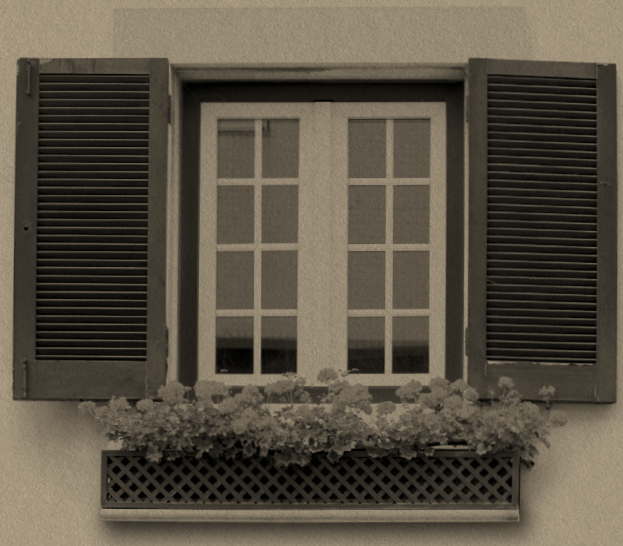


Paulo M. M. Rodrigues, coord.

The real estate market in Portugal

Prices, rents, tourism and accessibility

The analysis of real estate market dynamics has gained interest in recent years, following the US sub-prime collapse in 2007, which quickly spread worldwide and led to housing markets significantly impacting the global economy. As such, understanding price and rent dynamics in real estate markets is of foremost importance from a social, economic and public policy perspective. The focus of this study is the Portuguese real estate market. House prices in Portugal have been increasing in recent years, following a relatively inexpressive evolution during the 1990s and until the financial crisis of 2007. A detailed characterisation of the price dynamics and different dimensions of the housing market up until the beginning of 2020 is provided. The in-depth and comprehensive analyses in the different chapters of this study represent an important contribution to the understanding of potential future paths for the housing market in Portugal.

The real estate market in Portugal

Prices, rents, tourism and accessibility

Paulo M. M. Rodrigues, coordination

FUNDAÇÃO
FRANCISCO MANUEL dos SANTOS

Largo Monterroio Mascarenhas, n.º 1, 7.º piso
1099-081 Lisboa
Tel: 21 001 58 00
ffms@ffms.pt

Director of publications: António Araújo
Director of the series Foundation Studies: Gonçalo Saraiva Matias
Title: The real estate market in Portugal: Prices, rents, tourism and accessibility
Authors: Paulo M. M. Rodrigues (coordenação), Luis Aguiar-Conraria, Vera Gouveia Barros, Paulo Batista, Pedro Brinca, Eduardo Anselmo Castro, João B. Duarte, Duarte Gonçalves, René Huget, Rita Fradique Lourenço, João Lourenço Marques, Susana Peralta, Victor Reis, João Pereira dos Santos e Maria Joana Soares
Proofreading and translation: TT Translations
Design: Inês Sena
Typesetting: Guidesign

March 2022

ISBN: 978–989–9064–80–5

Contents

Introduction

Residential property is the most important component of households' wealth, and is often used as collateral for loans (Englund et al., 2002). This said, changes in house prices may affect households' consumption and investment decisions, as well as their debt and ability to repay loans (Case, Quigley and Shiller, 2005). Developments in real estate markets have far-reaching implications on the economy as a whole and on financial stability.

It has been shown that changes in housing wealth can have a more important effect on the economy than changes in wealth caused by stock price movements (Helbling and Terrones, 2003 and Rapach and Strauss, 2006). In fact, economic history suggests that some of the most severe systemic financial crises have been associated with boom--bust cycles in real estate markets (see e.g., Bordo and Jeanne, 2002, Reinhart and Rogoff, 2013, and Crowe et al. 2013).

The analysis of real estate market dynamics has gained particular interest in recent years, following the US sub-prime collapse in 2007, which quickly spread worldwide and led to significant impacts of housing markets on the global economy. Understanding price determination processes in real estate markets and its dynamics is therefore of paramount importance.

Traditional determinants of housing demand include growth in household disposable income and gradual shifts in demographics, such as the relative size of older and younger generations. Permanent features of the tax system that might encourage home ownership, as opposed to other forms of wealth accumulation, also matter, and so does the average level of interest rates possibly related to the long--term behaviour of inflation. The availability and cost of land, as well as the cost of construction and investments in the improvement of the quality of existing housing stock are also relevant (Poterba et al., 1991, and Tsatsaronis and Zhu, 2004). For instance, the growth of the housing stock can be constrained in the short run as a result of a number of factors, including length of planning and construction. There could also be shorter-term drivers related to constraints in the growth of housing stock, prevailing conditions in the provision of housing loans, or uncertainty about future prospects. Higher GDP and disposable income, more confidence in the economy, less unemployment, more labour and an increase in mortgage lending are expected to have a positive impact on the housing market. In contrast, higher interest rates are expected to drive borrowing costs up and demand down, leading to a subsequent fall in house prices and making alternative applications of wealth more interesting. The same happens with residential investment, as if it increases, prices may go down.

This book focuses on the Portuguese real estate market. House prices in Portugal have been increasing in the recent past, following a relatively inexpressive trend during the 1990s, until the financial crisis in 2007. Over the last decade, the evolution of house prices has been highly differentiated, declining four per cent in the 2008–2013 period and accelerating over six per cent up to the end of 2020. From the late 90s and until 2007, residential investment recorded a two per cent contraction while GDP only registered a slight acceleration. In the five years

following the financial crisis and until the recovery in 2013, the strongest contraction was in terms of investment with over eleven per cent, compared to one per cent in GDP. The unemployment rate increased sharply, and labour force declined, which may have been related to emigration flows. Between 2014 and 2019, amidst increasing confidence, GDP accelerated two per cent in Portugal and residential gross fixed capital formation (GFCF) increased four per cent. The COVID--19 pandemic caused an unprecedented GDP contraction of almost eight per cent, although residential GFCF and house prices continued to increase. It is also important to analyse credit in detail, given its relevance to the housing sector and the impact it may have on the cost of financing. Data on bank lending indicates the existence of episodes of very high growth in mortgage loans between the mid-1990s and 2007. This annual growth averaged around fifteen per cent in Portugal, within a context of declining bank loan costs and high and sustained growth in household disposable income, which resulted in an increase of family indebtedness. The significant deceleration of housing credit from 2010 onward should be observed in the context of the international financial crisis, which had a negative impact on supply, due to a significant tightening in lending conditions, and on housing credit demand.

Aiming to better understand the dynamics of the real-estate market in Portugal, this book provides a detailed characterisation of its different dimensions, up until the beginning of 2020. Unfortunately, at the time some of these chapters were being written, not enough information was available regarding the impact of the COVID-19 pandemic on the real estate market. However, the detailed analyses provided in this book will surely be useful to understand the potential paths the housing market may follow in a near future.

This book comprises six chapters and provides a comprehensive analysis of several dimensions of the real estate market in Portugal.

Chapter 1 — The importance of housing in Portugal: a macroeconomic perspective, by Pedro Brinca and João B. Duarte, provides a description of the housing market's importance for macroeconomic dynamics in Portugal. The description is divided into two parts: the first looks at the importance of the real estate market in economic cycles; and the second analyses the relevance of real estate in the financial balance of families. Throughout the chapter, the Portuguese reality is compared to that of the European Union, providing interesting different temporal and spatial perspectives regarding the real estate sector in Portugal, and how it affects the Portuguese macroeconomic context.

Chapter 2 — Exuberance and contagion in the Portuguese housing market: a perspective from disaggregate local residential prices, by René Huget, Rita F. Lourenço and Paulo M. M. Rodrigues, specifically focuses on the significant issue of exuberant behaviour within the Portuguese real estate market. This chapter seeks to answer two important questions: the first is whether Portuguese house prices have deviated from their fundamental determinants; and the second is whether local level prices (by district and civil parish) present bubble-like developments and if the exuberant behaviour is contagious. To answer these questions, an aggregate and detailed local level analysis is performed, allowing us to understand the origins of the exuberance and whether this behaviour may have generated spillover effects across civil parishes.

Chapter 3 — Synchronism in Portuguese housing, by Vera Gouveia Barros, Luís Aguiar-Conraria and Maria Joana Soares, further

investigates the dynamics of housing prices in Portugal. Using wavelet analysis, this chapter specifically focuses on housing price synchronization between Portugal and other countries, detecting which international markets are more deeply interconnected with the Portuguese market, while also investigating housing price synchronisation between Portuguese cities. Studying price synchronisation between different housing markets is of considerable relevance, as it may provide information on whether global investors and global financial conditions influence local housing price dynamics, which has implications on the effectiveness of a range of policy tools created to address imbalances in the housing market, such as affordability problems (Hoesli, 2020; IMF, 2018).

Affordability is precisely the topic of analysis in chapter 4 — Territorial patterns of housing affordability in Portugal, by Paulo Batista, João Lourenço Marques, Eduardo Anselmo Castro. This chapter provides an integrated territorial analysis of housing affordability. It not only reflects on the challenges posed to model market drivers by data collection and processing, but also (re)introduces the concept of territory in housing affordability metrics. Here, a concept of territory unbound from its common administrative expressions is used (João Marques and Batista, 2021). In line with the debate on the role of space developed by (Harvey, 2006; Lefebvre, 1991), the territorial analysis of affordability considers a space where different forces interact and, thus, territorial patterns are not objectively fixed or bound a priori. To consider the notion of space-territory, an approach which integrates econometric tools was developed to observe the expression of the spatial drivers of housing affordability, their spatial interlinkages (spatial autocorrelation) and the expression of these territorial features in housing affordability metrics.

Chapter 5 — Short-term rentals and real estate prices in Lisbon: boom and ban, by Duarte Gonçalves, Susana Peralta and João Pereira dos Santos, approaches another important dimension of the real estate market which is of particular relevance to the Portuguese economy, namely short-term rentals. This chapter specifically analyses the ban implemented by the Lisbon City Council in some of its neighbourhoods in November 2018, which provides an ideal quasi-experimental setup to estimate the causal impact of short-term rental regulations on the real estate market. A quantification of this ban's impact on registries, Airbnb prices and the real estate market in the city of Lisbon, namely the number of transactions and house prices, is also presented.

Finally, chapter 6 — Urban rents in Portugal: a decline with no return?, by Victor Reis, analyses the evolution of urban rents in Portugal based on existing traditional dwellings, as well as their forms and regimes since the beginning of the 20th century. This important topic, which has received little attention to date, addresses the development of the traditional housing stock, both nationally and within the cities of Lisbon and Porto, and their respective historic centres, since the 1960 census. The main legislative measures put in place over the last century, in terms of the liberalised rental markets, as well as the various social housing rental systems related to public housing policies, are also presented.

References

Bordo, M.D. and O. Jeanne, (2002), *Boom-busts in asset prices, economic instability, and monetary policy*, (2013), *The role of contagion in the last american housing cycle*. (8966).

Case, K.E., J.M. Quigley and R.J. Shiller, (2005), «Comparing Wealth Effects: the Stock Market versus the Housing Market», *Advances in Macroeconomics*, 5 (Article 1).

Crowe, C., G. Dell'Ariccia, D. Igan and P. Rabanal, (2013), «How to deal with real estate booms: lessons from country experiences», *Journal of Financial Stability 9*: 300–319.

Englund, P., M. Hwang and J.M. Quigley (2002), «Hedging Housing Risk», *Journal of Real Estate Finance and Economics*, 24, 167–200.

Helbling, T. and M. Terrones (2003), «Real and Financial Effects of Bursting Asset Price Bubbles», *IMF World Economic Outlook*, Chapter, 2, 67–92.

Poterba, J. (1991), «House Price Dynamics: The Role of Tax Policy and Demography*», Brookings Papers on Economic Activity*, 2(143).

Rapach, D. and J.K. Strauss, (2006), «The Long-Run Relationship Between Consumption and Housing Wealth in the Eight District States», *Federal Reserve Bank of St. Louis, Regional Economic Development*, 2(2).

Reinhart, C.M. and K.S. Rogoff, (2013), «Banking crises: an equal opportunity menace», *Journal of Banking and Finance* 37(11), 4557–4573.

Tsatsaronis, K. and H. Zhu, (2004), «What drives Housing Price Dynamics: Cross Country Evidence», Tech. rep., *BIS Quarterly Review*, BIS.

Chapter 1
The importance of housing in Portugal: a macroeconomic perspective

Pedro Brinca and João B. Duarte

1.1. Introduction

In this chapter, we describe the importance of the housing market for macroeconomic dynamics in Portugal. This description will be divided into two blocks: 1) the importance of the real estate market in economic cycles; and 2) the relevance of real estate in the financial balance of families. First, we describe the real estate cycle in Portugal using data from the national accounts of Statistics Portugal (INE), the Statistics Office of the European Union (Eurostat) and the Organisation for Economic Co-operation and Development (OECD). Second, we will use microdata from the *Household Finance and Consumption Survey* (HFCS) of the European Central Bank to describe the importance of real estate in the financial statements of families in Portugal. Regarding national accounts data, we use data available from the past three decades, starting our study from before the introduction of the single currency (euro). For the second part, in which we work with microdata, we use three surveys carried out by the European Central Bank in 2010, 2013, and 2017.

Against the backdrop of the relevant nexus between housing and macroeconomic dynamics, our contribution in this chapter is the description of the relative importance of housing in the Portuguese economy. In particular, this chapter focuses on providing stylized facts from a selected number of dimensions previously identified by the literature as sufficient statistics to provide a measure of the strength in which macro policies interact with the housing market.

For the sake of comparability, it is important to note that during our analysis we will compare Portuguese characteristics with those of the European Union. This way, we bring not only temporal but also spatial variation into the description.

1.2. Literature review on housing and the macroeconomy

There is an extensive literature on macroeconomics developed over the last two decades which demonstrates the relevance of the housing market for business cycle dynamics (Piazzesi and Schneider, 2016). To a large extent, these recent advances in the literature were motivated by the event of the Great Recession, where the collapse of the American

housing market gave rise to a devastating financial crisis, which in turn caused the world economy to plunge into a deep recession.

On the one hand, this literature has revealed that economic cycles are strongly affected by real estate market cycles. On the other hand, it has shown that macro policies, namely monetary policy (Iacoviello, 2005, Iacoviello and Neri, 2010, and Dias and Duarte, 2019) and credit access policy (Mian and Sufi, 2018) channel many of their effects to the rest of the economy through the housing market. For instance, state-of-the-art HANK models highlight the importance of the composition of household balance sheets, where housing plays a key role for monetary and fiscal policy (Auclert, 2019, and Kaplan, Moll and Violante, 2018).

This last role is particularly important for a number of reasons. First, it plays into a broader picture of what has been the role of heterogeneity in macroeconomics over the past 40 years. Following Brinca (2020), modern macroeconomics has expanded its focus solely from the dynamics of aggregate variables, such as income, consumption or savings, to the dynamics of the distributions that aggregate up to those variables. The challenge was two-fold: first to understand how heterogeneity could be relevant to aggregate dynamics; and second, to understand the distributional impacts of the dynamics of aggregate variables.

Early work exploring the role of heterogeneity can be traced back to Fisher (1930) who focused on age, and Kaldor (1955) and Pasinetti (1962) on ownership of production factors. Later in the 1980s, incomplete market models in terms of uninsurable labour income risk would emerge (see Bewley, 1980), and this second generation of models became widespread and a vibrant research avenue. By the late 1990s, early 2000s, the works of Krusell and Smith (1998) and Castañeda et al. (2003) were the state of the art with regard to creating environments that could replicate the joint distribution of income and wealth by resorting to incomplete markets, individual characteristics and permanent-behaviour.

However, despite the fact that these models had quantitative relevance in the sense that they could replicate observed moments of joint distribution of income and wealth, aggregate variables showed little to no dependence from higher moments of such distributions. The main result in Krusell and Smith (1998) is precisely that average wealth was a sufficient statistic for agents to forecast aggregate dynamics.

This led Lucas (2003) to claim that «for determining the behaviour of aggregates, [Krusell and Smith (1998)] discovered realistically modelled household heterogeneity just does not matter very much». A few years would pass until the Great Recession of 2008, where housing played a major role, and would contribute towards a greater sense that heterogeneity mattered for aggregate dynamics. The issue with the second generation of models that emerged in the 80s, was that while they were indeed able to replicate observed distributions of income and wealth, they failed to replicate distributions of marginal propensities to work and consume out of income. These models predict relatively high marginal propensities at the bottom of the distribution, where credit constraints could prevent intertemporal optimization and lead to hand-to-mouth behaviour, i.e., marginal propensities to consume equal to one, for example. But rational dynastic agents would anticipate the welfare losses of being close to the credit constraint and would thus accumulate precautionary savings to insure against such event, which leads to a very fast decay of marginal propensities.

This makes the average propensity to consume very low and close to 0.1, as households are still able to intertemporally smooth income shocks and, consequently, very little change in aggregate behaviour is observed. This is counterfactual, as studies have indeed shown that marginal propensities to consume are not just higher on average but are also much less decaying with respect to income levels (see, for example, Kaplan and Violante, 2014). This showed that the correlation of income and consumption was much higher than the permanent income hypothesis would predict, even for high levels of income, and thus the term «wealthy-hand-to-mouth» was popularized.

This led to a third generation of models that explored ways in which micro-heterogeneity would allow for a stronger propagation of aggregate shocks. Oh and Reis (2012), McKay and Reis (2016), and Kaplan, Moll and Violante (2018) brought forth environments with nominal rigidities, incomplete markets, illiquid assets and aggregate risk, which improved upon the empirical plausibility of marginal propensities to consume and work in those respective environments. In particular, illiquid assets are a widely used feature to achieve such purpose and housing represents the lion's share in that class of assets.

This is of special relevance for Portugal too as housing is typically and by far the most important asset in Portuguese household portfolios, and therefore cannot be used for consumption smoothing. Consequently, and in line with the literature, high percentages of wealth being held in illiquid assets lead, ceteris paribus, to stronger responses of household consumption in face of aggregate shocks. This is consistent with the latest COVID-19 crisis, for example, as in 2020 Portugal's Gross Domestic Product (GDP) contracted more than the average in the Euro-Area.

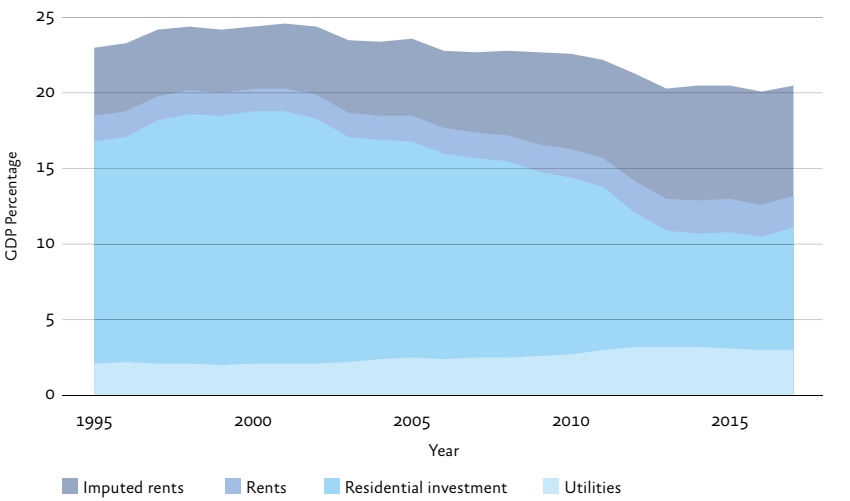
1.3. Relative importance of housing in GDP

We begin our analysis with the following simple but essential question: what is the real estate market's contribution to the Portuguese GDP? This contribution is fundamentally made through two channels:

- Consumption, through renting;
- Investment, through the construction of new properties.

In figure 1, we show the behaviour of these contributions to Portuguese GDP from 1995 to 2017.

Figure 1 **Contribution of the real estate market to Portugal's GDP**

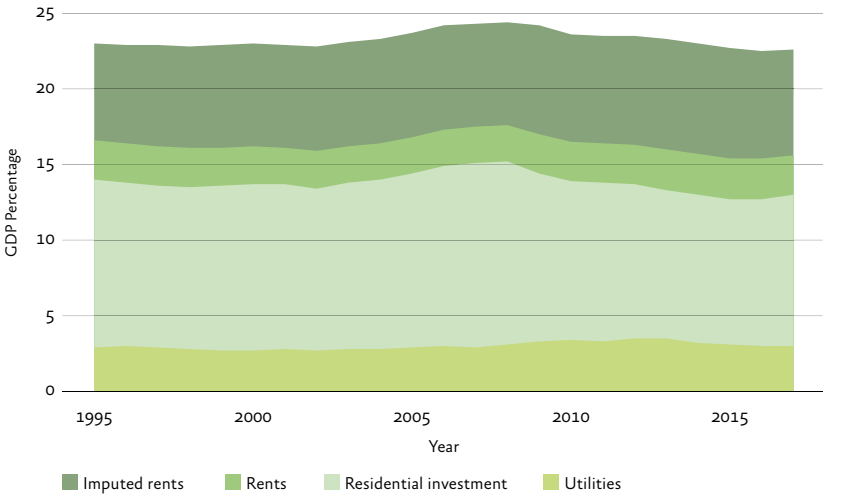


Source: Eurostat

It is possible to observe that the real estate market accounted for around 20% of the Portuguese GDP in 2017. The housing market's contribution to GDP reached almost 25% in 2001 and then began decreasing until 2017. Regarding the various parcels that make up this part of the Portuguese GDP, we can see that from 1995 to 2002, the major part of this contribution was made by residential investment, which added up approximately 16% of GDP, followed by the value of imputed rents, responsible for roughly 5%. However, by early 2000s, when Europe experienced the introduction of the single currency, this dynamic was altered. There was a sharp drop in the value of residential investment, which reached its minimum level in 2014 — a date that marks the end of the Troika's intervention— with 7.5% of GDP, stabilizing in the following years. This trend was inversely accompanied by an increase in the weight of imputed rents (transmitted through a rise in rental prices, as we will see later). Therefore, while there was an increase in the contribution of rents, there was also a decrease in the contribution from residential investment.

Comparing these dynamics with the European Union's average, it is possible to highlight significantly different behaviour. Figure 2 clearly shows that the contribution of the real estate market to the European Union's GDP has been relatively constant over time, amounting to approximately 22.5%.

Figure 2 **Contribution of the real estate market to GDP in the European Union**



Source: Eurostat

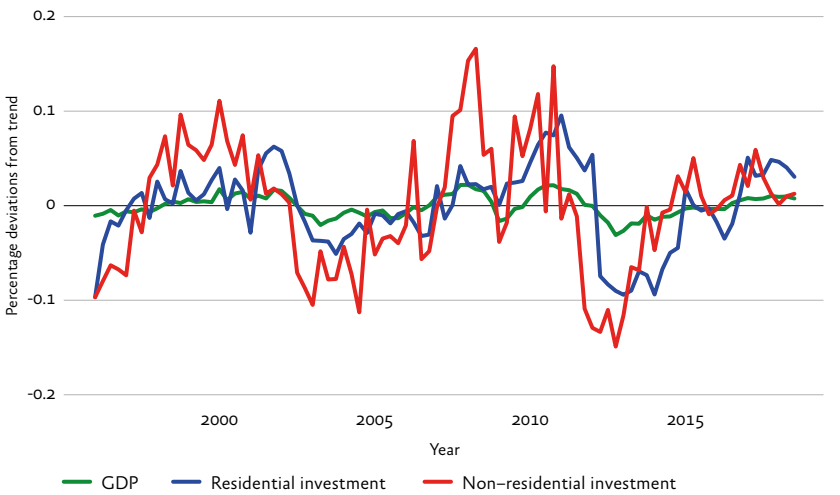
Although Portugal's value has been slightly below the European Union's average, in terms of the total amount of the housing market's contribution to GDP over the last few years, there are differences in each component's weight. There is an aspect that differs significantly from the Portuguese case: the proportions of each parcel remain practically unchanged during the period in question, with slight changes during the 2008 crisis. In this European scenario, the housing components with higher weight are: residential investment with 11% and imputed rents with 7%, followed by rents and utilities. Unlike Portugal, the average value of European rents does not appear to have changed, nor has there been a drop in investment in this market. It should be noted that this is only an average and each country has different characteristics. In other

words, the European average may reveal different dynamics behind each member country. Summing up, the property market in Portugal has a contribution to GDP in terms of rents similar to the European average. However, residential investment contributed around 7.5% to GDP in 2017, 2.5 percentage points below the European average.

1.4. The importance of housing in Portugal's business cycles

Given the high importance of residential investment in Portuguese GDP, we will analyse the evolution of residential investment cycles in Portugal, contrasting them with economic and non-residential investment cycles.

Figure 3 GDP and investment cycles in Portugal



Source: Eurostat

Figure 3 displays the behaviour of three variables regarding trend deviations in Portugal: GDP, investment in real estate assets (residential), and investment in non-real estate assets. First, we highlight the fact that the three variables behave similarly, or in other words, are strongly correlated over time. Second, residential investment appears to have a slightly later cycle than non-residential investment, as the latter falls first and also recovers first. However, it is worth noting that neither seem to precede a fall or recovery in GDP. Third, with a standard deviation of 1.3%, GDP is clearly the least volatile variable of the three.

Another interesting point to be taken from figure 3 is the presence of lead-lag correlations between the three variables in question. Table 1 displays a correlation matrix regarding the cycle components of HP-filtered data, with a focus on residential investment. As we can see, residential investment is a coincident indicator of GDP, with a very high correlation (0.81), even higher than non-residential investment. This highlights the importance of residential investment in business cycle fluctuations and stabilization policy in Portugal.

Table 1 Matrix correlation between GDP, non-residential and residential investment

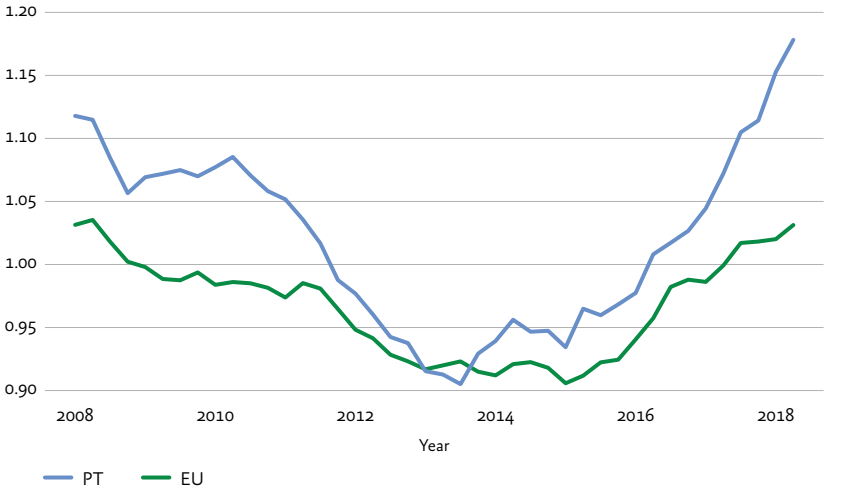
	Y_t	Y_{t-1}	I_t	I_{t-1}	H_t	H_{t-1}	H_{t-2}	H_{t-3}
Y_t	1	0.87	0.71	0.55	0.81	0.74	0.68	0.57
Y_{t-1}		1	0.73	0.71	0.73	0.81	0.74	0.69
I_t			1	0.71	0.57	0.62	0.66	0.67
I_{t-1}				1	0.44	0.55	0.62	0.66
H_t					1	0.81	0.67	0.56
H_{t-1}						1	0.82	0.69
H_{t-2}							1	0.82
H_{t-3}								1

Note: Y_t — GDP at time t, I_t — non-residential investment at time t, H — residential investment at time t.

1.4.1. Price and renting dynamics

Regarding the assessment of price developments in the real estate sector, we need to consider two aspects: the price of real estate assets and the price of their lease. Starting with the first, the narrative in Portugal since around 2014 has been that house prices in Portugal are very high. In various media it is reported that «real estate is on the rise» (Expresso, 2015), or that it has reached «maximum values since the peak of the crisis in 2013» (Observador, 2017). Although this news is factual in nominal terms, it conveys a distorted view of reality, as the important factor for economic agents' decisions are relative prices — housing prices adjusted for inflation. Since 2014, there has been robust growth in housing prices, but if we take real housing prices into account, the scenario is not so impressive. Figure 4 displays the evolution of real house prices, both in Portugal and the European Union.

Figure 4 Real house prices



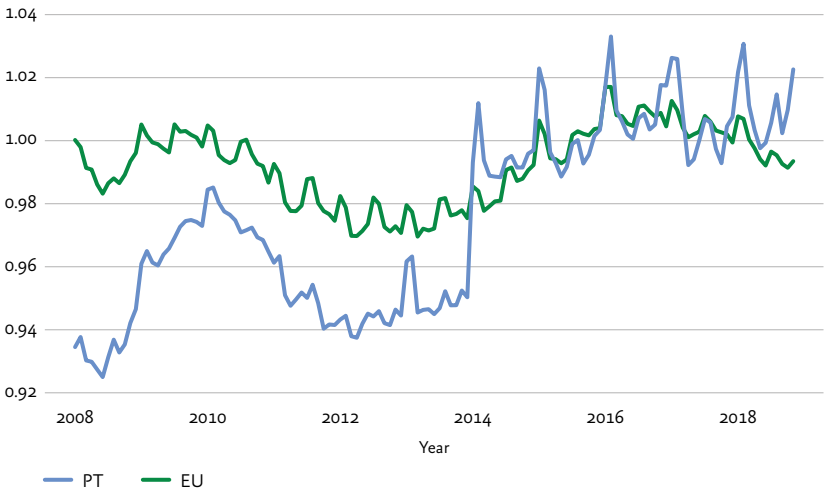
Source: Eurostat

Note that, after the great recession of 2008, there was a clear decrease in the value of real estate in both cases, followed by a recovery that started in 2013. Since then, Portugal has shown a sharp rise in prices, which shows no sign of deceleration. However, a price level similar to that of the time preceding the Great Recession of 2008 was only reached in 2017. The «very high prices» narrative in Portugal is thus based on nominal rather than real prices — adjusted for inflation (a detailed analysis using real house prices is provided in chapter 2). Price developments in the European Union are much smoother than in Portugal. In comparison to the European Union, the decline shown in Portugal is considerably more accentuated, as is the recovery. Let us note that, despite the years characterized by the sovereign debt crisis, when the difference between European and Portuguese prices was at

its smallest, this difference has increased considerably and shows no signs of slowing down when we look at the last year considered.

Has the rental market behaved similarly? Figure 5 shows the dynamics of the renting market, once again in Portugal and the European Union.

Figure 5 Real lease prices



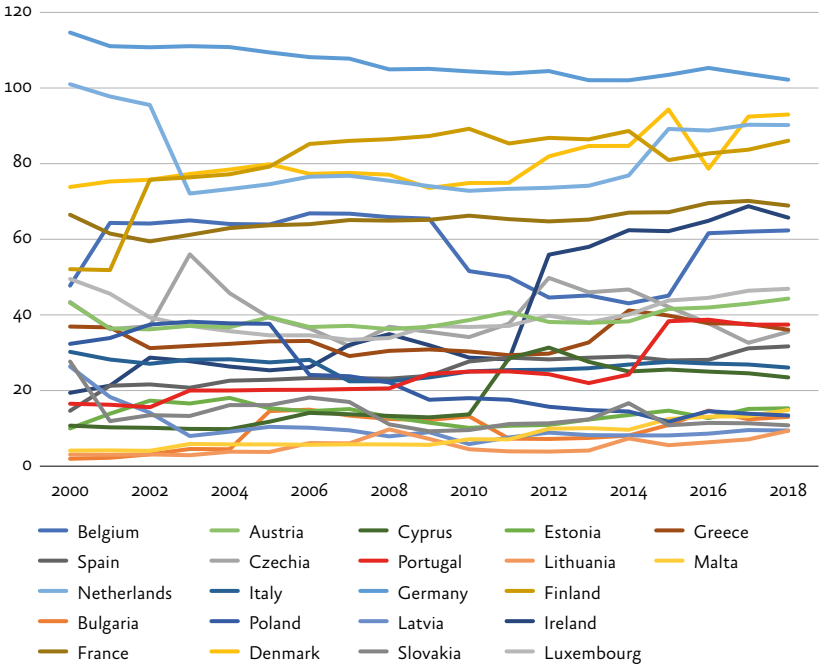
Source: Eurostat

Here we observe a considerably different evolution. Firstly, rental values in the European Union prove to be less exposed to seasonal effects than Portuguese values. Second, after 2009, there was a slight drop in the European Union until 2012, when the value of rents increased again, also moderately, until returning to the value of 2008. On the contrary, Portugal demonstrated much more accentuated falls and recoveries, namely in 2014, which registered a sharp rise of the variable in question (for a detailed analysis of rents in Portugal, see chapter 6).

We were thus able to establish two distinct periods concerning the evolution of the rental price: before 2014, when this price was significantly lower than the European average, and after 2014, a period during which Portugal demonstrated convergence with its European peers on this matter. Even so, it is relevant to once more point out that, as of 2014, the real rental price was much more susceptible to the effect of seasonality, which is the reason behind the high--intensity variance registered during this period. Combining this graph with the previous one, we can see that the recovery in prices coincides with the explosion of rents. The year of 2014 is marked by a limited offer (since residential investment had been decreasing for several years at the time) and high demand, due to the bullish behaviour of the tourism sector.

As we explained in the beginning of this chapter, while comparing the Portuguese reality with that of the European Union, one can observe differences within the Union by looking at lease prices by country in figure 6. While there is an obvious link between figures 5 and 6, the former hides several aspects that the latter displays. In fact, there are asymmetries within each country. Nevertheless, the behaviour of each market is not completely independent from the others. Notice that Portugal was not the only country with an increase in rent prices between the period 2013–2015.

Figure 6 Real lease prices by country



Source: Eurostat

What does all this tell us about the profitability of real estate investment? Being a medium/long-term investment, is this type of asset with little liquidity not attractive in comparison to different kinds of investment? No, on the contrary. Real estate investment continues to have high profitability levels in relation to the risk it pertains. Jordà et al. (2019) show that residential investment generates an attractive return, taking into account its expenses when compared to other types of investment, such as equity (which has a higher level of risk) or government bonds (which have much lower returns). Table 2 presents two variables which describe part of the rental scenario in Portugal.

Table 2 Additional property and lease

	Portugal	Europe
2013		
% of households with more than one real estate property	30,31%	24,25%
% of households that rent extra real estate	13,99%	30,66%
2017		
% of households with more than one real estate	29,22%	22,16%
% of households that rent extra real estate	13,40%	41,14%

Source: HFCS and authors' calculations

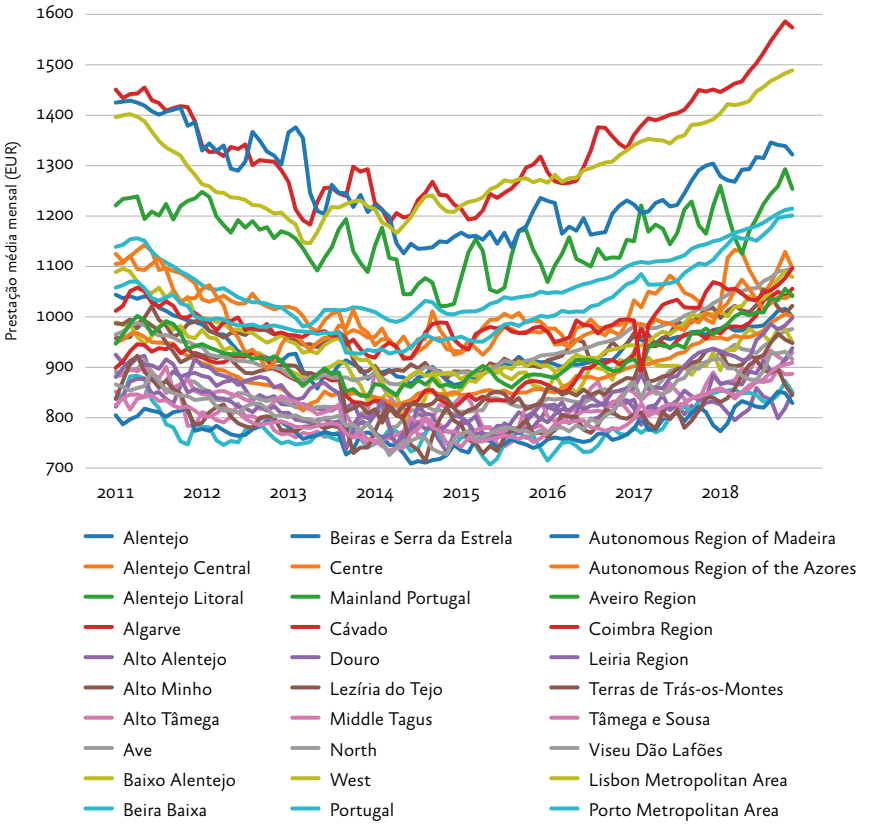
From these numbers, we were able to make two major findings:

- On average, in Portugal, there is a higher percentage of families owning two or more real estate properties than in Europe in general. Although this variable decreased for the two regions considered from 2013 to 2017, the distance between them increased.
- On average, and despite the point mentioned above, in Europe, a considerably more significant portion of families who own real estate in addition to their primary residence, decide to rent it. Not only did this figure remain practically unchanged in Portugal for four years, but it also rose by more than ten percentage points in Europe. This statistic shows that, in general, the Portuguese give their secondary residence(s) another use (other types of business than short-term, long-term or holiday rentals, etc.).

1.4.2. How the macro real estate cycle determines regional cycles

Looking at the regional segmentation of aggregate data, should we assume that local real estate markets are independent with regard to price developments? No. Despite their characteristics (supply and demand, strong presence/lack of tourism or foreign residents, etc.), the national and international macroeconomic scenario (namely decisions at the fiscal and monetary level) affects all regional markets, as we can see in figure 7. It is possible to draw a connection line between figures 7 and 5, where the former is a decomposition of the latter by NUTS III.

Figure 7 Monthly instalment by NUTS III



1.5. The importance of real estate in household balance sheets

We now move on to the description of the importance of real estate in household balance sheets. Recent work by Mian, Sufi and Verner (2017), Cloyne, Ferreira and Surico (2020), and Slacalek et

al. (2020) come to highlight how household balance sheets are not only decisive for economic cycles but also for stabilization policies. In this sense, this section contributes to describe household balance sheets in Portugal. To this end, we used data from the European Central Bank, obtained through a set of questionnaires carried out in several European Union countries (Germany, Austria, Belgium, Cyprus, Croatia, Slovakia, Slovenia, Spain, Estonia, Finland, France, Greece, Netherlands, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland and Portugal), the Household Finance and Consumption Survey. (Note: Throughout the section, having this dataset as basis for the analysis, we will use European Union and Europe interchangeably).

1.5.1. Financing for the acquisition of primary residences

We start with financing and indebtedness in the acquisition (and respective payment) of households' main residences. Table 3 contains information regarding Portuguese and European households' main residence for 2010, 2013 and 2017.

Table 3 Financing of primary residence

	Portugal	Europe
2010		
% relative to total wealth	80.21%	81.71%
Monthly instalment	391 EUR	661 EUR
Effort rate	21.55%	18.39%
Amount outstanding	71 434 EUR	87 380 EUR
% of ownership of the house	46.36%	47.66%
2013		
% relative to total wealth	79.62%	81.07%
Monthly instalment	343 EUR	670 EUR
Effort rate	18.49%	18.13%
Amount outstanding	EUR 72 723	91 466 EUR
% of ownership of the house	45.47%	49.64%
2017		
% relative to total wealth	80.79%	81.73%
Monthly instalment	320 EUR	740 EUR
Effort rate	16.16%	16.42%
Amount outstanding	61 792 EUR	101 147 EUR
% of ownership of the house	44.02%	49.53%

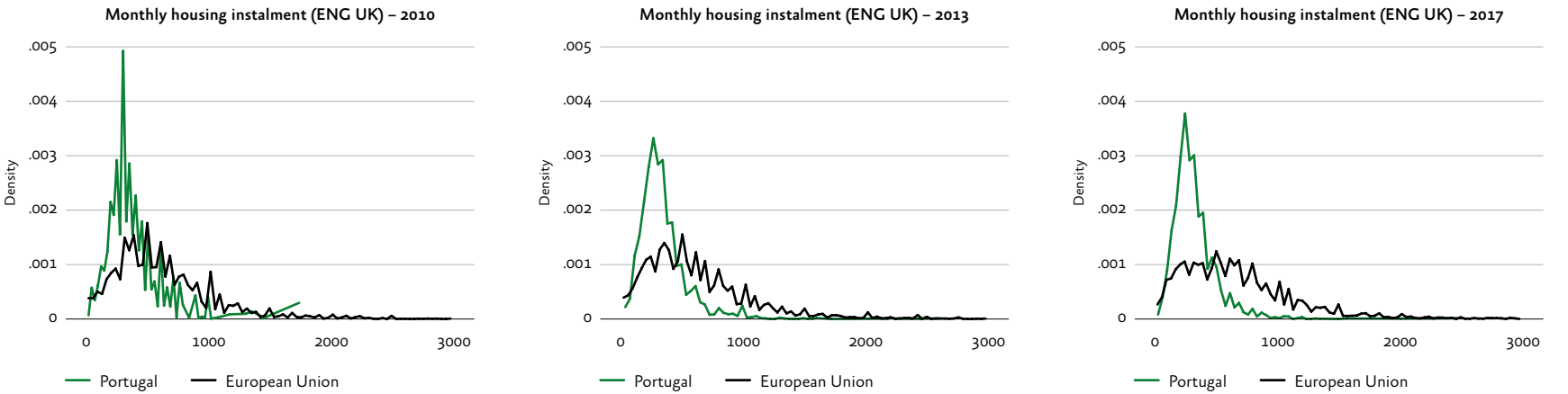
Source: HFCS and authors' calculations

It should be noted that, in Portugal, the weight of a household's primary residence in relation to the total value of its wealth is quite similar to that of the European average. We also observe that, despite paying significantly lower instalments, the effort rate (percentage of income spent on monthly payment in relation to total income) is higher in Portugal. Regarding the amount outstanding on loans made for the household's main residence, there is a significant difference between Portugal and Europe, a situation that does not occur when we observe the percentage of ownership of the same real estate asset. In 2013, with respect to our first variable, the value of the main residence in relation to the total value of assets, we concluded that it did not show major changes, neither at a national nor European level. The most significant difference in this seven-year period was the decrease in the effort rate, both in Europe in general and in Portugal. However,

there are also signs of divergence, namely regarding outstanding loans acquired for main residences, from 2013 to 2017. While Portugal saw this value decrease, Europe saw it increase substantially by the same magnitude. We can say that more houses for primary residence purposes were purchased in Europe (a fact that increases the amount due) than in Portugal. Another differentiating aspect is the behaviour of the main residence's monthly instalment, where Portugal once again displays a downward trend, unlike the European Union. Finally, Portugal shows a slight decrease in the percentage of ownership of primary residences, while the European average remained virtually unchanged from 2013 to 2017. This is consistent with the adjustment period in Portugal following the sovereign debt crisis, with significant deleveraging and protracted national demand.

