supported me during my dissertation. Moreover I would like to also thanks to my girlfriend that always encouraged me and was there when it was need to give a last push up. As well for my friends that have shown continuous interest in knowing more about my thesis, I thanked them. However, anything of this was possible if it was not for my family effort in providing me all the bases, education, conditions and maturity to be able to overcome all the changes. I acknowledged that and thanked them for their effort. To finish, I would also like to express a word of gratitude to Católica-Lisbon School of Business and Economics, its Professors and Staff for all the knowledge delivered and for the opportunity to make me a better human being.

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# I: INTRODUCTION AND MOTIVATIONS

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Buying a house is not an easy and quick decision. This decision comprises a series of factors, some of which can be explained by pure economic theory and others more on the psychological behavioral side of the homeowner/renter. The later are harder to explain, as stated by Shiller (2007), “The increase since 1994 in home ownership appears to be due in large part to the remarkable housing boom. The boom psychological encouraged potential homeowners and encouraged lenders as well. Home buyers were encouraged by the potential investment returns”. Even if the quote is directed at the US market, it represents very well an idea that reaches beyond that country’s environment: the difficulty in choosing the best option, between buying and renting a house. Each individual case of home acquisition is a different case, each person/investor has a different taste and/or need and this is also stated by Shiller (2007) as he, also, states that “there are many sensible reasons for people to rent rather than own: people who cannot currently bear the responsibilities of household management, who are likely to move soon or who have other plans for their time, should rent rather than own. Renting rather than owning encourages a better diversification of investments.”

All the credit constrains in the Europe, due to the subprime crisis and the European banking crisis, which also will be addressed in this study, and the difficulty decision that consumers/investors have in their hands, when the time comes, to buy or rent a property, lead us to research the literature in this topic. How did academic research contribute to help the consumers/investors decide, in a financially sound way, between housing or renting? Some authors already explored the issue of buying versus renting, for example, Shelton (1968) states that there are two categories analyses that were done at that time: one category is what Shelton calls the “on-the-one-hand, on-the-other-hand viewpoint”. He further describes the other category of analyses by saying that: “Others stress that the decision should hinge on a forecast of housing prices: If one is clever enough to buy low and sell high, he should own”, meaning that the types of analysis that were done, were mere speculative on the housing market and not built on some financial model that could evaluate properly the decision of buying versus renting.

The foundation of such a financial decision model would lie on the premise that the price of buying a house should compensate the present value of all the future rents, and in equilibrium equal it. We will use one such model in this dissertation. Several other papers adapt such models to particular contexts in terms of local, national frameworks (economically, legally, etc) in particular periods of time.

Hargreaves’ (2002) paper tries to answer the question “whether to rent or to buy (...)”, in the New Zealand real estate market, and for this Hargreaves (2002) starts by framing his financial model in some conditions, “In purely financial terms the decision to rent or buy housing is very similar to the decisions that businesses make when renting or buying equipment items such as cars or computers. Both involve financing and investment

and are described by Solis and Shahrokhi (1989) as hybrid capital budgeting decisions. Brealy and Myers (2000) state that the decision rule should be clear in concept. Buy the asset if the equivalent annual cost of ownership is less than the lease rate you can get from an outsider. Thus if you can rent the asset to yourself cheaper than you can't rent it from someone else then it pays to buy. The discount cash flow approach is the standard methodology used for assessing the rent/buy decision". However, this model, in our opinion had some flaws: for example, it did not incorporate the expenses of owning a property and it limited the analysis to a certain number of cash flows from rents (5 years) as opposed to an undetermined number of years. The later issue contradicts common understanding that properties should be measured without any expiration date, the comparison being made rather against a perpetuity of rents.

In the Portuguese context, our opinion also is backed by one paper, that also tries to answer the question to buy or to rent a property from Manha (2012) where it is stated: "During the research some types of models were tried. One of them was a cash flow model. It is a model in which all of the variables are projected and a fair value is computed, pointing to the best solution for one single hypothetical housing purchaser. However the objective is a generalised model where each person can identify herself in a specific hypothetic purchaser. The cash flow model would have other limitations such as the number of variables and its forecast, mainly when talking about a large period of time. The potential purchasers could have a big tree of options, which would make the decision and the computation much complex and less objective. The conclusions would not be precise or conclusive because the abundant hypothetical types of purchasers". Taking into consideration that our aim in this paper was to answer the question to buy or to rent to the higher number of individuals, a model which could generalize the Portuguese population, at least, until a certain degree, would be the best framework to be worked on.

As we felt the need to accommodate changes in the model and in the contextualization of the Portuguese real estate market, that changes were deployed from the original paper from Tabner (2008) which the goal was the same, to try to answer the question, for a certain profile, which would be the best decision, to buy or to rent a house. In our opinion Tabner (2008) provides the most thorough approach we found and one that is suitable and easily adaptable to the current situation in the Portuguese market. As we will describe later, Tabner's model considers a very complete set of variables that capture the various dimensions of the buy versus rent decision.

The goal of this study is to provide a framework, easy to understand for non-financial users, user-friendly and ready to use right out-of-the-box, in order to evaluate the best option to be taken, for a certain profile of user, between buying and renting, within a financial point of view. To achieve this, we adapted the Gordon Growth Model, Tabner (2008) to apply it to user profiles that can be found in the Portuguese Economy, in terms of interest-rates, tax liabilities, and others variables; and also to the characteristics of the Portuguese real estate market: with a consistently high ownership ratio (in the last 5 years, 5% above the European mean,

according to Eurostat reports), with hard to enforce renting legislation resulting in a weak competitive renting market.

Nevertheless, in this study we will not only cover the financial point of view, in a decision between housing and renting, but also others reasons to choose between one option or another, in a descriptive approach.

We also want to explore the impact of the credit restriction that Portugal is feeling from 2008 and on, as well what will be the impact of the new BCE Asset-Backed Mortgage bonds purchase, in order to clean, the Portuguese banks' balance sheets. Nevertheless we have the situation with Espirito Santo Bank, which will also have a lot of impact in the concession of credit from the banks to the economy, as it was common knowledge, Espirito Santo Bank, furthermore called as "BES", was one of the biggest banks operating in Portugal and their collapse, not only created a bad environment for investors, due to the rescue conditions, to the possibility of loss contamination to the others banks operating in Portugal, or even losses to the Portuguese population. Only time will tell the all story and the impact from this fall, for the time being we just can say that the shock for the moment can be seen as credit restriction, meaning that, the BCE measures to try to inject money into the economy are not having the desired effect.

As previously mentioned, the credit restriction is one of the most important facts that leads to choose to rent a house instead of buying a house. Other characteristics affecting the decision include potential mobility, since the possibility of moving is higher if a person rents instead of owning a house.

As a very rough descriptive indicator of the situation in Portugal in recent years we ran a quick search using Google Trends, with the terms "alugar casa" – rent a house; and also "comprar casa" – buy a home<sup>1</sup>. The resulting graph (see annex I) reveal what was already expected: that the search for renting a house has been constantly increasing over the years, even throughout the financial crisis from 2007 until now, while buying a house is stagnant throughout the crisis and even a slight decrease can be seen. The graph refers to relative interest in the search for the terms, hence filtering out absolute effects. The trends however do not filter out seasonal effects, such as renting summer vacation houses.

This work is very closely related to Manha (2012), which uses the same methodology evaluating the Portuguese real estate market. However, this study only used data until 2011, meaning that it did not use the most recent data. Due to this reason, our study first aim was to use updated data, because there were very important historical facts not covered by Manha (2012), as they had not happened yet, as for example the IMF entry and exit from Portugal and the consequences of it. We further improved upon that study, as we introduced the concept of rent insurance and the main framework used for calculations was modified to accommodate this change. The LTV (Loan to Value Ratio) was also taken into consideration in the risk premium rate. We also introduced and explained the concept of modular construction, and how it impacts the

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<sup>1</sup> Google trends includes related and close terms as well, such as "house to rent", "renting a house", "how to rent a house", etc. and similar to "buy a house".

real estate market. We also looked at what companies like Airbnb can do to improve and shake the rental market and their respective features. We have taken a differential approach for the risk premium as there were significant changes in the fiscal legislation. For example we looked at if it was possible to use that framework for the period in study, taking into account that for the structured profiles that had a higher tax rate than 28%, it was assumed that the person can now be taxed autonomously.

The study is divided into sections that will cover the hypothesis that is in study, try to solve it and present conclusions as well improvements that could be made to it.

In section 2, we will describe the Portuguese Market as an overview of it and under it own sub-sections, i) the Housing Market, ii) the Rental Market, iii) Pros and Cons of Housing and iv) Pros and Cons of Renting.

Moreover, in section 3 the Methodology, using as reference Tabner (2008), we will cover and apply the Gordon Growth Model to the Portuguese Market in specific. Section 4 will be section that will show the analysis of the results obtain for the different structured profiles, that will overview three different periods of time highly important for the history, the 90's, before the IMF entry in Portugal and after the exit of IMF from Portugal.

## II: THE REAL ESTATE MARKET

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The real estate asset category is very different from the others assets' classes. Normally the transactions of this type of asset involves real estate brokers who act as middlemen. Behind the price for a certain property and the supply and demand forces, lie a myriad of factors, such as the quality of construction, location, the design, proximity to infrastructures like schools or public transportation and railways.

As previously said, this asset category is unique and has characteristic features, such as not being able to be moved from one place to another, the possibility of the owner to create it own asset and add value to it, by investing in the land and construct or improve upon the property there, and generate income from it, i.e. reselling it, renting it to someone or simply using it.