Instead of exclusively analysing the averages of the variables described above, we can consider the entire distribution regarding each one of them (for example, if there is a strong concentration around the average, if the variables demonstrate high variance, etc.). The variable in question will be displayed on the horizontal axis and its density on the vertical axis. Therefore, let us look at some of the distributions of the variables presented above in the following figures.

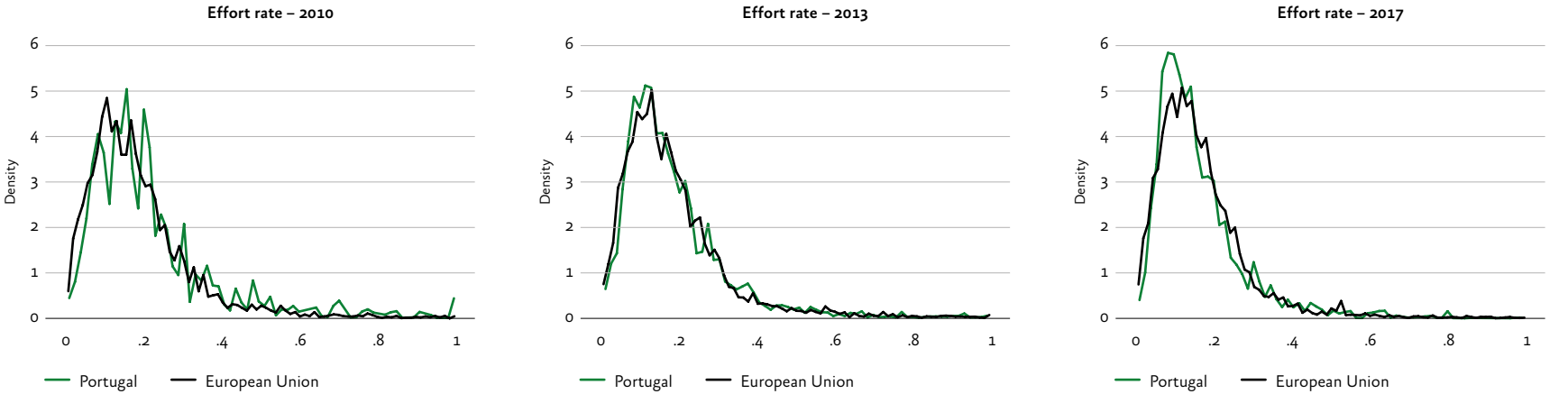
Figure 8 Monthly instalment



Source: HFCS and authors' calculations

This first group of diagrams is an example where, by only taking the average value into account, we are left with an incomplete analysis. Although we have already concluded that the monthly payment for the main residence loan was much higher in Europe in general than in Portugal, in nominal terms, we can now observe that the distribution of this variable is much less dispersed (that is, very concentrated around its average value) in Portugal, particularly in 2010.

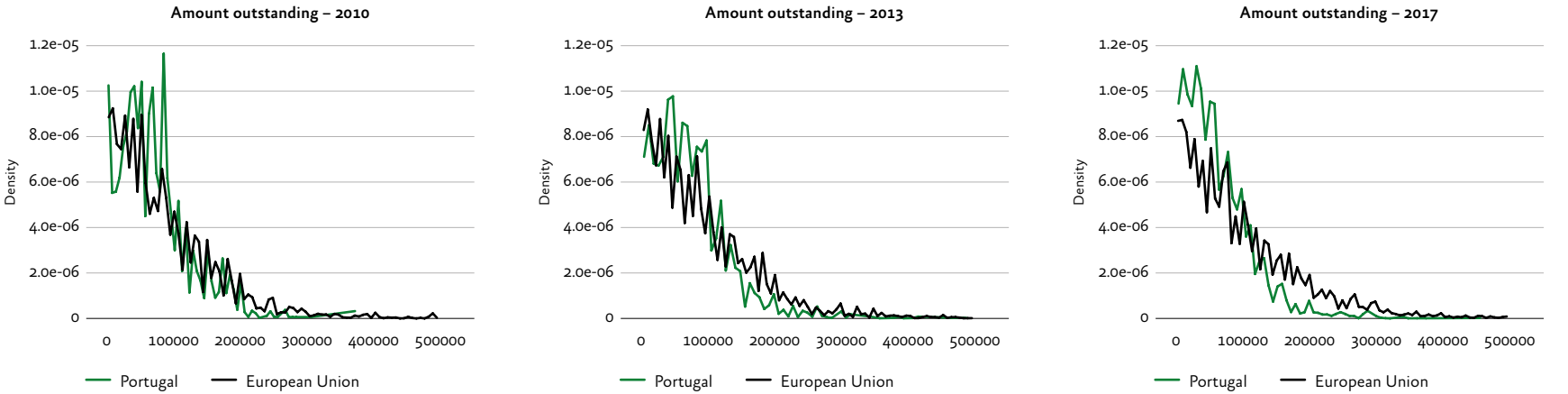
Figure 9 Effort rate



Source: HFCS and authors' calculations

With respect to effort rates, there are no significant differences between Portugal and the European Union throughout the period under analysis. However, we can see that the distribution seems to have become more concentrated at lower levels of effort rates for both, which is most likely a consequence of macroprudential regulations imposed on mortgage lending, such as higher loan-to-value ratios.

Figure 10 Amount outstanding



Source: HFCS and authors' calculations

In terms of amounts outstanding, as expected, there is a higher mass of loans at lower values, which can come as a result of a number of different effects (lower prices and consequently loans, but also lower purchasing power). Nevertheless, it is interesting to see that since 2010 there is a trend for the difference in comparison to the EU to grow, with Portugal's distribution of amounts outstanding being increasingly concentrated at lower amounts in comparison.

1.5.2. Household characterisation according to liquid wealth

The economic conditions of households are decisive for us to be able to anticipate the resilience of the real estate sector to aggregate shocks. In this sense, it is interesting to look at the financial structure of household assets according to their degree of liquidity. On the one hand, if households have little liquid wealth, significant income shocks can lead to a need to liquidate some of the non-liquid assets in order to make ends meet. Since housing is a household's biggest illiquid asset, this may lead to its forced sale. However, if done systematically in reaction to an aggregate shock, this may lead to a substantial fall in house prices and trigger a second aggregate shock in the economy. On the other hand, the lack of liquid assets means that households have to adjust their consumption when affected by income shortages, thus generating a fall in aggregate demand and deepening an aggregate negative shock (Corsetti, Duarte and Mann, 2018).

Following the approach carried out by Slacalek et al. (2020), we denominate these households as 'hand-to-mouth'. According to the authors' definition, these households either have zero liquid assets or depend on an unsecured credit limit. Just like the authors, we also distinguish between 'wealthy hand-to-mouth' and 'poor hand-to-mouth' households. The difference between these two is that the former possess illiquid assets (mainly made up of real estate) above a certain threshold. Table 4 allows us to look at the proportion of each of these types of households in the different European countries in 2010, 2013 and 2017.

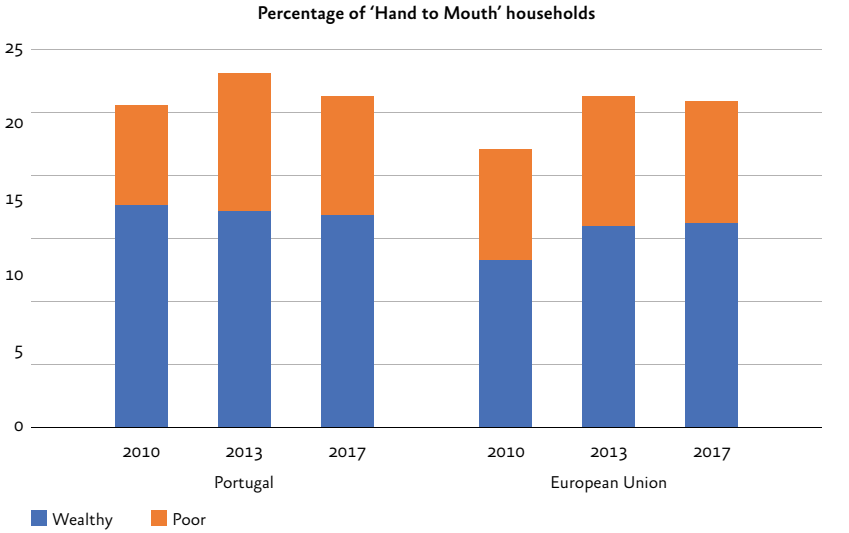
Table 4 Percentage of 'hand-to-mouth' households

	2010		2013		2017	
	Rich	Poor	Rich	Poor	Rich	Poor
AT	4.77	8.8	3.66	8.65	4.34	7.94
BE	11.38	6.86	10.24	8.84	10.6	9.55
CY	31.13	7.36	28.27	10.85	34.57	13.83
DE	11.75	9.98	12.33	12.54	12.39	11.99
EE	-	-	26.35	8.93	28.43	3.62
ES	18.44	6.46	17.65	8.9	-	-
FI	13.16	9.95	13.16	11.31	13.49	11.9
FR	8.42	8.95	9.17	10.08	10.97	11.07
GR	31.97	11.61	36.21	14.25	37	13.85
HR	-	-	-	-	56.11	3.13
HU	-	-	30.29	6.23	42.04	8.99
IE	-	-	18.87	18.31	20.35	13.38
IT	14.57	8.72	13.5	10.05	13.2	9.52
LT	-	-	-	-	37.94	2.76
LU	9.17	7.56	11.01	8.26	16.7	1.3
LV	-	-	50.15	15.86	59.82	5.74
MT	6.95	3.57	7.44	2.61	6.48	4.36
NL	11.75	7.81	10.92	8.63	5.06	9.54
PL	-	-	34.75	7.44	29.43	0.8
PT	17.67	7.86	17.16	10.9	16.83	9.39

	2010		2013		2017	
	Rich	Poor	Rich	Poor	Rich	Poor
SI	37.09	6.96	37.26	11	34.56	8.43
SK	24.32	3.22	28.73	5.61	30.53	3.92
European average	13.33	8.73	15.93	10.29	16.22	9.61

As of now, there is a marked heterogeneity within Europe itself. Namely, most of the countries that were part of the enlargement of the European Union in 2004 generally seem to have a higher proportion of 'hand-to-mouth' households (that is, with a very limited net worth and whose consumption patterns have a one-to-one relationship with net income) than the European average. Portugal appears at the middle of the table, as it does not have as high a percentage of this type of households as Greece or Hungary, but it is also far from a lower level such as registered in Austria or the Netherlands. With around 25% of 'hand-to-mouth' households, Portugal has not shown any change in the total of 'hand-to-mouth' households over these seven years (varying between 25 and 28%). Furthermore, from 2010 to 2013, there seems to have been a change in the proportion of poor and rich, where the first type has increased, and the second has decreased. Then, in 2017 the number of poor 'hand-to-mouth' came back again. This tells us that there has been a decrease in illiquid wealth (in which real estate assets are often included) in some of the Portuguese households. Figure 11 shows us precisely that.

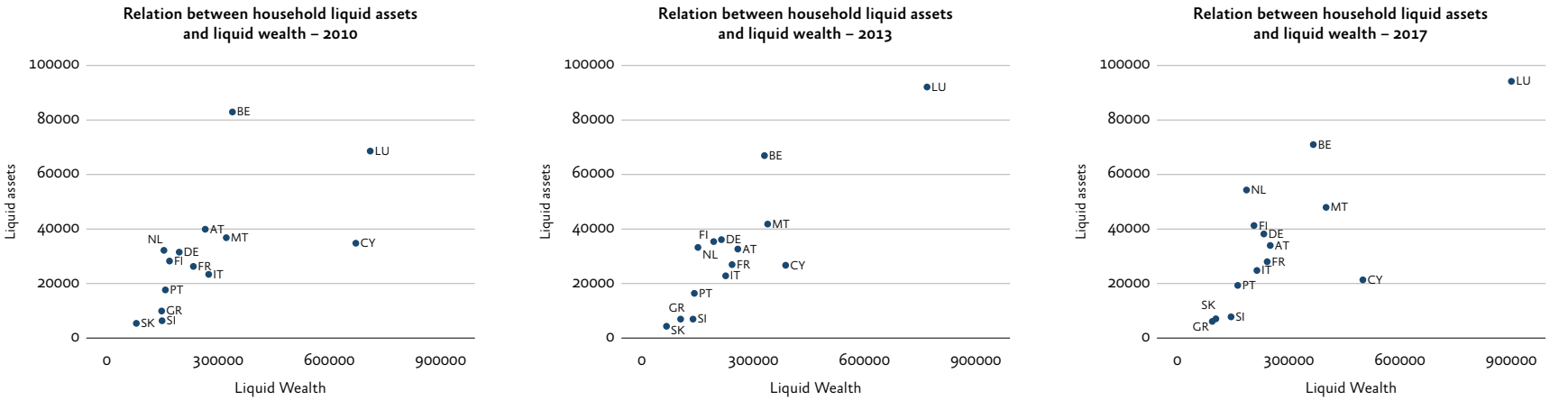
Figure 11 Evolution of 'hand-to-mouth' households in Portugal and Europe



Source: HFCS and authors' calculations

Before we finish this section, we consider it relevant to make a brief analysis regarding the relationship between liquid assets and the net wealth of households. The first concept is defined according to the previously used study (Slacalek et al., 2020): «Sight and saving accounts (deposits), directly mutual funds, bonds and stocks.» The second concept is the general definition of net wealth: assets discounted from liabilities. The behaviour of the national averages of these two variables for some of the countries previously referred to is presented in figure 12.

Figure 12 Net assets and net wealth of European households



Source: HFCS and authors' calculations

One can verify that these variables have a positive relationship: countries where households have higher indebtedness (with lower levels of net wealth) display a lower amount of liquid assets. This trend appears to be unchanged for most of the countries considered. By combining these graphs with table 2, we see that the countries in the lower-left corner (Slovakia, Slovenia and Greece) are some of the countries with the highest percentage of 'hand-to-mouth' households.

1.6. Conclusion

In this chapter, we have described the importance of the housing market within the Portuguese macroeconomic context. In general, we firstly concluded that the real estate market contributes to one-fifth of the Portuguese GDP, and its cycles are strongly correlated with the business cycles experienced in Portugal over the last two decades. Secondly, we concluded that housing is a relevant asset — 80% relative to total wealth — on the balance sheet of Portuguese households, and that the composition of the latter is similar to that of the European Union's average, especially in 2017. However, there is a great deal of variation between countries within Europe. Portugal is in a group of countries which has a high percentage of households without liquid assets (25%), leaving the country more vulnerable to aggregate shocks.

References

Auclert, A., (2019), «Monetary policy and the redistribution channel», *American Economic Review* 109 (6): 2333–67.

Brinca, P., (2020), «Modern macroeconomics and heterogeneity», *Notas Económicas* (51), 7–20.

Castaneda, A., J. Diaz-Gimenez and J.V. Rios-Rull, (2003), «Accounting for the US earnings and wealth inequality», *Journal of Political Economy* 111(4), 818–857.

Cloyne, J., C. Ferreira and P. Surico, (2020), «Monetary policy when households have debt: new evidence on the transmission mechanism», *The Review of Economic Studies* 87 (1): 102–129.

Corsetti, G., J.B. Duarte and S. Mann, (2018), «One money, many markets-a factor model approach to monetary policy in the euro area with high--frequency identification», *Cambridge Working Papers in Economics* 1816, Faculty of Economics, University of Cambridge.

Dias, D.A. and J.B. Duarte, (2019), «Monetary policy, housing rents, and inflation dynamics», *Journal of Applied Econometrics* 34(5), 673–687.

Antunes, Marisa (2015), «Imobiliário em Alta. Veja as zonas de Portugal onde as casas sao mais caras.», *Expresso*, April 2015, Accessed in July 2020, link

Fisher R.A., (1930), *The genetical theory of natural selection*, Oxford University Press, Oxford: 1–272.

Iacoviello, M. and S. Neri., (2010), «Housing market spillovers: evidence from an estimated DSGE model», *American Economic Journal: Macroeconomics* 2 (2): 125–64.

Iacoviello, M., (2005), «House prices, borrowing constraints, and monetary policy in the business cycle», *American Economic Review* 95 (3): 739–764.

Jordà, Ò., K. Knoll, D. Kuvshinov, M. Schularick and A.M. Taylor, (2019), «The rate of return on everything, 1870–2015», *The Quarterly Journal of Economics*, 134(3), 1225–1298.

Kaldor, N., (1955), «Alternative theories of distribution», *Review of Economic Studies* 23 (2), 83–100.

Kaplan, G., B. Moll and G.L. Violante, (2018), «Monetary policy according to HANK», *American Economic Review* 108(3), 697–743.

Kaplan, G. and G.L. Violante, (2014), «A model of the consumption response to fiscal stimulus payments», *Econometrica* 82(4), 1199–1239.

Krusell, P. and A.A. Smith Jr., (1998). «Income and wealth heterogeneity in the macroeconomy», *Journal of Political Economy* 106(5), 867–896.

Kay, A. and R. Reis, (2016), «The role of automatic stabilizers in the US business cycle», *Econometrica* 84(1), 141–194.

Lucas, R.E. Jr., (2003), «Macroeconomic priorities», *American Economic Review*, 93(1), 1–14.

Mian, A., A. Sufi and E. Verner, (2017), «Household debt and business cycles worldwide», *The Quarterly Journal of Economics* 132 (4): 1755–1817.

Mian, A., and A. Sufi, (2018), «Finance and business cycles: the credit-driven household demand channel», *Journal of Economic Perspectives* 32 (3): 31–58.

Observador, (2017), «Habitação. Preço das casas atinge valores máximos desde mínimos de 2013», September 2017, accessed in July 2020, link.

Oh, H. and R. Reis., (2012), «Targeted transfers and the fiscal response to the great recession», *Journal of Monetary Economics* 59, S50-S64.

Pasinetti, L.L., (1962), «Rate of profit and income distribution in relation to the rate of economic growth», *The Review of Economic Studies* 29(4), 267–279.

Piazzesi, M. and M. Schneider, (2016), «Housing and macroeconomics», Vol. 2, in *Handbook of macroeconomics*, 1547–1640.

Slacalek, J., O. Tristani and G.L. Violante, (2020), «Household balance sheet channels of monetary policy: a back of the envelope calculation for the euro area», *Journal of Economic Dynamics and Control*, 115, 103879.

Chapter 2
Exuberance and contagion in the Portuguese housing market: a perspective on disaggregate local residential prices[1]

René Huget, Rita F. Lourenço and Paulo M. M. Rodrigues

2.1. Introduction

According to Stiglitz (1990) «if the reason that the price is high today is only because investors believe that the selling price will be high tomorrow — when "fundamental" factors do not seem to justify such a price — then a bubble exists.» This definition comprises three dimensions often found in existing descriptions of asset price bubbles: 1) assets trade above their fundamental value; 2) investors may act speculatively; and 3) a strong price increase is followed by a bust.

Analysing house price exuberance is important for several reasons. First, house price bubbles generate wealth effects that may lead to higher consumption during the boom and lower consumption during the bust phase. This behaviour stems from the permanent income hypothesis, relating stronger current consumption to the discounted value of expected income rather than to current income, because households prefer a smooth consumption pattern (Friedmann, 1957). The discounted value of expected income does strongly depend on changes in wealth, and changes in house prices translate through this channel into the economy. These wealth effects are particularly important because housing accounts for much of a household's investment portfolio (Englund et al., 2002, Costa et al., 2020 and ECB, 2020). It has also been observed that changes in housing wealth can translate into higher consumption levels than with a similar increase in financial wealth (Carroll, Otsuka and Slacalek, 2011).

Second, house price bubbles may be associated with a substantial increase in borrowing for capital accumulation due to the positive expectations generated by high prices. Furthermore, as houses can serve as collateral, rising prices during a bubble can lead to an increase of debt, creating a link to the banking sector. Banks' balance sheets look safe as long as asset prices are high and back up accumulated debt. However, when there is a bust, banks may react with tighter credit conditions, leading to a credit crunch which impacts economic activity (Bean, 2004).

Third, the fact that housing supply is not rigid can give rise to further welfare losses associated to bubbles in housing (Glaeser, Gyourko, Saiz, 2008). Strong positive house price changes can signal profitable projects in construction, which may lead to oversupply. An example are the ghost cities in Spain which resulted from the housing bubble in the years before 2007. During this period construction overshot housing demand and lead to unoccupied and unused housing. A way to determine whether an expansion of housing investment may have originated a «housing overhang», is to calculate the difference between current residential gross fixed capital formation (GFCF) and the average of the previous 20 years (both as a percentage of GDP), and accumulate that difference over a specific period. This indicator may be seen as the cumulative loss that would occur in domestic demand if residential construction activity returned to its «long-term» level (Gros, 2007). Hence, computing this measure for the period between 2000 and 2006, indicates that in 2006 there was an accumulated «excess» of about 30 per cent of houses in Spain, whereas for Portugal the housing stock was negative (Lourenço and Rodrigues, 2014).

Fourth, besides the loss for investors who bought houses at a bubble price and sold them after the bust, the social impact of bubbles is also important, since a strong increase in the price for housing means that shelter (a basic necessity) becomes less affordable for households.

Studying the Portuguese housing market and examining possible exuberant behaviour is important as country specific empirical literature on housing bubbles is scarce (except for the U.S.) and detailed information for Portugal is even more limited. After the sovereign debt crisis, from 2014 to the present day, Portuguese house prices experienced a strong growth and several press publications (as also indicated in chapter 1) call for a Portuguese real estate or housing bubble.

The objective of this chapter is to answer two important questions: i) have Portuguese house prices deviated from their fundamental determinants? and ii) do local level prices (by district and civil parish) present bubble-like developments and are they contagious? These two questions are related in the sense that housing markets are driven by local determinants. Therefore, a detailed local level analysis may provide insights on the origins of a nationwide bubble and whether bubbles migrate.

This chapter contributes to existing literature in several aspects. Firstly, we use quantile regressions to assess whether a possible divergence between house prices and their fundamentals has occurred in Portugal, and if current exuberance is found as house price growth persists. Secondly, using local level price data for 18 Portuguese districts (and corresponding civil parishes), recursively estimated right tailed Dickey-Fuller tests are used to detect exuberant behaviour and analyse whether the evidence reflects the aggregate picture of house price exuberance. Thirdly, possible contagion effects of local level bubbles in Portugal are examined. Based on a time varying contagion coefficient, proposed by Greenaway-Mcgrevy and Phillips (2016), we provide evidence on whether the exuberant behaviour observed in Lisbon and Porto has been contagious to their surrounding areas. Evidence suggests that the contagion effect from the municipality of Lisbon was stronger in its surrounding civil parishes comparatively to Porto.

The remainder of this chapter is structured as follows: Section 2 briefly reviews related literature on housing bubbles and bubble contagion;

Section 3 analyses the Portuguese housing market dynamics, and provides results and discussion; Section 4 presents additional reasons for bubbles; and Section 5 concludes.

2.2. Definition of housing bubbles and contagion

The literature on housing bubbles is extensive. In the following section we focus mainly on rational bubbles in housing and on contagion. Works that incorporate plausible special features of the housing market will not be discussed in detail (see e.g., Head, Lloyd-Ellis and Sun, 2013 for a search model, Mian and Sufi, 2009, Stein, 1995, Glaeser and Nathanson, 2014, for the role of easy credit, and Poterba, 1984, Glaeser et al., 2008, for the role of housing supply and construction costs). Neither of the models, which are presented in detail, depart from the assumption of rationality (see e.g. Case and Shiller, 2003, for evidence of optimistic expectations, and Piazzesi and Schneider, 2009, and Guren, 2014, for models with limited rationality). For studies explicitly examining the Portuguese housing market and its drivers after 2007, see, for instance, Lourenço and Rodrigues (2017) and Hill, Lourenço and Rodrigues (2020).

2.2.1. Rational house price bubbles

Following Cuthbertson (1996), we consider a model with risk neutral and homogeneous agents, rational expectations, informational efficiency (no information asymmetries) and a constant real return rate, $E_t R_{t+i} = r$. In this model, the price of a house is provided by the Euler equation

$$P_t = \delta(E_t P_{t+1} + E_t D_{t+1}) \quad (1)$$

where $\delta = 1/(1 + r)$, E_t is the expectations operator, P_t is the house price in period t and D_t is the rent generated by the house in period t.

Under the rational expectations' assumption, (1) can be solved by forward substitution,

$$P_t = P_t^f = \sum_{i=1}^{\infty} \delta^i E_t D_{t+i} \quad (2)$$

Assuming that the transversality condition holds, i.e.,

$$\lim_{i \to \infty} \delta^i E_t D_{t+i} = 0,$$

a unique solution and therefore a unique fundamental house price, P_t^f, can be found.

In their essence, user cost models (such as Poterba, 1984, 1992 or Glaeser and Shapiro, 2002) are similar to (2) with D_t generally denoting the benefits of owning a house (Glaeser and Nathanson, 2014). In other words, D_t is usually associated with rental income (Himmelberg, Mayer and Sinai, 2005) or with the benefits of living in a particular area, such as income possibilities and amenities (Glaeser, Gyourko and Morales and Nathanson, 2014, Head, Lloyd-Ellis and Sun, 2014).

The mathematical foundation of an asset price bubble is that there is another solution to (1) which, apart from the fundamental value, P_t^f, contains a bubble term, B_t, such that

$$P_t = \sum_{i=1}^{\infty} \delta^i E_t D_{t+i} + B_t = P_t^f + B_t \quad (3)$$

The properties of B_t can be restricted to $E_t B_{t+m} = B_t / \delta^m$ (see Cuthbertson, 1996, for an intuitive demonstration). This restricts the bubble behaviour over time to a martingale, meaning that the existence of such a term in the house price equation still satisfies the efficient market

hypothesis. For $B_t \neq 0$ the Euler equation is satisfied but the transversality condition is not because the bubble term is arbitrary.

The rational bubble model just described can be extended to allow for strictly positive bubbles, which collapse almost surely in finite time (see, among others, Blanchard, 1979, Evans, 1991, Diba and Grossman, 1988, Taylor and Peel, 1998, and Hall et al. 1999). Froot and Obstfeld (1991) suggest a different formulation of bubble, one in which the bubble is tied to the level of dividends, known as intrinsic bubble. Sola and Driffill (1994) extend Froot and Obstfeld's formulation by allowing for regime switching fundamentals. For further results on regime dependent models see, inter alia, Hall et al. (1999), Funke et al. (1994), van Norden and Vigfusson (1998), Psaradakis et al. (2001) and Nneji, Brooks and Ward, (2013).[2]

2.2.2. House price bubble contagion

Looking at contagion one may loosely formulate the phenomenon as a bubble migrating from one market to another (Gomez-Gonzalez et al. 2017, and Deng et al. 2017). Teng, Chang and Chen (2017) employ a state space model on data from the Taipei city centre and suburbs finding a diffusion of bubble prices from the centre to suburbs. After diffusion, bubbles in suburbs are found to be larger than in the centre. DeFusco et al. (2012) find that contagion in the US market played a role during the years before 2007, while not finding evidence for contagion after 2007.

Martinez-Garcia and Grossmann (2018) analyse how risk-spread shocks can cause exuberance in house prices even in the absence of a bubble term in the house price equation. In their framework, the channel through which shocks to financial markets are spilled over to the housing market corresponds to a time varying discount factor in (3). Using logit and probit models provides evidence that financial market spill overs can cause explosive behaviour in house prices. This contrasts with purely speculative rational bubbles and confirms the implications of their stylized model.

Greenaway-Mcgrevy and Phillips (2016) analyse contagious behaviour between national housing markets in New Zealand's metropolitan areas. To examine the timing of bubble behaviour in metropolitan areas they use a time varying contagion coefficient. The authors find evidence for Auckland city centre leading the bubble phase and being contagious for its metropolitan area, as well as for further metropolitan areas in the country. Hu and Oxley (2018) used the contagion coefficient to provide evidence that in Japan, the 1980–1990 asset bubble migrated to the housing market. Deng et al. (2017) conclude that the house price bubble in China migrated to the housing market between 2005 and 2010. Gomez-Gonzalez et al. (2017) used the Greenaway-Mcgrevy and Phillips (2016) contagion coefficient considering 20 OECD countries and found evidence of contagion of the US bubble in a range of countries, although they did not find evidence of contagion from the UK bubble.

2.3. The dynamics of the Portuguese housing market

2.3.1. Dynamics of house price determinants

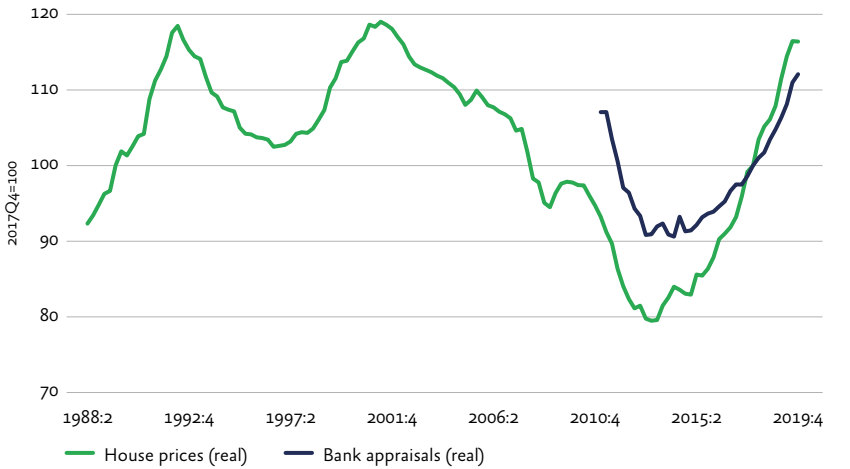
Before analysing the empirical results for Portugal, we first provide a general characterization of the housing market in Portugal. In the two decades preceding the year of 2007, house prices in Portugal grew

on average less than one per cent per year, in real terms, increasing one per cent since the crisis and up to 2019 (see figure 13). They did however mask a highly differentiated evolution over the last decade, with house prices declining four per cent between 2008 and 2013, and accelerating more than six per cent over the past five years. Looking at house prices measured in terms of bank appraisals rather than transactions, and despite the cautiousness of banks in the period following the crisis, which probably moderated the upward price trend in recent years, the conclusions are similar. Figure 14 indicates that the number and value of residential dwelling transactions has increased since 2014, particularly for existing dwellings, which represented 85 per cent of the total amount at the end of 2019. The average sale value of a dwelling increased over the last decade and is higher for new dwellings, especially in the metropolitan area of Lisbon (see figures 15 and 16). The metropolitan area of Porto currently represents 16 per cent of total transactions, while the metropolitan area of Lisbon corresponds to 35 per cent as illustrated in figure 17.

Analysing real residential GFCF, we see that the downward trend initiated in the late 1990s proceeded between 2007 and 2013. This class of investment contracted on average 12 per cent per year compared to the one per cent average fall in GDP per year. Figure 18 shows that since 2014 there has been an improvement in GDP and residential GFCF, the latter increasing almost five per cent yearly on average. As to the conditions of the labour market, we observe in figure 18 that after the crisis unemployment rate rose, reaching a peak in 2013, and that there was a significant decline in the labour force, probably as a consequence of increased emigration flows and ageing of the population.

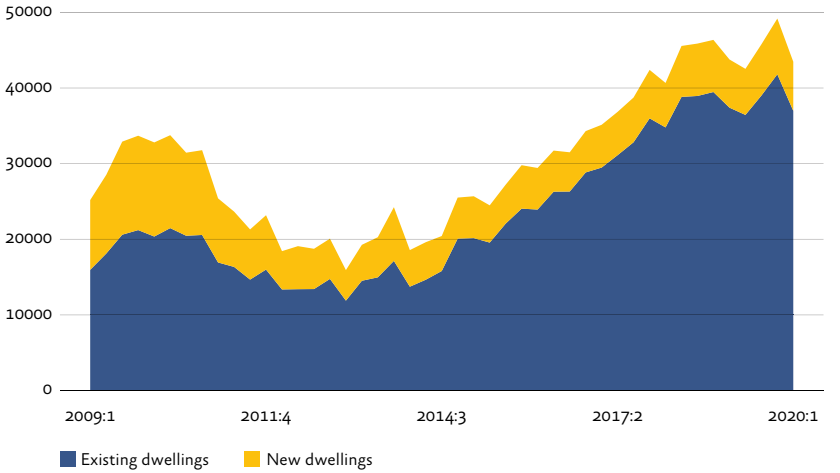
Given its relevance for the housing sector and the impact it may have on the cost of financing it is also important to analyse credit in detail. Figure 19, on bank lending, indicates the existence of episodes of very high growth in loans for house purchases between the mid-1990s and 2007. This annual growth was about 15 per cent on average in Portugal, in the context of declining costs of bank loans and high and sustained growth in household disposable income, which in which triggered an increase in household indebtedness. The significant deceleration of housing credit from 2010 onwards should be seen in the context of the international financial crisis, which had a negative impact on supply due to a significant tightening in lending conditions and housing credit demand.

Figure 13 House prices and bank appraisals in Portugal



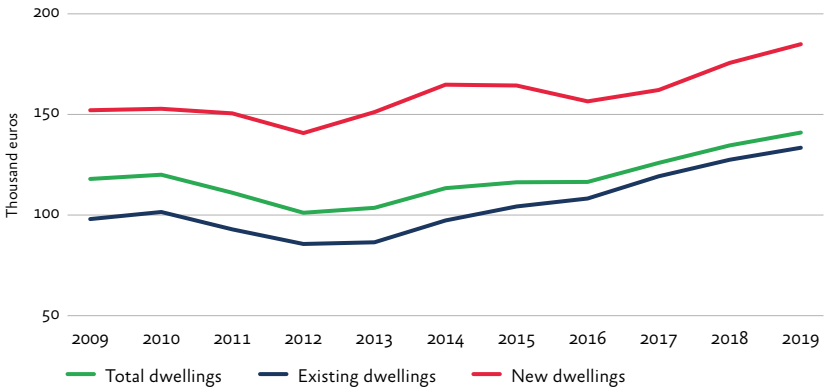
Note: Bank evaluations as average values in €/m². House prices based on transactions.
Sources: Statistics Portugal, Banco de Portugal, *Confidencial Imobiliário* and authors' calculations.

Figure 14 Number of residential dwelling transactions in Portugal



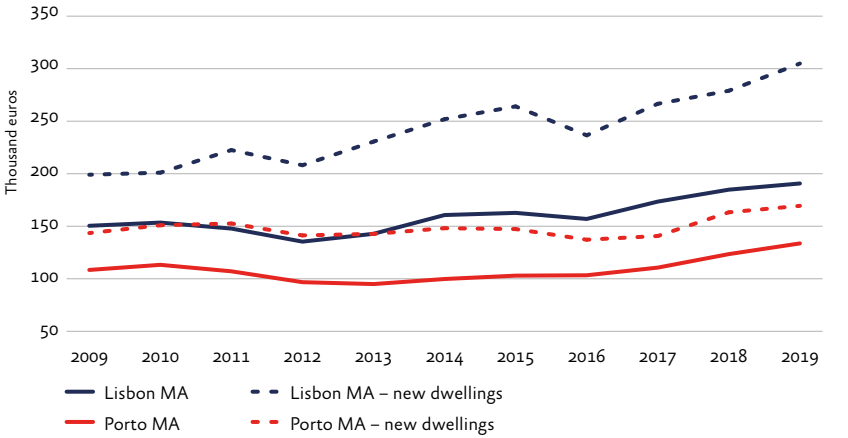
Source: Statistics Portugal and authors' calculations.

Figure 15 Average value of a residential dwelling in Portugal



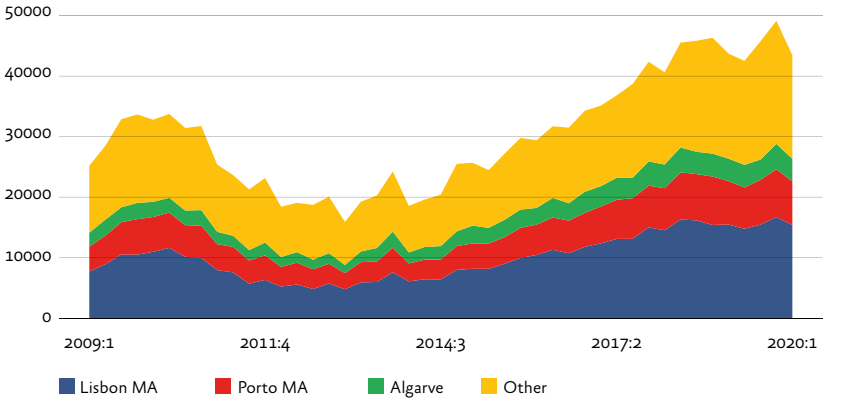
Note: Average transaction value (in thousand euros). Yearly averages.
Source: Statistics Portugal and authors' calculations.

Figure 16 Average value of a residential dwelling in Lisbon and Porto



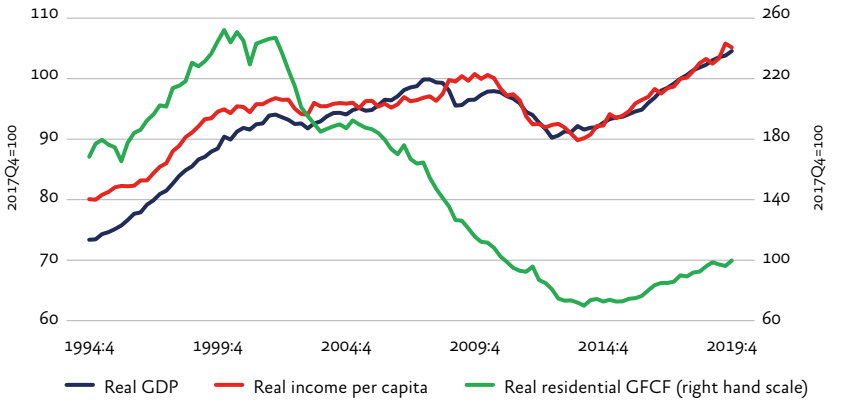
Note: Average transaction value (in thousand euros). Yearly averages.
Source: Statistics Portugal and authors' calculations.

Figure 17 Number of total residential dwellings transactions by region



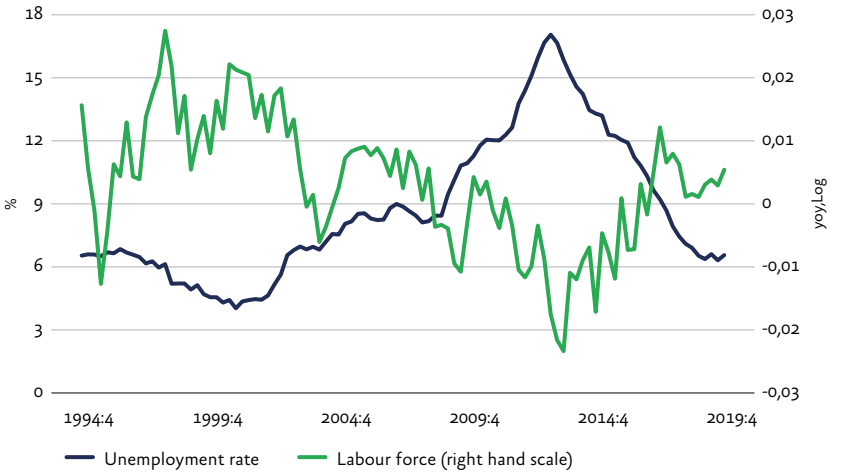
Note: Other regions include Madeira, Azores, Alentejo, Centre and North of Portugal, excluding the Porto area. MA refers to Metropolitan Area.
Source: Statistics Portugal and authors' calculations.

Figure 18 Economic activity



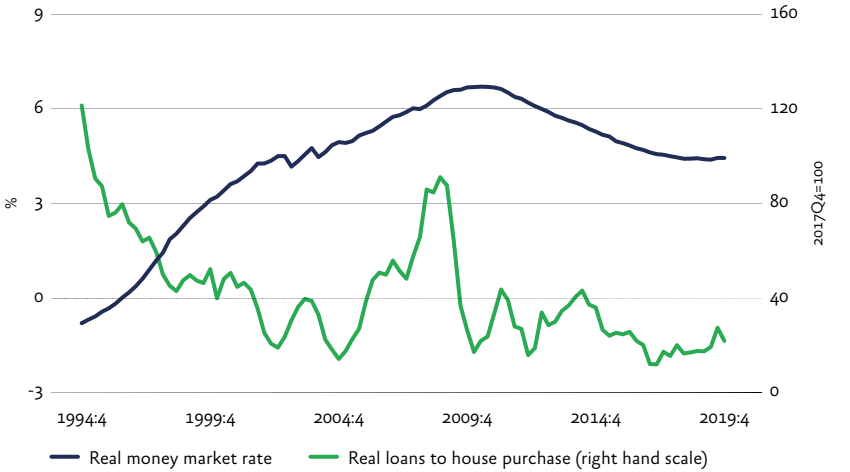
Sources: Statistics Portugal, *Banco de Portugal* and OECD.

Figure 19 Labour market



Sources: Statistics Portugal, *Banco de Portugal* and OECD.

Figure 20 Credit market



Sources: ECB, Statistics Portugal and Banco de Portugal.

2.3.2. House price exuberance in Portugal

Ordinary least squares (OLS) regressions are typically used to estimate the conditional mean of a variable. Quantile regressions (QR) on the other hand are used to estimate the conditional quantiles of the variable of interest. QR, first developed by Koenker and Bassett (1978), capture different impacts of predictors depending on the point in the distribution of the dependent variable.

The framework to describe asset price exuberance based on QR was suggested by Machado and Sousa (2006), who analysed stock price developments conditional on a set of macroeconomic variables. Gerdesmeier, Lenarčič and Roffia (2012) and Lourenço and Rodrigues (2015) apply the method to house prices in OECD countries. In the

QR framework, exuberant behaviour is evident when the observed asset price exceeds the upper tail of the modelled distribution of the predicted asset price, conditional on a set of regressors (Machado and Sousa, 2006). The measure for extraordinary high prices should be conditional on the macroeconomic environment, instead of the past behaviour of house prices. Gerdesmeier, Lenarčič and Roffia (2012) indicate that boom (exuberance) and bust phases in particular are known to be non-linear, which can be captured by the QR framework.

In practice, one might estimate QR at the median, a high quantile and a low quantile of house prices conditional on relevant covariates. The high and low QR predictions can be interpreted as an upper and lower bound, determining the tails of the conditional distribution of house prices. When the observed house price moves into these tails, it either signals exuberant behaviour or undervaluation, conditional on the selected macroeconomic drivers.

There is a vast number of studies that analyse the determinants of house prices. The findings in the literature indicate that models which explain changes in house prices in the long run include a wide set of fundamentals such as income, population, employment, borrowing costs and returns on alternative assets on the demand side, and the availability and cost of land, as well as the cost of construction and investments in quality improvement for existing housing on the supply side (Poterba, 1991, Englund and Inoannides 1997, Tsatsaronis and Zhu, 2004, Glaeser, Gyourko and Saiz, 2008).

For Portuguese house prices at the aggregate level, and given the length of the sample and available data, we consider disposable income per capita as a main driver of housing demand. If income rises, housing becomes more affordable and thus, demand for housing will rise, pushing prices upwards. The second variable included is the three-month money market rate, which captures the effects of credit availability to finance housing (by affecting the mortgage rate for dwellings and borrowing rates for institutional real estate investors). Higher interest rates are expected to drive borrowing costs up and demand down, leading to a subsequent fall in house prices, and make alternative applications of wealth more interesting. To capture demographic effects that influence housing demand, the labour force is included as well.

As we are looking at long run relationships, the supply of housing is proxied through Residential GFCF. This variable captures investment in housing, providing a good proxy for changes in housing supply. Thus, when residential GFCF rises, the supply of housing rises, putting downward pressure on house prices.

The house prices considered correspond to hedonic price data of newly built and existing dwellings purchased in the residential market in Portugal (adjusted for quality measures of housing: square metre price, size of dwelling and location of dwelling). The aggregate house price index is obtained from Statistics Portugal as from 2009 onwards, and before that from *Confidencial Imobiliário* (a private and independent databank that publishes statistical data based on real transaction prices). The empirical analysis spans from 1988:Q1–2019:Q3.

The model we consider is

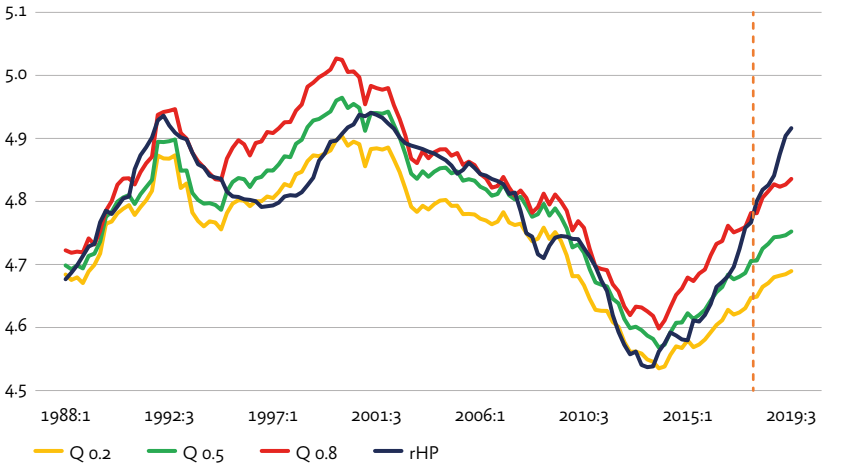
$$rHP_t(\tau \mid F_{t-1}) = \alpha_0(\tau) + \alpha_1(\tau) rdic_t + \alpha_2(\tau) rmmi_t + \alpha_3(\tau) rgfcf_t + \alpha_4(\tau) labour_t \quad (4)$$

where rHP_t is the natural logarithm of the real house price index in period t; $rdic_t$ is the natural logarithm of real disposable income per capita in period t; $rmmi_t$ corresponds to the real 3 month money market rate in period t; $gfcf_t$ is the natural logarithm of residential GFCF in period t; $labour_t$ is the natural logarithm of the labour force in period t, and τ is the quantile at which the model is estimated.

As the variables used in (4) are nonstationary (confirmed by unit root tests), quantile cointegration needs to be tested for. Following Xiao (2009), quantile cointegration testing is performed using a CUSUM test on the residuals of (4). Based on the results of this test the null hypothesis of cointegration cannot be rejected (1.7470 for τ = 0.2, 0.5950 for τ = 0.5, 1.6380 for τ = 0.8 the choice of these quantiles is driven by the sample size as these CUSUM type tests in small samples can become too sensitive when more extreme quantiles are considered).[3] Thus, (4) can be seen as a quantile specific long-run equilibrium.

Figure 21 displays the model's estimation results, plotting the predicted 0.2, 0.5 and 0.8 quantiles and the natural logarithm of the observed real house price index over time (the 0.2 and 0.8 quantiles are chosen as limits due to the length of the series). One can see that the estimated quantiles explain a lot of the variation in real house prices as these evolve between the estimated 0.2 and 0.8 quantiles for most of the series. However, towards the end of the series, from around 2016:Q2 onwards, house prices grew faster than the estimated conditional quantiles.

Figure 21 House prices and estimated fundamental quantiles



Note: Y Axis denotes natural logarithm of real house prices: predicted quantiles and observed house prices are plotted, yellow is the 0.2 quantile, green is the median, red is the 0.8 quantile, black is the observed series.
Sources: OECD, ECB, *Banco de Portugal* and authors' calculations.

The persistence in faster growth leads the observed house prices to move further into the upper tail of the estimated distribution. In 2017:Q4 house prices crossed the 0.8 quantile, marked by the dashed orange line. Given this threshold, house prices are considered exuberant from 2017:Q4. Remember this result is conditional on the chosen macroeconomic fundamentals. Different model specifications were examined (including GDP per capita, unemployment, mortgage rate, and real rents), and the result of house prices becoming exuberant towards the end of the series is robust. Still, factors that might drive house prices above the fundamental benchmark determined by macroeconomic variables remain (such as investment in tourism dwellings, foreign direct investment, regulations and other observed or unobserved economic variables; see discussion in Section 4).

2.3.3. Local level house price exuberance in Portugal

The analysis in the previous section has focused on the aggregate real house price index for Portugal, in this section we perform a more detailed analysis based on data by district and civil parish. This is of importance, since housing markets are known to be highly affected by local level variables. The price of housing in Lisbon is likely to move differently from the price of housing in Leiria. Thus, detecting exuberant behaviour when treating Portugal as one housing market may not be sufficiently informative, hence, local differences are interesting to explore.

To capture these differences, we use local level data obtained from *Confidencial Imobiliário*, regarding the 18 Portuguese districts and the 278 Portuguese civil parishes, from 1988:Q1 to 2020:Q1. Due to the lack of time series for determinants at the local level, we apply the univariate GSADF test to detect exuberant behaviour. This test is consistent with the rational bubble concept briefly described in section 2.1, as the martingale characteristics of asset price bubbles are captured. A drawback, when using the univariate approach is that explosive behaviour in the series can be caused by explosiveness in the underlying determinants. When considering a model of rational asset price bubbles with a constant discount factor, the determinant is the expected rental income. Sustained explosive growth in expected rental income would mean periods of consecutive good news, providing information which is better than that of the previous news, which might lack credibility (Greenaway-Mcgrevy and Phillips, 2016). The test is conservative in the sense that a prolonged but not explosive growth of prices will not qualify as a bubble.

More specifically, the aim of the GSADF is to test episodes of mildly explosive behaviour based on recursively estimated right tailed Augmented Dickey Fuller (ADF) tests. The null hypothesis of a unit root versus the alternative hypothesis of a mildly explosive root is tested with the following recursive regression:

$$\Delta y_t = a_{r_1,r_2} + \beta_{r_1,r_2} y_{t-1} + \sum_{j=1}^{k} \psi^j_{r_1,r_2} \Delta y_{t-j} + \epsilon_t, \quad (5).$$

where y_t is the time series of interest, Δ is the first difference operator, a_{r_1,r_2} is the intercept, β_{r_1,r_2} is the autoregressive coefficient of interest (H_0: $\beta_{r_1,r_2} = 0$), $\psi^j_{r_1,r_2}$, $j = 1, \ldots, k$, are the coefficients of the lagged first differences, Δy_{t-j}, and $\epsilon_t \sim i.i.d.(0,\sigma^2_{r_1,r_2})$. The subscripts r_1, r_2, such that $0 \leq r_1 < r_2 \leq 1$, are the subsample start and end points, respectively, for which the regression is estimated, i.e., $\lfloor r_1 T \rfloor + 1, \ldots, \lfloor r_2 T \rfloor$.

Using $r_1 = 0$ and $r_2 = 1$ provides the right tailed ADF test on the full sample. However, since the power of the right tailed ADF to detect bubbles on the full sample is harmed by collapsing bubbles, it may not detect the bubble even though bubble behaviour is present in one or more subsamples of the time series. Addressing this issue, Phillips, Wu and Yu (2011) use the recursive estimation of the ADF test, beginning with the smallest feasible window, starting from $r_1 = 0$. Keeping the starting point fixed, the ADF is performed with r_2, increasing one observation at a time until $r_2 = 1$. Phillips, Wu and Yu (2011) then compute the test statistic as the supremum of the set of ADF test statistics (SADF) obtained by recursive estimation. However, Phillips, Shi and Yu (2015a, 2015b) show that the SADF is less powerful in case of multiple periodically collapsing bubbles and introduce the General SADF (GSADF). The test uses an expanding window structure, which

is similar to that of the SADF, but allows r_1 to be flexible. This leads to a set of ADF tests for all feasible subsamples.[4]

The GSADF test was performed with an initial window of 16 quarters (4 years) and using four lags, supported by the Bayesian Information Criterion. Critical values are derived by Monte Carlo simulation using 5000 replications. The test results for the districts are reported in table 5.

Table 5 GSADF test results for Portugal's 18 districts

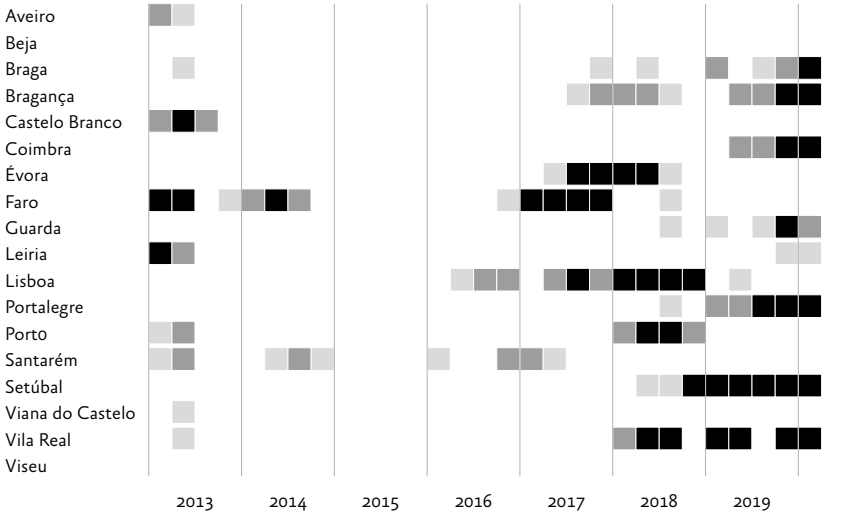
Aveiro	3.4167***	**Leiria**	2.7588***
Beja	3.5416***	**Lisboa**	2.6555***
Braga	2.2654***	**Portalegre**	2.7131***
Bragança	2.6060***	**Porto**	4.6269***
Castelo Branco	2.7939***	**Santarém**	3.2570***
Coimbra	4.5023***	**Setúbal**	6.2340***
Évora	2.2781***	**Viana do Castelo**	3.3685***
Faro	4.7140***	**Vila Real**	3.1258***
Guarda	2.3573***	**Viseu**	2.7540***

Note: *** denotes significance at the 1% level. Critical values are obtained by Monte Carlo Simulation.
Sources: Confidencial Imobiliário, Statistics Portugal and author's calculations.

We have noticed that within the period considered, 1988:Q1–2020:Q1, evidence of exuberant behaviour is found for all 18 districts under analysis. To get a more systematic picture of the occurring episodes of exuberant behaviour in recent years, figure 22 plots the timely course of exuberant episodes in the 18 districts at the usual confidence levels.[5]

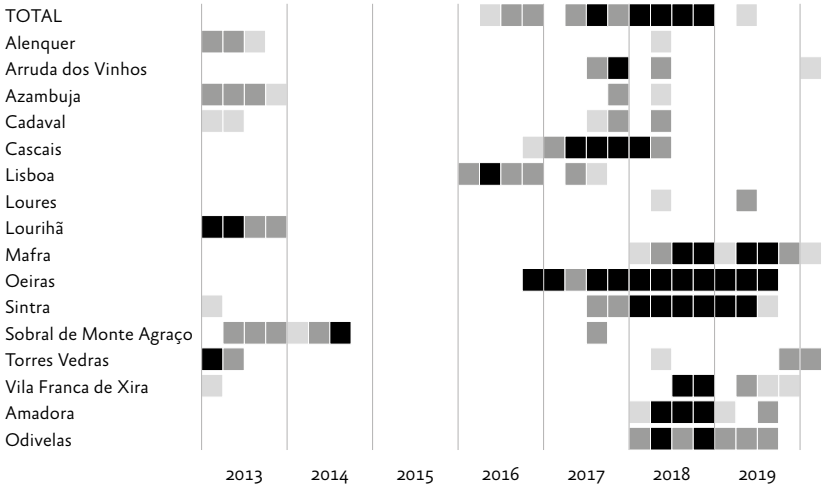
At first sight, bubble behaviour seems to be correlated across districts. Before 2016, evidence for exuberant behaviour is rather sporadic in the sample. Beginning in mid-2016, first evidence for the subsequently prolonged and widespread exuberant behaviour is recorded for Lisbon and Faro. By December 2017, exuberant behaviour is also detected in four of the 18 districts considered (Braga, Bragança, Évora and Lisbon).

Figure 22 Evidence of exuberant behaviour in Portuguese districts over time



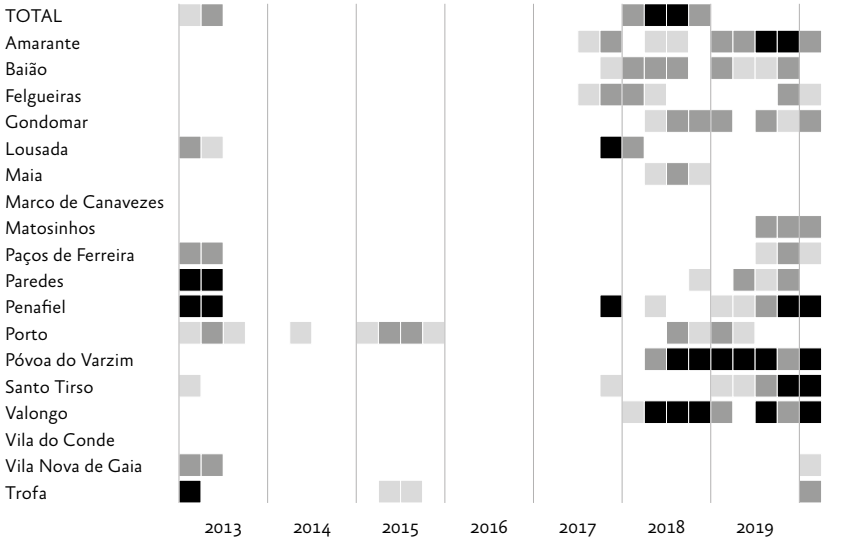
Note: Areas represent the rejection of the null of the GSADF test in favour of mildly explosive behaviour at the 10% (light grey), 5% (grey) and 1% (black) confidence levels.
Source: Confidencial Imobiliário and authors' calculations.

Figure 23 Evidence of exuberant behaviour in the Lisbon area over time



Note: Areas represent the rejection of the null of the GSADF test in favour of mildly explosive behaviour at the 10% (light grey), 5% (grey) and 1% (black) confidence level.
Source: Confidencial Imobiliário and authors' calculations.

Figure 24 Evidence of exuberant behaviour in the Porto area over time



Note: Areas represent the rejection of the null of the GSADF test in favour of mildly explosive behaviour at the 10% (light grey), 5% (grey) and 1% (black) confidence level.
Source: Confidencial Imobiliário and authors' calculations.

Figure 25 Test results for exuberant behaviour in Lisbon

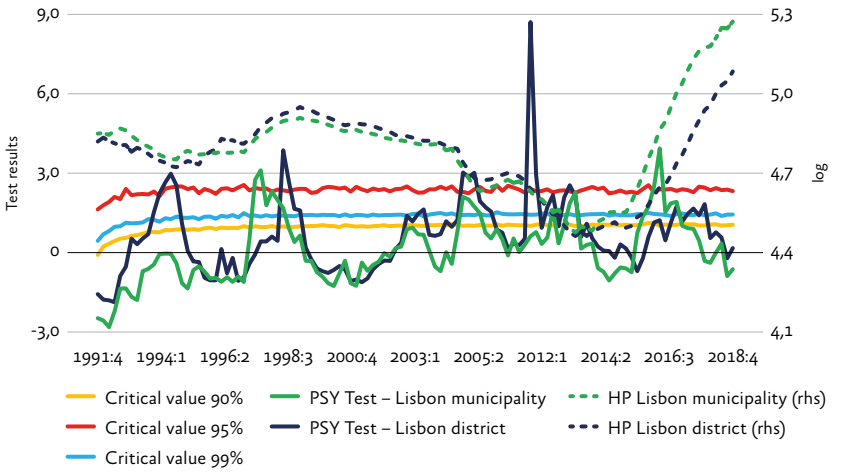
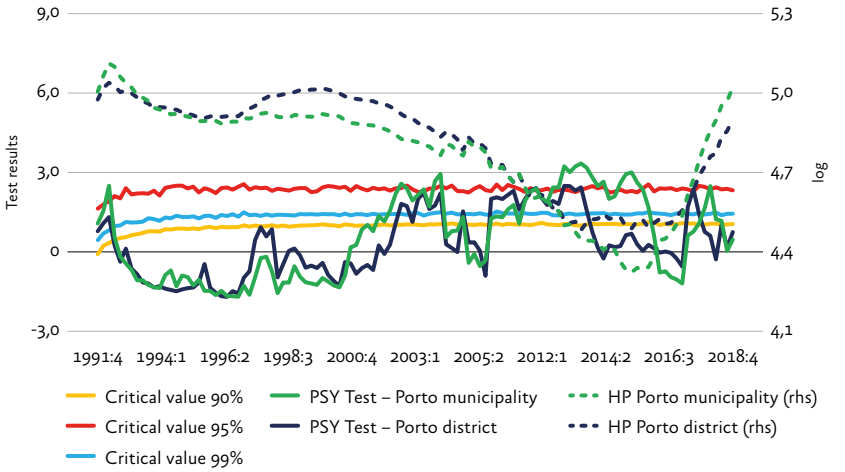


Figure 26 Test results for exuberant behaviour in Porto



These results agree with the aggregate analysis in section 3.2., in which exuberant behaviour is detected starting in 2017:Q4, represented by the dashed orange line in figure 21. Interestingly, despite Lisbon leading the exuberance cycle, exuberance in Lisbon seems to have ended in 2019:Q2. Also, the bubble in Porto is not evident towards the end of the period (2018:Q4), while there is strong evidence for exuberant behaviour in a wide range of districts.

2.3.4. Bubble contagion

The results of the previous section point towards the possibility of contagion, as bubbles are correlated and some districts/civil parishes present exuberant behaviour earlier than others. To analyse bubble contagion, the contagion coefficient proposed by Greenaway-Mcgrevy and Phillips (2016) is used and the contagion response before, during and after the exuberance periods is tracked.

As discussed in section 2.2., bubbles might be subject to contagion in the sense that a bubble in one market migrates to another. To formally describe this effect over time, Greenaway-Mcgrevy and Phillips (2016) develop a time varying contagion coefficient.

In a first step, the method estimates autoregressions similar to equation (5) with a fixed window and no augmentation, leading to sequences of autoregressive coefficients, $\{\hat{\beta}_{i,s}\}_{s=S}^{T}$, for each parish i, with S being the length of the fixed window, and s being the end of the subsample, $s = S, \ldots, T$. The autoregressive coefficients are obtained by ordinary least squares.

With the estimated sequences the following regression is estimated,

$$\hat{\beta}_{ij,s} = \delta_{1j} + \delta_{2j}\left(\frac{s}{T-S+1}\right)\hat{\beta}_{core,s-d} + \epsilon_t,\ s = S, \ldots, T \qquad (6)$$

where *j* denotes a specific civil parish and *core* denotes the potential contagion civil parish from which a bubble spreads, *d* is a lag parameter for the lagged contagion effect from *core* to *j*, and δ_{2j} is the time varying contagion coefficient. The contagion coefficient is estimated from (6) using a local level kernel regression with

$$\delta_{2j}(r; h, d) = \frac{\sum_{s=S}^{T} K_{hs}(r)\tilde{\beta}_{j,s}\tilde{\beta}_{core,s-d}}{\sum_{s=S}^{T} K_{hs}(r)\tilde{\beta}^2_{core,s-d}} \text{ and } \tilde{\beta}_{j,s} := \hat{\beta}_{j,s} - \frac{1}{T-S+1}\sum_{s=S}^{T}\hat{\beta}_{j,s}.$$

$$K_{hs}(r) = \frac{1}{h}K\left(\frac{s/T-r}{h}\right),$$

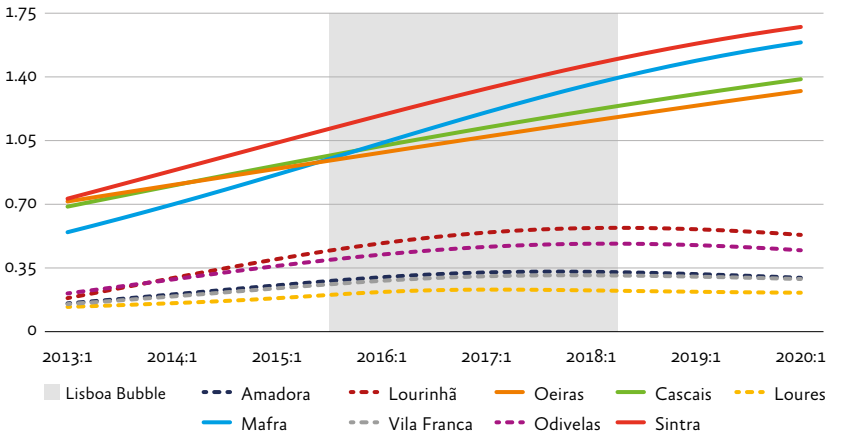
where $K(.)$ is the Gaussian Kernel, $K(.) = (2\pi)^{-1/2}e^{-1/2(.)^2}$ and *h* is the bandwidth parameter; for further details, see Greenaway-Mcgrevy and Phillips (2016).

This framework lets the contagion parameter evolve smoothly over time and one can track the change in the contagion coefficient during bubble periods. The method helps visualize the shape of the contagion impact over time in one civil parish and allows for a comparison between them.

In our analysis, Lisbon and Porto are chosen as core markets because they represent the centre of the country's two largest metropolitan areas. In Lisbon's case, the bubble also starts earlier than in any civil parish. The lag order for civil parish *j*, possibly behaving contagiously towards the core bubble, is determined by the quarters between first evidence for bubble behaviour in the core and first bubble behaviour in the tested civil parish. For Lisbon as a core market, all 15 surrounding civil parishes of the metropolitan area of Lisbon were tested for bubble contagion. Regression (5) was estimated using local level kernel regressions with local linear fitting. To estimate the autoregressive coefficients for the regression, a fixed window of 20 quarters (5 years) was used. Results are presented for selected civil parishes in figure 27.

The contagion coefficients for Sintra, Mafra, Cascais and Oeiras are positive and increase throughout the considered time period, while Sintra and Mafra present steeper slopes than Cascais and Oeiras. All four civil parishes currently present the strongest contagion coefficients within the considered period. The contagion effects from Lisbon to Lourinhã, Odivelas, Amadora, Vila Franca and Loures increase until reaching their maximum level around mid-2018, before starting to decrease. Generally, the effects on Lourinhã, Odivelas, Amadora, Vila Franca and Loures are weaker compared to Sintra, Mafra, Cascais and Oeiras.

Figure 27 Time varying contagion coefficient from the Lisbon housing market to civil parishes in geographic proximity

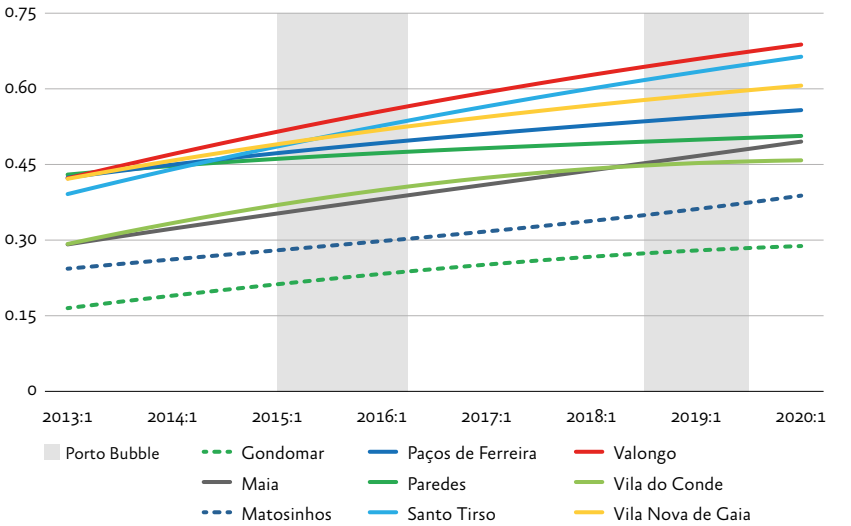


Note: The shaded area indicates the Lisbon bubble period evident in section 3.2. Lines are the plotted time varying contagion coefficients δ_{2j} for the respective civil parishes.
Source: Confidencial Imobiliário and authors' calculations

In a similar way, Porto is analysed as a core region having a contagious impact on the 17 civil parishes surrounding its metropolitan area. The results are displayed for selected civil parishes in figure 28. All contagion coefficients of the considered civil parishes are positive and present a positive slope in their contagion responses towards Porto. The contagious effect from Porto towards its surroundings is strongest in the most recent quarter.

Comparing Lisbon and Porto, one observes that contagion appears stronger in Lisbon's case than in Porto's.

Figure 28 Time varying contagion coefficient from the Porto housing market to civil parishes in geographic proximity



Note: The shaded area indicates the Porto bubble period evident in 3.2. Lines are the plotted time varying contagion coefficients δ_{2j} for the respective civil parishes.
Source: Confidencial Imobiliário and authors' calculations.

In general, the results indicate bubble contagion because responses are positive during bubble periods. Nevertheless, the results are rather descriptive, using the kernel regression specification to track how the civil parishes' autoregressive coefficients are related to the respective core market's autoregressive coefficients over time. To better explain bubble contagion and commonalities, and differences in the response functions above, further possible driver variables at the local level would need to be included.

The channels for contagion cannot be explored in detail in this work, but a narrative for the findings is still interesting to provide. The reason for contagion might be that when speculation begins in one place, say Lisbon, prices start to increase rapidly, leading first investors to search for alternatives and invest in other property markets, where they expect the next housing bubble to occur. Prices start to rise in these regions, attracting more investors and may originate bubble behaviour. Geographic proximity is an important channel, since bubble behaviour in centres is likely to push people to the suburbs, pushing prices up in those same regions. Even though bubble contagion can be described and analysed after its occurrence, a general prediction for bubble contagion patterns goes against the fundamental rule that bubbles cannot be predicted (martingale behaviour).

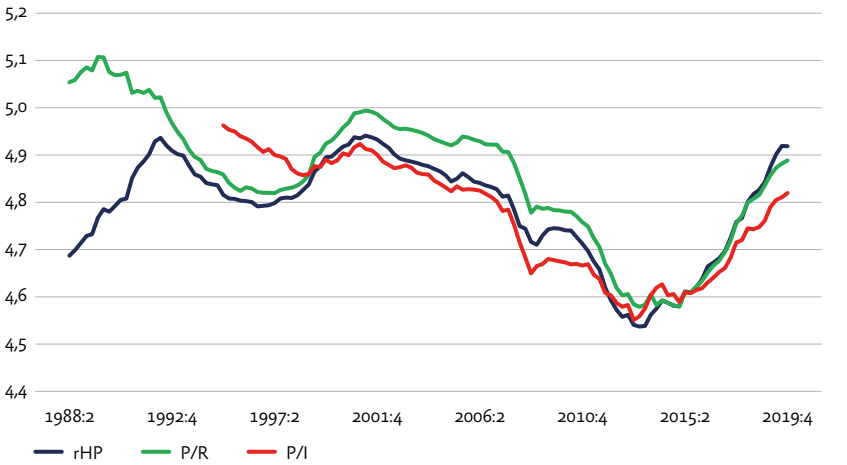
2.4. Possible additional sources of exuberant behaviour

Exuberance behaviour may not just be a consequence of speculation, but it may also be caused by other variables. In this section, we discuss different drivers for house prices, for which unfortunately we were not able to obtain sufficient data.

2.4.1. Price-to-Rent and Price-to-Income ratios

Common variables considered in the literature are income and rent, capturing affordability, the choice between renting and buying and the return on housing investment. As can be seen in figure 29, the price--to-rent and price-to-income ratios have been rising similarly to house prices from roughly 2014. Thus, at the aggregate level, it seems that a rather small part of the increase in real house prices can be explained by rising income or rising rents.

Figure 29 Real house prices, price-to-rent and price-to-income ratio for Portugal



Note: Plotted here are the natural logarithms of real house price index (rHP) and natural logarithms of Price-to-rent ratio (P/R) and Price-to-income ratio (P/I), 2015=100.
Sources: Banco de Portugal, Statistics Portugal and OECD

2.4.2. Tourism demand

Apart from the demand variables already mentioned in section 3.2, a further important driver of housing can be tourism and investment in tourism dwellings, especially in the Portuguese case. Due to online platforms fostering access to clients and management for short--term rental, housing investments to accommodate tourists became more attractive for a wider range of investors. This not only increases demand in the housing market, but also the willingness to pay from an investment point of view, since short-term letting to tourists (if the occupation rate is high enough) will lead to a substantially higher return than permanent letting to the local population. The tie between

local income and return on housing is broken in this case. The argument can be supported, to some extent, by the explosive growth in the number of firms associated to «furnished dwellings for tourists» from 2013 and 2014 onwards (see table 6). The data ends before the detected exuberance and bubble behaviour but it does give an indication of the importance of investment in tourism dwellings.

Table 6 Number of firms associated to furnished short-stay dwellings for tourists

	2009
Short-stay accommodation	2112
Furnished accomodation for tourists	340
Other short-stay accommodation	1772

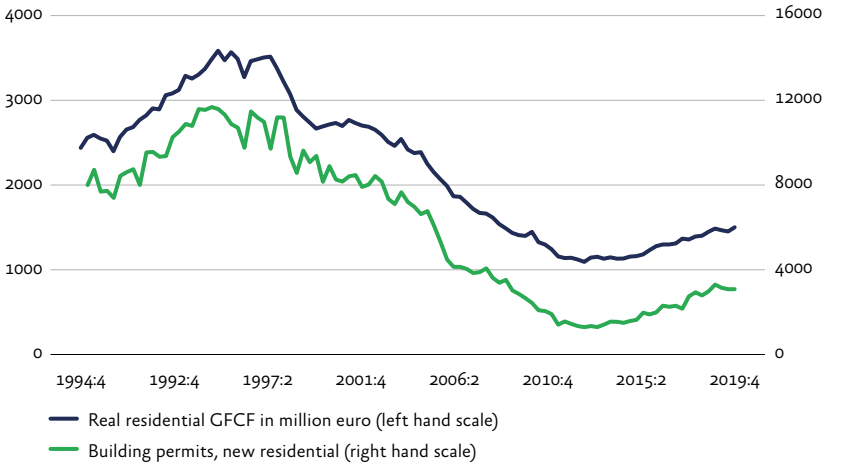
Source: IES — *Banco de Portugal*.

2.4.3. Foreign direct investment

Further arguments on drivers for house prices include foreign direct investment in housing. Following the Golden Residence Permit Programme, introduced in October 2012, foreign direct investment in housing likely accelerated. The regulation allows residence after investing more than €500.000 in property. The number of resident permits issued increased from 464 in 2013 to 1526 in 2014. In 2018, the number was 1332, and in 2019 it reached 1160 (Serviço de Estrangeiros e Fronteiras, 2020). According to Lourenço and Rodrigues (2017), the upward pressure on house prices due to foreign investment may have contributed to contain the decline in house prices following the financial crisis and until the end of 2011.

These factors present further demand for housing. Housing supply has only grown slowly from 2014 onwards after a prolonged decline, resulting in upward pressure on prices (see figure 30).

Figure 30 Housing supply



Source: *Banco de Portugal*, Statistics Portugal.

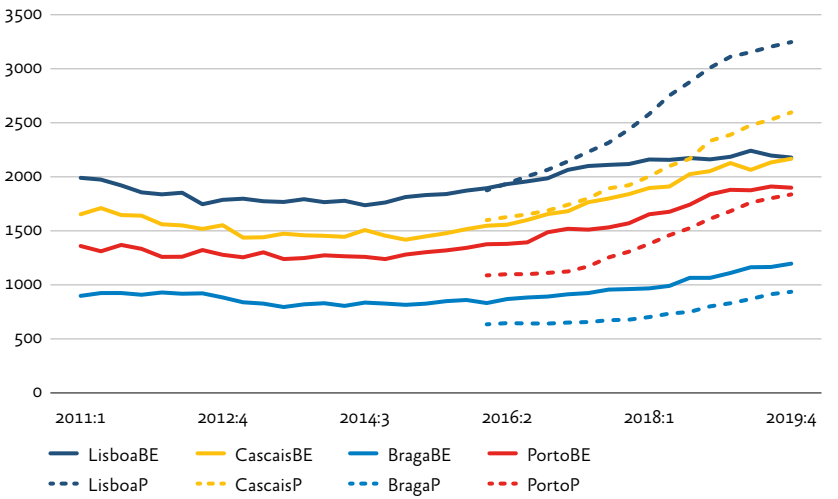
2.4.4. Bank appraisals vs market prices

It may also be interesting to have a look at the differences between bank appraisals and market prices. Appraisals provide a safety mechanism for banks, as the minimum appraisal value and purchase price is pledged as collateral. The value pledged as collateral is also used for the calculation of the Loan-to-Value (LTV), as a key metric for risk measurement in lending. In the case of bubbles, LTVs are biased downwards, skewing banks risk profiles. Nakamura (2010) argues that

appraisals are systematically upward biased (above the market price), due to a conflict of interest, as banks hire the appraiser.

Figure 31 displays average bank evaluations against median sales values for some important Portuguese housing markets. For Lisbon, average appraisals are substantially lower than median sales prices towards the end of the series. The picture for Cascais is similar but weaker. This might be explained by banks' precautionary behaviour towards the strong increase in market prices. For Braga, appraisals are above market prices throughout the series. Similarly, appraisals for Porto are higher than market prices but come closer together towards the end.

Figure 31 Bank appraisals vs. market prices



Note: Y Axis is in €/m², dashed lines are market prices (P), Median value per m2 of dwellings sales, solid lines are average values of Bank evaluations in €/m² (BE).
Source: Statistics Portugal.

Together, the presented arguments can explain at least part of the detected exuberant and bubble behaviour. Unfortunately, due to data restrictions it is not possible to quantify these impacts. Further disaggregate data would be crucial to explain local differences in exuberance behaviour. However, it is apparent that the arguments leave space for rational speculation as a possible explanation.

2.5. Conclusions

This chapter has presented an analysis of Portuguese house price behaviour. For aggregate data, we have conducted a quantile regression analysis which, conditional on the chosen macroeconomic determinants, provides evidence for exuberant behaviour starting in 2017:Q4.

For an in-depth analysis of the exuberant behaviour detected at the aggregate level, we resorted to disaggregate data from 18 Portuguese districts and 278 civil parishes. The General Supremum Augmented Dickey Fuller test, of Phillips, Shi and Yu (2015a, 2015b) was used to detect local level exuberant behaviour. Broad based exuberant behaviour is evident. Timely differences in exuberant behaviour can also be observed. Furthermore, to explore the question whether the exuberant behaviour in Lisbon and Porto was contagious for their surrounding civil parishes, we use the contagion coefficient proposed by Greenaway-Mcgrevy and Phillips (2016). The results indicate that Lisbon and Porto, although the latter to a lesser extent, seem to have had a contagious effect on surrounding housing markets.

Clearly, exuberant behaviour in prices can be caused by a range of reasons apart from speculative bubbles. Together, local and foreign investment associated to tourism dwelling, foreign direct investment

and shifts in preferences, can explain some but supposedly not all of the exuberant behaviour in the Portuguese house price market.

Future research on Portuguese local level housing markets is important to better understand the country's housing market dynamics (as they are known to be driven locally), even though data is less available than in other countries. Also, a framework to analyse channels through which bubbles can migrate is of interest to research. On a further level, it is important to research and improve techniques to detect bubbles as well as to conduct research on feasible policy responses.

References

Banco de Portugal, (2018), *Banco de Portugal*: link.

Bean, C.R., (2004), «Asset prices, financial instability, and monetary policy», *American Economic Review* 94 (2): 14–18.

Brunnermeier, M.K., (2009), *Bubbles*, Edited by Steven N. Durlauf and Laurance E. Blume, Vol. 2, London: Palgrave, Mcmillan.

Carroll, C.D., M. Otsuka, and J. Slacalek, (2011), «How large are housing and financial wealth effects? A new approach», *Journal of Money, Credit and Banking* 43: 56–79.

Case, K. and R. Shiller, (2003), «Is there a bubble in the housing market?» *Brookings Papers on Economic Activity* 34 (2): 299–362.

Cho, M. and I.F. Megbolugbe, (1996), «An empirical analysis of property appraisal», *Journal of Real Estate Economics and Finance* 13: 45–55.

Clapp, J. and D. Tiritiroglu, (1994), «Positive feedback trading and diffusion of asset price changes: evidence from housing transactions», *Journal of Economic Behavior and Organization* 24 (3): 337–355.

Cuthbertson, K., (1996), *Quantitative financial economics: stocks, bonds and foreign exchange*, New York: John Wiley and Sons.

DeFusco, A., W. Ding, F.V. Ferreira and J. Gyourko, (2013), «The role of contagion in the last american housing cycle», *Working Paper University of Pennsylvania*.

Dong, Y., E. Girardin, R. Joyeux and S. Shi, (2017), «Did bubbles migrate from the stock to the housing market in China between 2005 and 2010?» *Pacific Economic Review* 22 (3): 276–292.

Englund, P., M. Hwang and J.M. Quigley, (2002), «Hedging housing risk», *Journal of Real Estate Finance and Economics* 24 (1): 167–200.

Evans, G.W., (1991), «Pitfalls in testing for explosive bubbles in asset prices», *American Economic Review* 81 (4): 922–931.

Friedman, M., (1957), «The permanent income hypothesis», In *A theory of the consumption function*, by Milton Friedman, 20–37. Princeton University Press.

Froot, K.A. and O. Maurice, (1991), «Intrinsic bubbles: the case of stock prices», *American Economic Review* 81 (5): 1189–1214.

Gerdesmeier, D., B. Roffia and A. Llenarčič, (2012), «An alternative method for identifying booms and busts in the euro area housing market», *Working Paper 1493 European Central Bank*.

Glaeser, E.L. and C.G. Nathanson, (2015), «Housing bubbles», *Handbook of Regional and Urban Economics* 5: 701–751.

Glaeser, E.L., J. Gyourko and A. Saiz, (2008), «Housing supply and housing bubbles», *Journal of Urban Economics* Volume 64 (2): 198–217.

Glaeser, E.L., and J.M. Shapiro, (2003), «The benefits of the home mortgage interest deduction», «Tax policy and the economy» 17: 37–82.

Glaeser, E.L., J. Gyourko, E. Morales and C.G. Nathanson, (2014), «Housing dynamics: an urban approach», *Journal of Urban Economics* 81: 45–56.

Gomez-Gonzalez, J.E., J. Gamboa-Arbeláez, J. Hirs-Garzón and A. Pinchao-Rosero, (2017), «When Bubble meets bubble: contagion in OECD countries», *The Journal of Real Estate Finance and Economics* 56: 546–566.