Studies in this field show that global real estate markets are not only dependent on worldwide economical cycles, but also in a mix of global and local economical factors as stated by Goetzmann and Watcher (1996) These authors have documented “that the real estate crash in the early 1990’s was felt by nearly every country in the world.” (Case, Goetzmann and Rouwenhorst, 2000), and they have stated in their paper that “for example, investors who sought the safety of international real estate markets in the 1990's experienced shocking declines in both U.K. and Japan and lackluster performance in most continental European markets as well. In theory, international diversification lowers investor risk. In practice, this diversification has some serious pitfalls.” Case, Goetzmann and Rouwenhorst, (2000) quote Renaud (1995) who states that “the degree to which unique events in the late 1980's may have led to the correlated change in real estate prices and the global economy”, adding the notion “co-cyclicity of global economies and real estate”. The same authors conclude by saying that, “together, these recent studies suggest that a mix of global and local economic factors influence the world’s real estate markets.

However, we are aware that prices in real estate markets can be affected by local crisis, as we have experienced in the last years. The subprime crisis in the United States of America has affected almost every economy in the next years and it can be confirmed today that it has affected the European markets and consequently the Portuguese real estate market. Several authors have stated this, as Horta et al. (2010), “the burst of the US mortgage bubble, in early August 2007, was an abrupt waking up call for financial markets worldwide. Until then, even though interventions by central banks suggested the possibility of a more serious impact, the effects of the subprime crisis were mostly confined to the US. The first significant liquidity injection by the European Central bank took place on 9 August.” This injection was made to “ensure that the commercial banks could maintain a normal level of activity despite the increasing difficulties faced in the interbank money market. At the time, banks almost stopped mutual lending” (Horta et al, 2010). A report by the real estate initiative research team from the University of Ulster, Adair et al. (2009) also takes the same approach, that the US subprime crisis affected the European countries leading to a European banking crisis,

“The demise of the sub-prime mortgage market in the US was the catalyst for the credit crunch, but as news of the sub-prime crisis broke in August 2007 the effect it would have on global money markets was not immediately apparent.” and “The European outlook is equally grim. The credit crunch may have originated in the US but many analysts are predicting that the European economy could be its biggest victim.” meaning that some analysts were already predicting that the European markets and their countries would be one of the most affected areas in terms of credit crunch. Eichengreen et al. (2012) even state in their paper, “After Lehman's failure the prospect of global recession became imminent, auguring the further deterioration of banks' loan portfolios. At this point the entire global financial system had become infected.” Also, Alakeson (2011) stated this constrain in his paper, “Prior to the financial crisis, the impact of the chronic undersupply of housing on affordability was in part masked by easy access to high loan to value mortgages. Easier access to credit allowed some people on low-to-middle incomes to get on the housing ladder. In 2007-8, 30 percent of this group bought a house with a 100 percent mortgage. By 2010 tighter access to mortgage credit, high house prices and stagnating wages meant that it would have taken the average household on a low-to-middle income, 31 years to accumulate a deposit for the average first home if they saved 5 percent of their income a year which most cannot afford.”, not being directly about the European Union it was the scenario in the UK and it was transversal to the countries in the EU.

But even in a more microeconomic level, there is a certain international mobility in the real estate market. In last years, in Europe we have noticed a movement of investors' funds from the traditional real estate market, like Western Europe to countries like Russia or Turkey, where the profitability is higher. (Fanico, 2009).

## II.1: MACROECONOMIC ENVIRONMENT IN PORTUGAL

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For the purpose of this study, we got the most updated dataset available, from 1999 until 2013. The year 1999 is of particular relevance, since it marks the beginning of the use of the Euro in Portugal and in other 11 countries.

The single currency is critical in our model, since the introduction of the EURO provided new technical solutions on the variables used. To quote Zeppernick (1999), the “possibility of creating a euro securities as broad, liquid, deep and transparent (...) Continuity in prices sources has to be ensured. Prices calculated on a national basis (PIBOR, FIBOR, etc) and on a European basis (Euribor) can coexist. Euro area-wide published indicator rates or harmonised criteria for computation of regional indicators are desirable”, this last quote it is the one where we are going to focus our interest rate.

Euribor stands for Euro Interbank Offered Rate and according to the EMMI (European Money Market Institute), formerly known as Euribor-EBF, “Euribor® is the rate at which Euro interbank term deposits are offered by one prime bank to another prime bank within the EMU zone, and is calculated at 11:00 a.m. (CET) for spot value (T+2). The choice of banks quoting for Euribor® is based on market criteria. These banks have

been selected to ensure that diversity of the euro money market is adequately reflected, thereby making Euribor® an efficient and representative benchmark”. The first Euribor value was decided on 30<sup>th</sup> December 1998 and the value was to be in use on 4<sup>th</sup> of January 1999. Euribor would become then the used reference rate for new mortgages and it is at the moment indexed in “28% of the retail mortgages in the Euro Area (\$1.4 trillion)”.

In what concerns the variables related to the economic cycle impacting the real estate market and later used in our model, the following consideration are pertinent: The year 2000, was a year of global economical growth in large scale, as well in the Portuguese economy, that have grown 3.79%, even that this was lower than the previous year. In what concerns inflation, we have used the Consumer Price Index as proxy, and the value that was registered for that year was 2.85%. In 2001 as well in 2002, the Gross Domestic Product (GDP) slowed down the growth trend and only experienced growth rates of 1.94% and 0.77%, respectively. In what concerns inflation, the CPI registered a value of 4.37% for 2001 and 3.6% for 2002. GDP in 2003 stretched 0.93% and the inflation also decreased from last year values to 3.22%. In the year 2004 a growth in the Portuguese economy of 1.81%, was registered mainly due to an increase in the internal demand. In terms of inflation, it was registered, through the Consumer Price Index proxy, the value of 2.37%, was supported by an increase in the internal demand, backed by an increase in wages for 2004. For 2005, the GDP growth was not so good was in the previous year, registering values of 0.77% against a 1.81% in the previous year. For that year the inflation registered was 2.28%. In 2006, Portugal felt again a strong exportation of goods and services, registering, due to this, a variation on the GDP of 1.55%. Since 2001 that the inflation was in a descending trend, however, in 2006 this trend reversed and the inflation registered a value of 3.11%. The year of 2007 kept with the growth in GDP, in this year, a value of 2.49%, however in terms of inflation it was registered a value of 2.45%.

“The euro sovereign debt crisis erupted in May 2010 when the Greek government needed financial support, though, as we will show (section 5), there were signs of an emerging crisis in 2007.” and “(...) as excessive borrowing on the part of some euro area ...”, this two quotes are from Allen and Moessner (2012) and show what was the beginning of a major crisis in the last years, mainly due to the “large losses during the global crisis, particularly after the collapse of Lehman Brothers in September 2008. They were under severe liquidity pressure (...)”, meaning that with this scenario in hands, shortage on liquidity, banks would not be able to provide loans in the next years, at least at the same lending rate that they were doing before.

2008, the year when the crisis started to be felt in Portugal, and mainly in Europe, as the growth economies started to enter in recession and emerging economies started to slow down. The GDP growth for that period was very close to 0%, being only 0.20%. Due to this, the inflation value was 2.59% that it is highly correlated with the increase of the oil price in that period of time.

In the year 2009, the GDP decreased almost 3% and the inflation was -0.83%.

2010, was the last year, in our study timespan, when the GDP growth was positive, as the GDP in that year registered a growth of 1.90%. For this year the inflation registered was 1.40%.

The year 2011 will be marked in the Portuguese history as the 3<sup>rd</sup> time that Portugal needed to request external help, due to a severe financial crisis and this started to affect the GDP that decreased 1.83%. About the inflation it was 3.65%.

The years next to the external help request were, of course, economical speaking, difficult and affected in terms of GDP growth, 2012 registered a decrease of 3.32% and 2013 a decrease of 1.36%. In terms of inflation for the year 2012 it was 2.77% and in 2013, 0.27%.

The relationship between these macroeconomic conditions and the housing market will be explained in the next section.

## II.2: HOUSING MARKET

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“Houses have a number of unusual features that complicate the interpretation of price developments.” (Hilbers et. al, 2008). As it was previously referred, the real estate asset category it is very unique as well the housing market that has key features as reported in the paper “House Price Developments in Europe: A Comparison” from Hilbers et. al, 2008. The housing market key features are the ones that are quoted next:

1. **heterogeneity**: different properties have different characteristics, and even for identical properties the location – a key factor in the price – will differ;
2. high **transaction costs and low turnover**: transaction costs are often high and trades in a particular property are usually infrequent, which hampers assessing price developments;
3. **varying conditions of sales**: prices generally result from bilateral negotiations, which include agreements on the price, but also on the condition of the property (e.g., “as is” as opposed to after certain repairs/renovations) and other aspects of the sale (timing, distribution of costs);
4. **rigid supply**: supply may lag demand as a result of scarcity of buildable land and, even if land is widely available, the time needed to secure building permits, obtain financing, and finish construction, in case of a sudden slowdown in demand, the supply response will also be lagged;
5. varying **financing conditions**: these vary widely internationally; key factors include the presence of specialized mortgage finance institutions and mortgage-backed securities markets, options to refinance and the use of real estate as collateral, and the supervisory and regulatory framework for housing finance;
6. impact of **taxes and subsidies**: taxation of, and financial incentives for, home ownership can strongly affect conditions in housing markets; examples include real estate taxes, the tax deductibility of certain costs (such as mortgages interest payments), and housing subsidies.

The construction industry in Portugal, of which the housing market represents a non-negligible portion has been called, many times, the engine of the economy. The President of AICCOPN (Associação dos Industriais da Construção Civil e Obras Públicas) – Association of the Industrial Construction and Public Constructions, Mr. Reis Campos, recurrently states that construction (be it housing or public works) can represent the main driver behind the economic recovery as the crisis in the economy is directly linked to the crisis in the construction industry.<sup>2</sup> These may be a somewhat biased view from within the industry, but we analysed the housing market from three different points of view and there is some truth to the relationship. First, we looked at the number of licensed properties. Second, we looked at the amount of accumulated total credit and accumulated mortgages given to households<sup>3</sup>.

All two approaches show how the recent economic crisis impacts critical variables for the real estate market in Portugal.

From the first point of view we can see that the number of licensed properties have been, steadily decreasing over recent years. We can see this in the Chart 1. However, this downtrend accelerated after 2008, reaching unthinkably low levels in 2013. We are now at levels that cut the 2000 level by more than five times. This is symptomatic of an industry that was already experiencing difficulties in the early 2000s, but was almost destroyed by the recent financing crisis, when the credit restrictions added to this perfect storm.

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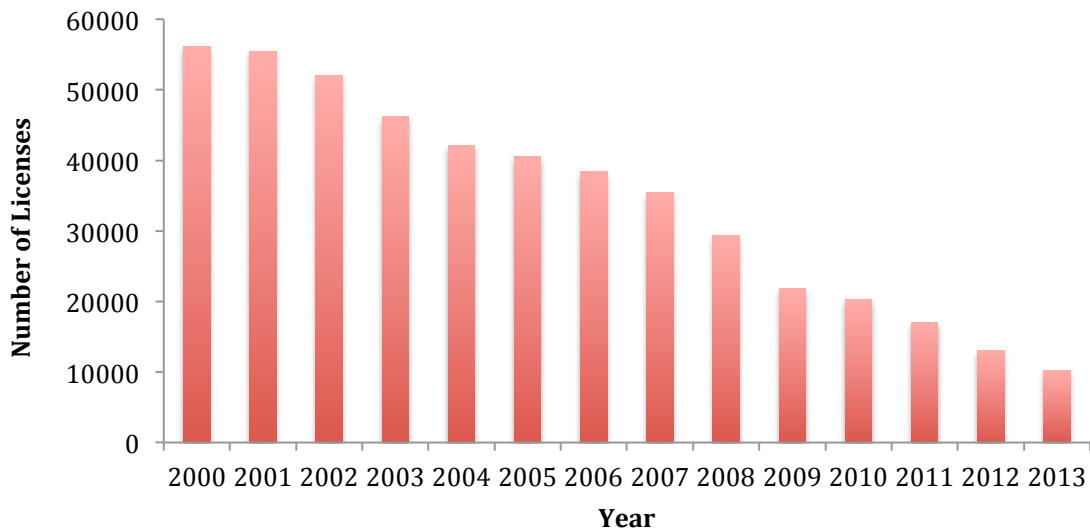
<sup>2</sup> See AICCOPN's website (for example, [http://www.aiccopn.pt/news.php?news\\_id=739](http://www.aiccopn.pt/news.php?news_id=739)) or Dinheiro Vivo article ([http://www.dinheirovivo.pt/economia/interior.aspx?content\\_id=4173496&page=-1](http://www.dinheirovivo.pt/economia/interior.aspx?content_id=4173496&page=-1))

<sup>3</sup> By “households” in this case, we include individual businesses and not for profit organizations, since the Bank of Portugal data series does not separate these.

Chart 1

### Number of licensed properties in Portugal

*This chart shows the number of licensed properties, in Portugal, over the period of 2000 until 2013. A filter has been applied to the search in order to obtain only the licensed properties, designated as New Construction and Reconstruction. The value in the X-axis is that respective amount. On the Y-axis it can be seen the respective year when the licensing happened. This data was primarily extracted from INE and after that compiled and created the following chart.*



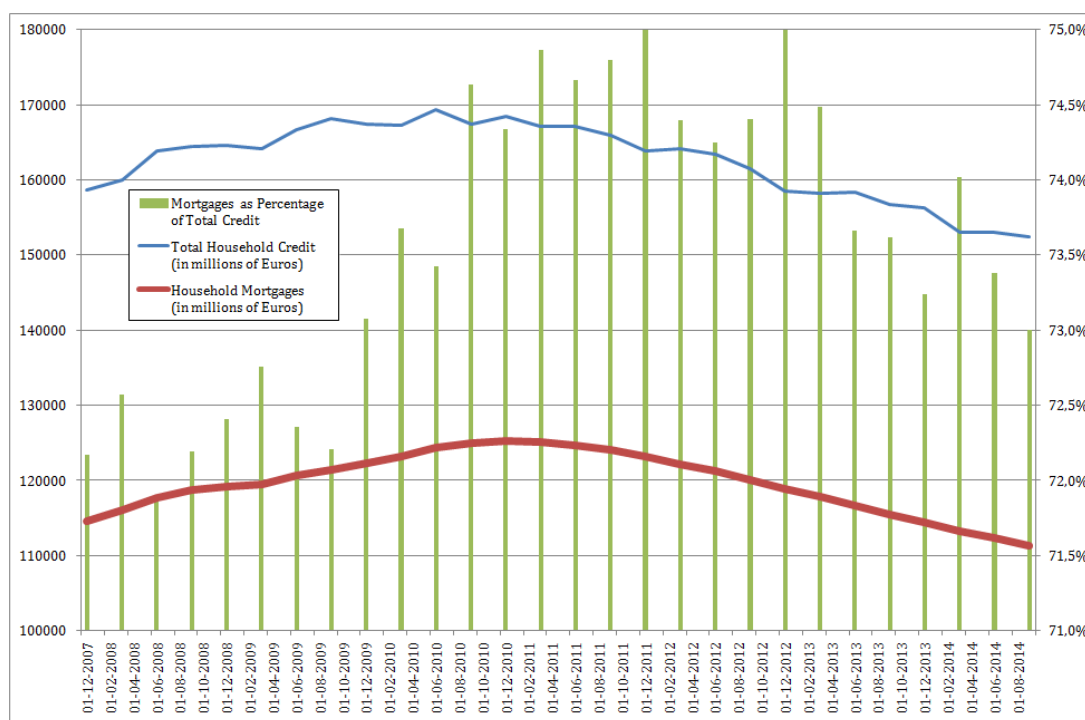
The amount of credit given to the non-financial sector, more specifically mortgages can also provide insights about what was happening in the timespan in study. Chart 2 presents the quarterly evolution of accumulated total credit and accumulated credit for mortgages to households between 2007 and 2014. From the analysis of Chart 2 we can see that from the year 2007 until 2010 there is a clear credit growth in both instances (total and mortgages). It is clear from the chart that other sources of credit were growing slower than mortgages as these gained weight as percentage of total credit from 2007 to 2010.

During the crisis, from 2011 to early 2013 we observe how both curves declined, with again mortgages being a bit more resilient to the crisis than the other sources of credit. Probably this is related to the fact that mortgages in Portugal depend much more on the Euribor rate than on an interest rate set locally... But from the year 2011 onwards there was a decrease in the credit resultant from the liquidity cut of the European banks, and specially from the Portuguese banks, as we have already discussed in section II. the real estate market.

Chart 2

### Credit to non-financial private sector in Portugal

This chart shows the amount of credit to non-financial private sector, in Portugal, over the period of December 2007 until September 2014, more specifically, the credit to Households and NPISHs (Non-Profit Institutions serving households). The data was obtained from Bank of Portugal. The data is quarterly organized. The blue series represents the amount of total household credit accumulated and the red series represents the household mortgages accumulated amount. The green bars represent the household mortgages as percentage of the total household credit.



The perspectives together provide a nice insight on the perfect storm that hit the real estate market in Portugal. The construction companies were already struggling as struggling was the Portuguese economy (see GDP growth in the 2000s in Annex II). To these difficulties we add the credit crisis that hit Portugal in 2010 onwards.

### II.3: RENTING MARKET

Manha (2012) extensively describes the Portuguese renting market. As such we provide just a brief summary of her main conclusions. For historical reasons the renting market was never all too efficient in Portugal. Since 1910 until 1948, laws were passed in order to protect tenants and to freeze the rents' value. Of course, this led to a degradation of the properties as the landlords were not able to expel tenants with late rents, while not being able to update the rents value for the paying tenants in order to, at least, compensate for the inflation value and add a little more for profit returning back cash invested by the owner in the property. In 1966, a new law was published, that would limit the contract duration to thirty years, however, contracts

agreements before that year were not affected. The year 1985 would be a year of turning point for this situation, as a new law was approved, that would allow free rental contracts and establish, an approved by Government (similar to something indexed to the inflation), coefficient, in order to update the rent value on an annual increment (or decrease, in case of deflation). However, 5 years later, in 1990, the law from 1985 was revoked, and introduced the ULA (Urban Lease Act).

“The absence of an active rental market is not healthy for society as it limits populations’ mobility. As result of such limitation, individuals who cannot find employment at their residential area are not able to get a job in another area, resulting in a diminishing of family wealth.” (Manha, 2012) We totally agree with that statement, as a non-dynamic rental market will lead to degradation of the properties, as owners would feel that they have don’t the right protection neither the proper profitability in their investment.

Due to these reasons and the constant public pressure for an improved law framework for landlords and tenants, it was introduced, in 2006, the NULA (New Urban Lease Act).

According to Tuna and Teixeira (2007), this law aimed to correct the old renting system that allowed, for many many years, low rental values, with the known consequences of this situation: degradation of the urban park in the main Portuguese cities, creation of unfair situations for landlords and tenants, the lack of living conditions in a very high number of properties and etc. In 2007, Tuna and Teixeira obviously claimed that it was too earlier to evaluate the efficiency of the NULA, passed just a year before. NULA predicted the update of the rent value by the landlord’s initiative to properties built before 1990, renovations would follow based on need. It is likely that by now a better assessment of NULA can be made. The decrease of the number of building permits (as seen in Chart 1.) however does not hint at a large amount of extensive renovations.