Greenaway-McGrevy, R. and P.C.B. Phillips, (2016), «Hot property in New Zealand: empirical evidence of housing bubbles in the metropolitan centres», *New Zealand Economic Papers* 50: 88–113.

Gürkaynak, R.S. (2008), «Econometric tests of asset price bubbles: taking stock», *Journal of Economic surveys* 22 (1): 166–186.

Head, A., H. lloyd-Ellis, and H. Sun, (2014), «Search, liquidity, and the dynamics of house prices and construction», *American Economics Review* 104 (4): 1172–1210.

Himmelberg, C., C. Mayer and T. Sinai, (2005), «Assessing high house prices: bubbles, fundamentals and misperceptions», *Journal of Economic Perspectives* 19 (4): 67–92.

Homm, U. and J. Breitung, (2012), «Testing for speculative bubbles in stock markets: a comparison of alternative methods», *Journal of Financial Econometrics* 10 (1): 198–231.

Hu, Y. and L. Oxley, (2018), «Bubble contagion: evidence from Japan's asset price bubble of the 1980–90s», *Journal of the Japanese and International Economies* 50: 89–95.

Koenker, R. and G. Bassett, (1978), «Regression quantiles», *Econometrica* 46 (1): 33–50.

Lourenço, R.F., and P. M. M. Rodrigues, (2015), «House prices: bubbles, exuberance or something else? Evidence from euro area countries», *Working Papers Banco de Portugal*.

Lourenço, R.F., and P.M.M. Rodrigues, (2017), «House prices in Portugal — what happened since the crisis?», *Working Paper Banco de Portugal*.

Martínez-García, E. and V. Grossman, (2020), «Explosive dynamics in house prices? An exploration of financial market spillovers in housing markets around the world», *Journal of International Money and Finance 101*.

Mian, A. and A. Sufi, (2009), «The consequences of mortgage credit expansion: evidence from the U.S. mortgage default crisis», *The Quarterly Journal of Economics* 124 (4): 1449–1496.

Nakamura, L.I., (2010), «How much is that home really worth? Appraisal bias and house-price uncertainty», *Business Review Federal Reserve Bank of Philadelphia* 11–22.

Nneji, O., C. Brooks and C.W.R. Ward, (2013), «Intrinsic and rational speculative bubbles in the U.S. housing market: 1960–2011», *Journal of Real Estate Research* (35): 121–151.

Phillips, P.C.B., S.P. Shi and J. Yu, (2015a), «Testing for multiple bubbles: historical episodes of exuberance and collapse in the S&P 500», *International Economic Review* 1043–1078.

Phillips, P.C.B., S.P. Yu and J. Shi, (2015b), «Testing for multiple bubbles: limit theory of real-time detectors», *International Economic Review* 56 (4): 1079–1134.

Phillips, P.C. B. and T. Magdalinos, (2007), «Limit theory for moderate deviations from a unit root», *Journal of Econometrics* 136 (1): 115–130.

Phillips, P.C. B., Y. Wu, and J. Yu, (2011), «Explosive behavior in the 1990s NASDAQ: when did exuberance escalate asset values?», *International Economic Review* 52 (1): 201–226.

Piazzesi, M. and M. Schneider, (2009), «Momentum traders in the housing market: survey evidence and a search model», *American Economic Review* 99 (2): 406–411.

Poterba, J.M., (1984), «Tax subsidies to owner-occupied housing: an asset-market approach», *The Quarterly Journal of Economics* 99 (4): 729–752.

Poterba, J.M., (1992), «Taxation and housing: old questions, new answers», *American Economic Review* 82 (2): 237–242.

Serviço de Estrangeiros e Fronteiras, (2020), *Serviço de Estrangeiros e Fronteiras*: link.

Stein, J.C., (1995), «Prices and trading volume in the housing market: a model with down-payment effects», *Quarterly Journal of Economics* 110: 379–406.

Teng, H.J., C.O. Chang and M.C. Chen, (2017), «Housing bubble contagion from city», *Urban Studies* 54 (6): 1463–1481.

World Travel Awards, (2019), *World Travel Awards*: link.

Xiao, Z., (2009), «Quantile cointegrating regression», *Journal of Econometrics* 150: 248–260.

Appendix A: the general supremum augmented Dickey Fuller test (GSADF)

The GSADF test statistic is given by

$$GSADF(r_0) = \sup_{r_1 \in [0, r_2 - r_0]} \left\{ \sup_{r_2 \in [0, r_0 - r_1]} ADF_{r_1}^{r_2} \right\} \tag{B.1}$$

in which r_0 is the smallest feasible window chosen. Under the null hypothesis, the limit distribution of $GSADF(r_0)$ is

$$\sup_{r_1 \in [0, r_2 - r_0],\, r_2 \in [0, r_0 - r_1]} \left\{ \frac{\frac{1}{2} r_w \left[W(r_2)^2 - W(r_1)^2 - r_w \right] - \int_{r_1}^{r_2} W(\mathrm{r}) dr [\mathrm{W}(r_2) - \mathrm{W}(r_1)]}{r_w^{1/2} \left\{ r_w \int_{r_1}^{r_2} W(r)^2 dr - \left[\int_{r_1}^{r_2} W(r) dr \right]^2 \right\}^{1/2}} \right\} \tag{B.2}$$

where W is a standard Wiener process and $r_w = r_2 - r_1$ is the size of the window.

If $GSADF(r_0)$ is larger than the critical value from the limit distribution, the null hypothesis of a unit root is rejected against the alternative hypothesis of mildly explosive behaviour.

Appendix B: quantile cointegration test and results

To interpret (6) as a long run relationship for each quantile, after confirming nonstationarity, (6) needs to be tested for quantile cointegration. Following Xiao (2009), quantile cointegration can be tested as follows. Looking at $\psi_\tau(u) = \tau - I(u < 0)$ and the residual from the estimated quantile regression: $\varepsilon_{t\tau} = y_t - Q_{yt}(\tau | F_t) = y_t - \Theta(\tau)'Z_t = \varepsilon_t - F_\varepsilon^{-1}(\tau)$, one has $Q_{\varepsilon_{t\tau}}(\tau) = 0$, where $Q_{\varepsilon_{t\tau}}(\tau)$ is the τ-th quantile of $\varepsilon_{t\tau}$ and $E\psi_\tau(\varepsilon_{t\tau}) = 0$. Xiao (2009) proposes to test for cointegration by testing the stability of the process of $\varepsilon_{t\tau}$. Considering the partial sum process such as $Y_n(r) = \frac{1}{\omega^*_\psi \sqrt{n}} \sum_{j=1}^{[nr]} \psi_t(\varepsilon_{jt})$, where ω^{*2}_ψ denotes the long run variance of $\psi_\tau(\varepsilon_{jt})$, under appropriate assumptions, that process follows an invariance principle and weakly converges toward a standard Brownian motion $W(r)$. Choosing a continuous functional $h(.)$ measuring the fluctuation of $Y_n(r)$, allows for a robust cointegration test to be examined by use of $h(Y_n(r))$. By the continuous mapping theorem and under regularity conditions and the null hypothesis of cointegration $h(Y_n(r)) \Longrightarrow h(W(r))$. Under the alternative hypothesis, the statistic diverges to ∞.

If a quantile specific cointegrating relationship is present, the residuals of the quantile regression only present fluctuations around a long-term equilibrium, reflected by a stable process of $\varepsilon_{t\tau}$.

Table B.1 Test results of ADFGLS and Phillips-Perron

	ADFGLS test				Phillips Perron test		
Variable	**test statistic**				**test statistic**		
					Z(t)	**Z(rho)**	
rHP	-1.148				-1.301	-3.595	
rgdpc	1.209				-2.942	-5.954	
rdic	-1.181				-3.087	-6.930	
rmmi	-2.540				-2.651	-13.122	
rgfcf	-1.505				-0.523	-0.777	
labour	-0.957				-0.862	-1.463	
rmrti	-1.700				-2.327	-11.003	
rrent	0.602				-3.147	-7.723	
unemp	-2.008				-1.140	-2.564	
Confidence level	10%	5%	1%		10%	5%	1%
Critical values	-2.64	-2.93	-3.46	Z(t)	-3.14	-3.44	-4.03
				Z(rho)	-17.58	-20.80	-27.57

Note: rdic, rmmi, rgfcf, labour are defined as in 5.1. rgdpc corresponds to the logarithm of real GDP per capita, rmrti is the real mortgage rate, rrent is the logarithm of real rent index and unemp is the unemployment rate. The ADFGLS test uses the Perron-Qu method, and it is tested down from 12 lags. A trend is always included except for rHP (the asymptotic p-value of the ADFGLS without including a trend for rHP is 0.229 and the critical values for the Phillips-Perron test when not including a trend are –2.578, 2.888 and –3.501 for the 10%, 5% and 1% levels, respectively). As the null of a unit root is not rejected for all series (except for rrent at the 10% level using Phillips-Perron Z(t)), the series are nonstationary and qualify for testing quantile cointegration.
Sources: OECD, ECB, *Banco de Portugal* and authors' calculations.

Chapter 3
Synchronism in Portuguese housing

Vera Gouveia Barros, Luís Aguiar-Conraria, Maria Joana Soares

3.1. Introduction

In recent years, especially after the financial crisis, several advanced economies saw their house prices increasing (IMF, 2018). According to OECD (2019), the gap between house prices and consumer price index inflation widened in the early 2000s, lessened during the global financial crises, and then broadened after that. On average, house prices have grown twice as fast as inflation in the last two decades; and have also grown more quickly than median incomes.

In this chapter, we are concerned with the dynamics of housing prices in Portugal. To be more precise, we first study the housing price synchronisation between Portugal and other countries, and detect which international markets are more interconnected with the Portuguese market. Second, we perform a similar analysis between Portuguese cities. We will rely on wavelet analysis, which will allow us to examine the evolution and find relationships at different frequencies.

Housing has some peculiar characteristics, such as its durability. A house satisfies the basic need for shelter, security, personal space, and privacy, but being a durable good, it is also an instrument of wealth accumulation, long-term investment, and collateral for lending. Correspondingly, there are two housing markets with blurred boundaries: one for the investment good (housing stock) and the other for the consumer good (housing services) (Arnott, 1987; Coakley, 1994; Fallis, 1985; Maclennan, 1979; Meen, 1996; Smith et al., 1988). Therefore, housing demand depends on permanent income, wealth, credit constraints, portfolio decisions, and financial-market dynamics. Thus, expectations about future price movements, risk diversification, and return rates on alternative investments are important (Adair et al., 1999; Coakley, 1994; Fallis, 1985; Whitehead, 1999; Yang et al., 2018).

Between 1950 and 2015, housing assets in several advanced economies displayed an average annual real return similar to that of equity investments, between 5 percent and 8 percent, but with a lower standard deviation (IMF, 2018; Jordà et al., 2017, 2019). Consequently, real estate has become more significant as store-of-value and housing-based wealth achieved records (Fernandez and Aalbers, 2016).

Another notable feature of housing is its spatial fixity. Gotham (2009) defines spatial fixity as «a condition of non-exchangeability,

non-transferability, immobility, illiquidity and long turnover times between buying and selling», which is why we traditionally look at housing markets as local markets (Aalbers, 2016; Bardhan and Kroll, 2007; Case et al., 2000; de Bandt et al., 2010; Ley, 2015; Pow, 2017; Vansteenkiste and Hiebert, 2011). However, real estate knows geographic substitutability as an asset for investment and, actually, the housing market has increasingly become an international market (Büdenbender and Golubchikov, 2017; Clerc, 2019; Fields, 2015; IMF, 2018; Ley, 2015; Pow, 2017; Rogers and Koh, 2017; Ronald and Dewilde, 2017).

The existence of global investors in housing markets is associated with increased housing price synchronisation, especially at the city level. Studying price synchronisation between different housing markets is, therefore, a very relevant matter. It suggests that global investors and global financial conditions may influence local housing price dynamics, which has implications for the effectiveness of a range of policy tools to address imbalances in the housing market, namely affordability problems (Alter et al., 2018; Duca, 2020; Hoesli, 2020; IMF, 2018; Katagiri, 2018).

3.2. Literature review

As an autonomous and separate area of study, housing economics progressed in the 1970s and has grown significantly since then and covered a wide range of topics (Arnott, 1987; Maclennan, 1979; O'sullivan and Gibb, 2003; Smith et al., 1988).

In the vast majority of OECD countries, house prices increased sharply between the mid-1990s and the early 2000s (Girouard et al., 2006; Igan and Loungani, 2012; Miles, 2017). In the United States, they started falling in 2006, causing the 2008 subprime mortgage crisis, which evolved into a global economic crisis and caused a worldwide collapse of housing prices (Flor and Klarl, 2017; Hirata et al., 2012; Kuang and Wang, 2018; Muellbauer and Murphy, 2008; Ryczkowski, 2019). In recent years, housing has experienced a rise in its price throughout many countries. These developments have generated a research agenda on the co-movement of housing prices across countries or cities (Beltratti and Morana, 2010; Gupta et al., 2015; Hoesli, 2020; IMF, 2018, 2019; Miles, 2017).

Demand and supply determine housing prices. Therefore, in the long run, housing prices should reflect market fundamentals. Several studies relate housing prices to household (permanent) income and wealth, mortgage interest rates, financial conditions, leverage, costs of land acquisition and construction, tax and other policies, and structural factors as demographics or urbanization (Duca, 2020; Geng, 2018; Girouard et al., 2006; Gupta et al., 2015; Igan and Loungani, 2012; IMF, 2018, 2019; Kishor and Marfatia, 2017; Marfatia, 2018). Housing price synchronisation may, therefore be the result of the co-movement in economic fundamentals, with either real macroeconomic or financial variables, across countries and regions (de Bandt et al., 2010; Duca, 2020; IMF, 2018; Miles, 2017; Terrones and Otrok, 2004; Vansteenkiste and Hiebert, 2011).

In industrial countries, real housing prices are procyclical; reflecting household's disposable income and employment prospects, they rise in a boom and fall in a recession (Davis and Nieuwerburgh, 2015; Hwang and Quigley, 2006; IMF, 2018; Leung, 2004; Terrones and Otrok, 2004). Between 1970 and 2000, for the OECD as a whole, business-cycle and house-price turning points have roughly coincided (Girouard et al.,

2006). Some authors have documented an increase in business cycle synchronisation (Aguiar-Conraria et al., 2017; Aguiar-Conraria and Soares, 2011b; Belke et al., 2017; Bordo and Helbling, 2003; Fidrmuc et al., 2012; Kose et al., 2008, 2012).

User cost of capital is another driver of demand and higher housing prices. We usually define the real user cost of capital as the after--tax mortgage nominal interest rate plus property taxes, insurance costs, and physical depreciation minus expected house price appreciation (Duca, 2020; Duca et al., 2011; Meen, 1990, 1996; Muellbauer and Murphy, 2008; Poterba, 1984). Investors' projections concerning house price appreciation in one country may be revised given expectations regarding other countries' house prices, so synchronicity may be a consequence of harmonized prospects in the development of housing markets across several countries (Beltratti and Morana, 2010; de Bandt et al., 2010; IMF, 2018; Vansteenkiste and Hiebert, 2011).

On the other hand, co-movement in housing prices may also be the result of simultaneous changes in financial factors: global financial conditions, portfolio channels, and expectations contribute to housing price synchronisation (Alter et al., 2018; Claessens et al., 2011; Helbling and Terrones, 2003; IMF, 2018; Terrones and Otrok, 2004). Financial conditions refer to the costs, conditions, and availability of funds to the economy (IMF, 2017). They are an influential variable on housing prices (Agnello and Schuknecht, 2011; Baffoe-Bonnie, 1998; Cesa-Bianchi et al., 2015; Englund and Ioannides, 1997; Favara and Imbs, 2015). According to Del Negro et al. (2019), trends in real interest rates across advanced economies have converged over the past three decades, and country-specific trends have all but vanished since the 1970s. Other several studies have shown that different channels transmit financial conditions across various countries, so that global factors significantly explain them (Baskaya et al., 2017; Bruno and Shin, 2013, 2015a, 2015b; Caceres et al., 2016; Calvo et al., 1996; IMF, 2016; Miranda-Agrippino and Rey, 2020; Rey, 2015).

Furthermore, for some housing markets, cross-border transactions appear to explain housing price synchronisation (Alter et al., 2018; Badarinza and Ramadorai, 2018; Duca, 2020; Hekwolter of Hekhuis et al., 2017; IMF, 2018; Katagiri, 2018). Despite this conceptual framework, housing price synchronisation, which refers to the more significant correlation or co-movement of house prices across geographic entities, is mainly an empirical question. It is the first step to assess the degree of synchronisation (Gupta et al., 2015; Hoesli, 2020).

The co-movement of housing prices has been investigated at a regional level, for which there is established empirical literature, concentrated mainly in the United Kingdom. Within the framework of cointegration, several authors have studied the structure of regional house prices within the United Kingdom, finding the existence of long run relationships between regional house prices and the ripple effect; that is, the notion of a causal link between house prices in London and the South East, and those in other regions (Alexander and Barrow, 1994; Cook, 2003, 2005; Giussani and Hadjimatheou, 1991; Holmes, 2007; Holmes and Grimes, 2008; MacDonald and Taylor, 1993; Meen, 1999; D. Zhang, 2010); the same conclusion has been reached using other methods and econometric approaches (Cameron et al., 2006; Cascio, 2020; Cook and Thomas, 2003; Holly et al., 2011; Hudson et al., 2018; Kyriazakou and Panagiotidis, 2014; Morley and Thomas, 2011; Muellbauer and Murphy, 1994; Tsai, 2015). However, evidence on the existence of regional house price convergence is mixed, and some

papers have failed to support the ripple effect (Abbott and de Vita, 2013; Ashworth and Parker, 1997; Chowdhury and Maclennan, 2014; Drake, 1995; Hamnett, 1989; Rosenthal, 1986).

From the late 1990s onwards, a few studies examining the interlinkages between regional and local housing markets in the United States, and focusing on the general issue of price diffusion, have been undertaken, also with mixed evidence (Apergis and Payne, 2012; Barros et al., 2012; Canarella et al., 2012; Clapp and Tirtiroglu, 1994; Clark and Coggin, 2009; Flor and Klarl, 2017; Gupta and Miller, 2012a, 2012b; Holly et al., 2010; Holmes et al., 2011; Kim and Rous, 2012; Payne, 2012; Pollakowski and Ray, 1997; Vansteenkiste, 2007; Zohrabyan et al., 2008).

Housing price co-movement has also been studied within several other countries, including Australia (Bangura and Lee, 2020; Churchill et al., 2018; Liu et al., 2008; Luo et al., 2007; Tu, 2000), Canada (Grigoryeva and Ley, 2019), China (Chiang, 2014; Huang, Li et al., 2010; Huang, Zhou, et al., 2010; Weng and Gong, 2017; Zhang and Morley, 2014; Zhang et al., 2017), Finland (Oikarinen, 2005), Ireland (Stevenson, 2004), Malaysia (Lean and Smyth, 2013), South Africa (Balcilar et al., 2013; Burger and Van Rensburg, 2008), Spain (Blanco et al., 2016; Larraz-Iribas et al., 2008; Taltavull de La Paz et al., 2017), Taiwan (Chen et al., 2011; Chien, 2010; Lee and Chien, 2011; Lee et al., 2014), and The Netherlands (Klarl, 2018; Teye et al., 2017).

Several other studies investigate housing market spillovers across countries, namely industrial countries and advanced economies, provide evidence that housing prices were often synchronized and the degree of synchronisation has been rising (Alter et al., 2018; Beltratti and Morana, 2010; Case et al., 1999; de Bandt et al., 2010; Gros, 2006; Helbling and Terrones, 2003; Hirata et al., 2012; Hoesli, 2020; IMF, 2018; Katagiri, 2018; Otrok and Terrones, 2005; Terrones and Otrok, 2004). For the euro area in particular, a different result has been attained by several authors (Álvarez et al., 2010; Gupta et al., 2015; Henley and Morley, 2000; Miles, 2017, 2019; Vansteenkiste and Hiebert, 2011).

3.3. Data and methods

3.3.1. Data

To perform a cross-country analysis, studying housing price synchronisation between Portugal and other countries, and detecting which international markets are more interconnected with the Portuguese market, we need a dataset on house prices that is as homogeneous as possible. The Bank for International Settlements (BIS) publishes statistics on residential property prices for several countries around the world. These derive their selected series from the detailed data set, which is harmonized according to the Handbook on Residential Property Prices Indices (Eurostat, 2013). They offer the closest indicator to nationwide coverage for each jurisdiction and typically include all types of dwellings (new and existing). We opted for the Real Residential Property Price Index (2010=100), computed by deflating the nominal residential property price series with the Consumer Price Index. The data set has a quarterly frequency.

For Portugal, as the data from BIS only refers to the period from 2008 onwards, we use the series obtained from *Confidencial Imobiliário*, starting in 1988, instead. This data set comprises the eighteen district capitals, covering the period 1988:Q1–2020:Q1. Computing a simple average for those cities, we have determined a correlation coefficient of 0,94

with the BIS series. Therefore, in our cross-country analysis, we have employed this constructed Portuguese housing price index. Our sample includes eleven other European Union Member States. Data from 1988 was available for Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, and the United Kingdom.

We also used the data set from *Confidencial Imobiliário* to analyse co-movements between housing prices in Portuguese cities.

3.3.2. Empirical strategy: wavelet analysis

Fourier spectral analysis can be (and has been) used to determine which frequencies play a predominant role in explaining the overall time-series variance. This analysis decomposes the observed pattern over time into a spectrum of cycles with different lengths. Similarly to a prism, which decomposes light into a spectrum of colours of different frequencies. The term white noise, used to describe independent and identically distributed variables, comes from the fact that such a process has a flat power spectral density, which is a characteristic of white light.

The main advantage of wavelet analysis is that we estimate time--series spectral characteristics as a function of time, revealing how its different periodic components change over time. To access the synchronicity of housing price cycles, we will rely on the continuous wavelet transform and several wavelet tools associated with it. We refer the reader to Aguiar-Conraria et al. (2012, 2013) for an intuitive introduction to this technique and its applications to social science data. For detailed technical treatment, the reader may consult Aguiar--Conraria and Soares (2014).

This chapter will rely on four main tools: the wavelet power spectrum, the wavelet coherency, the wavelet phase-difference, and the wavelet de-synchronisation matrix.

A wavelet is a function with mean zero (implying that it has to wiggle up and down) and well-localized in time (e.g., shows fast decay), behaving like a small wave that loses its strength as it moves away from the centre, hence the choice of the term *wavelet*, meaning little wave. Here we use the most popular wavelet, the Morlet wavelet. Aguiar-Conraria and Soares (2014) show that this specific wavelet has optimal features to study oscillations.

The continuous wavelet transform of a time series x(t) with respect to the wavelet is a function of two variables,

$W_x(\tau,s)$: $W_x(\tau,s) = \int_{-\infty}^{\infty} x(t) \frac{1}{\sqrt{s}} \overline{\varphi}\left(\frac{t-\tau}{s}\right) dt$.

The bar denotes complex conjugation, s is a scaling or dilation factor that controls the wavelet's width, and τ is a translation parameter which controls the wavelet's location.

In analogy with the terminology used in the Fourier case, the (local) wavelet power spectrum is defined as $WPS_x(\tau,s) = |W_x(\tau,s)|^2$.

It gives us a measure of the time series variance distribution in the time-frequency plane. This tool, as with the Fourier power spectrum, allows us to describe each frequency's contribution to the overall variance. Additionally, we can identify when that contribution is at its largest. In our pictures, the regions where the power spectrum, and hence the volatility, is larger, are depicted with lighter colours.

The concepts of cross wavelet power, wavelet coherency and phase-difference enable us to deal with relations between two time series. The cross-wavelet transform of two time-series, $x(t)$ and $y(t)$, is defined as $W_{xy}(\tau,s) = W_x(\tau,s)\bar{W}_y(\tau,s)$. The cross-wavelet power of two time-series, $|W_x(\tau,s)|$, depicts the local covariance. Compared with the cross-wavelet power, the wavelet coherency, a concept akin to the correlation coefficient, has the advantage of being normalized by the power spectrum of the two time-series. In analogy with the concept of coherency used in the Fourier analysis, given two time-series $x(t)$ and $y(t)$, one defines their wavelet coherency:

$$R_{xy}(\tau,s) = \frac{\left|S\left(W_{xx}(\tau,s)\right)\right|}{\sqrt{\left|S\left(W_{xx}(\tau,s)\right)S\left(W_{yy}(\tau,s)\right)\right|}},$$

where S denotes a smoothing operator in both time and scale.

Using a complex-valued wavelet, we can compute the phase of each series' wavelet transform, and thus obtain information about the possible delays of the two series' oscillations as a function of time and frequency by computing the phases and the phase difference, also known as the phase angle. A phase difference of zero indicates that the time series move together at the specified frequency. A phase-difference between 0 and $-\pi/2$ indicates that the two series move in-phase (positive correlation), with x leading y; while if the phase-difference is between 0 and $-\pi/2$, then it is y that is leading. A phase-difference between $\pi/2$ and π indicates that the series move out-of-phase (negative correlation), with x lagging y; while if the phase-difference is between $-\pi$ and $-\pi/2$, then it is y that is lagging.

Finally, we will also measure the dissimilarities between the wavelet transform of two time-series proposed by Aguiar-Conraria and Soares (2011a). Several authors have successfully applied this tool to study cycle synchronisation. The most relevant is Flor and Klarl (2017), who also study the synchronisation of house prices (in metropolitan areas within the United States).

The closer to zero our measure of distance is, the more similar the wavelet transforms of $x(t)$ and $y(t)$. To be more precise, a value close to zero means the two regions have a very similar wavelet transform. In turn, this implies that the contribution of house price cycles at each frequency towards the total variance is similar in both regions; this contribution happens simultaneously. Finally, the ups and downs of each cycle coincide.

3.4. Results

In this section, we present our results. We begin by estimating the Portuguese Housing Price Index's wavelet power spectrum, to get a sense of the dominant cycles we can identify in this data.

In subsection 4.2, we analyse how the Portuguese index is synchronized with a sample of other EU countries (including the UK). We first estimate the «distance» between the wavelet transform of Portuguese prices and other countries' prices — one pair at a time. To assess if synchronisation is statistically significant, we rely on Monte Carlo simulations, considering two independent time series as the null hypothesis.

Then, we perform a more detailed analysis by estimating the wavelet coherency and the phase-difference between Portuguese prices and the prices of a sample of selected countries. For statistical significance,

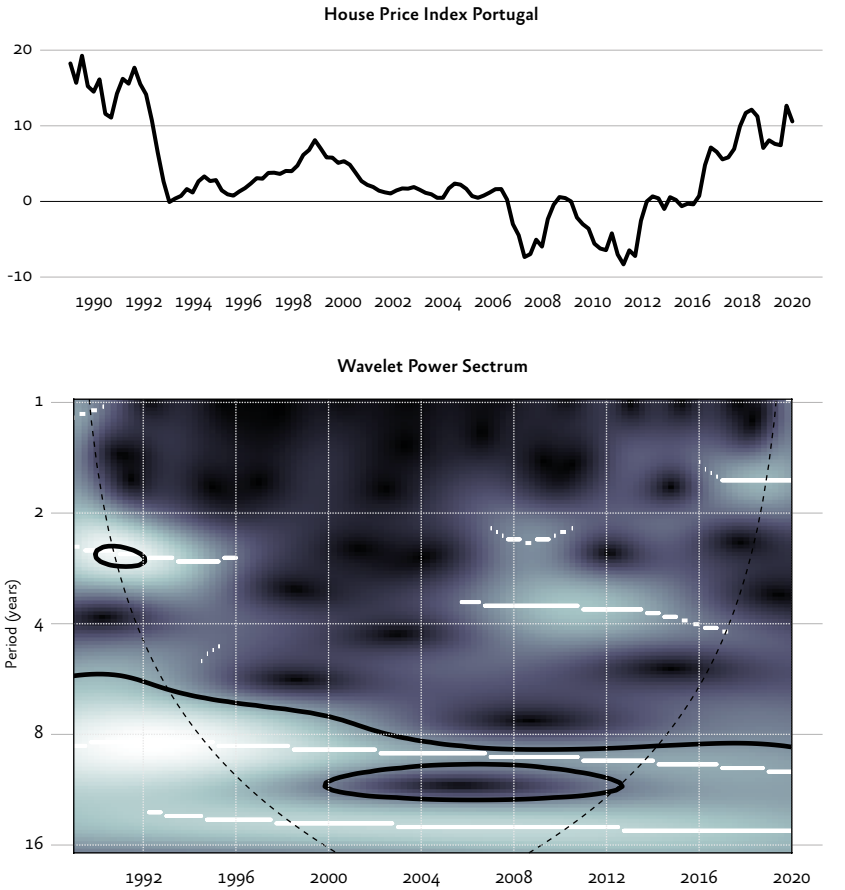
we rely on Monte Carlo simulations. The interpretation of our econometric results proceeds as follows: first, we identify the statistically significant time-frequency regions, meaning that, in those episodes, we may confidently say that there has been a considerable co-movement of the variables for cycles within the indicated period; then, we analyse the phase differences to detect whether the co-movement has been positive or negative and which countries were leading and lagging for the statistically significant locations.

In section 4.3, the analysis is similar, but instead of analysing synchronisation between countries, we do it between Portuguese cities.

3.4.1. The wavelet power spectrum

In figure 32, on top we can see the Portuguese House Price Index (we consider the year-on-year growth rate). At the bottom, we have the wavelet power spectrum. Lighter regions correspond to areas of high wavelet power (high volatility). We have the date on the horizontal axis, and the cycle period on the vertical axis. They range from 1-year cycles (on top) to 16-year cycles (at the bottom). The white stripes correspond to the wavelet power spectrum's local maxima, providing an estimation for the period of the dominant cycles. The thick black contour designates the (5%) statistically significant regions.

Figure 32 **Time series plot of House Price Index (on top). Wavelet power spectrum (at the bottom).**



Note The thick grey contour designates the 5% significance level. The shade code for power ranges from black (low power) to white (high power). The cone of influence, which indicates the area affected by edge effects, is the region outside the dashed line.

We can identify two primary cycles in the data which almost run the whole sample, and superimpose each other: one with a period of approximately nine years and another of about 14 years. Note that these primary cycles are statistically significant. A shorter run cycle, an almost 4-year period, shows up around the 2008–2012 period, corresponding to the international financial crisis and the subsequent sovereign debt crisis — although it is not significant at 5%, it is at 10% (not shown).

3.4.2. Synchronisation between Portugal and other countries

In table 7, we show the dissimilarity between the Portuguese housing cycles and several other countries. A value very close to zero means that the two countries have a very similar wavelet transform; this implies that they share the same high-power regions and their phases are aligned. Intuitively, this means that the contribution of cycles at each frequency to the total variance is similar between both countries. This contribution happens simultaneously, and the ups and downs of each cycle co-occur. It is in this sense that we say the two countries have synchronized cycles.

Table 7 De-synchronisation between Portugal and other countries

	Portugal
United Kingdom	0.17
Italy	0.20
Spain	0.21
France	0.23
Belgium	0.24
Sweden	0.28

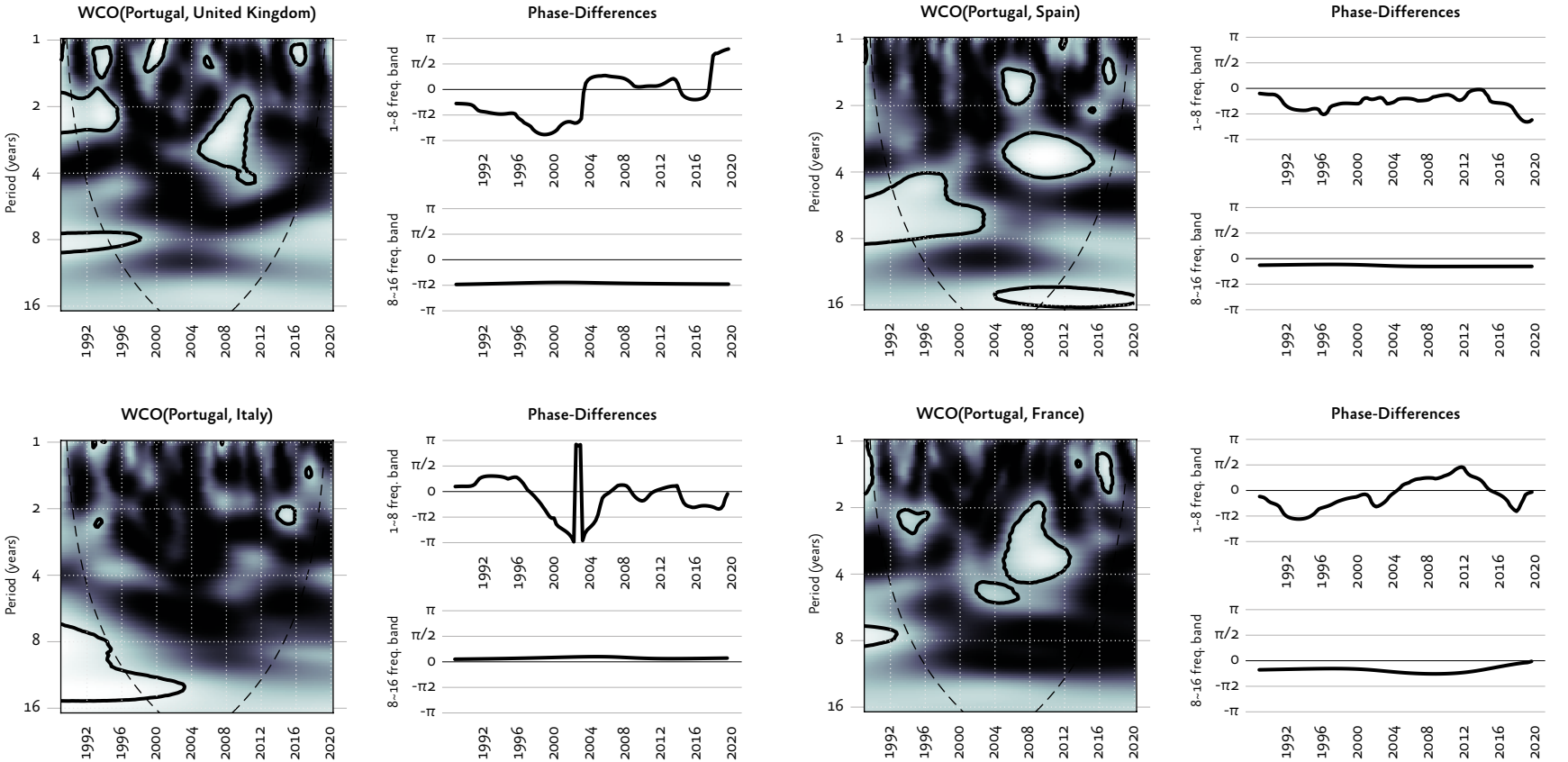
	Portugal
Germany	0.28
Denmark	0.35
Ireland	0.35
Netherlands	0.39
Finland	0.43

Legend	
	1%
	5%

Portugal is almost synchronized with the housing market in the UK. Italy, Spain, and France come next. In figure 33, we have the estimated coherencies between Portugal and the first four countries. Wavelet coherency is akin to the absolute value of the correlation coefficient but in the time-frequency plane. Lighter regions correspond to areas of high coherency. On the right, we have the phase difference for two frequency bands. The first frequency band, 1~8-years, corresponds to typical business cycle frequencies. The second band, 8~16-years, corresponds to longer and more structural cycles.

The country which has the largest regions of statistically significant coherency with Portugal is Spain. Until the early 2000s, there is a region of high coherency between the 4 and 8-year frequencies. The corresponding phase difference is between $-\pi$ and 0, meaning the correlation is positive, with Spanish prices leading the Portuguese prices. After that, we can see regions of high coherencies both at higher and lower frequencies. In both, the phase difference indicates that Spain is the leader and Portugal the follower. The behaviour of house prices in Portugal and Spain is investigated by Lourenço and Rodrigues (2014). Using three different approaches, these authors draw some conclusions regarding the dynamics and contrast of house prices in both countries.

Figure 33 Cross-wavelet coherency between Portugal and other countries (on the left). Phase-difference (on the right).



Note: Wavelet Coherency: the black contour designates the 5% significance level. The shade code for coherency ranges from black (low coherency –- close to zero) to white (high coherency –- close to one). The cone of influence, which indicates the area affected by edge effects, is the dashed line's outer region.

With other countries, the regions of high coherency are much scarcer. Between Portugal and the UK, and Portugal and France, the most impressive high coherency areas take place around 2008 at business cycle frequencies. Interestingly, the phase difference for these frequencies tells us that Portugal is leading.

Between Portugal and Italy, the only region of high coherency happens at very low frequencies and lasts until 2004. During this time, the Portuguese cycle led the Italian one. However, there are no more regions of statistically significant coherencies.

We leave the task of trying to understand the determinants of such synchronicity between countries for future research. Obvious candidates are distance, business cycle synchronisation, general price synchronisation, emigration destination, and tourism flows.

Regarding the first three possible determinants, we did perform some exploratory analysis. Given that we are working with 12 countries, we have 66 pairs. The Spearman's correlation coefficient between housing price cycle dissimilarities and physical distances between countries (distances between capitals) is 0.15. We also estimated the business cycle dissimilarities between countries (using data on real GDP) and found no correlation with housing price cycle dissimilarities. Interestingly, the correlation between housing price and general price cycle dissimilarities is 50%. This result comes as a surprise because, in our data, house prices are presented in real terms.

3.4.3. Synchronisation between Portuguese cities

We will now focus on Portuguese cities and start by estimating the de-synchronisation index between them. Given that we are working with 18 cities, we have 153 pairs. It would not be reasonable to display a table with all these values. Alternatively, we use the dissimilarity matrix as a distance matrix and map the cities in a two-axis system. The idea is to reduce the dissimilarity matrix to a two-column matrix, the configuration matrix, containing each city's position in two axes.[6] This algorithm results in the map we can see in figure 34.

The first thing to note is that this map is not similar to Portugal's geographical map. We can confirm this impression by computing the correlation between cycle distances and the physical distances between Portuguese cities. The Spearman's correlation coefficient is –0.0266. Therefore, location does not seem to be a factor in explaining synchronicity between Portuguese cities.

The second result is that a few cities are quite de-synchronized with the rest of the country. Braga is the most obvious outlier, but the same is true for Santarém, Portalegre, and Leiria and Setúbal — these last two form a cluster of their own. Other cities are reasonably well synchronized between themselves. It is also easy to identify some subclusters. Lisbon, Porto, and Faro, the three Portuguese district capitals with international airports (we did not include the islands in our sample) are synchronized. Like the subcluster formed by Aveiro, Bragança, Coimbra, and Guarda, it is easy to identify with the hierarchical tree clustering produced in figure 35.