Since Manha (2012) a few institutional improvements were introduced to better the renting market in Portugal. In the beginning of the year 2013 a new entity to settle disputes between tenants and landlords was approved and established: the BNA (Balcão Nacional do Arrendamento – *National Renting Helpdesk*). We will get back to this institution in sub-section II.5. .During the year 2014, a new law mandates the online registration of the properties that would be used for short-term rental as well the registration for tax purposes of all providers of accommodations services<sup>4</sup>. We will also address short term renting services in subsection II.6.

#### II.4: PROS AND CONS: THE ADVANTAGES OF HOUSING

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In terms of consuming goods, in Portugal, being the owner of a house is perceived as a great sensation that is timeless. Commonly, the only reasons for a person not to buy a house is liquidity constraint, lack of property availability, or some lifestyle opportunity (someone is about to dislocate or enlarge family). Other than this, in Portugal, owning a house is seen as a absolute need.

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<sup>4</sup> <http://www.arrendanahora.com/noticia/arrendamento-de-casas-sem-registo-a-turistas>

The real estate market is particularly interesting due to dual feature, owning a house for personal use or having it for investing purposes. The two features can coincide in the same house. One can live in the house purchased solely as a investment opportunity. Average housing prices in Portugal (see Annex VI) have not always proved this option correct, since prices have decreased in 2009 and in 2012. However, supporters of the living+investing theory can always claim that they can wait for the values to recover.

When we compare the total change in the price of transacted houses from 2000 to 2013 (about 45% increase, for an average 2.9%/year) with the accumulated inflation (see Annex III, about 36%, for an average of 2.4%/year) we realize that over this century the option to invest in real estate is not that obvious, even though the results indicate a marginal real gain of slightly above 0.5%/year<sup>5</sup>.

There are of course other determinants of buying that maynot have a monetary measurement. For example, the fact of owning a house is a great feeling as previously mentioned and allows the owner to make modifications at his taste, change everything he wants (supposing he has the county permission for these). If the property is bought, the owner does the maintenance whenever he wants, or has the chance to do it, there are no fixed dates, neither a obligation to proceed with reparations or maintenance. Buying and holding an house also allows for the possibility of renting the house generating a income stream that is, until a certain point, steady over time.

There are also tax differences between owing and renting a house. Until 2014, it was possible to deduct until 30% of the mortgage interest costs in the personal income tax, however, from the introduction of the state budget for 2014, this deduction is not possible anymore and a new type of deduction was introduced, at the moment it is possible only to deduct 15% of the interest costs from the mortgages, if the mortgage is for the permanent house, besides that the deduction limit is now<sup>6</sup> 296€, however it can be increased, depending what is the current tax rate that the person is subject to.

We are seeing nowadays an introduction of a new practice in terms of construction that is the modular building, that are prefabricated buildings, or houses, that consist of multiple sections. These modules are previously produced in a factory, according to the requested design and then sent to the location where it should be assembled side-by-side, end-to-end. This modular buildings use high-quality components, environmental friendly construction processes, low waste, efficient energetic grade A or higher and the speed of construction, vs. the traditional construction methods. This modular construction is changing the game substantially. It brings flexibility to homeownership that previously was only possible through renting. One of the advantages of owning/buying a house like this, it to increase the house size, when, for example, the family

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<sup>5</sup> If we repeat the analysis for 2012, instead of 2013, when the transacted house price reaches the maximum, then the real gain climbs to 1.3%, which hints at the arguments that the timing can be crucial for these calculations.

<sup>6</sup> As of the fiscal year 2014.

is growing. Before, such events imposed selling the current house and then buying a new one, with a higher capacity for the family.

Another advantage of owning versus renting, as referred by Sinai and Souleles (2005), “However, homeownership also provides a hedge against fluctuations in future rent payments”, this means that by owning a house, the owner is protected against movements in the future rent values, if they would need to rent it.

There are not only advantages of buying a house and we will now talk about the disadvantages.

## II.4: PROS AND CONS: THE ADVANTAGES OF RENTING

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The current renting market in Portugal has some problems that, in order to work correctly and smoothly, would need to be fixed. However, these problems are structural, hard to fix quickly and would involve radical changes in the existing system.

Presently, the major problems of the renting market are, the high taxation that is applied to the landlords, when they receive the rent amount, which add to all the expenses of homeownership: the property taxes (IMI, IMT), the condominium monthly payment (if applied), the insurance, rent insurance, also if applied and used as protection for tenant’s default of rent payment. Still on this situation of problems related with the renting market, we have an out-dated legal framework that is unable to provide landlords the required protection acceptable to create a fair renting market. In 2013, there was the creation of a helpdesk to the renting market, called “Balcão Nacional de Arrendamento”, that would provide additional guarantees to home owners, if some conditions were met by tenants. Data available from the previous year, 2013, shows that between the creation of this helpdesk at January 8<sup>th</sup> 2013 and the end of the year 2013, there were more than 3800 requests to expel tenants, however, only about 1000 expel titles were issued, meaning that only 26% of the requests lead to a effective expel. There is also data relative to the denied requests, for the same period, and we can see a 52% of denial for the requests.

Moreover, we think it is important to separate the advantages and disadvantages, however, from two perspectives, the home owner/investor and the tenant one, since the two are not directly inverse, it is important to correctly identify them.

From the owner/investor perspective in terms of advantages we can enumerate the following ones,

- Profitability of the investment

In case of no occupancy, for self-usage, of the property, the owner can simply rent the house and generate revenue from that asset that they have.

- Real Estate Options

It has been more and more common to structure rent contract incorporating Real Estate Options, an agreement where the option to purchase is granted to the tenant at the end of the lease, allowing the exercise price of the house to be deducted of some of the rent payments, they are more suitable “when sellers are having difficulty renting or selling, or when purchasers are having difficulty qualifying for mortgages”. This means the tenant initially acquires an option to purchase the property that is being rented, at a later date, at a certain price. It is also normal, under these conditions, to the tenant to pay a higher rent monthly, than the requested value in then market, due to this implied option for a future option of property purchase.

We decided to include this because if that the option is not exercised, meaning that, the home owner/investor got, for all the time period of the contract, a premium, in order to support the option, however, the option was not exercised.

For the owner/investor perspective in terms of disadvantages we can list the following ones,

- Home damages

There is the possibility, in the end of the contract or even when it is still happening, the home owner/investor can see his house damaged, and these damages can be very costly to repair. An insurance against this could possibly cover this situation, however, the owner would have to incur in one more cost to secure this unfortunately actions from the tenants.

- Tenant’s rent credit risk

One of the biggest weakness that home owners/investors can claim in order to justify a not profitable renting market, is precisely the situation where the tenant does not proceed to the payment of the agreed rent, for one or more months (if the month is the typical cycle of payment in the contract), and keeps the use of the property for his own use, therefore being in default to owner and moreover not leaving the property free to be rented again or used by the owner. This situation is more and more common in Portugal with the crisis and difficult to the owner to manage, which is why we have explained in more detail what can be done to help the owner, as mentioned there was the creation of a helpdesk that would allow the owner to process a dispute in judicial terms, faster and with lower costs that the judicial way. In the late years, it was also introduced a new product to help the home owners/investors to protect themselves against the tenant credit default risk, that are the rent insurance products, that were also analysed with more exactness in a dedicated section, under the methodology section, as we introduced this type of hedge against tenants’ default in our framework that is explained in the methodology section.

From the tenant perspective in terms of advantages we can enumerate the following ones,

- Little maintenance

Remodelling, structural conservation,, are not the tenant responsibility, but of the owner, therefore, the tenant does not need to be worried about this, as it is assumed the owner would take care of this occurrences. Still, the normal maintenance is expected from the tenant, in order to not damage the property condition.

- No house depreciation

Assets, except some certain, and even more tangible, are subject to depreciation, due to his usage, and a tenant, by not owning a house is exempt from this situation.

- Flexibility

If there is the case, of need to mobility from the tenant's part, for example, and we see this a lot in the Portuguese context, a professor is allocated to a different school, therefore a different city, every year, would not be a very good idea to buy a house and sell it every year, thus renting is the best option if the person is in need for a frequent flexible situation.

In addition, there is also other point of view for flexibility, that is the flexibility of terminating the contract, if needed, or something is not good, the contract can be very well terminated and the tenant can just move to another property.

Further, as mentioned before, situations like family increase also require housing flexibility.

- No "hidden costs"

The tenant, depending in what is written in the contract, typically only needs to pay the rent (plus, the utilities bills, if those are not included in the rent) and nothing more, implying that, there is no place to the payment of property taxes, like *IMI*, or *IMT*, condominium expenses and insurance.

- Real Estate Options

The advantages of these instruments are also obvious for the tenant. They can buy the house they have been living in for a while for a fixed price (usually lower than the market price), hence reducing risk and anticipating part of the mortgage.

For the tenant perspective in terms of disadvantages we can list the following ones,

- Be kicked out

The owner can very well, for some simple reason, terminate the contract, if this situation is predicted in the contract., and therefore the tenant would no longer be able to live in the property and enjoy the benefits of it.

- Significant initial payment

The tenant could be required to deliver a significant amount of money, in the first month, as the home owner/investor might request a caution, in the same proportion of the rent value, it could even be asked for more than one month value.

- Maintenance dispute

When there is the need to fix something, and consequently to pay for the repair, there are always two points of view. The tenant could consider that something is in need for repair, at that period in time, however the home owner/investor could not think the same way, wanting to delay the repair, generating a dispute between them two.

## II.5: SPECIFIC CASES FOR RENTING AND BUYING

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This section illustrates two new players in the housing market that are changing the game of renting and of housing. They serve as indicators of changes to be in the model we are about to use.

Variables such as flexibility or home scalability, landlords insurance and increased profitability are affected by new technological solutions of which Airbnb and modular construction are two examples of.