Figure 34 Multidimensional scaling map

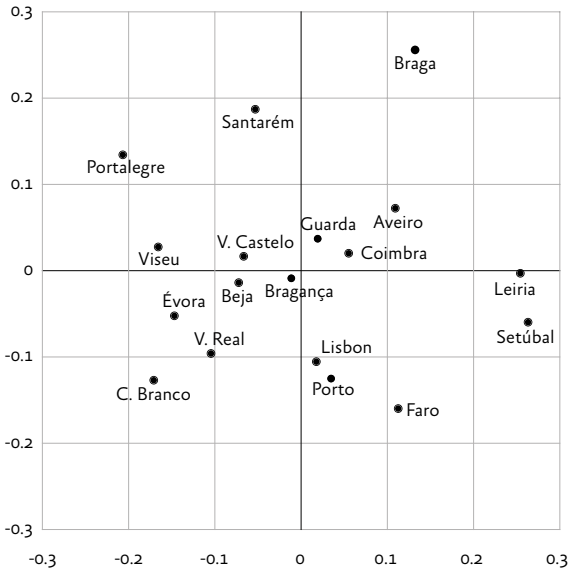
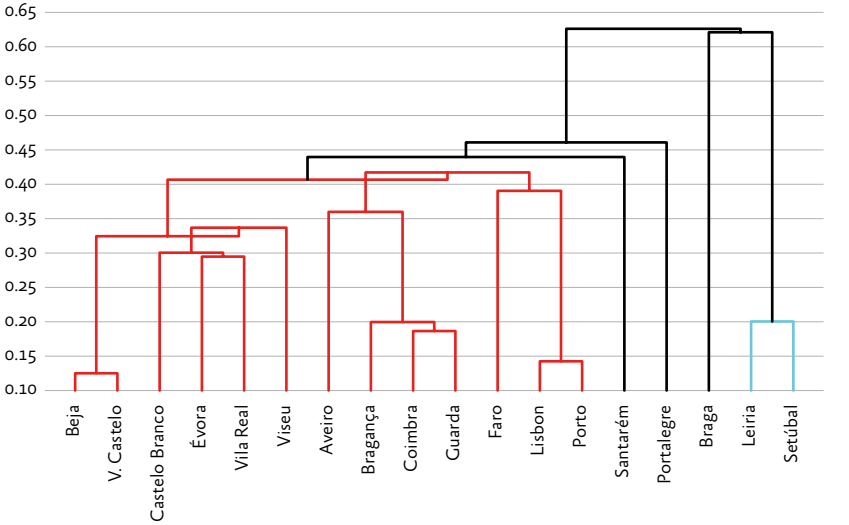
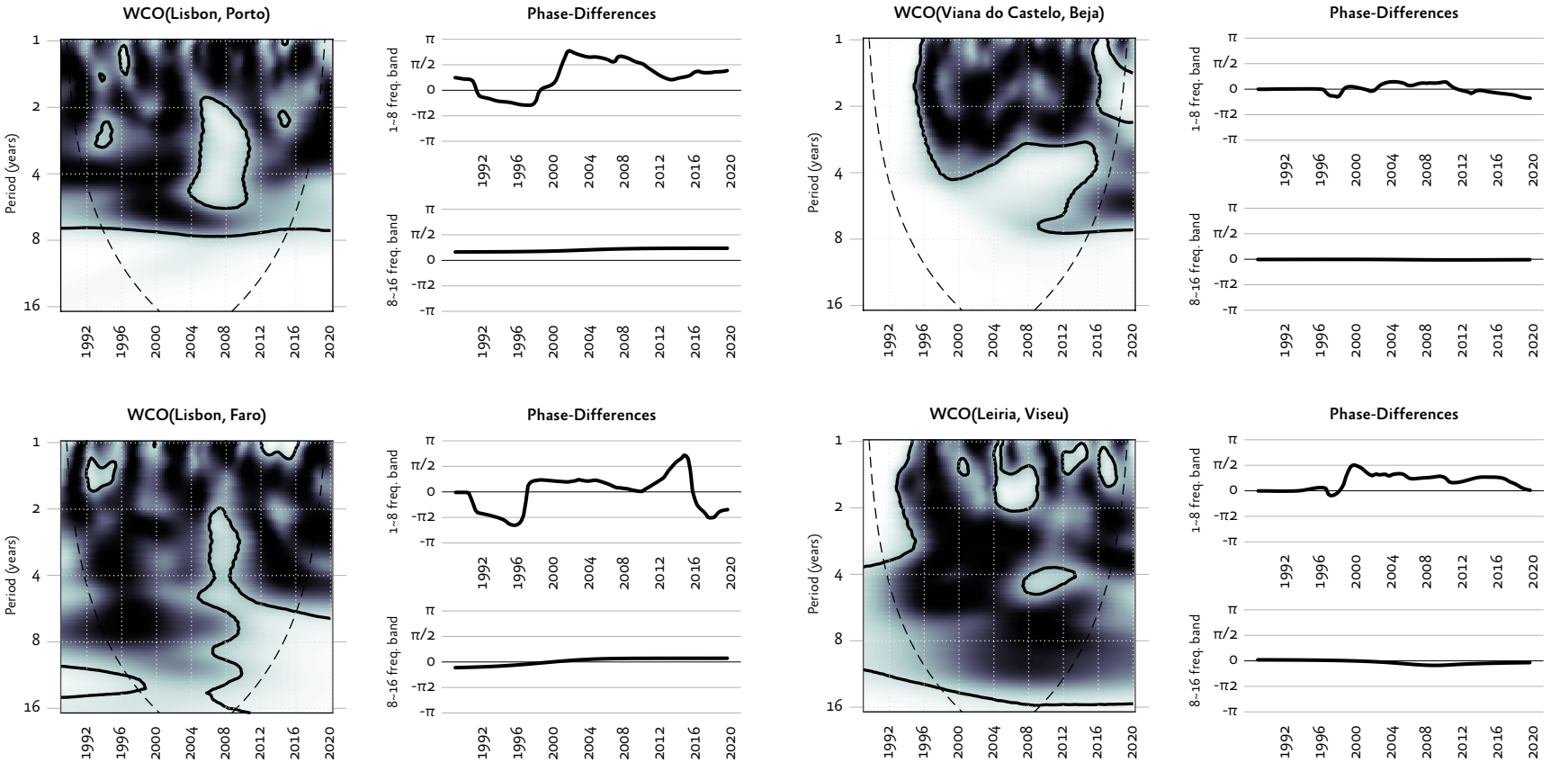


Figure 35 Hierarchical Tree Clusters



In figure 36, we have the wavelet coherency and phase difference for a few pairs of cities. Lisbon-Porto and Lisbon-Faro (because these cities form a subcluster with the Portuguese capital of Lisbon); Viana do Castelo and Beja (because this is the most synchronized pair); and Leiria and Viseu (the least synchronized pair).

Figure 36 Cross-Wavelet Coherency between Portuguese cities (on the left); Phase-Difference (on the right).



Note: Wavelet Coherency: the black contour designates the 5% significance level. The shade code for coherency ranges from black (low coherency –- close to zero) to white (high coherency –- close to one). The cone of influence, which indicates the area affected by edge effects, is the dashed line's outer region.

The coherency between Lisbon and Porto, the two most important Portuguese cities, reveals that both district capitals are synchronized at lower frequencies (longer run cycles). The phase difference informs us that the Lisbon cycle leads the one from Porto. However, at higher frequencies, the cycles may diverge from each other. We see a region of high coherency around the year 2008, in the –years frequency band. What is particularly interesting is that the phase difference reveals a negative correlation. Therefore, it is possible to have longer run cycles aligned while shorter run cycles are misaligned. The second picture shows that Lisbon and Faro became highly synchronized after 2005, with Lisbon leading.

Comparing the third and fourth pairs, we can see the difference between the most and least synchronized pairs. Viana do Castelo and Beja's wavelet coherency is consistently high at several frequencies. The phase differences are very close to zero, suggesting the cycles are almost simultaneous in both towns.

In the case of Leiria and Viseu, the least synchronized pair, high coherency regions are much scarcer. However, it is still remarkable that coherency is very high and statistically significant at very low frequencies, meaning that even these two cites display a common long-run cycle.

3.5. Conclusions

In this chapter, we were concerned with the dynamics of Portugal's housing prices, which have increased in recent years. This rise has been a feature of the economic recovery in several countries after the financial crisis. On average, in OECD countries, house prices have grown quicker than median incomes. Simultaneously, the housing market has become an increasingly international market, and there are claims that foreign residential investments have been driving housing prices up. Consequently, there has been an intense public debate on housing affordability and global real estate investment.

The existence of global investors in housing markets is also associated with increased housing price synchronisation, especially at a city level. In this chapter, we relied on the continuous wavelet transform and several associated wavelet tools to study housing price synchronisation between Portugal and eleven other member states of the European Union (Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, and the United Kingdom), covering the 1988–2019 period.

We detected two primary cycles in the Portuguese Housing Price Index, one about nine years long and another covering a period of approximately 14 years; these two cycles almost run the whole sample and overlap. We also identified a shorter run cycle, almost four years long, corresponding to the international financial crisis and the subsequent sovereign debt crisis (2008–2012).

We then estimated the «distance» between the wavelet transform of Portuguese prices and other countries' prices. The British housing market is the one Portugal is most synchronized with. Italy, Spain, and France come next. So, we have estimated the wavelet coherency and the phase-difference between Portuguese prices and prices in those four countries. This more detailed analysis has revealed that Spain is the country with which Portugal has the largest regions of statistically significant coherency. Until the early 2000s, there is a region of

high coherency between the 4 and 8-years frequencies; after that, we can see high coherencies at higher and lower frequencies. The phase difference indicates that Spain is the leader and Portugal the follower. In regards to the other three countries, regions of high coherency are fewer. They exist around 2008, at business cycle frequencies, with the UK, and with France.

Interestingly, the phase difference for these frequencies shows that Portugal is leading. The Portuguese cycle also led the Italian one. However, the only region of high coherency between Portugal and Italy occurs at very low frequencies and lasts until 2004, with no more regions revealing statistically significant coherencies.

We have not explored the determinants of such synchronicity. According to the literature, distance, emigrant destination, and tourism flows (note that UK, Spain, and France were the Portuguese top 3 outbound tourism markets in 2019) are factors to be considered. However, we leave this examination for future research. How globalisation and financialisation influence national housing price dynamics is also a very relevant matter, as it may have implications on the effectiveness of a range of policy tools aimed at addressing imbalances in the housing market, namely affordability problems.

This analysis has also been conducted focusing on Portuguese cities. To be more precise, we start by estimating the de-synchronisation index between the 18 district capitals. Our results can be summarised as follows: Braga, Santarém, Portalegre, Leiria, and Setúbal are quite de-synchronized with the rest of the country (the last two form a cluster of their own); and despite other cities being relatively well synchronized between themselves, one can distinguish some subclusters, namely the one formed by Lisbon, Porto, and Faro (the three district capitals with international airports) or the subcluster constituted by Aveiro, Bragança, Coimbra, and Guarda. Once again, we have not tried to explain such synchronicity except in what concerns physical distances, which are not correlated with cycle dissimilarities, suggesting that location does not explain synchronicity between Portuguese cities; hence, other determinants must be found.

Next, we have estimated wavelet coherency and phase difference for a few pairs of cities. The two most important Portuguese cities, Lisbon and Porto, are synchronized at longer run cycles, with the Lisbon cycle leading over the Porto one. However, at higher frequencies, the cycles may diverge from each other, and the correlation is negative. Therefore, it is possible to have longer run cycles aligned while shorter run cycles are misaligned. Lisbon and Faro became very synchronized after 2005, with Lisbon leading. Viana do Castelo and Beja is the most synchronized pair, with consistently high wavelet coherency at several frequencies. The phase differences are very close to zero, suggesting that cycles are almost simultaneous in both towns. Regarding Leiria and Viseu, the least synchronized pair, high coherency regions are rarer. However, they still exist at very low frequencies, meaning that even these two cities display a common long-run cycle.

These results suggest that the Portuguese housing market is segmented and displays regional heterogeneities. Knowing that the housing cycles of Portuguese cities may be de-synchronized, housing policies should be designed locally.

References

Aalbers, M.B., (2016), «The financialization of housing», In *The Financialization of Housing*.

Abbott, A., and G. De Vita, (2013), «Testing for long-run convergence across regional house prices in the UK: a pairwise approach», *Applied Economics*, 45(10), 1227–1238.

Adair, A., J. Berry, S. McGreal, L. Sýkora, A. G. Parsa and B. Redding, (1999), «Globalization of real estate markets in central Europe», *European Planning Studies*, 7(3), 295–305.

Agnello, L. and L. Schuknecht, (2011), «Booms and busts in housing markets: determinants and implications», *Journal of Housing Economics*, 20(3), 171–190.

Aguiar-Conraria, L., P. Brinca, H.V. Guðjónsson and M. J. Soares, (2017), «Business cycle synchronization across U. S. states», *B. E. Journal of Macroeconomics*, 17(1), 1–15.

Aguiar-Conraria, L., P.C. Magalhães and M.J. Soares, (2012), «Cycles in politics: wavelet analysis of political time series», *American Journal of Political Science*, 56(2), 500–518.

Aguiar-Conraria, L., P.C. Magalhães and M.J. Soares, (2013), «The nationalization of electoral cycles in the United States: a wavelet analysis», *Public Choice*, 156(3–4), 387–408.

Aguiar-Conraria, L. and M.J. Soares, (2011a), «Business cycle synchronization and the Euro: a wavelet analysis», *Journal of Macroeconomics*, 33(3), 477–489.

Aguiar-Conraria, L. and M.J. Soares, (2011b), «The continuous wavelet transform: a primer», *NIPE Working Paper*, 16, 1–43.

Aguiar-Conraria, L. and M.J. Soares, (2014), «The continuous wavelet transform: moving beyond uni-and bivariate analysis», *Journal of Economic Surveys*, 28(2), 344–375.

Alexander, C. and M. Barrow, (1994), «Seasonality and cointegration of regional house prices in the UK», *Urban Studies*, 31(10), 1667–1689.

Alter, A., J. Dokko and D. Seneviratne, (2018), «House Price synchronicity, banking integration, and global financial conditions», In *IMF Working Papers* (WP/18/250).

Álvarez, L. J., G. Bulligan, A. Cabrero, L. Ferrara and H. Stahl, (2010), «Housing cycles in the major euro area countries» (*Documentos Ocasionales* n.o 1001; *The occasional paper series*), link

Apergis, N. and J.E. Payne, (2012), «Convergence in U.S. house prices by state: evidence from the club convergence and clustering procedure», *Letters in Spatial and Resource Sciences*, 5(2), 103–111.

Arnott, R., (1987), «Economic theory and housing», In E. S. Mills (Ed.), *Handbook of Regional and Urban Economics: Vol. II Col* (pp. 959–988), Elsevier.

Ashworth, J. and S.C. Parker, (1997), «Modelling regional house prices in the UK», *Scottish Journal of Political Economy*, 44(3), 225–246.

Badarinza, C. and T. Ramadorai, (2018), «Home away from home? foreign demand and London house prices», *Journal of Financial Economics*, 130(3), 532–555.

Baffoe-Bonnie, J., (1998), «The dynamic impact of macroeconomic aggregates on housing prices and stock of houses: a national and regional analysis», *Journal of Real Estate Finance and Economics*, 17(2), 179–197.

Balcilar, M., A. Beyene, R. Gupta and M. Seleteng, (2013), «"Ripple" effects in south african house prices», *Urban Studies*, 50(5), 876–894.

Bangura, M. and C.L. Lee, (2020), «House price diffusion of housing submarkets in Greater Sydney», *Housing Studies*, 35(6), 1110–1141.

Bardhan, A.D. and C.A. Kroll, (2007), *Globalization and real estate: issues, implications, opportunities* (Issue January 2007).

Barros, C.P., L.A. Gil-Alana and J.E. Payne, (2012), «Comovements among U.S. state housing prices: evidence from fractional cointegration», *Economic Modelling*, 29(3), 936–942.

Baskaya, Y. S., J. di Giovanni, Ş. Kalemli-Özcan, and M.F. Ulu, (2017), «International spillovers and local credit cycles», No. DP11839; *CEPR Discussion Papers*, cepr.org/active/publications/discussion_papers/dp.php?dpno=11839

Belke, A., C. Domnick and D. Gros, (2017), «Business cycle synchronization in the EMU: core vs. periphery», *Open Economies Review*, 28(5), 863–892.

Beltratti, A. and C. Morana, (2010), «International house prices and macroeconomic fluctuations», *Journal of Banking and Finance*, 34(3), 533–545.

Blanco, F., V. Martín and G. Vazquez, (2016), «Regional house price convergence in Spain during the housing boom», *Urban Studies*, 53(4), 775–798.

Bordo, M. and T. Helbling, (2003), «Have national business cycles become more synchronized?», *National Bureau of Economic Research, Working Paper 10130*.

Bruno, V. and H.S. Shin, (2013), «Global factors in capital flows and credit growth», *Working Paper 237, Griswold Center for Economic Policy Studies*, link

Bruno, V. and H.S. Shin, (2015a), «Capital flows and the risk-taking channel of monetary policy», *Journal of Monetary Economics*, 71, 119–132.

Bruno, V. and H.S. Shin, (2015b), «Cross-border banking and global liquidity», *The Review of Economic Studies*, 82(2), 535–564.

Büdenbender, M. and O. Golubchikov, (2017), «The geopolitics of real estate: assembling soft power via property markets», *International Journal of Housing Policy*, 17(1), 75–96.

Burger, P. and L.J. Van Rensburg, (2008), «Metropolitan house prices in South Africa: do they converge?», *South African Journal of Economics*, 76(2), 291–297.

Caceres, C., Y. Carrière-Swallow, I. Demir and B. Gruss, (2016), «U.S. monetary policy normalization and global interest rates», WO/16/195, *IMF Working Papers*.

Calvo, G. A., L. Leiderman, and C.M. Reinhart, (1996), «Inflows of capital to developing countries in the 1990s», *Journal of Economic Perspectives*, 10(2), 123–139.

Cameron, G., J. Muellbauer and A. Murphy, (2006), «Was there a british house price bubble? Evidence from a Regional Panel», In *CEPR Discussion Papers* (No. 5619).

Canarella, G., S.M. Miller and S. Pollard. (2012). «Unit roots and structural change: an application to US house price indices», *Urban Studies*, 49(4), 757–776.

Cascio, I. Lo, (2020), «A wavelet analysis of the ripple effect in UK regional house prices», *D/SEAS Working Papers*, 3(1), 1–22.

Case, B., W.N. Goetzmann and K.G. Rouwenhorst, (1999), «Global real estate markets: cycles and fundamentals», No. 99–03, *Yale International Center for Finance Working Paper*.

Case, B., W.N. Goetzmann and K.G. Rouwenhorst, (2000), «Global real estate markets — cycles and fundamentals» (Working Paper 7566; *NBER Working Paper Series*).

Cesa-Bianchi, A., L.F. Cespedes and A. Rebucci, (2015), «Global liquidity, house prices, and the macroeconomy: evidence from advanced and emerging economies», *Journal of Money, Credit and Banking*, 47(S1), 301–335.

Chen, P.-F., Chien, M.-S., and Lee, C.-C., (2011), «Dynamic modeling of regional house price diffusion in Taiwan», *Journal of Housing Economics*, 20(4), 315–332.

Chiang, S. H., (2014), «Housing markets in China and policy implications: comovement or ripple effect», *China and World Economy*, 22(6), 103–120.

Chien, M.-S., (2010), «Structural breaks and the convergence of regional house prices», *Journal of Real Estate Finance and Economics*, 40(1), 77–88.

Chowdhury, R. A. and D. Maclennan, (2014), «Regional house price cycles in the UK, 1978–2012: a markov switching VAR». *Journal of European Real Estate Research*, 7(3), 345–366.

Churchill, S. A., J. Inekwe and K. Ivanovski, (2018), «House price convergence: evidence from Australian cities», *Economics Letters*, 170, 88–90.

Claessens, S., M.A. Kose and M.E. Terrones, (2011), «Financial cycles: what? how? when?», WP/11/76, *IMF Working Papers*, link.

Clapp, J. M. and D. Tirtiroglu, (1994), «Positive feedback trading and diffusion of asset price changes: evidence from housing transactions», *Journal of Economic Behavior and Organization*, 24(3), 337–355.

Clark, S. P. and T.D. Coggin, (2009), «Trends, cycles and convergence in U.S. regional house prices», *The Journal of Real Estate Finance and Economics*, 39(3), 264–283.

Clerc, L., (2019), «Towards a global real estate market? Trends and evidence», In *R. Nijskens, M. Lohuis, and W. Heeringa (Eds.), Hot Property* (pp. 63–81), Springer International Publishing.

Coakley, J., (1994), «The Integration of property and financial markets», *Environment and Planning A: Economy and Space*, 26(5), 697–713.

Cook, S., (2003), «The convergence of regional house prices in the UK», *Urban Studies*, 40(11), 2285–2294.

Cook, S., (2005), «Regional house price behaviour in the UK: application of a joint testing procedure», *Physica A: Statistical Mechanics and Its Applications*, 345(3–4), 611–621.

Cook, S. and C. Thomas, (2003), «An alternative approach to examining the ripple effect in UK house prices», *Applied Economics Letters*, 10(13), 849–851.

Davis, M. A. and S. van Nieuwerburgh, (2015), «Housing, finance, and the macroeconomy», In *Handbook of Regional and Urban Economics* (1st ed., Vol. 5B, pp. 753–811). Elsevier B.V.

de Bandt, O., K. Barhoumi and C. Bruneau. (2010). «The international transmission of house price shocks». In O. De Bandt, T. Knetsch, J. Peñalosa, and F. Zollino (Eds.), *Housing Markets in Europe* (pp. 129–158), Springer Berlin Heidelberg.

Del Negro, M., D. Giannone, M.P. Giannoni, and A. Tambalotti, (2019), «Global trends in interest rates», *Journal of International Economics*, 118, 248–262.

Drake, L., (1995), «Testing for convergence between UK regional house prices». *Regional Studies*, 29(4), 357–366.

Duca, J.V. (2020), «Making sense of increased synchronization in global house prices», *Journal of European Real Estate Research*, Vol. 13 No. 1, pp. 5–16.

Duca, J. V., J. Muellbauer and A. Murphy, (2011), «House prices and credit constraints: making sense of the US experience», *Economic Journal*, 121(552), 533–551.

Englund, P. and Y.M. Ioannides, (1997), «House price dynamics: an international empirical perspective», *Journal of Housing Economics*, 6(2), 119–136.

EUROSTAT, (2013), «Handbook on residential property prices» (RPPIs), In *Handbook on Residential Property Prices* (RPPIs), *Publications Office of the European Union*.

Fallis, G., (1985), «Introduction», In *Housing Economics* (pp. 1–26).

Favara, G. and J. Imbs, (2015), «Credit supply and the price of housing», *American Economic Review*, 105(3), 958–992.

Fernandez, R. and M.B. Aalbers, (2016), «Financialization and housing: between globalization and varieties of capitalism», *Competition and Change*, 20(2), 71–88.

Fidrmuc, J., T. Ikeda and K. Iwatsubo, (2012), «International transmission of business cycles: evidence from dynamic correlations», *Economics Letters*, 114(3), 252–255.

Fields, D., (2015), «Contesting the financialization of urban space: community organizations and the struggle to preserve affordable rental housing in New York City», *Journal of Urban Affairs*, 37(2), 144–165.

Flor, M. A. and T. Klarl, (2017), «On the cyclicity of regional house prices: new evidence for U.S. metropolitan statistical areas», *Journal of Economic Dynamics and Control*, 77, 134–156.

Geng, N. (2018), «Fundamental drivers of house prices in advanced economies», In *IMF Working Papers* (WP/18/164; IMF Working Paper).

Girouard, N., M. Kennedy, P. van den Noord and C. André, (2006), «Recent house price developments: the role of fundamentals», *In OECD Economic Outlook*, No. 475, *Economics Department Working Papers*.

Giussani, B. and G. Hadjimatheou, (1991), «Modeling regional house prices in the United Kingdom», *Papers in Regional Science*, 70(2), 201–219.

Gotham, K. F., (2009), «Creating liquidity out of spatial fixity: the secondary circuit of capital and the subprime mortgage crisis», *International Journal of Urban and Regional Research*, 33(2), 355–371.

Grigoryeva, I. and D. Ley, (2019), «The price ripple effect in the Vancouver housing market», *Urban Geography*, 40(8), 1168–1190.

Gros, D., (2006), «Bubbles in real estate? A longer-term comparative analysis of housing prices in Europe and the US», No. 239/February 2006, *CEPS Working Document*, link

Gupta, R., C. Andre and L. Gil-Alana, (2015), «Comovement in Euro area housing prices: a fractional cointegration approach», *Urban Studies*, 52(16), 3123–3143.

Gupta, R. and S.M. Miller, (2012a), «The time-series properties of house prices: a case study of the southern california market», *Journal of Real Estate Finance and Economics*, 44(3), 339–361.

Gupta, R. and S.M. Miller, (2012b), «"Ripple effects" and forecasting home prices in Los Angeles, Las Vegas, and Phoenix», *The Annals of Regional Science*, 48(3), 763–782.

Hamnett, C., (1989), «Regional variations in house prices and house price inflation in Britain, 1969–1989», *Journal of Valuation*, 7(4), 342–360.

Hekwolter of Hekhuis, M., R. Nijskens and W. Heeringa, (2017), «The housing market in major dutch cities», No. 1, *Occasional Studies*, Vol. 15, link

Helbling, T. and M.E. Terrones, (2003), «Real and financial effects of bursting asset price bubbles», In *IMF World Economic Outlook*, April 2003 (pp. 61–94), International Monetary Fund. link

Henley, A. and B. Morley, (2000), «European house price volatility and the macroeconomy: the implications for european monetary union», *Royal Economic Society Annual Conference*, link

Hirata, H., M.A. Kose, C. Otrok and M.E. Terrones, (2012), «Global house price fluctuations: synchronization and determinants», *NBER International Seminar on Macroeconomics*, 9(1), 119–166.

Hoesli, M.,u (2020), «An investigation of the synchronization in global house prices», *Journal of European Real Estate Research*, 13(1), 17–27.

Holly, S., M.H. Pesaran and T. Yamagata, (2010), «A spatio-temporal model of house prices in the USA», *Journal of Econometrics*, 158(1), 160–173.

Holly, S., M.H. Pesaran and T. Yamagata, (2011), «The spatial and temporal diffusion of house prices in the UK», *Journal of Urban Economics*, 69(1), 2–23.

Holmes, M.J., (2007), «How convergent are regional house prices in the United Kingdom? Some new evidence from panel data unit root testing», *Journal of Economic and Social Research*, 9(1), 1–17.

Holmes, M.J. and A. Grimes, (2008), «Is there long-run convergence among regional house prices in the UK?» *Urban Studies*, 45(8), 1531–1544.

Holmes, M. J., J. Otero and T. Panagiotidis, (2011), Investigating regional house price convergence in the United States: evidence from a pair-wise approach, *Economic Modelling*, 28(6), 2369–2376.

Huang, F., C. Li and Y. Li., (2010), «Ripple effect of housing prices among chinese deputy provincial cities based on an alternative approach», *International Journal of Business Administration*, 1(1), 19–24.

Huang, F., Y. Zhou and C. Li, (2010), «Ripple effect of housing prices fluctuations among nine cities of China», *Management Science and Engineering*, 4(3), 41–54. file:///Users/yangwen/Downloads/1341–1381–1-PB.pdf

Hudson, C., J. Hudson and B. Morley, (2018), «Differing house price linkages across UK regions: a multi-dimensional recursive ripple model», *Urban Studies Journal Limited*, 55(8), 1636–1654.

Hwang, M. and J.M. Quigley, (2006), «Economic fundamentals in local housing markets: evidence from U.S. metropolitan regions», *Journal of Regional Science*, 46(3), 425–453.

Igan, D. and P. Loungani, (2012), «Global housing cycles», WP/12/217, *IMF Working Paper*.

IMF, (2016), «The growing importance of financial spillovers from emerging market economies», *Global Financial Stability Report*, April (Chapter 2).

IMF, (2017), «Are countries losing control of domestic financial conditions?» In *Global Financial Stability Report* (Issue April, pp. 83–108), link

IMF, (2018), «House price synchronization: what role for financial factors?», In *Global Financial Stability Report April 2018: A Bumpy Road Ahead* (Issue April 2018), link

IMF, (2019), «Downside risks to house prices», In *Global Financial Stability Report* (Issue April), International Monetary Fund, link

Jordà, Ò., K. Knoll, D. Kuvshinov, M. Schularick and A.M. Taylor, (2019), «The rate of return on everything, 1870–2015», *The Quarterly Journal of Economics*, 134(3), 1225–1298.

Jordà, Ò., M. Schularick and A.M. Taylor, (2017), «Macrofinancial history and the new business cycle facts», *NBER Macroeconomics Annual*, 31(1), 213–263.

Katagiri, M., (2018), «House price synchronization and financial openness: a dynamic factor model approach», WP/18/208, *IMF Working Paper*.

Kim, Y. S. and J.J. Rous, (2012), «House price convergence: evidence from US state and metropolitan area panels», *Journal of Housing Economics*, 21(2), 169–186.

Kishor, N. K. and H.A. Marfatia, (2017), «The dynamic relationship between housing prices and the macroeconomy: evidence from OECD countries», *Journal of Real Estate Finance and Economics*, 54(2), 237–268.

Klarl, T., (2018), «Housing is local: applying a dynamic unobserved factor model for the dutch housing market», *Economics Letters*, 170, 79–84.

Kose, M. A., C. Otrok and E. Prasad, (2012), «Global business cycles: convergence or decoupling?», *International Economic Review*, 53(2), 511–538.

Kose, M. A., C. Otrok and C.H. Whiteman, (2008), «Understanding the evolution of world business cycles», *Journal of International Economics*, 75(1), 110–130.

Kruskal, J.B., (1964a), «Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis», *Psychometrika*, 29(1), 1–27.

Kruskal, J.B., (1964b), «Nonmetric multidimensional scaling: a numerical method», *Psychometrika*, 29(2), 115–129.

Kuang, W. and Q. Wang, (2018), «Cultural similarities and housing market linkage: evidence from OECD countries», *Frontiers of Business Research in China*, 12(1), 1–25.

Kyriazakou, E. and T. Panagiotidis, (2014), «Linear and nonlinear causality in the UK housing market: a regional approach», *Economics and Business Letters*, 3(4), 288–297.

Larraz-Iribas, B., J.-L. Alfaro-Navarro and F. Rodriguez-Aragon, (2008), «Asymmetric behaviour of spanish regional house prices: a multivariate approach», *The Journal of Economic Asymmetries*, 5(2), 81–104.

Lean, H.H. and R. Smyth, (2013), «Regional house prices and the ripple effect in Malaysia», *Urban Studies*, 50(5), 895–922.

Lee, C.C. and M.S. Chien, (2011), «Empirical modelling of regional house prices and the ripple effect», *Urban Studies*, 48(10), 2029–2047.

Lee, M.-T., M.-L. Lee and S.H. Lin, (2014), «Trend properties, cointegration, and diffusion of presale house prices in Taiwan: can taipei's house prices ripple out?», *Habitat International*, 44, 432–441.

Leung, C., (2004), «Macroeconomics and housing: a review of the literature», *Journal of Housing Economics*, 13(4), 249–267.

Ley, D., (2015), «Global China and the making of Vancouver's residential property market», *International Journal of Housing Policy*, 17(1), 15–34.

Liu, C., Z.Q. Luo, L. Ma and D. Picken, (2008), «Identifying house price diffusion patterns among australian state capital cities», *International Journal of Strategic Property Management*, 12(4), 237–250.

Lourenço, R.F. and P.M.M. Rodrigues, (2014), «The dynamics and contrast of house prices in Portugal and Spain», *Economic Bulletin and Financial Stability Report Articles and Banco de Portugal Economic Studies*.

Luo, Z., C. Liu and D. Picken, (2007), «Housing price diffusion pattern of Australia's state capital cities», *International Journal of Strategic Property Management*, 11(4), 227–242, link

MacDonald, R. and M.P. Taylor, (1993), «Regional house prices in Britain: long-run relationships and short-run dynamics», *Scottish Journal of Political Economy*, 40(1), 43–55.

Maclennan, D., (1979), «Housing Economics — A Review and introduction», *Scottish Journal of Political Economy*, 26(3), 325–329.

Marfatia, H.A., (2018), «Wavelet linkages of global housing markets and macroeconomy», *SSRN Electronic Journal*.

Meen, G., (1990), «The removal of mortgage market constraints and the implications for econometric modelling of UK house prices», *Oxford Bulletin of Economics and Statistics*, 52(1), 1–24.

Meen, G., (1996), «Ten propositions in UK housing macroeconomics: an overview of the 1980s and early 1990s», *Urban Studies*, 33(3), 425–444.

Meen, G., (1999), «Regional house prices and the ripple effect: a new interpretation», *Housing Studies*, 14(6), 733–753.

Miles, W., (2017), «Has there actually been a sustained increase in the synchronization of house price (and business) cycles across countries?» *Journal of Housing Economics*, 36, 25–43.

Miles, W., (2019), «Has the euro sustainably increased home price co-movement?», *Journal of Regional Science*, 59(5), 931–961.

Miranda-Agrippino, S. and H. Rey, (2020), «U.S. monetary policy and the global financial cycle», *The Review of Economic Studies*, 87(6), 2754–2776.

Morley, B. and D. Thomas, (2011), «Risk-return relationships and asymmetric adjustment in the UK housing market», *Applied Financial Economics*, 21(9), 735–742.

Muellbauer, J. and A. Murphy, (1994), «Explaining regional house prices in the UK», WP94/21, *UCD Centre for Economic Research Working Paper Series*.

Muellbauer, J. and A. Murphy, (2008), «Housing markets and the economy: the assessment», *Oxford Review of Economic Policy*, 24(1), 1–33.

O'sullivan, T. and K. Gibb, (2003), Introduction, In *T. O'sullivan and K. Gibb (Eds.), Housing Economics and Public Policy* (pp. 1–21), Blackwell Science.

OECD, (2019), «The rising cost of the middle-class lifestyle», In *Under Pressure: The Squeezed Middle Class* (pp. 102–133), OECD Publishing, link

Oikarinen, E., (2005), «The diffusion of housing price movements from centre to surrounding areas», No. 979, *ETLA Discussion Papers*.

Otrok, C. and M.E. Terrones, (2005), «House prices, interest rates and macroeconomic fluctuations: international evidence», In *International Monetary Fund, mimeo* (Issue May), link

Payne, J.E., (2012), «The long-run relationship among regional housing prices: an empirical analysis of the U.S.», *Journal of Regional Analysis and Policy*, 42(1), 28–35.

Pollakowski, H.O. and T.S. Ray, (1997), «Housing price diffusion patterns at different aggregation levels: an examination of housing market efficiency», *Journal of Housing Research*, 8(1), 107–124.

Poterba, J.M., (1984), «Tax subsidies to owner-occupied housing: an asset--market approach», *The Quarterly Journal of Economics*, 99(4), 729–752.

Pow, C.P., (2017), «Courting the 'rich and restless': globalisation of real estate and the new spatial fixities of the super-rich in Singapore», *International Journal of Housing Policy*, 17(1), 56–74.

Rey, H., (2015), «Dilemma not trilemma: the global financial cycle and monetary policy independence», *Working Paper 21162, NBER Working Papers*.

Rogers, D. and S.Y. Koh, (2017), «The globalisation of real estate: the politics and practice of foreign real estate investment», *International Journal of Housing Policy*, 17(1), 1–14.

Ronald, R. and C. Dewilde, (2017), «Why housing wealth and welfare?», In *C. Dewilde and R. Ronald (Eds.), Housing Wealth and Welfare* (pp. 1–34). Edward Elgar Publishing.

Rosenthal, L., (1986), «Regional house price interactions in the UK, 1975–81: a cross-spectral analysis», *Applied Economics*, 18(9), 1011–1023.

Ryczkowski, M., (2019), «Money, credit, house prices and quantitative easing — the wavelet perspective from 1970 to 2016», *Journal of Business Economics and Management*, 20(3), 546–572.

Smith, L. B., K.T. Rosen and G. Fallis, (1988), «Recent economic developments in models of housing markets», *Journal of Economic Literature*, 26(1), 29–64.

Stevenson, S., (2004), «House price diffusion and inter-regional and cross-border house price dynamics», *Journal of Property Research*, 21(4), 301–320.

Taltavull de La Paz, P., E. López and F. Juárez, (2017), «Ripple effect on housing prices, evidence from tourist markets in Alicante, Spain», *International Journal of Strategic Property Management*, 21(1), 1–14.

Terrones, M. E. and C. Otrok, (2004), «The global house price boom». In *World Economic Outlook*, September (pp. 71–89), link

Teye, A. L., M. Knoppel, J. De Haan and M.G. Elsinga, (2017), «Amsterdam house price ripple effects in the Netherlands», *Journal of European Real Estate Research*, 10(3), 331–345.

Tsai, I.C., (2015), «Spillover effect between the regional and the national housing markets in the UK», *Regional Studies*, 49(12), 1957–1976.

Tu, Y., (2000), «Segmentation of australian housing markets: 1989–98», *Journal of Property Research*, 17(4), 311–327.

Vansteenkiste, I., (2007), «Regional housing market spillovers in the US: lessons from regional divergences in a common monetary policy setting», In *ECB Working Paper* (No. 708; Issue January).

Vansteenkiste, I. and P. Hiebert, (2011), «Do house price developments spillover across euro area countries? Evidence from a global VAR», *Journal of Housing Economics*, 20(4), 299–314.

Weng, Y. and P. Gong, (2017), «On price co-movement and volatility spillover effects in China's housing markets», *International Journal of Strategic Property Management*, 21(3), 240–255.

Whitehead, C. M. E., (1999), «Urban housing markets: theory and policy», In *P. Cheshire and E. S. Mills (Eds.), Handbook of Regional and Urban Economics: Vol. III* (pp. 1559–1594), Elsevier.

Yang, Z., Y. Fan and L. Zhao, (2018), «A reexamination of housing price and household consumption in China: the dual role of housing consumption and housing investment», *Journal of Real Estate Finance and Economics*, 56(3), 472–499.

Zhang, D., (2010), «Testing convergence on UK regional housing prices: A Fractional Integration Approach», In *L. Tsipouri, N. Tsounis, and A. Vlachvei (Eds.), International Conference On Applied Economics — ICOAE 2010* (pp. 845–852).

Zhang, F. and B. Morley, (2014), «The convergence of regional house prices in China», *Applied Economics Letters*, 21(3), 205–208.

Zhang, L., E.C. Hui and H. Wen, (2017), «The regional house prices in China: ripple effect or differentiation», *Habitat International*, 67, 118–128.

Zohrabyan, T., D. Leatham and D. Bessler, (2008), «Cointegration analysis of regional house prices in U.S.» In *M. A. Gunderson (Ed.), Agricultural and Rural Finance Markets in Transition, Proceedings of Regional Research Committee NC-1014, October 4–5, 2007, St. Louis, Missouri* (Issue July).

Chapter 4
Territorial patterns of housing affordability in Portugal

Paulo Batista, João Lourenço Marques and Eduardo Anselmo Castro

4.1. Introduction

Housing is a recurring topic when it comes to defining public policies. The right to housing is one of the fundamental human rights, and as several authors argue (e.g. Allen, 2006), there has been a converging set of policies that focus on realising the legal duties arising from them. Nevertheless, in the last few years, a growing debate has taken place over how such policies translate into the practical realization of those rights, with a focus on the role of the housing market (see Marques et al., 2020, for a brief overview on housing provision and housing consumption). This debate is supported by the claim that the right to housing should go beyond its usual interpretation, such as the focus on structural and infrastructural housing conditions (Carmo et al., 2014; Ferrão, 2019; Wetzstein, 2017).

The contemporary guidelines for the right to housing, developed as an international consensus (see, for example, The Human Rights-Based Approach to Housing and Slum Upgrading, 2017), establishes a multi-dimensional approach which includes:

- Safety of usufruct: a house is not deemed appropriate if its occupants do not possess a certain degree safety in terms usufruct, for which legal protection against forced evictions, harassment, and other threats is particularly relevant;
- Availability of services, materials, facilities, and infrastructure: a house is appropriate if there is a set of elements and basic infrastructures available within it, namely in what concerns access to drinking water, sanitation and collection/treatment of residues, and energy (to cook, for warmth, lighting and food storage);
- Availability of essential structural elements: housing is appropriate if it ensures its sheltering capabilities — of physical safety and protection from natural risks — and adequate space considering the number and type of occupants;
- Adequacy to the physical needs of occupants: housing is appropriate if it meets the specific needs of vulnerable, marginalized, or physically limited groups;
- Adequate location: housing is appropriate if it provides residents with essential services — education, healthcare, and access to other social protection services (for the elderly, for example,) — and equal access to employment opportunities;
- Cultural adequacy: housing needs to be considered part of the right to individual expression and the cultural manifestation of identities.

However, in practical terms, efforts to identify and assess housing needs usually focus on a quantitative perspective, namely the number and type of dwellings compared to the population and its characteristics (such as the number of households, size, or composition). A complementary quantitative perspective is concerned with an economic dimension, from where the concept of housing affordability emerges. This perspective is commonly viewed as the outcome of a relationship between housing costs and household income. However, efforts to combine affordability and larger dimension housing needs have resulted in a multitude of metrics that seek to measure the adequacy and satisfaction of households — see Mulliner and Maliene (2015) for a summary of a multidimensional vision of housing affordability.

The spatial character of housing (Bogdon and Can, 1997; Butler and Hamnet, 2013) has resulted in the decentralization of capabilities of local political administrative bodies (municipalities) to ensure the effective monitoring and regulation of the housing market. The operational instruments have been pointed out as underdeveloped and insufficient (Alves, 2020) but have seen a relevant boost in recent years. Now, as part of a new generation of territorial planning instruments, local housing strategies[7] (Decree-Law no. 37/2018) and municipal housing charters (Act no. 83/2019) have defined a set of new housing intervention programmes[8]. These instruments are expected to embody the principles of the equally recent housing act (Act no. 83/2019), allowing for the effective regulation of the housing market.

Public policy has been focused on improving households' access to housing through its participation in the open residential market. The state assumed a regulatory role in this context, with its interventions being more concerned with identifying households' lack of financial resources to buy a house than with assessing the satisfaction of housing needs in their multiple dimensions. As a result, nowadays the most relevant housing tenure status is that of owner (representing around 70% of Portuguese households in 2011, a number in line with most of the OECD member countries), and a low potential for residential mobility has had important consequences on the satisfaction of housing needs (Baker et al., 2016; Henley, 1998).

Moreover, the territorial features embedded in houses, and the difficulty in fully identifying them, lead to relevant information asymmetries (Ambrose and Diop, 2018; Kurlat and Stroebel, 2015) and, therefore, to markets which are usually far from efficient, while also complicating the development of integrated policies. The territory's spatial and socioeconomic characteristics offer an opportunity to pinpoint the diversity and multidimensionality of housing needs. However, this imposes the need to develop new metrics in order to intersect territorial diversity with housing market drivers.

Seeking to contribute towards the spatial, social, and economic features of the housing market, the work presented in this chapter makes an integrated and territorial analysis of housing affordability. It not only reflects on challenges posed to model market drivers by data collection and processing, but also (re)introduces the concept of territory in housing affordability metrics. Here, a concept of territory unbound from its common administrative expressions is used (João Marques and Batista, 2021). In line with the debate on the role of space developed by (Harvey, 2006; Lefebvre, 1991), the territorial analysis of affordability considers a space where different forces interact and, thus, territorial patterns are not objectively fixed or bounded a priori. To consider this notion of space-territory, an approach was

developed integrating econometric tools to observe the expression of the spatial drivers of housing affordability, their spatial interlinkages (spatial autocorrelation) and the expression of these territorial features in housing affordability metrics.

A synthetic and spatial measure of housing affordability was developed as an extension of the standard relationship between housing costs and household income ratios. This contributes to combining this classical approach with the endogenous and exogenous features of the territory. To pursue this aim, the paper begins with a brief discussion of the exogenous territorial patterns as candidates for explaining housing affordability, in Section 2. In Section 3, we present the methodological benchmarks used for proposing a territorialized housing affordability index for mainland Portugal[9], discussing the challenges related with data scarcity, the micro-macro nexus, and small area estimations. Section 4 describes the results, namely the territorial patterns of housing affordability at a civil parish level, showcasing the explanatory factors of housing prices and household income. Lastly, Section 5 reports the main findings and conclusions, focusing on the relevance of the identified geographical patterns for designing public housing market policies.

4.2. Social, economic and spatial elements under housing affordability analysis

4.2.1. Demography and territorial transformation processes

Amongst the exogenous socioeconomic drivers of housing access conditions, demographic dynamics and territorial transformations represent key elements. Characteristics arising from these phenomena can be linked to the drivers of housing demand and supply.