### **Airbnb**

Airbnb also known as Airbnb.com is “a trusted community marketplace for people to list, discover and book unique accommodations around the world – online or from a mobile phone”, meaning that is a website that provides a platform that allow to people that want to list their property to being rent, allowing it to match it with a other party that it is interested in renting an accommodation. Airbnb has places listed in more than 190 countries and in more than 34,000 cities, summing up to a total of more than 800,000 worldwide listings.<sup>7</sup> It is then possible to list a property and get a return from it, allowing this to create a more dynamic rental market, as it is a different type of renting due to their properties, which are, more global-oriented, your tenants can be from any part of the globe, as the platform is global and worldwide available, and more short-term rental, that can influence the price as a single night will be more expensive than the price of a set of 10 nights divided by 10 (just to know the daily price).

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<sup>7</sup> <https://www.airbnb.com/about/about-us>

The platform and the concept are really an innovation in this field as it allows to great a new income source, when needed, and only when needed as there no obligation in being always listed in the website. Along with this, the features of Airbnb are what attract more their users. “Guests and hosts verify their IDs by connecting to their social networks and scanning their official ID or confirming personal details”, this is the Verified ID feature, meaning that with this feature, there is at least a significant background check from Airbnb’s verification department, allowing the two parties, the landlord and the tenant to being able to trust a little bit more that what would happen, if the landlord just posted an online advertisement. Another feature from Airbnb it is the Profile & Reviews, where the two parties can consult previous feedback, being able to check what previous landlords or tenants have to say about the property or the tenant, respectively.

We already described above two disadvantages of the renting market, the possibility of default from the tenant and also the possibility of damage of the property that is in use by the tenant. These two disadvantages are indeed facts that can lead to a diversion from the rental market. However, Airbnb took care of these two disadvantages, allowing landlords to be rest assured that the property is secure, as well as the income they are suppose to receive. Airbnb does this by providing landlords with a host guarantee, “Airbnb Host Guarantee”<sup>8</sup>, where hosts, also described as landlords, are protected up to \$1,000,000 and this value is to protect against guest damages, which are not resolved directly with the guest, this being the protection against the damages made by the tenant. For the possibility of default by the tenant, Airbnb also as the solution to it, as their business model is designed to that. Airbnb is a intermediary between the two parties, and as a intermediary, Airbnb act as a escrow, i.e. a third party that holds the funds and only releases it to the party that is supposed to receive them, after the confirmation from the two parties that the situation occurred as it was planned. This process is as it follows, when a tenant submit a reservation request to a host, the tenant provides his or her details and the payment method can be authorized for a charge, if the request for reservation it is accepted, the amount is collected from Airbnb and it only is released to the host 24 hours after the check-in, in order to, both parties check if what was agreed is in the right terms.

It is important to emphasize that Airbnb is extensively used for vacation purposes, but it is also more and more common as a more permanent leasing option. Exchange students are a good example of this, but the advantages of the platform are understandably extendable to even longer periods.

We wanted to check in what dimension the search for the platform Airbnb was relevant in Portugal. For this we used again Google Trends, we searched for the term “Airbnb” and compared this to the term “alugar casa”. (See Annex IV) We started the analysis in 2011, even though in that year the interest for Airbnb

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<sup>8</sup> <https://www.airbnb.com/trust>

was irrelevant in Portugal. The more interesting aspect is the fact that by now the levels of interest of “Airbnb” and “alugar casa” are surprisingly similar, matching each other from the summer onwards.<sup>9</sup>

### **Modular Construction**

This type of construction has been already around a few years ago, in another format. Modular construction was very common for commercial applications, like stands and promotional fairs, however, nowadays, this type of construction is attracting investors and clients due to the characteristics that are inherent to this type of construction.

First of all, according to the Modular Building Institute, “Modular construction is a process in which a building is constructed off-site, under controlled plant conditions, using the same materials and designing to the same codes and standards as conventionally built facilities – but in about half the time. Buildings are produced in “modules” that when put together on site, reflect the identical design intent and specifications of the most sophisticated site-built facility (...)”.<sup>10</sup>

We can identify a few advantages of using this type of construction: for example, accelerating the project stage, taking on average about half the time that would take a regular process of construction. The process of construction being faster than what is normal, leads to a decrease in the cost of construction, as the man labour impact will be much lower, decreasing the total construction cost drastically. Another advantage is the quality of construction. Of course this depends on what was contracted with the modular construction company, however, the quality of construction is equal or even better as the “modules” are built in by machines, not being subject to human errors, in the manufacturing process.

Also related to the quality of the construction, there is also another advantage that is the energetic efficiency, that is the activity of searching to use a better energy source. Energetic efficiency is, by definition, the ratio between the energy allocated to a certain activity and the one available to his usage in the determined task. In Portugal, nowadays, it is obligatory to have a energetic certificate for a house and this certificate has a grade, higher the grade, better the house is, in energetic efficiency terms. In order to have this energetic efficiency, there are some examples of energy savings that contribute for this situation, like the thermic isolation of the hot surfaces, optimization and control of the lights or even the thermic recuperation of energy using air compressors, this are all examples that can provide a higher energetic efficiency and the modular construction can provide this savings due to his construction process and high quality materials.

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<sup>9</sup> There is a week where Airbnb actually surpasses “alugar casa”, but this was driven by news surrounding local celebrities renting out their places using Airbnb.

<sup>10</sup> [http://www.modular.org/HtmlPage.aspx?name=why\\_modular](http://www.modular.org/HtmlPage.aspx?name=why_modular)

In the Portuguese market there are some modular constructions providers, as *Betonit*<sup>11</sup>, *Jular*<sup>12</sup> and *Decisões e Soluções*<sup>13</sup> with a very good reputation and a well structured catalogue of pre-designed modular houses that can be consulted in the given links.

We felt that we need to highlight the possibility of having modular construction as a part of the buying section, as this type of construction can lead to reinforcement in the idea to buy a house. Due to his characteristics, modular construction would be able to provide a house with a lower price, within half of the time of construction, normally able to be modified and changed at the owners' description, energetic efficiency and last, but not least, upgrade to the structure, done in a already expected process, as normally in modular construction you can add up modules in the future, therefore, for example, if the owner decides to form family and would need to sell the house to buy a house with an extra room, this need, would be very easily fulfilled with a extra module in the actual house, without needing to sell the current house, buy a new house, and all the others actions during this painful process that would be necessary.

To conclude, there will be, in a near future, the need for higher energetic efficient, for example as reported in the document *Hypostat 2013*<sup>14</sup>, from the European Mortgage Federation, where it is stated “Increasing the energy efficiency of buildings – renovation, retrofit and refurbishment are the terms used – has, in recent years, been one of the most controversial issues in Germany. This is not only because Germany aims to be a leader in climate change policy and set itself (...)” and also “In 2010, the German government set the following ambitious targets for the property sector (Energy Concept 2050): - By 2020: a reduction of 20% in Final Energy Consumption; - By 2050: a reduction of 80% in Primary Energy Consumption (also called “near-zero-carbon building stock”)”.

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<sup>11</sup> <http://www.betonit.pt/#!modular/c117>

<sup>12</sup> [http://www.jular.pt/conteudos.php?lang=pt&id\\_menu=326](http://www.jular.pt/conteudos.php?lang=pt&id_menu=326)

<sup>13</sup> [http://www.decisoesesolucoes.com/brochura\\_ds.pdf](http://www.decisoesesolucoes.com/brochura_ds.pdf)

<sup>14</sup> <http://www.hypo.org/Content/default.asp?pageId=578>

### III: METHODOLOGY

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The main goal of this research is to help to identify, from a financial point of view, the best option for each profile, if housing is a wise decision or not.

Since the beginning the chosen model that would better fit the purpose of this research, being able to generate the best decision to housing or not, was the Gordon Growth Model developed by Tabner (2008), for the UK market, with the goal of “enabling individuals to decide whether to buy, or to rent, their housing consumption needs and offering insights for potential buy to let investors”. With this model we will evaluate and extrapolate a decision for the different profiles we have created in order to fit in a general description of the Portuguese population, since the Gordon Growth Model will be applied to the Portuguese real estate market.

As referred by Tabner in his paper “(...) that in a heterogeneous property market, different discount rates, different cash-flows and hence different fundamental values apply to different categories of housing purchaser, even if the underlying property is identical.” meaning that, taking in consideration a property with a certain value, the decision, to buy or to rent, will be different from profile to profile, because each profile has a effective discount rate that take in concern aspects as tax rates and different risk premium considerations for each profile. The idea behind the Gordon Growth Model, in a brief explanation, is to calculate a certain present value having in account a certain rent and a discount rate. After that we just need to calculate the NPV for each profile and therefore produce a decision, within an economic scope of course.

The main assumptions of the model we use follow the original ones from Tabner’s paper, namely:

1. Purchase holding periods are infinite.
2. Discount rates are fixed at the time of purchase and expected to be constant to infinity.
3. Non funded purchases are financed by an interest only mortgage with an infinite life.
4. Rentals and purchase are substitutable so that housing consumption with identical utility may be either rented or purchased.
5. Households’ housing assets do not form part of a fully diversified market portfolio with the result that the required risk premium return of non-g geared housing asset is scaled to the market risk premium using a ratio of housing return standard deviation divided by market portfolio return standard deviation.

In the following sections we will describe in a detailed mode the Gordon Growth Model and next every one of the variables that are inputs for the model.

### III.1: Generalized Gordon Growth Model

Having as starting point the Generalized Gordon Growth Model from Tabner's paper we decided to introduce some modifications to the one exposed in the paper, in order to appropriate better the formula to the market in study, the Portuguese market.

The main model is simply based on the notion that the price of buying ( $P$ ) a house must equal the present value of a perpetuity of the cash flows generated by rents net of all the costs ( $C$ ), discounted at a certain rate ( $r$ ) than anticipates a steady state growth of some sort ( $G$ ),  $P = \frac{C}{r-G}$ . The critical variable to determine are: what are the rents, the costs, the discount rate and the buying price and compare these values.

The formula was modelled in a way that is able to be easily used for each one of the profiles that will be describe in detail in the next sections, as the fully funded housing consumer, the fully funded profile and the partially funded profile. As suggested by Tabner the original formula can be "easily programmed into a spreadsheet and adjusted for individual cases as follows", and we wanted to maintain that characteristics so the generalized modified formula (1), is the following

$$P = \left[ \frac{[R \times [1 - (m + i + a + v + s) - p \times (mi \times LTV + t)] \times [1 - T_{btl}]]}{\left( r_f + \left( \frac{r_p}{1 - LTV} \right) \right) \times (1 - T_x) - CPI - g} \right] - p \times (pc + f) \quad (1)$$

$a$  = annual letting agents fees including advertising and administrative expenses incurred by the owner as a percentage of R

$CPI$  = the assumed rate of CPI, working as a proxy to emulate inflation value

$f$  = up front cost of purchasing furniture equivalent in value to what which would be included in a furnished let

$g$  = the assumed real annual growth rate in future rental income

$i$  = annual building insurance costa as a percentage of R

$LTV$  = loan-to-value ratio

$m$  = average annual maintenance costa as a percentage of R

$mi$  = mortgage interest as percentage of R, this is set as zero for fully funded purchasers

$P$  = the model price based on fundamentals

$p$  = market price which is an exogenous based on the most recently available comparable transactions or the asking price

$pc$  = purchase costs, including solicitors fees, stamp duty, surveyors fees, mortgage approval fees as percentage of the exogenous variable  $p$

$R$  = the rent required to occupy the property when fully furnished

$r_f$  = risk free rate of interest for a depositor

$r_p$  = the percentage risk premium return required by the owner or mortgage finance provider over the contemporaneous risk free deposit rate

$s$  = rent insurance as a percentage of R

$t$  = annual municipal tax as percentage of the exogenous variable  $p$

$T_{btl}$  = marginal tax rate paid by a buy to let investor, this is set as zero for housing consumers

$T_x$  = marginal tax rate paid by fully funded buyers be they house consumers or buy to let investors, as well partially funded in the same situation

$v$  = vacancy costs as a percentage of R

## III.2: VARIABLES DETAILED ANALYSIS

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Some variables need to be looked at in more detailed than others and that is done in this section due to some very special characteristics and delicate variables as, growth rate, interest and discount rates, rent insurance and rental yields.

### **Growth Rate ( $g$ )**

Growth rate for mature economies can be assumed as equal to the inflation, and as there is no inflation index, neither inflation is directly observable we need to use a proxy and the proxy for inflation, is common in this field, to use the CPI (Consumer Price Index). Although several authors, as for example, Judson and Orphanides (1999), for the sake of simplicity and easiness of data usage, use CPI data as proxy to calculate the inflation, “Predominantly, we use quarterly data on the consumer price index (CPI), and construct our annual inflation rate variable (...)”. In other hand, there are authors, as Gartner and Wehinger (1998) that claimed that “the issue of how to measure inflation and, in particular, it is underlying trend has attracted increasing attention in recent years.” and “an important limitation of commonly used inflation measures such as the Consumer Price Index (CPI) is their susceptibility to specific disturbances which are unrelated to the “pure” (or core) inflationary process. As a result, measured inflation may give a misleading picture (...)”, therefore purposing an alternative process to calculate inflation as describe in their paper.

Yet, for the purpose of this paper we will stay with the KISS (Keep It Simple) principle, or as it is normally attributed as a Leonardo da Vinci’s quote, “Simplicity is the ultimate sophistication” and use the CPI as proxy for inflation as done in Tabner’s paper.

### **Interest and Discount Rates ( $i$ and $r$ )**

The discount rate is one of the most important variables of our formula, because it represents an enormous part of the denominator, denominator that will update the value of the denominator, the rent less all the specific costs, and that has a great effect on the present value, a tiny change in the discount rate and the present value could completely change.

As described in Tabner’s paper “The discount rate  $r$  comprises the market risk free interest rate plus a premium for risk.” and for scaling the risk premium, we used the same approach, CAPM (Capital Asset Pricing Model) in order to scale the risk premium purely on the basis of total risk.

However, the effective discount rate is still a combination of factors and different for every profile, it differs as profiles have different tax status and funding requirements.

The base risk free rate was equal to all the profiles, the difference is in the risk premium. For a buy to let investor, the discount rate is the sum between the current market risk free and a risk premium, which that risk

premium exists in order to compensate for the price volatility and the possibility of void lets and rental defaults. In the case of housing consumers, the risk premium will be different between an unfunded and a funded buyer, because the unfunded buyer has to reflect the eventual default and that is reflected in the formula by taking into account the LTV ratio applied to the risk premium variable. For the purpose of this study we assumed a risk free rate of 5% and a risk premium of 2%, that could be levered up taking into account the gearing provided by the LTV ratio.

### **Rental Yields (C)**

The variable C in the original equation , or the numerator in the equation (1) represents the rental cash flow, in net terms, of the annual rent of a furnished property, R, less all the inherit costs. In the case of housing consumers, C represents the annual rent, R, deducting the annual maintenance costs required to sustain the value of rent in real terms, building insurance, rent insurance, that is explained in detail in one of the next sections. In the case of a buy to let investor, we also have to include the cost of agents' fee, administrative costs and taxes, also being deducted from R.

### **Rent Insurance (s)**

We decided improve the original formula from Tabner's paper by including this variable in the model, because it is a service that is now available in the Portuguese market, an insurance of the rent, that allows the lender to receive every month the agreed value, paid by a 3<sup>rd</sup> party company, less a 4.25% fee, however, this guarantees the receivable of this income with a higher probability as the 3<sup>rd</sup> party company has a insurance company financially backing this. In our model we will simulate the options using a equally weighted value for the rent insurance variable (s), between the product offered by Remax Portugal named "*Solução Renda Garantida*" and the ARAG product, "*ARAG RENDA SEGURA*". For the first product the premium to be paid is 4% and for the second product the premium to be paid is 4.5% resulting in an equally weighted value of 4.25%.

## III.3: PROFILE STRUCTURING

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Having all the model setup it was essential to also model the profiles that would, at least, try to fit, a good part of the Portuguese population, in terms of profile, for this purpose of course.

Using the original paper from Tabner as guideline, we did not include the six profiles as they did it in the paper, on other hand, we have divided the profiles in two different, Fully Funded Profile and Partially Funded Profile.

The tax income rate is different for each profile due to each profile being structured based on different assumptions. For the Partially Funded Profile, we will assume that the historical average wage in national currency units plus a 10% margin error is the annual wage value used to cross check what will be the tax rate paid by this profile<sup>15</sup>. As can be seen in the Annex V, taking in consideration the period from 2000 to 2013, we got an average tax rate of almost 25%, so that was the tax rate used for Partially Funded Profile. For the Fully Funded Profile it is reasonable to assume that at least the double of the amount of the annual wage used for the Partially Funded Profile<sup>16</sup> it is a reasonable assumption for this profile, leading to a average tax rate of 35%, as also can be seen in the Annex V.

Our research aim was to gather all the empirical data available and that we considered that would be useful to add to our work. We did this also with the House Prices in Portugal, where we have retrieved the data available from 2000 until 2013 of the Urban Mortgaged properties, which will be the value of the average of that timeframe, that will be used in our profile structuring, value, which is almost 100.000€, and this can be seen in Annex VI.

For this research we have focused on the period from the year 2000 until 2013 and every piece of data is taking into account values from variables that have occurred and that data is historical and obtained under reliable sources. For this variables we used have taken in consideration historical values as well setup some assumptions, indispensable, to be able to provide a good generalization.

### **Fully Funded Profile**

Divided yet in 2 sub-categories, the Fully Funded Profile – Consumer with Tax Rate of 35% and the Fully Funded Profile – Buy-to-Let investor with Tax Rate of 35%. There is a particular situation in this case, for the Portuguese taxpayers, there is the possibility, at the person choice, of aggregation of income<sup>17</sup>, that is, the option of being taxed at the same rate, for all the income. The discount rate represents also the return that the buyer/investor would need to have in other investment alternative in order to equal the value obtained from the real estate investment. So, for example, if the buyer/investor did not invested in a real estate property it would invest in other investment product (e.g. investment funds, indexed deposits or standard deposits) and be taxed at an autonomous tax rate of 28%, this means that the tax rate used for the calculation of this profile can be capped at 28%. Although, the aggregation of income could be favourable in some situations, for example, it allows the deduction of costs related to the property, it even allows the deduction of this expenses over a period of 5 years, we still have choose the hypothesis of being taxed at an autonomous rate of 28%, because we

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<sup>15</sup> We are assuming that the average homeowner has a revenue 10% above the national average. This indeed assumes that only a portion of the population can be a homeowner, which should be consistent with the approval conditions of commercial banks granting credit. Lack of data on banking practices cannot allow me to go further on more precise assumptions.

<sup>16</sup> Again further data from the banks could add precision to this assumption.

<sup>17</sup> In Portuguese “englobamento”.

would assume the property will be only subjected to a few repairs as well the expenses and costs derived from the property would not exceed the necessary value in order to change the choice between aggregate the rental income and being taxed autonomously.

- Fully Funded Profile – Consumer with Tax Rate of 35%

This fully funded profile uses a tax rate of 35% (effective tax rate 28%), a market price property of 100,000€ and a gross annual rental stream of 5,000€ and that any financing required is obtained and provided via an interest only mortgage as established previously in the assumptions that were assumed before.<sup>18</sup>

- Fully Funded Profile – Buy-to-Let Investor with Tax Rate of 35%

This fully funded profile also uses a tax rate of 35% (effective tax rate 28%), a market price property of 100,000€ and a gross annual rental stream of 5,000€ and that any financing required is obtained and provided via an interest only mortgage as established previously in the assumptions that were assumed before.