As an example, in territorial contexts where population is ageing, and usually associated with population decline, housing needs are linked to the physical comorbidities of households. These conditions translate into very specific housing needs — e.g., on an architectural level — which are not in line with available housing features, since they were designed with another demographic context in mind. This example is particularly relevant considering the demographic challenge Portugal and the majority of European countries currently face.

Several authors highlight life cycles as an important element in establishing housing needs (see e.g. Abramsson and Andersson, 2016, Bitter and Plane, 2013, and Costa-Font et al., 2009). Thus, while population ageing and decline are generalized phenomena, they affect central and peripheral regions in different ways (Castro et al., 2020, and Marques et al., 2021). Portugal, which fits the description of a peripheral territory in the European context, faces a much fiercer decline and ageing of its global demographic dynamics, also displaying highly contrasting internal scenarios (Castro et al., 2015, and Marques et al., 2021). Current demographic metrics show that only a few specific areas within the cities of Lisbon and Porto, the Algarve region and some other urban areas, are an exception regarding population ageing and decline (see figure 37 and figure 38). This internal contrasting demographic evolution is reflected in very differentiated patterns regarding the housing market's demand and supply.

If at first a decline in population (demand) can result in a surplus of available housing, according to these territories' needs (in purely quantitative terms), the fact that the population's characteristics are generally different (due to population ageing) should also be considered, as well as the fact that the decline process usually originates

insufficient dynamics in the housing market. This also happens due to low demand and expectations, and in turn will result in an even further reduction in the future. In the Portuguese case, the metric of the average age of residential housing units seems to, albeit partially, prove this phenomenon (see figure 38, figure 39, and figure 40).

Figure 37 Demographic evolution 2001–2011

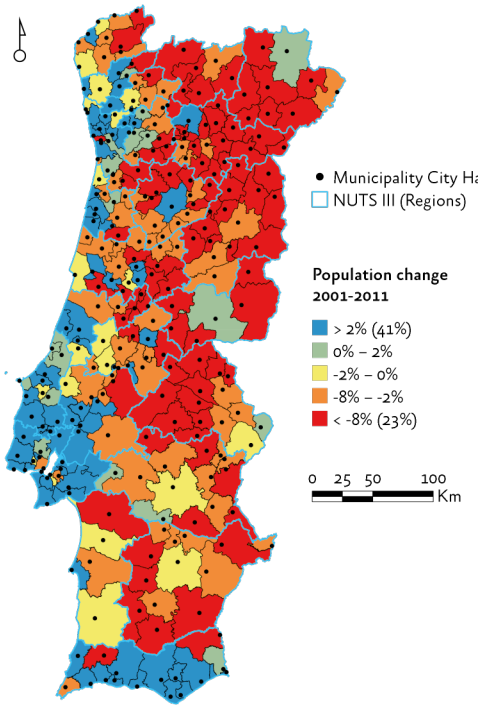


Figure 38 Demographic evolution 2011–2015 (municipalities)

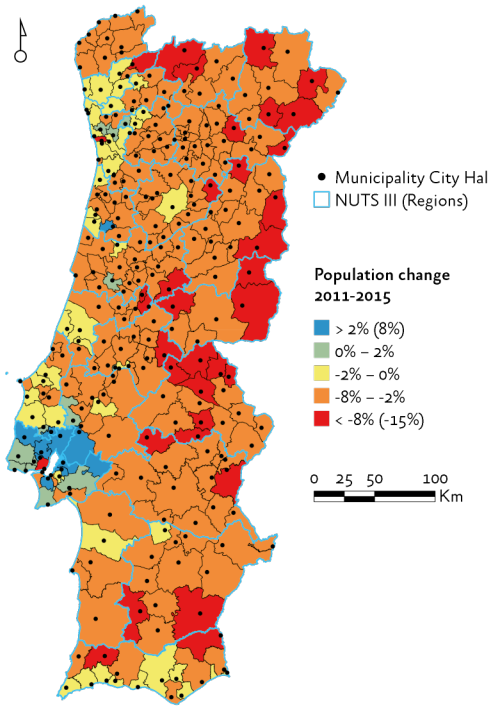


Figure 39 Average age of residential housing units (2011)

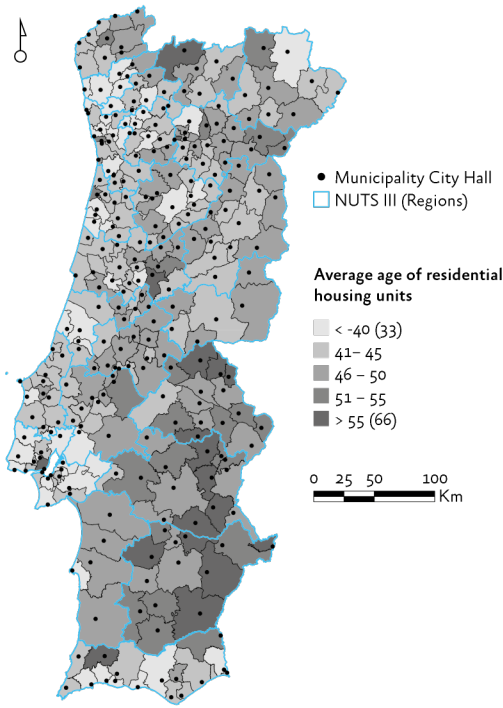
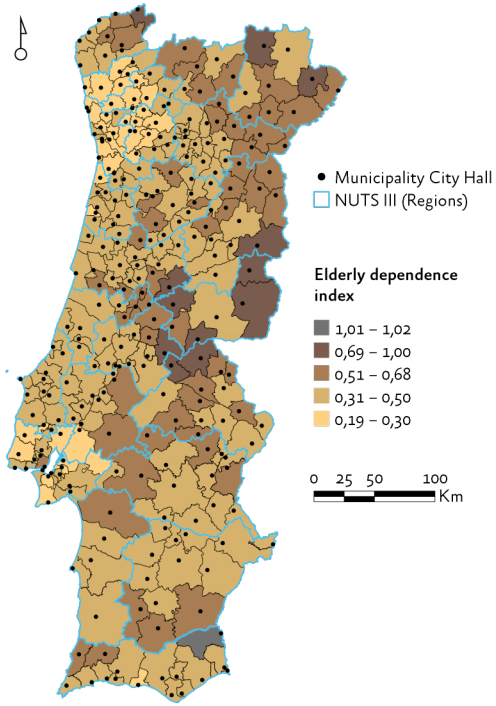


Figure 40 Elderly dependence figures

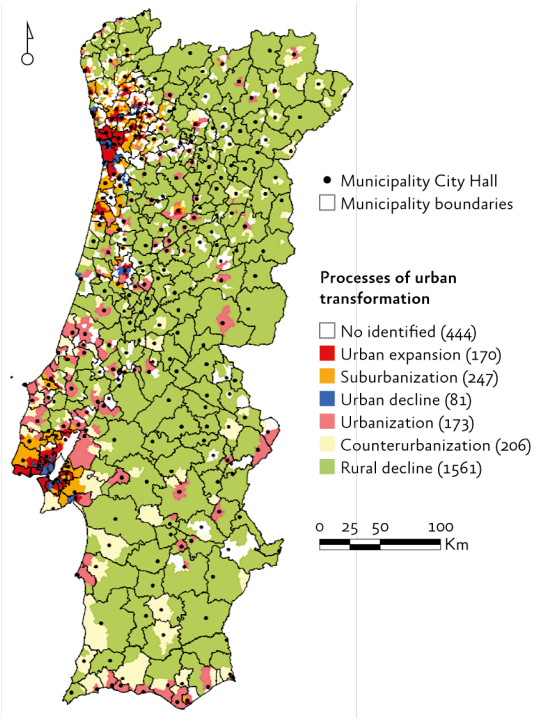


The overlap between urban transformations and different housing markets frequently uncovers inadequacies in the fulfilment of housing needs. These relations are well-documented in scientific literature, with the works of Bramley (2007), Fingleton (2008), Meen and Andrew (2008) and Mulliner and Maliene (2013) making up some examples. This highlights their robust territorial character, as well as, above all else, the spatial expression brought to housing affordability metrics. In the Portuguese context, the localized dimension of both phenomena allows the creation of a common analysis strategy: the work of Wolf et al. (2020) approaches the geographic identification of different urban transformation processes in an integrated manner, intersecting population growth with artificial urbanity metrics (populational density, proportion of artificial land use, etc.) and centrality (equipment, services, economic activities, etc.). There is also the merit of using civil parish level analysis, as it allows for a more thorough territorial survey (see figure 41).

Thus, the urban transformations taking place within Portuguese territory today seem to support a divide between coastline and countryside: for the countryside, the prevailing process is rural decline, which contrasts with the urbanization taking place in some civil parishes, particularly in the municipal seat (urban entrenchment); for coastline regions, there is a declining pattern amongst more central civil parishes in large urban agglomerations (as happens in both metropolitan areas, and Braga or Setubal), contrasting with urban expansion processes in civil parishes neighbouring these older urban continuums, as well as with processes of suburbanization taking place at territory level and already merging with more rural areas.

Geographical patterns identified by Wolf et al. (2020) will thus allow for the analysis and interpretation of housing affordability metrics developed in this work. Processes of urban transformation promote the reading of affordability drivers in face of the defining characteristics of these phenomena, contributing towards the multidimensional and integrated understanding of housing affordability, as has been advocated in international policy forums.

Figure 41 Processes of urban transformation in (mainland) Portugal's civil parishes



Urban expansion
The growth of larger urban areas, leading to a concentration of population, economic activities, or services.

Urbanization
The passage from low density land uses to high density ones, mostly an outcome of migration to existing urban areas.

Urban decline
Population decline in urban areas, leading to the abandonment of infrastructures and housing, ageing or economic decline.

Rural decline
Population decline in rural areas, which is generally characterized by agricultural abandonment, the closure of services and changes in the landscape.

Counter urbanization
Urbanization processes in rural areas beyond suburban or peri urban locations.

Suburbanization
The expansion of urban areas beyond their former limits, normally marked by sprawl.

Note: Adapted from Wolf et al. (2020).

4.2.2. Housing and housing market

In Portugal, as in most European countries, the free market is the main gatekeeping mechanism in housing access. The traditional assumption of free competing markets would want us to consider that housing prices are a mere result of the relationship between supply and demand. However, the housing market has its own characteristics, which contribute to the emergence of much more complex outcomes.

The special characteristics of housing as an asset partially separate it from the more standard economic theory (e.g. Bourne, 1981; Maclennan, 1977), mainly due to its unique mix of features: i) heterogeneity and singularity; ii) immobility; and iii) durability. These distinct elements of housing translate into two important market behaviours: a) as any decision over a durable asset, decisions on housing transactions are more easily postponed. Furthermore, economic decisions are not only based on housing attributes themselves, but also ponder investment or hoarding criteria; b) housing tends to incorporate the territorial features of its surroundings and the advantages (or disadvantages) the location factor has within the urban context. Thus, the housing market is vulnerable to influences of exogenous phenomena, whether these are produced through territorial planning or dynamics arising from varied social and economic activities, which take (or do not take) place in its surroundings.

Besides this uniqueness and complexity, housing is connected with important macroeconomic multiplying effects (Meen, 2013). Thus, global public policies seek to maximize the role of housing as an asset in investment, or hoarding as a common strategy to foster global economic growth (Aalbers and Christophers, 2019, and Santos et al.,

2014). This option tends to be implemented alongside unawareness regarding its potential effects on housing needs. This is a recurrent strategy in Portugal's policy options, which can be emphasized by a few examples from recent years: i) the promotion of the housing market for tourism purposes — from the construction of touristic villages to the transformation of single housing units into touristic housing, also called local accommodation (Cocola-Gant and Gago, 2019); ii) the investment incentives targeting the housing market as part of the foreign residence permit programme (Lopes, 2013; Rogers and Koh, 2017); and iii) the implementation of favourable frameworks for house purchases by large investment funds (Waldron, 2018, and Wijburg et al., 2018), where one of the most notable examples is the recent promotion of REITs (*real estate investment trusts*) as a special mechanism to attract global foreign investment to the real estate sector in Portugal.

Although the distinction between endogenous elements in the housing supply market and exogenous ones is difficult to measure, it is important to bear in mind some of the consequences that have been attributed to exogenous phenomena. It is possible to highlight: i) the inflationary pressure on housing prices (Lourenço and Rodrigues, 2014, 2017), moving them away from the evolution path for household income (OECD, 2020) (figure 42), thus contributing to worsening the metrics of housing (un)affordability (Rodrigues et al., 2016; Xerez et al., 2019), especially in the most vulnerable groups (table 8); and ii) the prevalence of an apparent housing oversupply (a common phenomenon in most developed countries, as highlighted by data compiled by (OECD, 2020)) without translating into substantial improvement in housing deprivation metrics (table 8).

Figure 42 Trajectory of housing prices and income

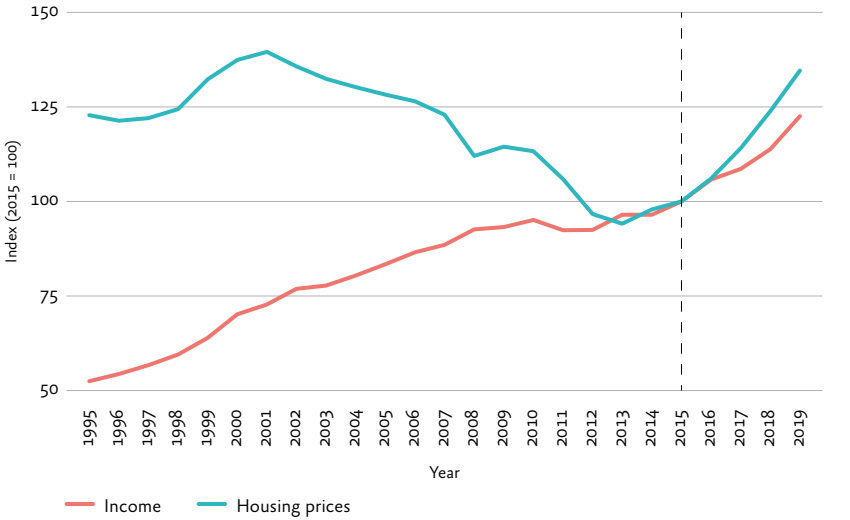


Table 8 Residential housing and housing deprivation metrics in Portugal

	2005	2015
Residential dwellings by resident population: (Source: Statistics Portugal / own calculations)	0,53	0,57
Overcrowding rate (Source: Statistics Portugal — link)	16,5	10,3
Severe housing deprivation rate (Source: Statistics Portugal — link)	7,7	4,7
Median of housing cost burden (Source: Statistics Portugal — link)	8,4	13.4
Housing overburden rate (Source: Statistics Portugal — link)	4,3	9,1

In fact, in Portugal, as shown in table 8, high housing availability (based on the ratio of housing units per inhabitant) has not been reflected in the metrics of housing cost burden, which have been aggravating. The metrics of housing deprivation and overcrowding, on the other hand, have shown improvements, although they remain at high levels. In fact, the combined analysis of these more habitual dimensions of housing shortages have suggested that the problem runs deeper, leading to the National Survey of Rehousing Needs (Levantamento Nacional Das Necessidades de Realojamento Habitacional, 2018), conducted by the Institute of Housing and Urban Rehabilitation (IHRU), in collaboration with local authorities (municipalities). This initiative sought to provide a more accurate and effective portrait of the most serious housing shortages, having identified around 26,000 households in unsatisfactory housing conditions, within the most disadvantaged territories and social groups. This survey was the basis for the design and implementation of the *1.º Direito* (1st Right) programme (Decree-Law No. 37/2018, mentioned above), aimed at conducting a more thorough[10] survey and providing intervention instruments (financial included). It should be noted that the *1.º Direito* programme (which is still under development) had, by June 2020, identified situations of severe housing shortage that already exceeded the values identified in the above-mentioned survey by 77% (IHRU records «an approximate 77%» increase in housing shortages, 2020)[11].

The role played by the non-housing aspect in setting housing prices naturally has a territorial dimension to it. Characteristics such as place and location are relevant to these differentiated economic roles, thus contributing towards distinct territorial effects that should be taken into consideration when assessing housing affordability.

4.3. Measuring housing affordability

4.3.1. Affordability — measurement challenges and approaches

Despite methodological challenges, the definition and measurement of housing affordability has been a key challenge in supporting the formulation and implementation of public policies: i) it is a key criterion for the efficient allocation of public subsidies; ii) it allows the assessment of households' abilities to bear the burden of mobilizing resources in order to gain access to housing; iii) it constitutes a metric that regulates real estate investment, especially the agents' decisions, be it public or private, to locate investments; and iv) it is a key dimension taken into account in the analysis of the population's living conditions and income, with special relevance in defining poverty thresholds.

As mentioned by (Bramley, 2012), the scientific community has contributed with a fruitful discussion on the methodological strategies to be adopted, and two main lines of methodological development can be identified — the residual income perspective and the normative perspective.

i) The residual income perspective

In this approach, the definition of housing affordability is based on the construction of an «equivalence level», which allows the effects of household characteristics to be reflected (e.g., household size or composition). In this approach, housing affordability is measured through a comparative analysis of the disposable income of several households, after deducting the necessary expenses considered

essential, excluding housing (Stone et al., 2011). The surplus value is then compared with housing access costs, taking into consideration the most appropriate household characteristics.

It is an exercise in which the multiple dimensions of housing rights are more easily integrated, as the act of meeting basic housing needs translates into allocating differentiated proportions of income by household income. Borrowman et al. (2017) refer to this approach as a «housing stress» assessment, as it seeks to assess the budget balancing effort required from households to ensure minimum housing conditions, forcing them (or not) to forego the use of income for other purposes. The residual income approach is, however, extremely difficult to conduct. The specific details (consumption structures) and those of the analysis units (the household, the housing unit) require a detailed set of data (often inaccessible) and the implementation of complex analytical methods.

In addition to the reported difficulties, this methodological approach proves very difficult to implement in a territorial analytical focus — which this work aims to achieve. The complexity and difficulty in collecting data with the necessary (spatial) granularity make this option impractical, not least because it makes the necessary regularity with which this analytical exercise should be developed unfeasible, given the very dynamics of the urban transformation processes already mentioned above.

ii) The normative perspective

The normative perspective refers to a more immediate and simple method, where housing values are compared with household income. Where the provision of housing is mostly carried out through the market, the adoption of the (market) price becomes a trivial and expeditious option to design this type of metric[12]. This perspective also benefits from the consolidated development of techniques for measuring both house prices and household income: econometric methods provide an expeditious way of identifying market price (and household income) factors in a scientific technical framework which combines simplicity, (territorial) versatility, and (spatial) comparability.

Given the degree of subjectivity at play here, it is important to realize some of the most common normative references, of which the following stand out:

1. The proposal of consulting firm Wendell Cox Consultancy, in its renowned publication «Demographia International Housing Affordability Survey» (Cox et al., 2020), adopts the ratio between the median (total) price of transacted housing and the (median) income of all households, in a set of different territorial units (309 metropolitan areas, 7 countries). It associates a level (threshold) of housing affordability with 5 classes: below 3 is affordable, between 3 and 4 is moderately unaffordable, between 4 and 5 is severely unaffordable, and finally, a ratio above 5 is considered greatly unaffordable.
2. The OECD yields a housing affordability metric with the clear purpose of allowing comparisons between countries. In this case, the ratio that confronts the average nominal value of housing prices (for sold housing units) with the metric of (average) nominal disposable income, per individual, is chosen.
3. Lastly, the European statistical system (Eurostat and Statistics Portugal) yields a housing affordability metric that is used to design

European and national public policies: the housing cost overburden rate. In this case, the metric matches a proportion of households which are above a given normative threshold for a ratio that collates housing costs with disposable income, calculated for each one of the households. This ratio is obtained through a representative survey on the population's living conditions, with the sample design providing a maximum territorial detail corresponding to NUTS II. The normative threshold for housing affordability is 40% (the maximum share that housing costs represent in a household's income).

The normative basis for housing affordability is the most common approach for country-level (or region-level) comparisons. Different international and national, public and private institutions resort to this type of approach as a way to provide expedient metrics which allow the comparison and assessment of public policy formulations (Anacker, 2019; Hulchanski, 1995; and Li, 2015). These works allow us to realize that the spatial detail (disaggregation) of prices and income metrics largely determine territorial granularity, through which it is possible to analyse the housing affordability phenomenon. For example, the housing cost overburden rate describes an accurate metric, since it arises from detailed data for each housing unit and its households. However, it has a very limited territorial scope (in Portugal this reaches maximum spatial disaggregation at the level of the large NUTS II regions), limiting its usability as an indicator to help local decision-making regarding housing policy.

The complexity of the territorial patterns in Portugal briefly described in the previous section, suggests the need to adopt analytical instruments at the level where housing policies make more sense: at the local/municipal scale. The methodological proposal shown here seeks to extend the normative approach to the local level, where three fundamental challenges will be answered: the decision regarding the instrument of measurement to be adopted (models, assumptions and functional specifications) and the data and variables (whether primary or secondary, objective or subjective, simple or composite, quantitative or qualitative).

4.3.2. Methodology

The work in development aims to pinpoint a set of metrics that allow for housing affordability analysis regarding civil parishes in mainland Portugal. The normative approach is adopted due to its ease of use, simplicity and suitability as a support tool for designing public policies.

The territorialized analysis of housing affordability requires estimates to be obtained for the market price of housing units, as well as for household income. In the first case, the role of the housing market regarding housing supply in Portugal enables us to derive estimates of the value of the entire housing stock, and consequently of the (annualized) costs eventually associated with it, from market prices observed in each territory. In the second case, we will make use of information on household income and its acknowledged connection with factors such as qualifications, sectors of activity, and occupations, as the most relevant explanatory element of territorial variations in household income.

In greater detail, the analytical procedure can be broken down into 3 sequential phases.

Phase 1: identifying housing prices and household income drivers.

i) Housing price explanatory model

In the information provided by Statistics Portugal, the median value of sales per square metre of dwellings (€)[13] was selected as the market price metric. This has a territorial breakdown at the municipality level and a quarterly periodicity[14].

The model of housing price drivers (hedonic price model) can be expressed by the mathematical relation:

$p(X) = b X + \varepsilon$

where:

$p(X)$ — housing market price;

$X = (X_1, X_2, \ldots, X_n)$ — housing attributes and explanation factors for housing prices;

$b = (b_1, b_2, \ldots, b_n)$ — hedonic prices for each X attribute;

ε — stochastic component.

Based on these considerations, the explanatory model of housing prices that we propose to implement considers: i) intrinsic attributes — dwelling's age and area; ii) neighbourhood characteristics — population density, typology of the surrounding urban area, rate of change in the number of housing units); and iii) other location and neighbourhood attributes — defined by the region where the housing unit is located. Considering that the housing market is not limited to the provision of housing and depends on different dynamics, it is also important to ponder a set of metrics that consider the impact of these market configurations on the determination of the market price. Thus, we consider also including the following: a) a measure of the intensity of tourist accommodations, b) a metric for the ratio of dwellings occupied under rental contracts, and c) a metric referring to the number of transactions for each territorial unit.

The relation between the housing prices and housing attributes is rarely linear in nature — see, for example, the relationship between housing prices and size. However, scientific evidence has allowed to consider it reasonable to proceed, a priori, with transformations of the initial variables, which easily establish the mathematical conditions necessary to resort to estimates in a classical linear model. Among the possible features that arise from transformations of the original variables, the log-log[15] model was selected. Here, the logarithmic function is used for the transformation of the independent variables and the dependent variable. This transformation of variables also allows for greater interpretative simplicity regarding the linear regression model, since the coefficients (b) can thus be interpreted as percentage changes in the dependent variable — $p(X)$, arising from the 1% variation of variable X — which, in economic terms, refers to the concept of price elasticity for the housing attribute represented by variable X.

Finally, it should be noted that we intend to define a variable to explain annual housing costs, so that a direct comparison with income, which tends to be measured on an annual basis, can be drawn. It is assumed that this variable derives directly from the observed market price metric (in the year under analysis), assuming that in a housing market where there is a predominance of owner-occupied housing acquired through credit instruments, it is admissible to consider the conversion of the market value of housing into an annual cost corresponding to a 30-year

period credit instrument, as an approximation for the annual cost of housing. The total amount to be amortized does not only correspond to the house's market price but also to a portion reflecting the financial costs of the credit instrument/conversion of the house's market value regarding the deferred amortization of that same value (interest rate, risk premium, other administrative costs).

It should also be noted that since the housing price metric shown is per square metre, the actual housing price from which the respective costs are derived requires the identification of an estimate of the housing area. Within this specific work, assuming that the unit of analysis corresponds not to one dwelling but to a set of reasonably homogeneous dwellings located in a given spatial unit (from the municipality to the statistical sub-section), means working with the central values of these variables — the median market price and the median observable area in the spatial unit.

ii) Explanatory model of household income

To develop an explanatory model of household income, we identified the census metrics referring to the qualifications, occupations, and respective sectors of economic activity of the employed population, as key factors. In fact, this set of aspects is consensually referred to in scientific literature as the main explanatory aspect of income distribution, especially in studies that focus on territorial analysis.

The choice of household income metrics benefits from Statistics Portugal's recent divulgence of the metric median value of gross declared income per tax household[16], available with spatial disaggregation at the municipality level. It should be noted that, despite the need to adopt some assumptions, this metric allows the development of a spatial econometric modelling process similar to that previously established for house prices.

It should be noted that the approximation between income reported in the IRS (income tax return) and the effective income of households is an imperfect approximation, as it tends to underestimate the representativity of households with income not always stated in the IRS form. On the other hand, the approximation between the concept of household used in the statistical context, and that of the tax household in the context of tax administration, may also create some biases. In this case, this is due to a selection of households, namely the poorer ones, possibly not being represented as tax households in the context of income tax return, as they are exempt from handing in this statement due to low levels of income — a factor which will certainly influence the median declared income value.

Lastly, it should be noted that both models have a time gap between the explanatory variables considered (mostly from census data from 2011) and the metrics selected as variables to be explained — house prices and household income — which refer to data from 2015. It should also be noted that although this differential may suggest a weakness, this is balanced with the fact that: i) the rates of residential mobility are generally low (even regarding the initially referred durability of good standards of housing, but also by other idiosyncratic factors of housing as an asset) and ii) the cycles of urban transformation processes usually take place in time intervals longer than the 5-year intervals mentioned here (which translates into the reasonability of assuming a territory which generally retains its determining characteristics, regarding both prices and income). In this context and

for the spatial partitions taken into account, it is considered that there are no significant changes in the characteristics of households and dwellings with very significant influence on the identification of the main territorial patterns of housing affordability.

Phase 2: estimates of household housing costs and income for the statistical sub-section analysis unit.

The use of the above-mentioned set of metrics, with the municipality--level resolution with which they are provided, is limiting.
As previously mentioned, a) housing affordability issues tend to arise most urgently at the household level and concerning the ability to access a specific dwelling; and b) location and neighbourhood features are drivers of housing prices (Can, 1992, and Marques, 2012) as well as of income itself — as an example, Linneman (1980) identified that location and neighbourhood variables of housing surroundings represent a 15% to 50% variability in the prices of each dwelling.

To ensure a compromise between the resolution of the initial data and the desirable (territorial) resolution of the housing affordability metrics, we propose to infer housing costs and household income for spatial partitions determined by statistical sub-sections. It is assumed that, at the level of these spatial partitions, it is possible to make assumptions about the homogeneity of the dwellings and households located therein. The availability of data on the features of the dwellings and households, with a spatial breakdown at the statistical sub-section level — a spatial unit that is close to the urbanistic notion of block — opens the possibility of achieving this goal. However, as already mentioned, market price and income metrics are only available for municipalities.

Reconciling the availability of data at these two levels implies the adoption of a challenging assumption: the explanatory models, developed for the county level will have to be assumed to be reasonable approximations of household income and housing costs drivers at the subsection levels. That is, the weight (hedonic price) of the explanatory variables, estimated at the county level, is assumed to be similar (unchanged) for the different measurement resolutions adopted (the county and the statistical subsection units). This assumption ensures that the estimated amount for housing costs and household income is assigned to any dwelling and household located within its considered spatial unit.

The assumptions mentioned in the previous paragraph fall under well-known challenges in spatial analysis. The issues of estimation and inference at different geographic scales refer to the evidence, in many studies, that different scales capture different phenomena, even though they may be related to each other — this is known as the Modifiable Areal Unit Problem, (see, for example, Amrhein, 1995, Fotheringham and Wong, 1991, and Openshaw, 1981, for a detailed discussion). This challenge can also be linked to the debate around the Ecological Fallacy Problem, which refers to the impossibility of deriving global models by simple aggregation of individual models and vice versa (see Openshaw, 1984).

Aware of these challenges, it is considered that:

i) in the housing market, explanatory factors of housing prices are reasonably unchanged drivers for models at detailed geographic scales when these are considered within a territorially limited housing market (the municipality here is assumed as the spatial delimitation of each housing market);

ii) homogeneity of higher resolution spatial partitions (the statistical units) is presumed, further allowing extrapolation of their aggregate measurable properties as observables of the explanatory variables of household income and housing prices.

The process of estimating housing prices and household income for more detailed spatial partitions (statistical sub-sections) also presumes the risk of the characteristics of these partitions going beyond the sample limits of the data considered in the estimation of the models (carried out at the municipal level). The occurrence of this phenomenon increases the uncertainty of the estimation process, aggravated by the constraint of accurately measuring the errors arising from this specification. To mitigate this potential problem, a data pre-processing process was carried out, excluding subsections with values lower than 3 records, for the metrics of number of households and number of dwellings, from the estimation and analysis of results.

Phase 3: measure affordability at a local scale and describe its territorial patterns.

Inspired by the housing cost burden metric proposed in the statistical system (Statistics Portugal/Eurostat), we propose the development of a territorial housing cost burden index, using the ratio of 0.4 between the estimated median housing costs and the estimated median income as a normative reference (similar to what is defined in the official metric).

From this metric, it is possible to develop a spatial analysis that allows for the identification of territorial patterns of housing affordability by summarizing these estimates for the usual political administrative divisions. In this case, and given the detail, it is possible to yield summary results at the most disaggregated level — the civil parish. Thus, we have:

Housing cost burden index — established as the proportion of households residing in subsections (of the civil parish) where the ratio between the estimated (median) value of housing and the (median) value of income is greater than 0.4.

Recovering the notion that the definition of adequate housing involves a variety of interdependent aspects, difficult to capture within a single simplified metric, it is important to emphasize that data on housing costs and income also makes it possible to present a risk assessment of housing unaffordability.

In fact, admitting the achievement of housing affordability through the mobility of households in search of housing units compatible with their income as a hypothesis, will only make sense if the search is considered within the boundaries of their local community — the municipality. Thus, it is proposed to measure the:

- Housing unaffordability risk index — defined as the proportion of resident households (sum of households residing in subsections that meet the criterion) for which the (median, subsection) income value estimate is lower than the (observed) median income for all households in the county and where the (median, subsection) housing cost estimate is higher than the municipality's observed median housing cost.

Lastly, to better identify the observable territorial patterns of the metrics here proposed, we recommend an analysis of the recognized relations of spatial dependence which emerge from territorial

phenomena. As proposed by Waldo Tobler in what is commonly called the «first law of geography» — «everything is related to everything else, but near things are more related than distant things» (Sui, 2004; Tobler, 1970, 2004) — the interaction relations of individuals and their activities (including housing choices) with their surroundings tend to make geographical clusters emerge, which can be identified by techniques developed in spatial econometrics. Global (Moran I) and local (LISA) (Anselin, 1995) metrics of spatial association are the traditional example of these statistical measures of spatial association which allow us to identify patterns of territorial connection.

It should be noted that, doing justice to Tobler's postulate, spatial association metrics thus require the prior definition of what is understood as close, i.e., neighbourhood relationships. These are usually specified through a weight matrix (W) (Elhorst, 2014), generally established in an aprioristic way, based on the adoption of a classical notion of distance or neighbourhood relation, i.e., where the meaning of «near» and neighbour is consistent with topological or geometric relationships in the conventional Euclidean representation of geographic space. It's worth bearing in mind, however, that the notion of space for the purpose of territorial analysis has been a subject of dispute, with several authors calling for a more flexible approach (Bhattacharjee and Jensen-butler, 2006; Paelinck, 2013), which goes beyond the purely geographical notion — an aspect left here for future development.

4.3.3. Data

Tables 9 and 10 provide a brief description of the variables used in this work, the maximum spatial disaggregation, and the used data sources.

Table 9 **Modelling data for housing costs**

Variable	Description	Year	Adm. Level	Sources
HOUSINGCOST[17] (a)	Housing costs (Median, €/year) Obtained from a weighted median value per m² of dwelling sales (€) and the median area of dwellings (see next variable)	2016 and 2011	Subsection	Statistics Portugal: link link link
AREA (a,c)	Dwelling area (median, m²) Obtained as a weighted median retrieved from the number of dwellings by area.	2011	Subsection	Statistics Portugal: link
AGE (a,b,c)	Dwelling age Obtained from a weighted median of the buildings' ages	2011	Subsection	Statistics Portugal: link link
RENT (c)	Proportion of rented dwellings (% of total residential dwellings)	2011	Subsection	Statistics Portugal: link
DENS	Population density in 2011 (Pop/Km²) Data from Census 2011	2011	Civil Parish	Statistics Portugal: link
TOURISM (a)	Number of available beds in touristic activities (except campsites)	2016	Civil Parish	Turismo de Portugal: link
TRANS	Number of housing unit transactions	2016	Municipality	Statistics Portugal: link

Variable	Description	Year	Adm. Level	Sources
VARHU (a)	Evolution of the number of dwellings in the housing stock, 2011 and 2016 (%), only taking into account the cumulative sum of new housing units finished per year between 2011 and 2016	2011 and 2016	Municipality	Statistics Portugal link link
TERRITORY_TYPE	Classification of urban areas as predominantly urban area, medium urban area and predominantly rural area[18]	2014	Civil Parish	link
NUTSIII[19]	NUTS III	2016	NUTS III	

Notes:
(a) Authors' simple own calculations from primary data;
(b) Source: Statistics Portugal dataset for research and development teams;
data provided with crossing relations between variables;
(c) Source: Statistics Portugal dataset for research and development teams; data provided
with the higher spatial resolution available (subsection / smallest census track);
(d) Source: Statistics Portugal dataset for research and development teams;
data provided with higher disaggregation of variable classes;
(e) Obtained through statistical pre-processing (variable reduction techniques; variable selection approach).

Table 10 Modelling data for income

Variable	Description	Year	Adm. Level	Sources
INC	Median household income (€/year). Obtained from the median value of gross reported income per household.		Municipality	Statistics Portugal: link
QUAL (a,c)	Qualification index. Obtained from the number of years of each educational level weighted by the number of individuals with a given educational level.	2011	Subsection	
EMPp (a,d,e)	Proportion of workers per profession p(%). A variable for each p is produced. And p is: 1. Representatives of the legislative and executive bodies, directors and executive managers; 2. Skilled farmers and other skilled workers in agriculture, fishery and forestry; 3. Skilled workers in industry, construction and craftsmen.	2011	Civil Parish	link
EMPs (a,d,e)	Proportion of workers of companies with activities in sector s (%). A variable for each s is produced. And s is: 1. Extractive industries (B); 2. Manufacturing industries (C); 3. Electricity, gas, steam, hot and cold water, and cold air (D); 4. Information and communication activities (J); 5. Real estate activities (L); 6. Education (P); 7. Activities employing domestic staff and production activities for the producer's own use (T).	2011	Civil Parish	link

Variable	Description	Year	Adm. Level	Sources
TERRITORY_TYPE	Classification of urban areas as predominantly urban area, medium urban area and predominantly rural area.	2014	Civil Parish	link
NUTSIII[20]	NUTS III	2016	NUTS III	

Notes:
(a) Authors' simple own calculations from primary data;
(b) Source: Statistics Portugal dataset for research and development teams;
data provided with crossing relations between variables;
(c) Source: Statistics Portugal dataset for research and development teams; data provided with the higher spatial resolution available (subsection / smallest census track);
(d) Source: Statistics Portugal dataset for research and development teams;
data provided with higher disaggregation of variable classes;
(e) Obtained through statistical pre-processing (variable reduction techniques; variable selection approach).

4.4. Territorial patterns of housing affordability in Portugal

The Portuguese territorial reality is admittedly contrasting. Demographic aspects have revealed a country in rapid transformation. In this context, it is expected that the diversity of social, economic, and spatial dynamics be associated with distinct patterns of housing affordability.

Some of these patterns have been closely observed. For example, housing shortages related to the physical conditions of housing have been mostly identified in their direct relationship with poverty (and inequality) levels (Fernandes et al., 2016), and their territorial expression has been especially associated with the most densely populated areas, namely the two metropolitan regions.

As mentioned in section 2.1, profound changes in the demographic structure and differentiated population dynamics require us to consider the spreading of housing issues to other regions and social strata. This section thus appears as an effort to integrate these predominantly territorial phenomena in the debate of housing affordability in Portugal.

4.4.1. Housing affordability drivers: an analysis at the municipal level

4.4.1.1. Explanatory factors of housing prices

Of the two key components of a housing affordability metric, the housing price is the most difficult to model. Although it benefits from a consolidated econometric approach (hedonic price models), the available data does not always allow the assurance of the optimal modelling conditions suggested in the literature. Among various constraints are challenges connected to the availability of information. In fact, most of the available databases are fragmented across different agents and usually have restricted access applied to all or some of the crucial attributes (e.g., house prices). The collection of public data from real estate portals is also not a reasonable alternative. Not only because these portals limit the mechanisms that can be implemented to consult the information in the ads, but also because these data have important limitations, which make the spatial analysis proposed here unfeasible — for example, the absence of property georeferencing and the precise identification of transaction prices (or, at least, the records of quotation prices).[21]

An explanatory model of the median housing cost was developed from the information available at Statistics Portugal, which was derived from the variable provided by Statistics Portugal for the median price per square metre of traded properties (in 2016[22]) in the various Portuguese municipalities. As mentioned above, the estimation of an absolute value is obtained through an estimate of the median housing

area, which in turn is obtained from numbers included in the 2011 census (for the entire housing stock).

The set of intrinsic housing attributes, neighbourhood and location attributes are also mostly derived from metrics made available through the Statistics Portugal databases (census, typification of urban areas). For the specific case of the tourism intensity metric, the information obtained derives from georeferenced data made available by the Turismo de Portugal programme[23].

From the available data set, the final model, adjusted to ensure consistency of the estimates, presents the variables and their respective estimated weights, as described in table 11.

Housing area (AREAh) is the main explanatory factor for the median housing cost. As this is a recurrent observation in scientific literature, it should be noted that it is a result which also derives directly from the model construction options, or in other words, the estimated variable (PRICEh) resulting from the multiplication of the price per square metre and the area of dwellings in the unit of analysis.

As this model is focused on territorial analysis, it is important to stress that population density is the most relevant variable in explaining housing costs. This is an expected result given the common perception that housing prices tend to be higher in more densely populated territorial areas. This observation is further reinforced by the significant effect of the variable number of urban buildings traded (TRANSh), and also by the effect of the variable which translates the growth in the number of buildings (VARh). These metrics have clear territorial association with the more dynamic and more densely populated areas.

The association of housing costs is not only an adaptation of the market to a more dynamic territory regarding the housing function. As it has been argued, there are interdependencies between the housing market and economic activities that intersect with it: the example of tourism is the most well-known and discussed. Thus, the relevance of the variable indicating the supply of tourism beds (TOURISMh) in the model here presented, is in line with the evidence that has been documented regarding the effects of tourism on housing costs — places with a higher supply of tourism beds tend to also have higher housing costs.

Table 11 **Main results from the housing costs model**

Most statistically significant[(a)] explanation variables (X)	Coefficient estimate (Can be interpreted as elasticity: the % effect of increasing 1% of the explanation variable X in the (annual) amount of housing costs Y)
AREAh	0,31%
AGEh	-0,13%
RENTh	0,13%
DENSp	0,27%
TERRITORY_classe (reference: TERRITORY_apu)	-0,07%
TOURISMh	0,17%
TRANSh	0,16%
VARh	0,08%
NUTSIIIPT111 to NUTSIIIPT187 (reference: NUTSIIIPT170 — Área Metropolitana de Lisboa)	
Global explanatory power of the model (R^2): 83%	

Notes:
(a) significance based on $\alpha < 0,05$.
(b) region dummy variable coefficients are not presented; but significant coefficients are obtained for the NUTSIII 112, 119, 11A, 11C, 11D, 11E, 150, 16H, 16J, 181 regions.