### **Partially Funded Profile**

Divided yet in 2 sub-categories, the Partially Funded Profile – Consumer with Tax Rate of 25% and the Partially Funded Profile – Buy-to-Let investor with Tax Rate of 25%. For both profiles we assume a LTV ratio of 55%, following the same line of assumption as Tabner (2008).

- Partially Funded Profile – Consumer with Tax Rate of 25%

This partially funded profile uses a tax rate of 25%, a market price property of 100.000€ and a gross annual rental stream of 5.000€ and any financing required is obtained and provided via an interest only mortgage as established previously in the assumptions that were assumed before.

- Partially Funded Profile – Buy-to-Let Investor with Tax Rate of 25%

This profile is the type of profile that can fit the type of person that not being fully funded, highly believes, that, investing in real estate is the best option as it is the “safest asset” and can generate a “constant” rental stream, they think. For this profile the same assumptions and values are structured as the Partially Funded Profile.

## **IV: PROFILE ANALYSIS**

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This section contains the consideration on the final comparisons for the different profiles. See Annex VII for the table containing the comparisons. First, the way of evaluate if some option, between profiles, is better

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<sup>18</sup> Values used correspond roughly to national averages (see Annex VI).

than another, it is taking in consideration the NPV value. A positive NPV means the profile should buy rather than rent. Secondly, we have also solved for indifference between buying and renting, by solving for the variable  $g$  in formula (1).

According to our model, it is possible to state that for the fully funded consumers the option to buy is indeed always the best option. This situation would not be best option if the rents were to decrease at a rate of 2.56% per year, which is not a realistic assumption.

The second best profile would be the Fully Funded Investor, that even paying taxes over the rents received would be presented with a NPV of 46,250€, more than 100,000€ lower than the Fully Funded Buyer, however it is still a positive NPV, and far away from the breakpoint zero, and it would be necessary for the rents to decrease a little less than 1% per year, in order to be more preferable to rent instead of buy.

In terms of Partially Funded profiles, with the assumptions of our model, we conclude that these agents are better of renting, rather than buying, as both experience negative NPVs.

For the Buyer and Investor, the difference is not so severe as the difference for the Fully Funded ones.. The Partially Funded Buyer with a NPV of -34,833€ is less worse off than the Investor. A rent growth rate above 3.64% a year would actually revert the preference to buying rather than renting. For the Partially Funded Investor the scenario is even worse as this scenario is penalized in the interest payment along with the taxes over the property as well the taxes over the rent payments. The NPV is about -51,500€ and for this situation, it would be needed an increase above 4.39% in the rents values to establish this NPV in a positive field.

Some profiles are not possible to do a quick conversion from Portugal to the UK. However, taking into consideration for comparison, the values we obtained for the Portuguese real estate market and the values that were obtained by Tabner (2008), are in the same trend as the ones obtained by our study, even though the markets are different from each other, each one with unique characteristics.

## IV: CONCLUSIONS

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The decision between buying and renting a house it is one of the more difficult in a person life also one of the most significant that lead to impact in a person's life. This research aims to help this fact, the great exposure to people's life that a good or bad decision can impact them. This help is not only based on financial indicators, as for the analysis in terms of profiles as done in section 4, profile analysis, but also in terms of advantages and disadvantages for housing as well for renting, and even recent improvements that can completely change the way of thinking, though being it renting or buying, as for example for the introduction of modular houses or AirBnB. We are talking about game-changing innovations that can completely alter the actual way of thinking, because we are talking about ways of getting more profitability out of their investment and also a faster, easier and cheaper way of construct a house. These two innovations together could revolutionize the real estate market and would be very good to see, in future researches, the impact of this bundle.

Further in our profile analysis section, we can conclude that, for the period between 2000 and 2013, a Fully Funded consumer with a tax rate of 35%, capped as we described, by buying a house, would make the wiser decision, financially speaking. Having the same period of study into account, the worst, financially speaking, decision that could be made, was a Partially Funded buy-to-let investor, with a tax rate of 25% and LTV ratio of 55%, to buy a property in order to rent it, that would lead to a negative NPV of 51,500€.

In this study we tried to cover up what was necessary to contextualize the advantages and disadvantages as well the introduction of a framework to be able to, according to certain profiles be able to decide in a wise way. We have done this by using the most updated data we were able to obtain as well the updated law framework at the moment of writing this research.

The literature for the Portuguese real estate market, comparing to the US and UK markets, is still scarce, meaning that it is open for further research.



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## ANNEXES

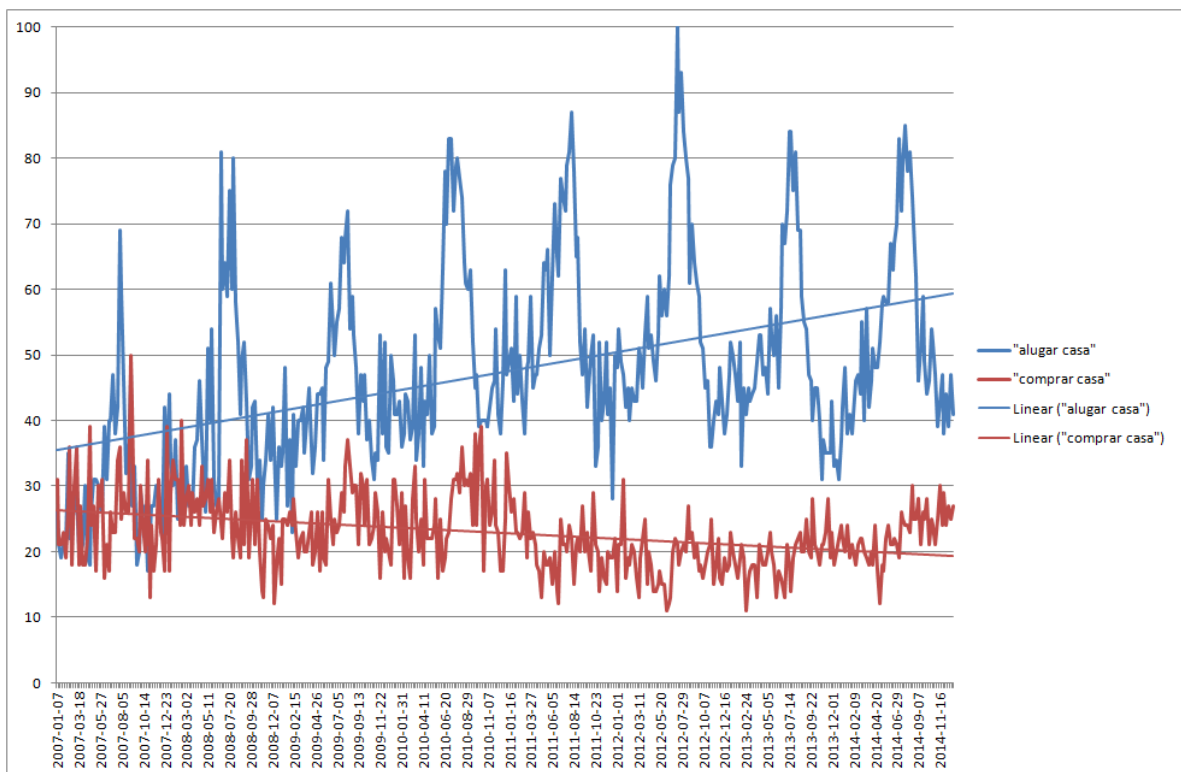
## Annex I

### Google Trends search for the term “alugar casa” – “rent house” and “comprar casa” – “buy house”

Source: Google Trends

Period of Data: January 2007 – December 2014.

The blue series represents the interest of people searching in the web engine Google during that period of time. In order to get more concrete data we have narrow down the search to get only regional filter from Portugal. The red series represents the interest of people searching in the web engine Google during the period in study, for the term, “comprar casa” – “buy house”. The trends lines help a lot and it is visible, in the blue series a increase in the interest over the time, the trend for the red series, “comprar casa” – “buy house” is not so much clear, however, we can see a slight decrease over the time. The interest over time represented by the Google Trends is relative, this means that one point is considered as 100 and the others are interest relative to this point.



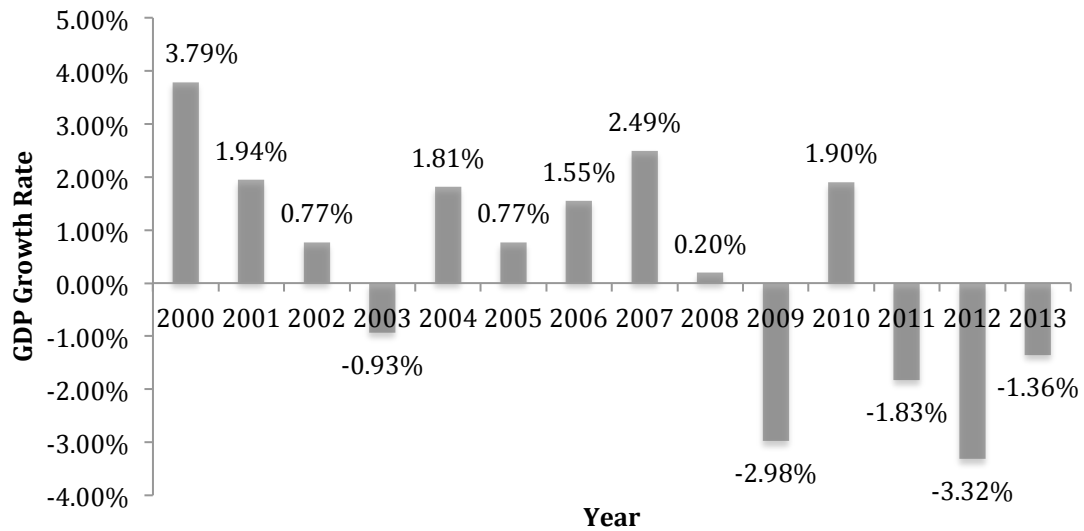
## Annex II

### GDP Growth – Year-over –Year change

Source: OECD Stats.

Methodology: The data was extracted from the OECD.StatExtracts, a complete database where it can be filtered for a diversity of fields. It was requested the Gross domestic product – expenditure approach, for the period in study, 2000-2013, as measure it was Growth rate compared to the same quarter of previous year, seasonally adjusted and the frequency was Annually. After gathering all the data it was then created the respective graph. The Y-Axis represents the GDP growth rate that is correspondent to the year that is shown in the Y-Axis.

Period of Data: 2000-2013



## Annex III

### Inflation (Change of the Consumer Price Index)

*Source:* PORDATA/INE.

*Methodology:* The data was obtained from PORDATA database, even the Data Source is from INE. The data retrieved was filtered for Portugal and it was the total general value, for the period in study, from 2000 until 2013.

	Inflation
<b>Panel A - Average Inflation (Variation of the Consumer Price Index)</b>	
2000	2.85%
2001	4.37%
2002	3.60%
2003	3.22%
2004	2.37%
2005	2.28%
2006	3.11%
2007	2.45%
2008	2.59%
2009	-0.83%
2010	1.40%
2011	3.65%
2012	2.77%
2013	0.27%
<b>Average</b>	<b>2.43%</b>

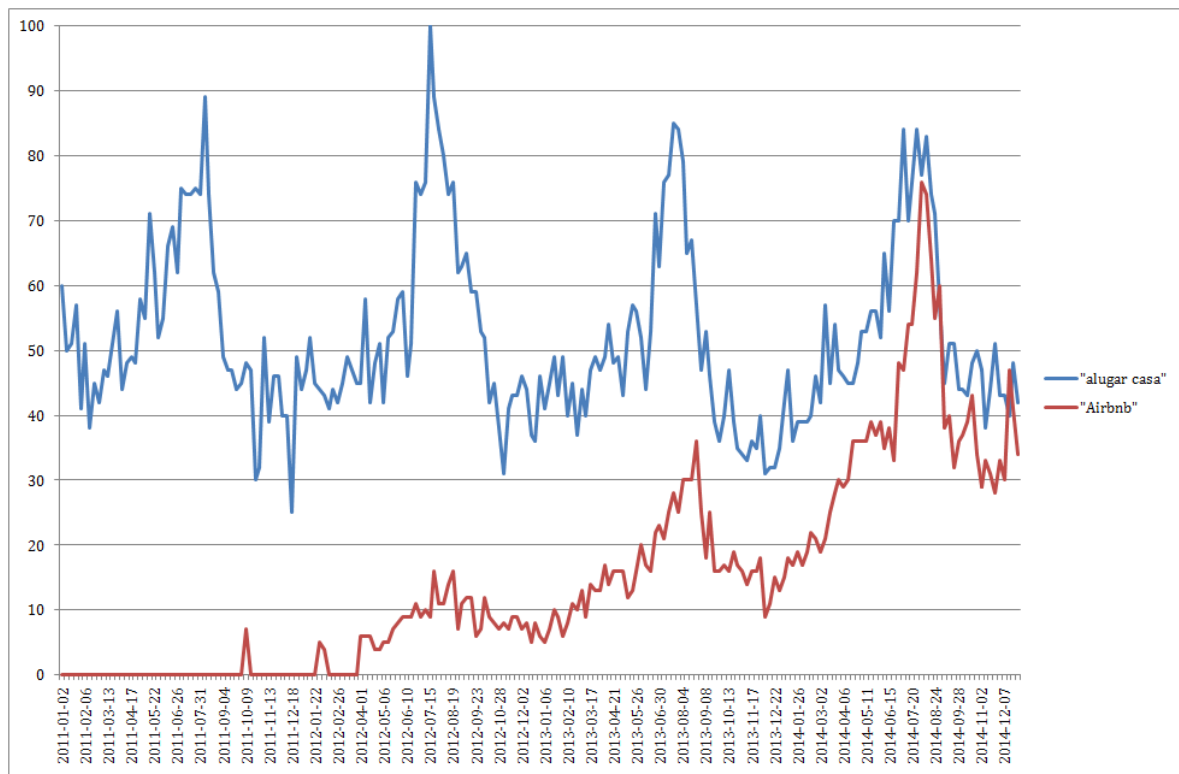
## Annex IV

### Google Trends search for terms “alugar casa” and “Airbnb” in Portugal

Source: Google Trends

Period of Data: 2011-2014.

The blue line represents the interest of people searching in the web engine Google during that period of time, for the term “alugar casa”. We have filtered the location to show the trend only for Portugal for the period in study, from January 2011 until December 2014. The red line, also is for the same period in study, however the searched term was “Airbnb”. The interest over time represented by the Google Trends is relative, this means that one point is considered as 100 and the others are interest relative to this point.



Annex V

**Marginal tax rate for each one of the profiles**

*This table shows the marginal tax rate for each one of the profiles. The data is from 2000 until 2013. Source of the data is from INE however it was retrieved from PORDATA. The threshold represents the annual income that was the limit of income that could be obtained in order to be taxed the respective tax on the left column. The same applies for Threshold Fully Funded tax rate.*

	Partially Fully Funded (PFF)	Threshold PFF	Fully Funded (FF)	Threshold FF
<b>Panel A - Marginal Tax Rate</b>				
2000	25.00%	14,165.86	35.00%	32,825.89
2001	24.00%	14,963.94	34.00%	34,417.05
2002	24.00%	15,375.45	34.00%	35,363.52
2003	24.00%	15,682.96	34.00%	36,070.79
2004	24.00%	15,997.00	34.00%	36,792.00
2005	23.50%	16,317.00	34.00%	37,528.00
2006	23.50%	16,692.00	34.00%	38,391.00
2007	23.50%	17,043.00	34.00%	39,197.00
2008	23.50%	17,401.00	34.00%	40,020.00
2009	23.50%	17,836.00	34.00%	41,021.00
2010	24.08%	17,979.00	34.88%	41,349.00
2011	24.50%	18,375.00	35.50%	42,259.00
2012	24.50%	18,375.00	35.50%	42,259.00
2013	28.50%	20,000.00	37.00%	40,000.00
<b>Average Tax Rate</b>	<b>24%</b>		<b>35%</b>	

## Annex VI

### House prices in Portugal

*In this table we got the House Prices from Urban Mortgaged properties and also in Urban Transacted. The data is from 2000 until 2013. The source of the data is DGPJ/MJ and PORDATA.*

	Urban Mortgaged	Urban Transacted
<b>Panel A - Average House Price</b>		
2000	62,662.00	87,922.00
2001	66,957.00	95,764.00
2002	71,398.00	96,185.00
2003	81,532.00	106,452.00
2004	96,634.00	111,295.00
2005	111,347.00	121,410.00
2006	121,298.00	124,626.00
2007	124,405.00	121,780.00
2008	125,992.00	125,170.00
2009	115,405.00	139,317.00
2010	118,345.00	126,004.00
2011	100,709.00	127,730.00
2012	95,297.00	140,577.00
2013	99,869.00	127,843.00
<b>Average of each type</b>	<b>99,383.15</b>	<b>117,248.62</b>
<b>Total Average</b>		<b>108,315.88</b>

## Annex VII

### Profile structuring

The table that follows was constructed using the following data. All the variables are described in the section methodology.

In Panel A we can see all the formula variables that were used for the calculation of the NPV for the profile that is indicated.

In Panel B we can see all the results, divided into certain pre-calculations and total value as well as NPV and the respective implied g.

A is the Fully Funded Profile – Consumer with Tax Rate of 35%. B is the Fully Funded Profile – Buy-to-Let investor with Tax Rate of 35%.

C is the Partially Funded Profile – Consumer with Tax Rate of 25% and LTV ratio of 55%. D is the Partially Funded Profile – Buy-to-Let investor with Tax Rate of 25% and LTV ratio of 55%.

	A	B	C	D
<b>Panel A - Formula Variables</b>				
Gross Rent	5 000.00	5 000.00	5 000.00	5 000.00
Maintenance cost	8%	8%	8%	8%
i	0,75%	0,75%	0,75%	0,75%
a	0%	10%	0%	10%
v	0%	0%	0%	0%
s	0%	4.25%	0%	4.25%
p	100,000.00	100,000.00	100,000.00	100,000.00
mi	0%	0%	6%	6%
LTV	0%	0%	<b>55%</b>	<b>55%</b>
t	0.40%	0.40%	0.40%	0.40%
Tbtl	0%	28%	0%	25%
rf	2%	2%	2%	2%
rp	3%	3%	3%	3%
Tx	28.00%	28.00%	25.00%	25.00%
CPI	2.00%	2.00%	2.00%	2.00%
g	0.00%	0.00%	0.00%	0.00%
Up	4162.5	2,484	862.5	112.5
Down	1.60%	1.60%	4.50%	4.50%
<b>Panel B - Results</b>				
Net Rent Pre-Tax	<b>4,162.5</b>	<b>3,450</b>	<b>862.5</b>	<b>150</b>
UP   Tax Paid	0	966	0	37.5
PV	<b>260,156</b>	<b>155,250</b>	<b>19,167</b>	<b>2,500</b>
pc	6.50%	6.50%	6.50%	6.50%
f	2.50%	2.50%	2.50%	2.50%
P	251,156	146,250	10,167	-6,500
implied g	-2.56%	-0.88%	3.64%	4.39%
<b>NPV</b>	<b>151,156.25</b>	<b>46,250.00</b>	<b>-34,833.33</b>	<b>-51,500.00</b>