Figure 43 Housing cost (median) based on (median) market prices and (median) dwelling characteristics. Municipalities. 2016

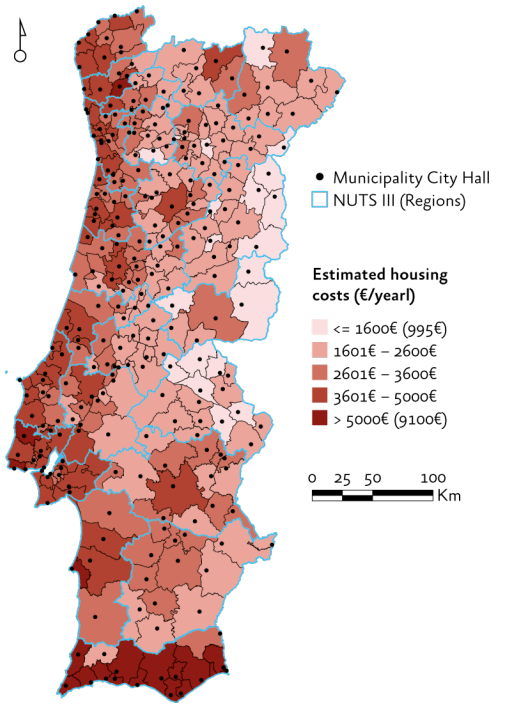


Figure 44 Housing cost (median) based on (median) market prices and (median) dwelling characteristics. Civil parishes. 2016

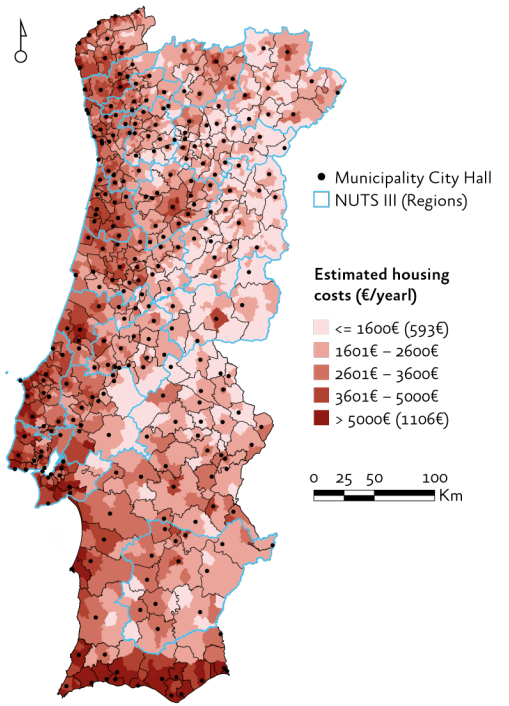
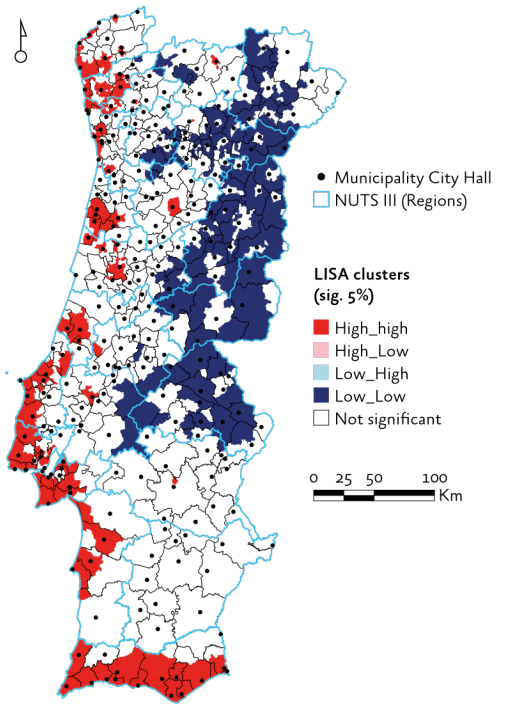


Figure 45 LISA clusters on the estimated housing costs. Civil parishes in 2016



The mapping of the estimation results (figure 43, by municipality), suggests a territorial pattern where housing costs that are estimated to be higher correspond to municipalities with a higher population density, aggregating important political and administrative functions, mainly at the regional or national level. Also, there is a recognized social and economic dynamism which is relatively higher in comparison to the rest of the surrounding territory. In fact, these areas correspond to the territories where population growth has been registered in recent years or where population attraction still prevails; these are territories we can easily identify as overlapping the urban transformation phenomena (referred to in section 2.1) of urban expansion, suburbanization, and urbanization. Thus, the metropolitan areas of Lisbon and Porto,

the northern coast (above Porto) and a large part of the municipalities along the territory, where the headquarters of the bodies of intermunicipal[24] communities are located, emerge as those with the highest housing costs. Naturally, these are the municipalities where higher values are recorded for variables such as RENT, DENSp or TOURISMh, which partially capture elements of this socio-economic dynamism.

Alongside these territories, Chaves and Sines (and some of their surrounding municipalities) also appear in the group of territories with higher housing costs. Although they do not have such relevant political and administrative functions as the municipalities mentioned above, they stand out due to a few unique features that decisively contribute to their position. For example, Sines is home to the largest national port and a whole set of related activities which qualify its territory as an urban centre of intermediate size and great socio-economic dynamism; Chaves, thanks to its geographical positioning (near the border and in the centre of a region where a relevant agricultural and livestock sector prevails), is also an important centre of socio-economic dynamism. Finally, in the same vein, comes the Algarve region — it is the recognized central role of the tourism sector in this region that supports its leadership amongst territories with the highest housing costs. In this specific case, and regarding the socio-economic dynamism of tourism activities, it is worth highlighting the effect of tourist accommodation on the real estate market, namely through the competition between the residential and touristic roles of accommodations, and its effects on housing prices, as mentioned above.

The use of the explanatory model described above (municipal level) to yield housing cost estimates at the micro level (by subsection) allows us to create more detailed housing affordability metrics. For an integrated presentation of these metrics for the national territory, we have opted to show a summary analysis at the civil parish level (figure 44). This mapping allows us to identify the relationship between civil parishes (as municipality headquarters) and their surroundings as the dominant pattern. In fact, as municipality headquarters are territories that concentrate political administrative functions and relevant public services, this encourages their socio-economic dynamism to reinforce urbanization processes (see also figure 37, figure 38, and figure 41 in section 2). Another territorial pattern that becomes visible at the civil parish level is the effect of activities in the tourism sector: coastal civil parishes, and in particular those in the Algarve region, emerge with the highest housing costs. This pattern of territorial association between civil parishes is supported by the recurring measure of spatial dependence (LISA), which allows to identify clusters of territories where more significant spatial relationships are concentrated amongst civil parishes with higher housing costs (in red) similar to those described. The opposite phenomenon (territories that group civil parishes with lower housing costs) occurs in the countryside, particularly in the northern and central cross-border territories.

These territorial aspects of the explanatory model of housing costs reveal the expected relationship between higher population concentrations and more economically dynamic territories as an explanatory factor of higher housing costs. In addition to exposing a country with marked territorial contrasts — a conducive factor for inequalities and inequities — this supports the goal of this paper: the need to confront housing costs with income from a territorial perspective. The desired sustainment of social and economic dynamism requires that housing costs be supported by compatible incomes, keeping this relationship at adequate levels to support households' living conditions.

4.4.1.2. Explanatory factors of household income

The development of an explanatory model for the territorial variability of household income is supported by theoretical evidence, especially in regional science, of the triad of socioeconomic factors that determine the competitive advantages of different territorial units. In this case, the qualifications of the population, the dominant sectors of activity and the position of firms in these value networks (see, for example Pavitt, 1984), are indirectly measured here by the structure of dominant occupations. These key dimensions are further related to evidence from urban studies, which tend to point to these same elements as the main factors explaining the segregation of individuals at an urban level. Social and cultural factors are also often associated with the latter spatial level of analysis (see, for example Wong et al., 2007). This diversified theoretical framework was integrated in the income estimation model by collecting and incorporating a set of variables (see section 3.3) that cover these different income drivers.

The need to identify, amongst the initial set of available metrics, those that measure distinct territorial phenomena, required a prior analysis of primary data in order to distinguish, in the detail provided on occupations (10 types, at level 1) and economic sectors (21 sectors, at level 1 of disaggregation), which ones are effectively relevant to explain income differences between the territorial units considered in the modelling process (municipalities). This procedure is also necessary in econometric terms, strengthening the assumption of the explanatory variables' independence and, of course, minimizing the occurrence of undesirable multicollinearity. The relevant variables and model results are shown in table 12.

Table 12 **Main results from the explanatory factors of income**

Explanatory variable	Effect from increasing 1% of the Expl. Variable in yearly income
QUALf	38%
EMPs_s_1(C)	13%
EMPs_4(J)	9%
EMPs _7(T)	-6%
EMPp _2	-26%
EMPp _3	-29%
TERRITORY_amu	-6%
NUTSIIIPT111 to NUTSIIIPT187 (reference: NUTSIIIPT170 — Área Metropolitana de Lisboa))	
Global explanatory power of the model (R^2): 84%	

Notes:
(a) significance based on $\alpha < 0{,}05$;
(b) region dummy variable coefficients are not presented; but significant coefficients are obtained for the NUTSIII 111, 112, 119, 11A, 11B, 11C, 11D, 11E, 150, 16B, 16J, 185 regions

The variable selection procedure, together with the modelling process, allows us to highlight the role of activity sectors with population employed in manufacturing, information and communication activities (which includes information technology) and family-based economic activities (where most of the labour is family-based; and traditional agriculture, for example, is particularly relevant). At the occupation level, we emphasize skilled professionals in agriculture, fisheries, and forestry, and skilled workers in industry and construction. These results are in line with important clusters of territorial specialization in the Portuguese economy: for example, the role of the manufacturing industry (footwear, clothing, furniture, plastics, metalworking) in the regions of Vale do Ave and Vale do Sousa, Estarreja-Aveiro-Águeda

and Leiria-Marinha Grande. The variables on workers' occupations reveal the sophistication and specialization of many of these economic activities, with the above-mentioned clusters coinciding with the territories where there is a higher relative proportion of specialized/skilled workers (namely, the industrial cluster of the Vale do Sousa region, or more modern agricultural clusters, such as the western region or Douro). In the same vein, these results show the prevalence of traditional (and subsistence) agriculture in the countryside and remote regions, where not only is this sector of activity proportionally relevant, but a greater ratio of occupations requiring lower levels of qualification stand out.

The differentiated generation of income associated with different economic activities is visible in the estimated effects of the variables. As an example, territories where there is a higher ratio of skilled workers in industry and construction (EMPp_3) have associated lower incomes (INC), keeping all other effects static. This is explained by the fact that the variable is associated with territorial clusters of economic activities where the business model is historically very dependent on low wages (e.g., the clothing and footwear sectors). A similar phenomenon occurs with farmers and skilled professionals in agriculture, fishing and forestry (EMPp_2).

Lastly, the prominent role of the qualifications index (QUAL) in explaining different income levels is explained by the fact that this metric aggregates several phenomena: i) real income gains, well recognized in the literature, as a function of higher qualifications (maintaining other effects static), ii) most qualified and best paid activities in any sector tend to cluster territorially (hence the favourable numbers in areas around Lisbon and Porto) and iii) strong association of qualification levels with areas of greater demographic and economic dynamism.

Similarly to the exercise carried out for the housing costs model, the observation of geographical patterns regarding summary values (at the civil parish level) of income estimates carried out for subsections allows us to observe, in figure 46 and figure 47, a strong connection between higher incomes and the territorial units where there is greater demographic and socioeconomic dynamism — see also figure 37 and figure 38. It is also worth noting the repetition of the pattern which differentiates civil parishes that are municipality seats from others, once again revealing many more marked differences in cross-border and inland regions. These aspects reinforce the possibility of important negative effects on housing affordability, which will now be analysed below.

With respect to territorial patterns resulting from the spatial dependence of income, the patterns are slightly different from those previously identified for housing costs. In this case, figure 48 shows regions in the north countryside where several lower-income civil parishes tend to be grouped together surrounded by other low-income civil parishes. This pattern seems to conflate with mountainous and particularly hilly areas, where severe phenomena of rural decline (and depopulation) prevail — territories coinciding with the Freita, Montemuro and Alvão mountains, and parts of the Gerês and Montesinho mountains, are identifiable. Effectively, these territorial areas correspond to remote civil parishes, dominated by traditional agricultural activities, in clear decline, and as the model suggests, connected to comparatively very low incomes.

Figure 46 Estimated income based on (median) income declared to tax authorities and (median) family characteristics. Municipalities. 2016

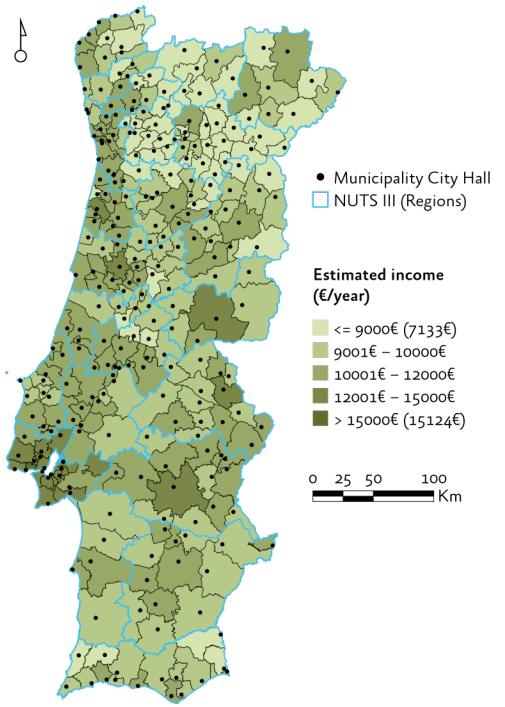


Figure 47 Estimated income based on (median) income declared to tax authorities and (median) family characteristics. Civil parishes. 2016

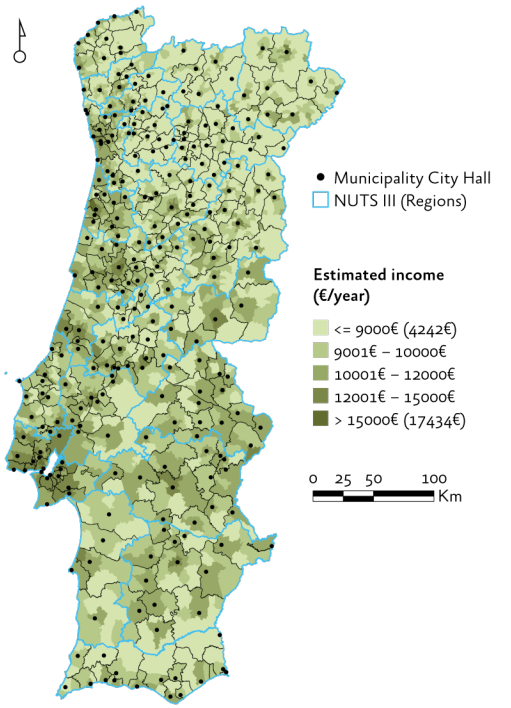
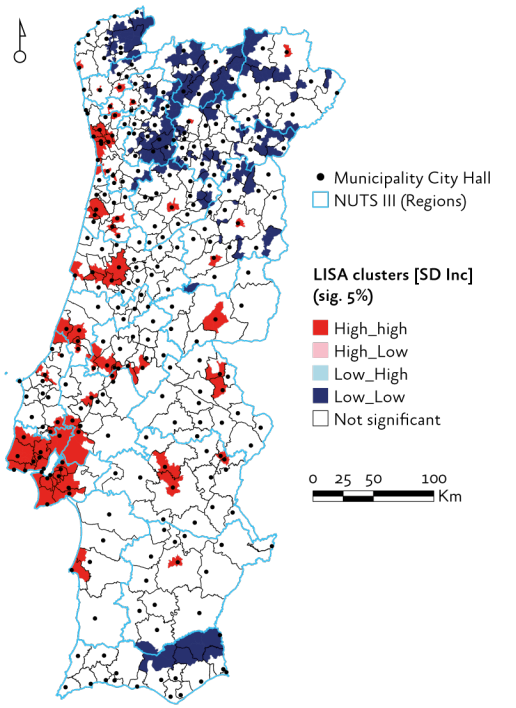


Figure 48 LISA clusters by estimated income. Civil parishes in 2015



The pattern that brings territorial units with the highest incomes together matches the pattern joining coastal areas and intermediate urban areas with the greatest dynamism. The latter are typically associated with urbanization and urban expansion, either in coastal territories (larger patches) or inland urban centres surrounded by declining rural areas (polarizing urban centres), but clearly yielding a dynamism (and respective higher household income) that distinguishes them within the regional pattern.

Also noteworthy for its size, is the large area around Lisbon, which almost completely overlaps the limits of its metropolitan area (the Lisbon Peninsula region and the Setúbal Peninsula region) and also includes contiguous areas belonging to other regions, such as the Middle Tagus region.

4.4.2. Territorial patterns of housing affordability in mainland Portugal

The estimated housing costs and household incomes present a territorial distribution that conflates with the territorial reality usually perceived for these phenomena. This aspect reinforces the sustainability and consistency of the methodology proposed here, allowing us to move on to the analysis of the two metrics proposed in section 3.2.

Figure 49 and figure 50 present the territorial patterns of the housing burden index and the housing (un)affordability risk, presenting numbers of the proposed metrics calculated for civil parishes (the territorial unit of analysis).

Figure 49 Housing cost burden index

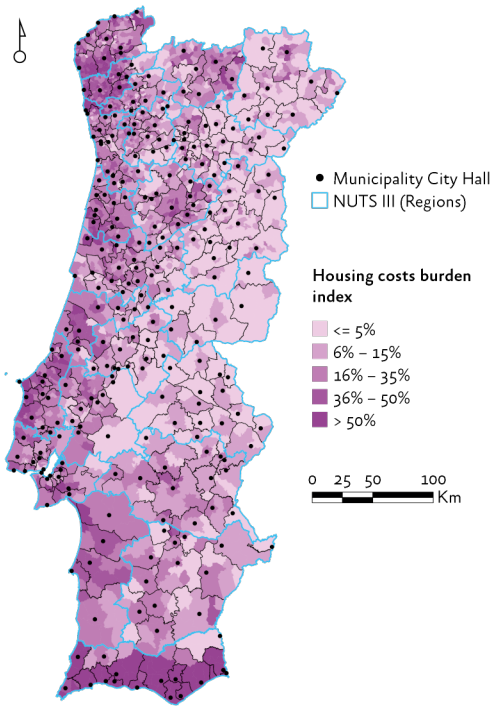


Figure 50 LISA clusters of housing cost burden index

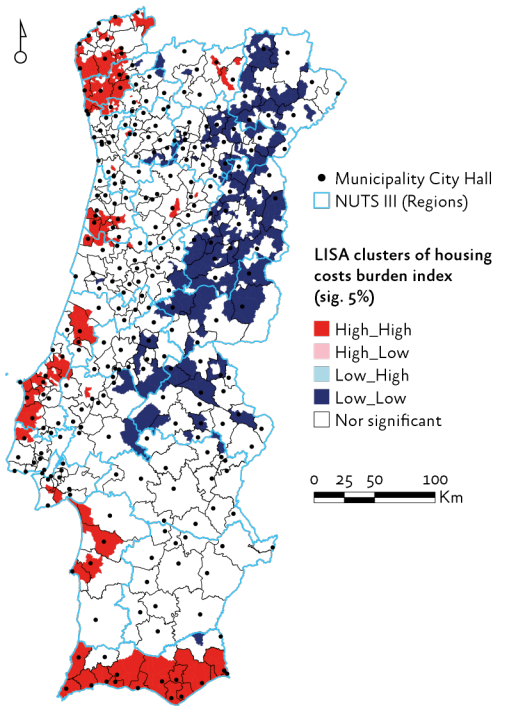


Figure 51 Housing unaffordability risk

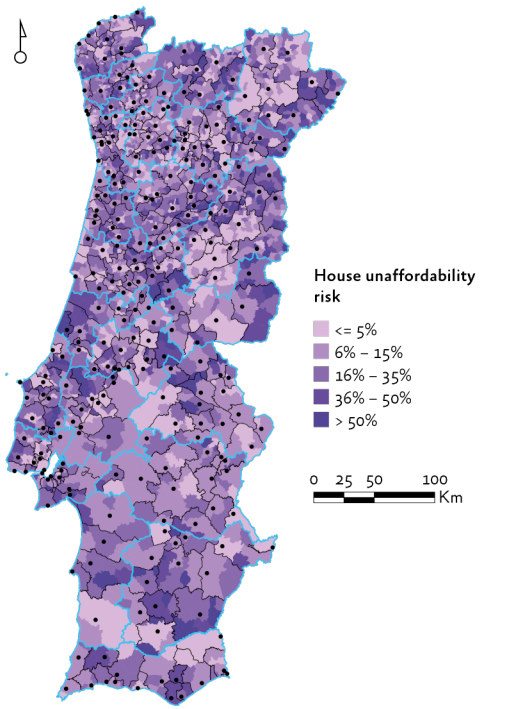
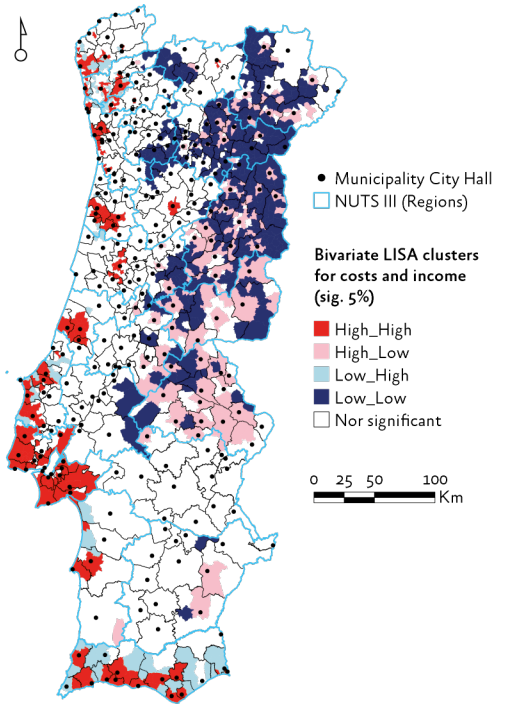


Figure 52 Bivariate LISA clusters for costs and income



4.4.2.1. Housing cost burden

In figure 49, we can find the mapping of the housing cost burden index, calculated for the civil parishes of mainland Portugal, complemented by figure 50, which allows us to identify the territorial groupings that share one of the four types of association provided by the spatial dependence measure.

The data reveals that coastal territories, on the periphery of the most densely populated urban areas (Lisbon and Porto), are those where the burden of housing costs tends to affect households the most. In these territories, it is possible to identify three more or less continuous patches, which we can associate to differentiated social, economic, and territorial characteristics.

One of these territorial groupings, where the burden of housing costs is comparatively more relevant, can be found on the northern coastline, in a territorial continuum covering municipalities such as Viana do Castelo, Ponte de Lima, Barcelos, Vila do Conde, Braga or Guimarães. Going back to what was previously mentioned (section 2), this is a territory that has observed a process of population growth throughout the first decade of the 21st century. However, it is also a territory where several phenomena of urban transformation are taking place, thus creating a complex pattern by combining phenomena of urbanization, urban decline, rural decline, and counter-urbanization. The concentration of such diverse phenomena, in a densely populated territory with a young demographic structure (see figure 40), explains the relatively high housing costs in a market that, due to its features, tends to be less efficient when compared to complex urban transformations, which tend to occur in a more volatile fashion, as this diversity seems to indicate.

On the country's central coast, intermediate urban areas with a strong presence of the secondary sector in their economic structure, emerge as territories where the burden of housing costs is also relevant. This includes the urban continuum between Aveiro, Ílhavo, Vagos, Oliveira do Bairro, and Águeda. Further down, with similar features, an almost continuous corridor connects Pombal to Mafra, also including Leiria and Marinha Grande. Lastly, the Alentejo coastline, in particular urban areas around Sines and Santiago do Cacém, where important economic activities of the secondary sector prevail, also stand out as territories with a higher burden of housing costs.

A central element in this analysis is the strong connection which can be visually established between the spots with the highest housing cost burden and most noticeable urban transformation processes (of growth, expansion, densification), revealing a housing market that tends to be less efficient in meeting housing needs.

The Algarve, which stands out as the territory where the burden of housing costs is most intense, is also the one region where explanatory factors are most relevantly associated with the weight of tourism activities. The economic specialization of this territory has implications both on the competitiveness this activity exerts on the use of housing and the fact that this economic sector is often connected with relatively low wages (which has an impact on household income). Hence, it should be noted that the effects of touristic activity will also have partial relevance for some of the above-mentioned coastal territories, although this is not as clear as in the case of the Algarve coastline.

Lastly, in the Lisbon and Porto metropolitan regions, we find territories with comparatively moderate levels of housing cost burdens.

Notwithstanding, the fact that the prices registered in the housing market are the highest in the country, it is also in these regions that we find the highest household incomes, contributing decisively to a greater moderation of the housing cost burden metric. Another aspect that adds to the moderation of this metric is the preponderance of a housing stock with features which tend to culminate in lower housing costs. In fact, Lisbon and Porto, for example, have a relevant ratio of dwellings in decay or presenting other characteristics revealing greater inadequacy (for example, small areas in relation to the size of households). This is one of the limitations of this type of normative and simplified housing affordability metrics, which tend to not consider the effects of composition/adequacy of the housing stock. When these other elements, which define housing shortages, tend to be very relevant, the housing cost burden metric tends to be more biased.

4.4.2.2. Housing unaffordability risk

Since the measurement of the housing cost burden can be biased by heterogeneity effects in the territorial units of analysis, the housing (un)affordability risk index makes it possible to identify scenarios where the housing cost burden is not an evident element. However, when analysed independently, the characteristics of dwellings and the households residing therein suggest possible risks of housing unaffordability.

The mapping of housing (un)affordability risk allows us to identify the territories where rural decline phenomena prevail as those where these risks are more evident. In fact, within these territories, the housing stock features show relatively high-cost housing — for example, single-family dwellings, with unsparing areas, in many cases with a quite reasonable degree of preservation. However, households residing there tend to be older, from households that have since greatly reduced in size and, therefore, have relatively lower incomes.

Thus, these territories tend to be connected to other housing shortages, resulting from the inadequacy of dwellings' physical characteristics, either due to size or the prevalence of older and precarious buildings. These territorial characteristics reinforce the possible association between housing unaffordability risk metrics as a complementary mechanism to alert us towards the existence of other dimensions of housing needs, which should be explored and are strongly interconnected with housing costs, placing the populations in situations of increased housing risk.

In general, as is to be expected, the risk of housing (un)affordability is higher in territories where rural decline phenomena, associated with greater demographic ageing, prevail. These territories tend to house an ageing population, on low incomes, with very small family units contrasting with the size they assumed in a prior stage of their lives. Furthermore, as these are territorial areas in decline or surrounded by such processes of decline, the state of conservation of buildings tends to worsen, and dynamism is practically non-existent within the housing market.

It should also be noted that figure 16 allows us to scrutinize these phenomena a little further — it is the inland territories, recognized for their serious ageing and depopulation problems, that emerge as those where residing households are at greater risk of housing unaffordability. In these territories, the municipal seat civil parishes are grouped in the same class, reinforcing the idea that they play a central

role as urban centres, where incomes are substantially higher than in their surrounding territories, thus increasing population attraction. However, these apparently more beneficial conditions may also translate into greater housing unaffordability, especially for the surrounding populations, who in case of need and while maintaining their original income, will not be able to afford housing in these urban centres. This aspect may thus contribute to reduce the attraction effect of these urban centres on their surrounding areas, weakening what could represent an alternative (or complement) for consolidation in face of direct «competition» in terms of housing affordability conditions, with more dynamic territorial areas. In fact, demographic data helps support this reading, since these inland urban civil parishes have also registered significant population decreases, although not as sharp as those in surroundings territories.

To support the link between housing affordability and the main urban transformation processes, figure 17 and figure 18 try to provide some clues. As can be seen, the urban transformation processes connected with decline are those in which the housing affordability metrics appear to be more favourable to satisfying households' needs. However, in larger cities where this occurs (Lisbon and Porto), this phenomenon has been associated with exogenous effects, such as i) the disturbance of the housing market by economic logics (tourism and other economic activities), ii) a gentrification process, iii) processes actively promoted by public bodies (for example, the attraction of foreign residents with very high incomes) or even iv) economic financial logics (investment in real estate by large corporations, in an international logic which is not adapted to the needs of most local populations). In rural territories, the rationale is more evident. Depopulation and lack of economic and social dynamism have removed these territories from the market valuation logics, thus contributing to very low housing costs, which is not unrelated to the state of abandonment and degradation of housing units in these territories (see Borges et al., 2012; E. Castro et al., 2013).

Figure 53 Housing cost burden index

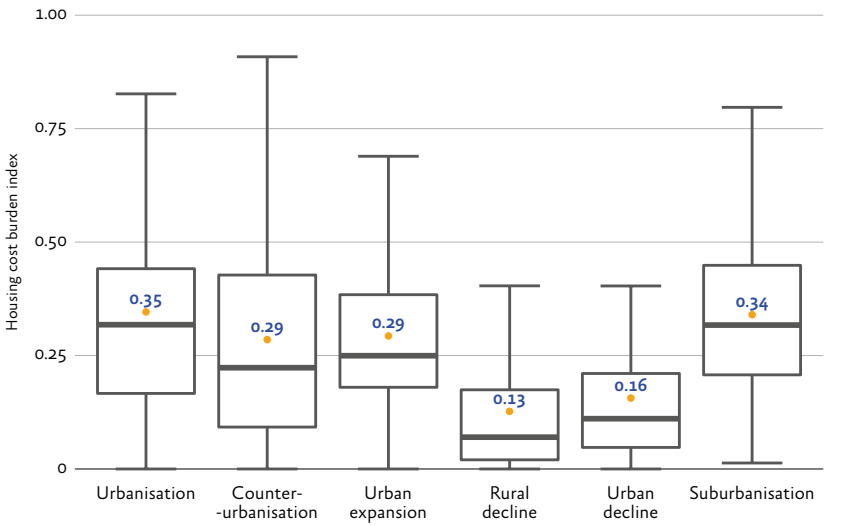
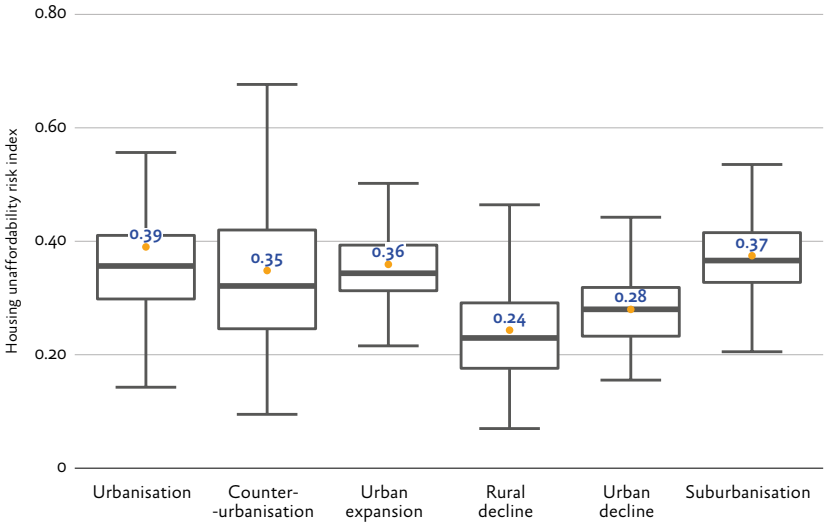


Figure 54 Housing affordability risk index



4.5. Concluding remarks

This work presents two major challenges. On one hand, the discussion of concepts connected to housing affordability, such as adequacy, access, availability and need; and, on the other hand, making them operative at a local level in order to assess the territorial patterns resulting from the (un)balances between housing prices (translated into costs) and household income. As it is not possible to work with micro data at the housing and household level, it was decided the statistical subsections of Statistics Portugal would form the basic unit for the preparation of this analysis. For reading and interpretation purposes, the results integrated for mainland Portugal are presented at the civil parish level, allowing us to identify the diversity of territorial patterns which characterize housing affordability.

Even after opting to analyse levels of affordability by statistical subsection, the available data requires a demanding process of collection, transformation, measurement, and modelling. The scarcity of studies focusing on the relationship between housing affordability and territorial context makes this effort very relevant, as it allows to signal phenomena at a local level, for which customized solutions can and should be thought out, even though some of their drivers are relevant at a macro level and require this global integration.

In the analysis of housing needs, we have tried to emphasize the urban transformation processes as exogenous factors, conditioned to a large extent by the dynamics of demographic change itself, which unavoidably determine housing shortages, not only in quantitative terms, but also by directly impacting market mechanisms. This results in the most visible mismatch between housing supply prices and the financial capacity of households seeking housing. Mainland Portugal is admittedly a coastal territory (with strong contrasts between inland and coastal locations), bipolar (through the lenses of the two metropolitan areas of Lisbon and Porto) and increasingly urbanized. Even in regions subject to processes of marked population decline and ageing, there are signs of urban consolidation and expansion in major urban centres. The analysis of the housing (market) phenomenon is obviously not, and cannot be, dissociated from these territorial dynamics, since housing supply has been a function increasingly reserved for the market, but the rules and criteria it establishes are not always the most appropriate for the territories' desired social and economic development.

Moreover, market mechanisms themselves tend to be opaque, and it is very difficult to monitor both the quantity and type of housing supply, its prices, and drivers. Data on the real estate market is not as transparent and accessible as would be desirable, which can be explained by the existence of multiple agents who benefit from this asymmetry of information. This aspect is outside the scope of this reflection, but it is important to raise an alert concerning the need for regulatory intervention in this area. Additionally, there is a lack of culture, rooted in public bodies, regarding the collection and supply of information, as well as the implementation of qualified, effective, and consistent decision-making processes. Although some efforts are recognized, there is still insufficient data to analyse shortages and access to adequate housing with the desirable granularity and precision, not to mention the devaluation of prospective analyses that would allow a timely response to these needs.

This chapter presents an innovative approach based on existing statistical data, seeking to measure and analyse housing affordability in Portugal from the perspective of the territorial disparities emerging from them. The methodology followed for this research involved the development of two models, one for income and the other for housing prices, at a municipal level, allowing for an estimation of prices (costs) and income at the micro level (of the statistical sub-sections). The focus on territorial analysis also led to the adoption of strategies for identifying spatial clusters which emphasize the effects of spatial autocorrelation, thus making it possible to group analysis units (civil parishes) not only by their features, but also by the spatial relationships they establish with their geographical surroundings. Although it was possible to ensure the models' reasonable explanatory capacity and robustness, they performed differently for different parts of the territory. In this regard, the lower accuracy of the housing cost estimates for the main national urban centres (Lisbon and Porto) stands out. These two cases not only reveal existing information weaknesses, but also suggest that the estimates' lower level of robustness in these specific cases can be explained by the housing market's features, which contain elements that make them autonomous in light of the country's more global logic.

Notwithstanding the limitations that were exposed throughout the work, the results are reliable, allowing for the calculation of two housing affordability metrics: i) the housing expenditure burden index and ii) the housing unaffordability risk index. The former assesses the ratio between estimated values of housing and household income, with civil parishes as the unit of analysis and accounting for households living in subsections where the ratio is higher than 0.4; the latter analyses the proportion of households living in subsections with a median income lower than the median of the municipality, and housing costs higher than the median housing cost in the municipality.

As expected, the results show strong spatial heterogeneity in housing affordability patterns and significant evidence of spatial dependence, thus claiming the importance of a territorial outlook in the design of public policies which impact housing. These interventions can be housing policies specifically, or initiatives from other domains (social and economic), which, as can be seen here, exert substantial effects on the housing market and, consequently, can effectively contribute to meet housing needs.

Lastly, one of the most important messages of this work is the identification of housing affordability challenges in the territories located between the largest cities. On the one hand, regarding the coastline, small and medium-sized cities, which conflate with urbanization, urban expansion and suburbanization processes, and have been serving as alternatives to the larger urban centres (Lisbon and Porto), see the most negative numbers in both metrics, putting them in a challenging position to achieve reasonable housing affordability levels. On the other hand, amongst inland regions, consolidation phenomena in small urban and rural centres, which may play a key role in countering depopulation, also seem to face housing affordability issues, which place them in similar positions to those of more socially and economically dynamic territories.

References

Aalbers, M. and B. Christophers, (2019), «Centering housing in political economy», *CIDADES, Comunidades e Territórios*, 0(38).

Abramsson, M. and E. Andersson, (2016), «Changing preferences with ageing — housing choices and housing plans of older people», *Housing, Theory and Society*, 33(2), 217–241.

Allen, J., (2006), «Welfare regimes, welfare systems and housing in Southern Europe», *European Journal of Housing Policy*, 6(3), 251–277.

Alves, S., (2020), «Divergence in planning for affordable housing: a comparative analysis of England and Portugal», *Progress in Planning*, 100536.

Ambrose, B.W. and M. Diop, (2018), «Information asymmetry, regulations and equilibrium outcomes: theory and evidence from the housing rental market», *Real Estate Economics*.

Amrhein, C.G., (1995), «Searching for the elusive aggregation effect: evidence from statistical simulations», *Environment and Planning A*, 27(1), 105–119.

Anacker, K.B., (2019), «Introduction: housing affordability and affordable housing», *International Journal of Housing Policy*, 19(1), 1–16.

Anselin, L., (1995), «Local indicators of spatial association — LISA», *Geographical Analysis*, 27, 93–115.

Baker, E., R. Bentley, L. Lester and A. Beer, (2016), «Housing affordability and residential mobility as drivers of locational inequality», *Applied Geography*, 72, 65–75.

Bhattacharjee, A. and C. Jensen-Butler, (2006), «Estimation of spatial weights matrix, with an application to diffusion in housing demand», in *Centre for Research into Industry, Enterprise, Finance and the Firm*.

Bitter, C. and D. Plane, (2013), «Housing Markets, the Life Course, and Migration Up and Down the Urban Hierarchy», In *D. F. Clapham, W. A. V Clark, and K. Gibb (Eds.), The SAGE Handbook of Housing Studies* (pp. 295–312), SAGE Publications.

Bogdon, A.S. and A. Can, (1997), «Indicators of local housing affordability: comparative and spatial approaches», *Real Estate Economics*, 25(1), 43–80.

Borrowman, L., G. Kazakevitch and L. Frost, (2017), «How long do households remain in housing affordability stress?», *Housing Studies*, 32(7), 869–886.

Bourne, L. S., (1981), *The geography of housing*, Edward Arnold.

Bramley, G., (2007), «The sudden rediscovery of housing supply as a key policy challenge», *Housing Studies*, 22(2), 221–241.

Bramley, G., (2012), «Affordability, poverty and housing need: triangulating measures and standards», *Journal of Housing and the Built Environment*, 27(2), 133–151.

Butler, T. and C. Hamnet, (2013), «Social geographic interpretations of housing spaces», In *D. F. Clapham, W. A. V Clark, and K. Gibb (Eds.), The SAGE Handbook of Housing Studies* (pp. 147–162).

Can, A., (1992), «Specification and estimation of hedonic housing price models», *Regional Science and Urban Economics*, 22(3), 453–474.

Carmo, A., J. Ferrão and J. Malheiros, (2014), «Geografias do estado social: reorganização territorial, habitação e urbanismo», *Estado Social: De Todos Para Todos*, 167–200.

Castro, E., M. Marques, J. Marques and M. Viegas, (2020), «Demografia e economia: um modelo regional integrado de estimação da população portuguesa», *Revista Portuguesa de Estudos Regionais*, 55, 18.

Cocola-Gant, A. and A. Gago, (2019), «Airbnb, buy-to-let investment and tourism-driven displacement: a case study in Lisbon», *Environment and Planning A: Economy and Space*, 0308518X1986901.

Costa-Font, J., D. Elvira and O. Mascarilla-Miró, (2009), «"Ageing in place"? exploring elderly people's housing preferences in Spain», *Urban Studies*, 46(2), 295–316.

Cox, W., H. Pavletich and T. Polidi, (2020), *16th Annual demographia international housing affordability survey*.

de Castro, E.A., J.M. Martins and C.J. Silva, (2015), *A demografia e o país: previsões cristalinas sem bola de cristal*, Gradiva.

Elhorst, J. P., (2014), *Spatial econometrics: from cross-sectional data to spatial panels*, Springer.

Fernandes, C., N. Crespo and N. Simoes, (2016), «Poverty, richness, and inequality: evidence for Portugal using a housing comfort index», In *Journal of Economic and Social Measurement* (Vol. 41, Issue 4, pp. 371–394), IOS Press.

Ferrão, J., (2019), «O estado da habitação em Portugal: Uma trajetória promissora mas ainda excessivamente em aberto», *Cidades, Comunidades e Territórios*, 2019(38), 53–54, link

Fingleton, B., (2008), «Housing supply, housing demand, and affordability», *Urban Studies*, 45(8), 1545–1563.

Fotheringham, A. S. and D.W.S. Wong, (1991), «The modifiable areal unit problem in multivariate statistical analysis», *Environment and Planning A*, 23(7), 1025–1044.

Harvey, D., (2006), «Space as a keyword», In *N. Castree and D. Gregory (Eds.), David Harvey: A Critical Reader* (pp. 270–293), Blackwell Publishing Ltd.

Henley, A., (1998), «Residential mobility, housing equity and the labour market», *The Economic Journal*, 108(447), 414–427.

Hulchanski, J. D., (1995), «The concept of housing affordability: six contemporary uses of the housing expenditure-to-income ratio», *Housing Studies*, 10(4), 471–491.

IHRU regista aumento das carências habitacionais «na ordem dos 77%.» (2020, June), TVI24.

Kurlat, P. and J. Stroebel, (2015), «Testing for information asymmetries in real estate markets», In *Review of Financial Studies* (Vol. 28, Issue 8, pp. 2429–2461), Oxford University Press.

Lefebvre, H., (1991), *The production of space*.

Levantamento Nacional das Necessidades de Realojamento Habitacional, (2018), link

Li, J. V., (2015), «Recent trends on housing affordability research: where are we up to?», *SSRN Electronic Journal*.

Linneman, P., (1980), «Some empirical results on the nature of the hedonic price function for the urban housing market», *Journal of Urban Economics*, 8(1), 47–68.

Lopes, L., (2013), «Autorização de residência para actividade de investimento» (ARI — golden visa), *Gaudium Sciendi*, 4, 202–208, link

Lourenço, R. and P.M.M. Rodrigues, (2014), «Dinâmica e contraste dos preços da habitação em Portugal e Espanha», *Boletim Económico do Banco de Portugal*, 4, 41–54.

Lourenço, R. and P.M.M. Rodrigues, (2017), «Preços da habitação em Portugal — uma análise pós-crise», *Revista de Estudos Económicos do Banco de Portugal*, III(4), 45–62.

Maclennan, D., (1977), «Some thoughts on the nature and purpose of house price studies», *Urban Studies*, 14(1), 59–71.

Marques, J. L., J. Wolf and F. Feitosa, (2021), «Accessibility to primary schools in Portugal: a case of spatial inequity?», *Regional Science Policy and Practice*, 1–15.

Marques, J., (2012), «The notion of space in urban housing markets» [PhD's thesis, Universidade de Aveiro], In *Department of Social Sciences, Policies and Territory: Vol. PhD thesis.*

Marques, J. and P. Batista, (2021), «A noção de espaço e a ciência regional», In *F. Carbalho-Cruz and J. Marques (Eds.), 30 anos de ciência regional em perspetiva*, Edições Almedina.

Marques, J., P. Batista, E.A. Castro and A. Bhattacharjee, (2020), «Housing consumption», In *V. Chkoniya, A. O. Madsen, and P. Bukhrashvili (Eds.), Anthropological Approaches to Understanding Consumption Patterns and Consumer Behavior* (pp. 265–285). IGI Global.

Marques, J., M. Tufail, J. Wolf and M. Madaleno, (2021), «Population growth and the local provision of services: the role of primary schools in Portugal», *Population Research and Policy Review*, 40, 309–335.

Meen, G. and M. Andrew, (2008), «Planning for housing in the post-Barker era: affordability, household formation, and tenure choice», *Oxford Review of Economic Policy*, 24(1), 79–98.

Meen, G., (2013), «Housing and the economy», In D. F. Clapham, W. A. V Clark, and K. Gibb (Eds.), *The SAGE Handbook of Housing Studies* (pp. 251–273), SAGE Publications.

Mulliner, E. and V. Maliene, (2013), «Austerity and reform to affordable housing policy», *Journal of Housing and the Built Environment*, 28(2), 397–407.

Mulliner, E. and V. Maliene, (2015), «An analysis of professional perceptions of criteria contributing to sustainable housing affordability», *Sustainability*, 7(1), 248–270.

OECD, (2020), *OECD Affordable Housing Database*.

Openshaw, S., (1984), «Ecological fallacies and the analysis of areal census data», *Environment and Planning A*, 16(1), 17–31, link

Openshaw, S., (1981), «The modifiable areal unit problem», *Quantitative Geography: A British View*, 60–69.

Paelinck, J.H.P., (2013), «Spatial econometrics: a personal overview», *Studia Ekonomiczne*, 152, 106–118.

Pavitt, K., (1984), «Sectoral patterns of technical change: towards a taxonomy and a theory», *Research Policy*, 13(6), 343–373.

Rodrigues, C. F., R. Figueiras and V. Junqueira, (2016), «Desigualdade do rendimento e pobreza em Portugal — as consequências sociais do programa de ajustamento», *Fundação Francisco Manuel dos Santos*.

Rogers, D. and S.Y. Koh, (2017), «The globalisation of real estate: the politics and practice of foreign real estate investment», *International Journal of Housing Policy*, 17(1), 1–14.

Santos, A. C., N. Teles and N. Serra, (2014), *Finança e habitação em Portugal*.

Stone, M. E., T. Burke and L. Ralston, (2011), *The residual income approach to housing affordability: the theory and the practice*.

Sui, D. Z., (2004), «Tobler's first law of geography: A big idea for a small world?», *Annals of the Association of American Geographers*, 94(2), 269–277.

UN-Habitat, (2017), *The Human Rights-Based Approach to Housing and Slum Upgrading*.

Tobler, W., (1970), «A computer movie simulating urban growth in the detroit region», *Economic Geography*, 46, 234–240.

Tobler, W., (2004), «On the first law of geography: a reply», *Annals of the Association of American Geographers*, 94(2), 304–310.

Waldron, R., (2018), «Capitalizing on the state: the political economy of real estate investment trusts and the 'resolution' of the crisis», *Geoforum*, 90, 206–218.

Wetzstein, S., (2017), «The global urban housing affordability crisis», *Urban Studies*, 54(14), 3159–3177.

Wijburg, G., M.B. Aalbers and S. Heeg, (2018), «The financialisation of rental housing 2.0: releasing housing into the privatised mainstream of capital accumulation», *Antipode*, 50(4), 1098–1119.

Wolf, J., P. Batista and J. Marques, (2020), «Processos de transformação urbana: uma tipificação baseada na urbanidade, na centralidade e na evolução da população dos territórios», *CIDADES, Comunidades e Territórios*, 41(41).

Wong, D. W., M. Reibel and C.J. Dawkins, (2007), «Introduction — Segregation and neighborhood change: where are we after more than a half-century of formal analysis», In *Urban Geography* (Vol. 28, Issue 4, pp. 305–311). Taylor and Francis Group.

Xerez, R., E. Pereira and F. Cardoso, (2019), *Habitação própria em Portugal numa perspetiva intergeracional*.

Chapter 5
Short-term rentals and real estate prices in Lisbon: boom and ban[25]

Duarte Gonçalves, Susana Peralta and João Pereira dos Santos

5.1. Introduction

According to *The Guardian*, in June 2019, the mayors of ten European cities demanded help from the European Union to tackle the negative impact of Airbnb and other holiday rental websites on their cities.[26] These platforms, according to the mayors of Amsterdam, Barcelona, Berlin, Bordeaux, Brussels, Krakow, Munich, Paris, Valencia and Vienna, were changing the nature of the cities and pricing the locals out of city housing. The mayors wanted the explosive growth of short-stay rentals to be on the agenda of the new European Commission, which would step in one month later.

The cities wanted to be able to counter the adverse effects of the boom in short-term rentals, deemed to be the cause behind rising rents for full-time residents and the continuing «touristification» of neighbourhoods, by «introducing their own regulations depending on the local situation».

The mayors were reacting to a decision by the Advocate General of the European Court of Justice, who issued a non-binding opinion in April stating that Airbnb should be considered a digital information provider rather than a traditional real estate agent. The mayors understood that this decision might hamper them from regulating the presence of Airbnb in their cities through the usual regulation of local activity, urban planning and housing rules.

The mayor of Lisbon was not amongst the subscribers of this letter, possibly because, by June 2019, Lisbon was already into its seventh month of imposing restrictions on short-term holiday rentals. Indeed, in November 2018, the municipality of Lisbon had banned new property registries for the short-term rental market in some of the city centre's historic neighbourhoods. More recently, he wrote an open letter in the British newspaper *The Independent* mentioning the social costs of this phenomenon and reassessing post-pandemic priorities: «Essential workers and their families have increasingly been forced out as Airbnb-style holiday rentals have taken over a third of Lisbon's city centre properties, pushing up rental prices, hollowing out communities and threatening its unique character.»[27] However, the mayor had not always been in favour of curbing the growth of Airbnb and similar platforms. In 2016, at a time when the number of Airbnb's listings in the Lisbon metropolitan area had nearly tripled since January 2014, he said to Bloomberg: «This is the first time that tourism is allowing

many people to participate in the development process of the city. We shouldn't be scared of this new dynamic, we shouldn't be afraid of growth. On the contrary, we need to prepare the city to take in even more tourists. This process creates a series of significant changes to the city. Most of them are positive.»[28]

This study analyses the ban implemented by the municipality of Lisbon in November 2018 in some neighbourhoods, which provides an ideal quasi-experimental setup to estimate the causal impact of short-term rental regulations on the real estate market.

In 2014, Portugal introduced a new law to regulate short-term rentals, which consisted in an online simplified registration process to license a property. Landlords who want to advertise their property on websites such as Airbnb are required to acquire the necessary license.[29] Four years later, the government legislated to allow municipalities to regulate the supply of short-term rentals. As a consequence, in November 2018, the municipality of Lisbon decided to ban new short-term rental registries in pre-designated neighbourhoods. One year later this was extended to some adjacent areas.

This study uses the results in Gonçalves et al. (2020) to quantify the impact of this ban on registries, Airbnb prices, and the real estate market in the city of Lisbon, namely the number of transactions, and house prices. The empirical strategy we employ in our working paper Gonçalves et al. (2020) takes advantage of the geographical extension of the ban in 2019 to design a difference-in-differences empirical strategy which allows for convincing causal estimates.

Difference in differences (diff-in-diff) is an econometric strategy used for policy evaluation. This technique mimics an experimental research design using observational panel data, thus mitigating the effects of unobserved factors and selection bias.[30] Using diff-in-diff, we will compute the effect of a treatment (in our case, the ban on short-term rentals) on a series of outcomes by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the comparison group. The treatment group comprises the neighbourhoods of Lisbon which were affected by the short-term rental ban imposed by the municipality in 2018. As a comparison group, we choose the neighbourhoods in which new registries were prohibited one year later. This ensures that the comparison and the treated neighbourhoods are sufficiently similar, allowing us to make causal inferences. In addition, we will control for 1) time-invariant factors at the local level using civil parish fixed effects, and 2) quarter fixed effects that capture aggregate economic shocks.

There are at least three reasons why Lisbon (and Portugal) is an interesting laboratory to study the impact of short-term rentals on the real estate market. The first is methodological: the way in which the reform was implemented creates an ideal comparison group of neighbourhoods to be juxtaposed with those treated with the November 2018 ban.[31] The next two pertain to the context: Portugal witnessed a very rapid real estate price increase in the recent past, and also welcomed a touristic boom. We elaborate on these in the next section.

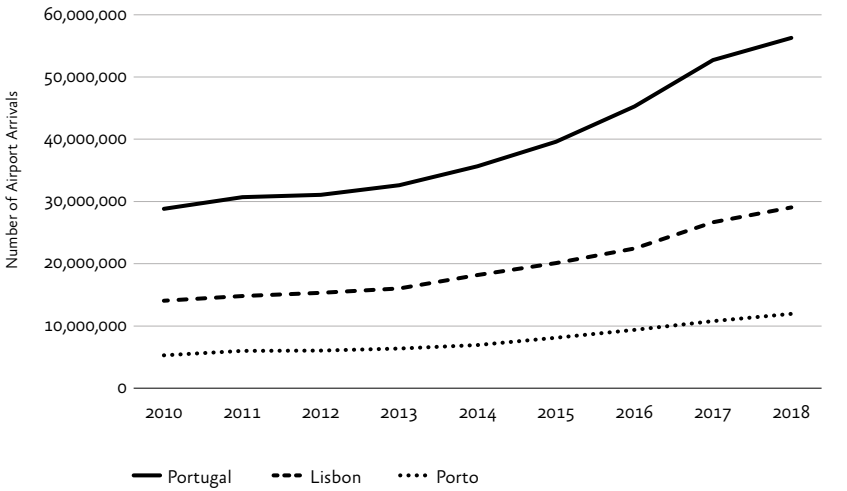
Decree-law 128/2014 created a straightforward online registration process for short-term rental properties. The Portuguese government claimed this simplified registration comprised an innovation in the regulation of short-term holiday rentals, a view confirmed by Andreu Castellano, Airbnb's public relations manager for Spain and Portugal, who in an e-mail to Bloomberg wrote: «Portugal is one of the leaders in Europe addressing the regulation of the sharing economy».[32] Obtaining a short-term rental license is necessary to advertise a property on Airbnb or similar platforms. Failure to comply is punishable by fine and online platforms are forbidden to list unregistered properties. The licenses are made available immediately upon request, after which owners can start renting their dwellings. The competent authority — Turismo de Portugal — can conduct visits to the registered properties at any moment to verify safety regulations. The license belongs to the individual and not to the house, i.e., it expires when the dwelling is sold.

We now describe the tax treatment of this type of income, in a nutshell.[33] If the annual income from short-term rentals is above 200 thousand euros, it is treated as business income, i.e., taxes are paid on revenue net of costs. Below this threshold, the earner has the option of paying tax on a fixed share of 35% of the short-term rental income. In both cases, when the owner is an individual, the income is added to the owner's total income and thus subject to the individual's marginal tax rate. As an alternative, the owner may opt to declare the earnings as rental income, in which case it is subject to a flat tax of 28%. Capital gains from the appreciation of the property during its tenure as a short-term rental are also taxed, but only when the house is sold or withdrawn from the short-term rental market.

5.2.1. The evolution of short-term holiday rental in Portugal

The simplification of the short-term rental registration procedure was accompanied by a sharp increase in the number of tourists. Figure 55 shows the evolution in the number of airport arrivals. In 2019, Portugal hosted more than 16 million foreign tourists, up from 9 million in 2013. Lisbon airport received 29 million passengers in 2019. The World Travel Awards elected Lisbon as the World's Leading City Break Destination in 2017, 2018, and 2019.[34]

Figure 55 Airport arrivals in Portugal, Lisbon and Porto

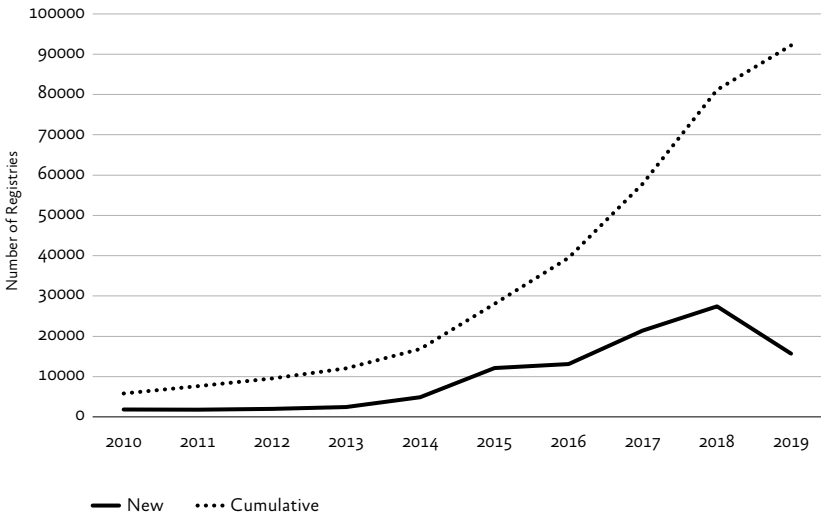


Source: Statistics Portugal

Thanks to the simplified procedure, the number of properties registered for short-term rentals multiplied eightfold in seven years, from twelve thousand properties in 2013 to more than 94 thousand

properties in 2020, as shown in figure 56. Not surprisingly, given these figures, Lisbon tops the ratio of Airbnb listings per inhabitant across European capitals.[35]

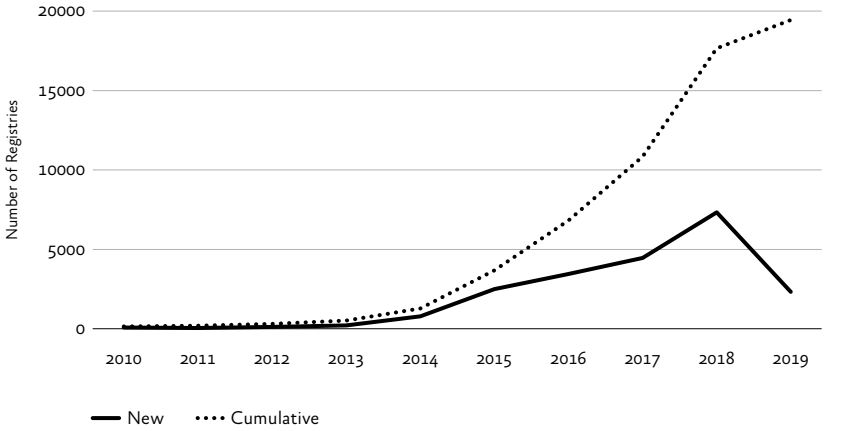
Figure 56 Short-term rental registries (in Portugal)



Source: RNAL

Lisbon is by far the most sizeable short-term rental market in the country; solely responsible for more than 20% of the total number of registries, as shown in figure 57, which also displays the ban effect with a sharp decrease in the number of new registries as of 2018. Given the importance of the capital city in this market, its effect is also visible on the overall country registries depicted in figure 56.

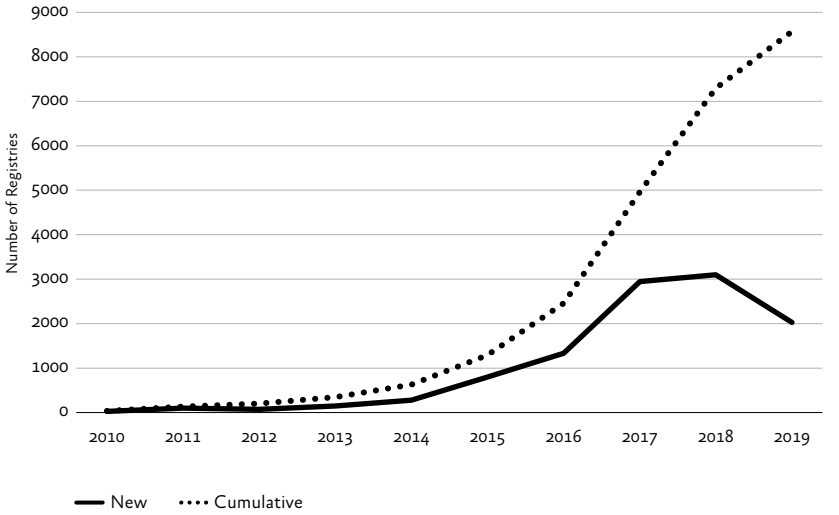
Figure 57 Short-term rental registries (in Lisbon)



Source: RNAL

By contrast, Porto, which is the second largest city, represents about one half of the Lisbon market, as depicted in figure 58.

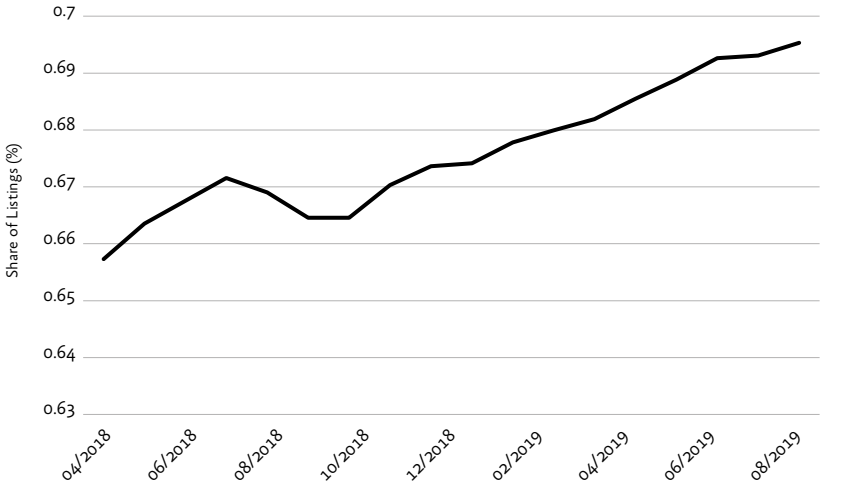
Figure 58 Short-term rental registries (in Porto)



Source: RNAL

It is interesting to notice that, according to data from the Inside Airbnb website, most of the Airbnb listings are owned by individuals or firms that advertise several properties on the platform. This is shown in figure 59.

Figure 59 Share of Airbnb listings by owners with multiple listings (in Lisbon)



Source: RNAL

5.2.2. The boom of the real estate market

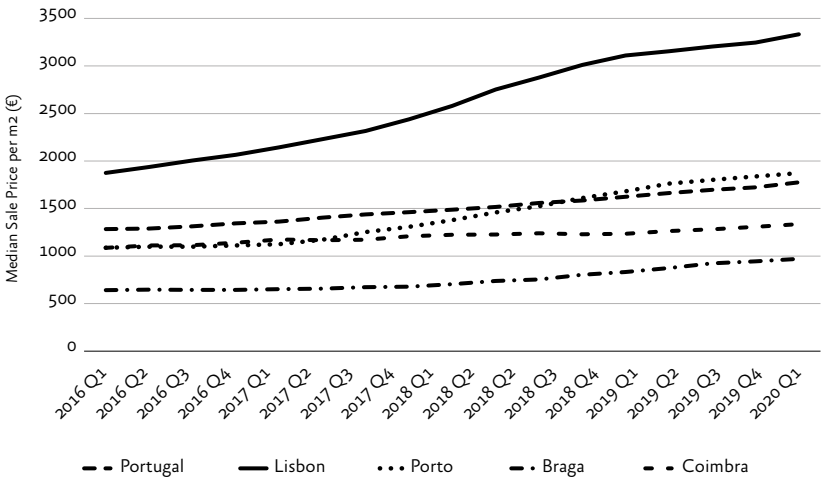
The rapid growth in short-term rentals coincided with the rapid increase in real estate prices. Between 2016 and 2019, the median sale price, per square metre, for Lisbon and Porto, increased by 68.2% and 61.9%, respectively.

The 2019 Property Index report, published by Deloitte, analyses the evolution of the real estate market in sixteen countries: Spain, The Netherlands, Hungary, France, Austria, Belgium, Croatia, Poland, Czech Republic, Italy, Portugal, Denmark, Latvia, UK, Norway, and Germany. In this analysis, Portugal stands out as one of the countries with the fastest increase in real estate prices between 2015 and 2018.

In fact, it is amongst the four countries with a price increase of more than 30% within this period.

The real estate market in Portugal did not change symmetrically across the territory, as shown in figure 60.

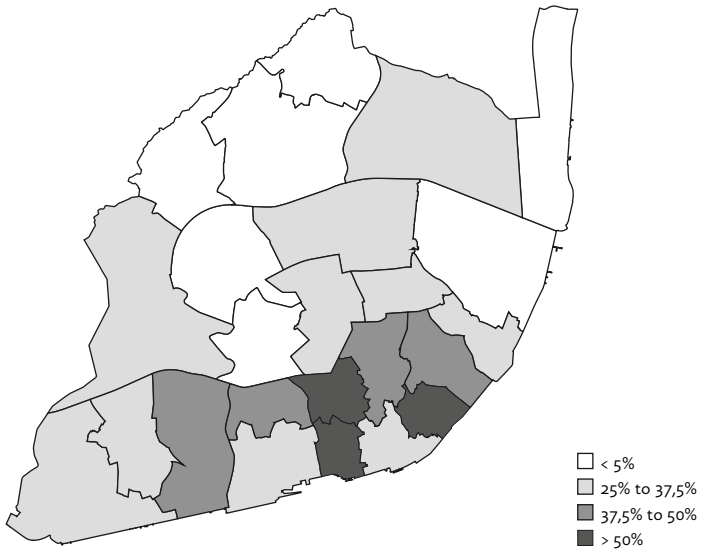
Figure 60 Median real estate price per m2 in Portugal and selected cities



Source: Statistics Portugal

The median real estate price per square metre in the city of Lisbon increased from 1886 to 3245 euros, i.e., more than 70% in just 4 years.

Figure 61 Growth rate of the median sale price in Lisbon — 2016 to 2018

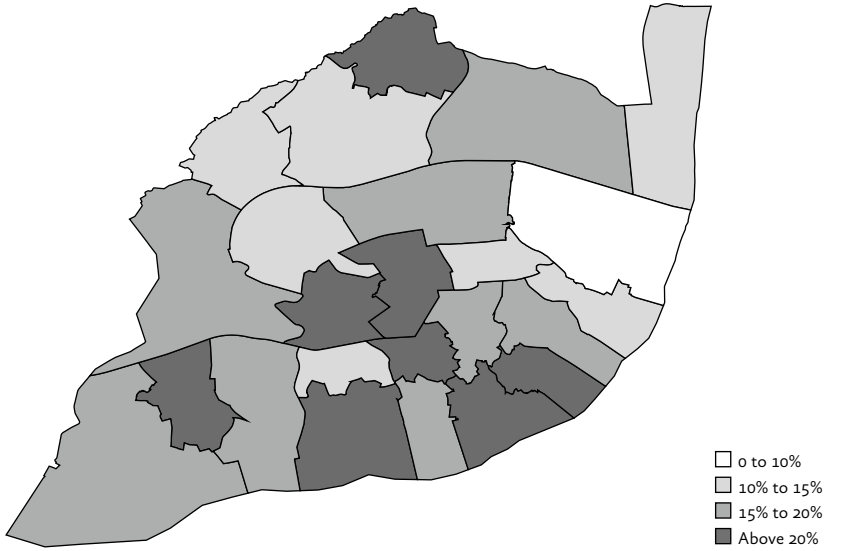


Note: This replicates figure 2 from Gonçalves et al. (2020).
Source: Statistics Portugal

Figure 61 depicts the city of Lisbon split into its 24 civil parishes, or *freguesias* in Portuguese. Civil parishes in Portugal have their own directly elected governments but run a fairly small budget and have limited competences. The city of Lisbon implemented a decentralisation reform in 2014 which transferred competences to its civil parishes in the areas of waste management, security and public spaces. However, they have no zoning powers.

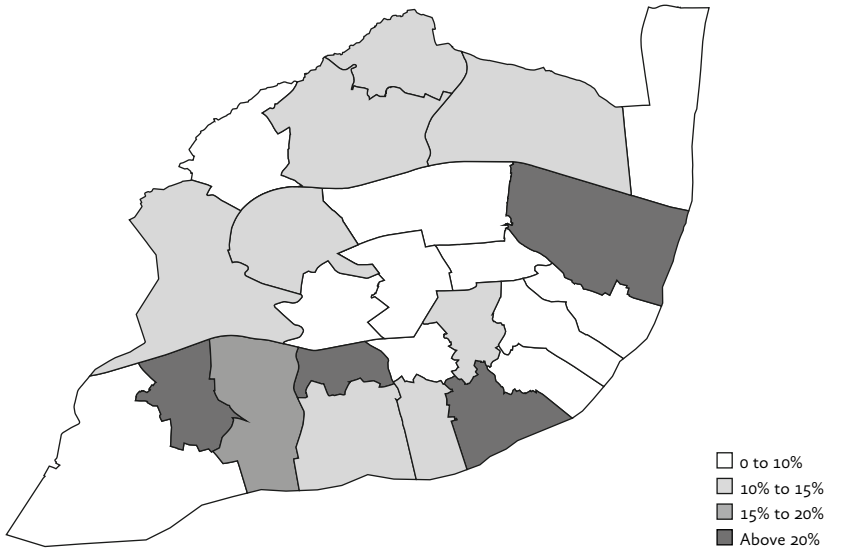
Zooming into the city of Lisbon, we find very heterogeneous growth rates of real estate prices in different neighbourhoods, with the historic downtown experiencing the strongest increases. This heterogeneity is also clear if we focus our attention on rent prices per square metre. However, as shown in figures 62 and 63, 2019 experienced a slowdown in growth rates when compared with the previous year.

Figure 62 **Growth rate of the median rent (per m2) for new housing rental agreements in Lisbon, during 2018**



Source: Statistics Portugal

Figure 63 **Growth rate of median rent (per m2) for new housing rental agreements in Lisbon, during 2019**



Source: Statistics Portugal

5.2.3. The route to the 2018 reform

The rapid and uneven increase in real estate prices, alongside concerns over local residents being evicted from the city centre due to housing affordability, prompted a public debate about the merits of the short--term rental market and related touristic boom witnessed in Portugal during the decade of the 2010s.

Some Lisbon-based NGOs and grassroots organizations became very active in the debate about the excessive number of tourists and the impact of holiday rentals on housing prices. Some NGO names became

familiar to Lisbon residents for their commitment to the cause, such as *Morar em Lisboa* (link) or *Habita* (link). In January 2017, around twenty organizations promoted a petition calling for public policies to curb the real estate price increase in the capital city, deemed excessive by its organizers.

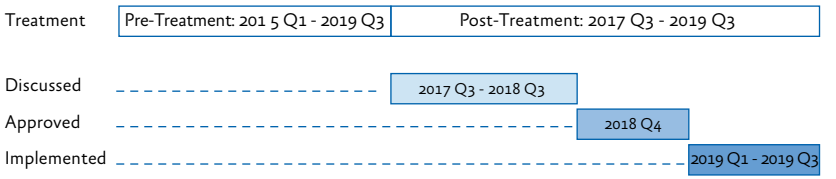
Before the 2017 Portuguese municipal elections, held in October, the incumbent socialist mayor of Lisbon, Fernando Medina, declared his intention to intervene in the market by imposing limits on the number of short-term rental units in some neighbourhoods. Some of his contenders, mostly on the left, intended to impose similar restrictions.[36] Interestingly, right-wing candidates shared the concern for lack of housing affordability and the belief that short-term holiday rentals were one of its main determinants. However, they favoured incentives for long-term rental as a policy solution.[37] Medina was re-elected in October 2017 with 42% of the votes.

In August 2018, the Parliament legislated to allow municipalities to regulate new property registries in the Portuguese Registry Office for Short-Term Rentals, the *Registo Nacional de Estabelecimentos de Alojamento Local*, henceforth RNAL. According to Law 62/2018, municipalities can incorporate short-term rental supply caps into their usual zoning regulations. The law became effective in October.

The municipality of Lisbon was quick to react, and in November immediately suspended new registries in certain pre-designated areas, the so-called Delimited Homogeneous Turistic Zones, with a new municipal proposal — Proposta n.° 677/AML/2018. The suspended areas were those where the density of short-term rentals, measured by the share of short-term rental properties in relation to total properties, was considered high, more precisely, above 25%. The number of properties in the short-term rental market was calculated based on information from RNAL, and the total number of dwellings from the 2011 census.

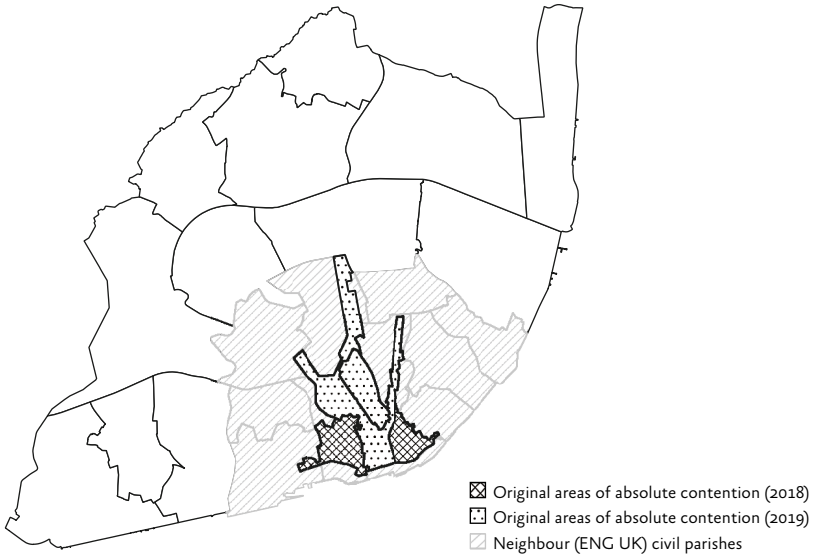
In the following year, there was a public debate about the appropriateness of extending the ban. A new municipal proposal — Proposta n.° 204/CM/2019 — was put forward in April 2019 and finally approved in November 2019. Figure 10 displays the timeline of the reform. We discuss our datasets below. Our period of analysis begins in 2015 and ends in the third quarter of 2019. The pre-treatment period corresponds to the quarters before the legal change was discussed. The post-treatment period is divided into the months during which the reform was discussed, announced, and later implemented. In Gonçalves et al. (2020) we discuss the possible impact of each of these three periods.

Figure 64 Analysis timeline



Note: This replicates figure 3 from Gonçalves et al. (2020)

Figure 65 Treated areas and control groups



Note: This replicates figure 4 from Gonçalves et al. (2020). Neighbour Civil Parishes: Estrela, Campo de Ourique, Campolide, Avenidas Novas, Areeiro, Beato, Penha de França, Arroios, São Vicente, Santa Maria Maior, Santo António, and Misericórdia

Figure 65 is a map of the city of Lisbon that highlights the different areas: the ones that were suspended in November 2018 are depicted in black; the extension of the prohibition one year later, in November 2019, affects the areas filled with dots; finally, we show neighbouring civil parishes (*freguesias*) that we used in our analysis in grey.

The map clearly shows that all these areas belong to the historic centre of Lisbon.

5.3. Data sources and empirical strategy

We use three sources of data:

- *Registo Nacional de Estabelecimentos de Alojamento Local*, i.e., the short-term rental registry which, as explained above, includes all properties officially registered to be used as short-term holiday rentals.[38] Each registry includes the registry date, address, number of rooms, nationality of the owner, and whether the owner is an individual or a firm. We collected all registries between January 2015 and November 2018, i.e., a total of 16972 dwellings.
- Our second data source is Inside Airbnb, a website which contains monthly information about Airbnb listings in Lisbon, scrapped by site curators from the Airbnb site. It also includes the number of reviews per listing and the number of listings belonging to the same owner, between April 2018 and September 2019. According to AirDNA, one of the largest databases on short-term rental analytics, Airbnb accounts for 74% of the short-term rental activity on these type of platforms in Lisbon. We only use information on entire dwellings, i.e., eliminating the registries on rentals of parts of the house, such as a guest bedroom.
- The third data source contains quarterly information about the number of house sales and their average and quartile prices, per

square metre, between the first quarter of 2015 and the third quarter of 2019. Lisbon is the capital of Portugal and Porto its second largest city. They are also the only two metropolitan areas in the country. In the historic centres of these two cities, the municipality has a right of first refusal, according to which it can buy any dwelling for the market transaction price. That is, once the price is agreed between the owner and the buyer, the municipality can exert the option of buying the property for that price. This procedure ensures that the municipality has individual records of every transaction in the city centre's so-called urban rehabilitation areas, which include the areas we analyse here. We gained access to this information via a protocol with *Confidencial Imobiliário*, an independent databank specialized in real estate. *Confidencial Imobiliário* provides information to credit firms in Portugal, and also to institutions such as Banco de Portugal, and the European Central Bank, who use the data in their monitoring of the real estate market. We did not have access to the individual records of each dwelling. For anonymity reasons, the quarterly data has been provided at the «neighbourhood» level, per square metre and type of dwelling, according to the number of rooms. When the number of transactions in a neighbourhood during a given quarter is too low, price data is eliminated. Fortunately, the city areas in this dataset come from the two municipalities' information system, the same one used to design the ban of short-term rental registries. Therefore, our real estate transaction data exactly fits the banned and non-banned areas in the zoning regulation we use to analyse the impact of these regulations.

We now briefly explain our empirical strategy. The policy change in Lisbon has a quasi-experimental nature. A quasi-experiment allows one to estimate the causal impact, as the nature of the policy change creates a suitable treatment and comparison group. This is an almost ideal experimental setup, in which the treatment is randomized and allows one to exploit actual reforms that have not been implemented, with the purpose of testing their impact explicitly built into the policy design. In this case, the neighbourhoods with a freeze on new short-term rental registrations in November 2018 are the treated areas. For comparison, we use the neighbourhoods included in the November 2019 extension, namely Baixa, Almirante Reis, Liberdade, Graça, and Colinas de Santana. This list requires an important clarification. It turns out that the inclusion of Graça and Colinas de Santana was already being discussed as of April 2019, when the extension of the ban started being debated. The neighbourhoods of Baixa, Almirante Reis and Liberdade have a lot of property allocated to the service sector and were, for that reason, not included in the initial discussions.[39] In order to avoid the contamination of our results by anticipation effects, we eliminated Graça and Colinas de Santana from our sample in all the empirical analyses that move past 2018. For robustness, we also use the neighbouring civil parishes, adjacent to the November 2018 and November 2019 freezes, in some parts of our analysis. These areas can be seen in figure 63.

The fact that our comparison group was also later included in the ban, ensures that it is very similar to the treatment group and eliminates concerns about unobserved heterogeneity biasing our results (Neumark and Simpson, 2015, page 23). Indeed, treated areas had short-term rental to total property ratios of 27% and 29%, while the comparison ones had ratios of 18% and 25%.[40]

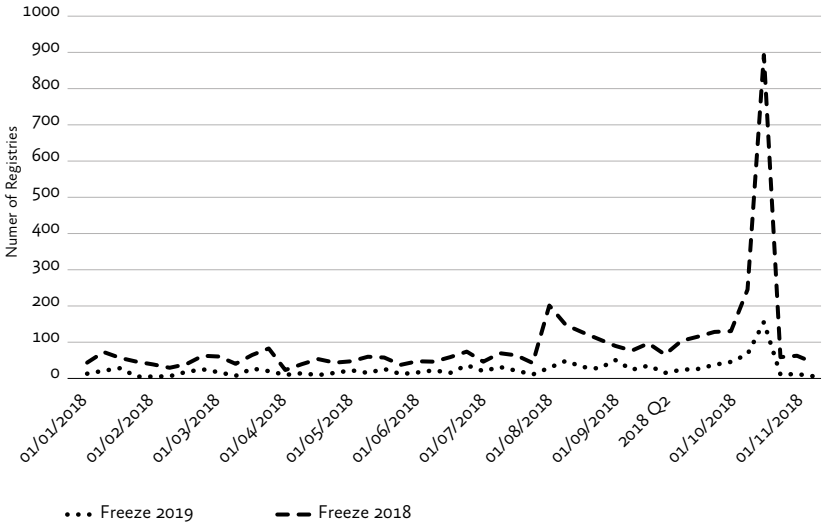
Having defined the treatment and comparison groups, we estimate difference-in-differences specifications. The difference-in-differences approach consists in comparing the outcome variables for the treatment and comparison group before and after the reform, i.e., November 2018. In principle, one would expect that, absent the reform, the evolution of the two groups would be similar. Therefore, one can attribute the differential change between the two groups (if any) to the policy reform.

We estimate the equations by ordinary least squares. We include civil parish fixed effects to account for unobserved time invariant characteristics of civil parishes, such as the existence of amenities or the proximity to historical sites. We also use quarter dummies to control for the state of the economy and the dynamics of the touristic market in each quarter. As time varying controls, we used civil parishes' political alignment with the mayor's party (i.e., whether the civil parish is governed by the Socialist Party or not), and the turnout rate in the 2013 and 2017 local elections. In addition, our estimations distinguish three different moments at which the policy may have an impact: the discussion, the approval and the implementation of the November 2019 reform, as detailed in the timeline presented in figure 8. Standard errors are clustered at the civil parish level.

We analyse four outcome variables; look at the number of short-term rental registries; and also study the evolution of the real estate market by analysing prices and quantities of dwellings traded in the market. Lastly, we analyse short-term rental prices. All our outcome variables are measured in natural logarithm, allowing us to interpret the results as percentage changes.

Figure 66 gives a graphic example of the difference-in-differences methodology. It displays the number of registries in the areas banned in 2018 and the comparison ones, which were banned one year later. The figure shows a very sizeable spike in registries in the treated areas just before the ban became effective in November 2018. The number of registries in treated areas is always above that of comparison ones; which is to be expected, since treated areas were precisely those with a higher density of short-term rental properties. However, the important fact for our empirical strategy is that the registries in the two areas are parallel throughout the period of analysis, with a small exception in July 2018, which is, nonetheless, much less sizeable than the one registered in November. Given the common evolution of the two variables before the ban, we may reasonably attribute the spike in October 2018 to the policy change. In other words, absent the policy change, we would expect the two variables to have a similar evolution to the pre-ban one, without the clear spike in the treatment areas. The difference-in-differences estimate starts by computing two average differences between the treated and comparison areas, one before the implementation of the ban, and another after the implementation. It then computes the difference between these two average differences.

Figure 66 Number of short-term registries



Source: RNAL

5.4. Results

We now turn to the discussion of our main results. We will analyse each of the outcome variables separately.

5.4.1. Registries

As documented in figure 64, there was a big spike in the number of registries just before the ban was implemented. It is important to recall the timeline of the legislative change. The Parliament voted the law which allows municipalities to regulate short-term rentals in late August 2018. The law became effective, i.e., municipalities were able to limit the areas, as of late October 2018. Our results show that this lag gave the incumbent owners ample opportunities to register new properties, which may have curbed the intended effects of the law, at least in the short run.

We proceed by aggregating registries to the quarterly level. We slightly change the definition of quarter, in order to account for the fact that the ban was implemented in November. Therefore, the quarters in our regressions are as follows: December to February, March to May, June to August, September to November.

The estimates are presented in table 13. Coefficients provide the difference in the change of the natural logarithm of the number of registries, before and after August 2018. Therefore, they should be interpreted as the percentage change in the number of registries caused by the new law.

Table 13 Difference-in-Differences results — Ln (registries)

Sample	Estimate	Standard error	Number of observations
Overall	0.309	0.04	9440
Number of bedrooms: below median	0.296***	0.06	8704
Number of bedrooms: above median	0.196**	0.03	6544
Nationality of owner: Domestic	0.304***	0.04	9376
Nationality of owner: Foreign	0.092	0.07	3504

Notes: For more details, please refer to tables 4 and 5 in Gonçalves et al. (2020). The period of analysis ranges between 2015 Q1 — 2018 Q4. Asterisks depict significance levels of * p < 0.10, ** p < 0.05, *** p < 0.01.

Our results indicate the following: overall, the announcement of the ban led to a spike of 30% in the number of registries in the treated

areas; most of the effect was driven by small dwellings, for which the spike is almost 30%, while bigger ones had a spike of just below 20%. It is also very interesting to notice that only domestic incumbent owners reacted to the announcement, possibly because they are more aware of the local political debate and were therefore able to incorporate the anticipated announcement in their decisions.

The magnitude of the effect, together with the evidence that it is driven by domestic incumbent owners, suggests that the anticipation period suppressed the impact of the ban in the short run.

5.4.2. Airbnb Prices

We will now present the results on rental prices of Airbnb listings. Our analysis is restricted to the prices of entire homes. All prices are per night and dwelling, and include dwelling fixed effects. Since fixed effects also control for the surface of the property, we run the regression on total rental price.

Our results, presented in table 14, indicate that, at least in the short--term, the ban had no impact on Airbnb prices. We also provide separate results for the subsample of dwellings owned by individuals or firms that only have one listing on the platform and those that have several, and also split the dwellings according to the number of reviews. The latter is a proxy of quality, as more reviews signal a property that is rented more often. We do not find significant price impacts in any of the subsamples. If anything, we identify a minor decrease of 0.08% in the price of listings owned by single owners, a result that may indicate temporary excess supply due to the increase in registries.

Table 14 Difference-in-Differences results — Ln (Airbnb prices)

Sample	Estimate	Standard error	Number of observations
Overall	-0.003	0.01	39336
Number of listings: single	-0.008**	0.00	10572
Number of listings: multiple	-0.001	0.01	28764
Number of reviews: above median	-0.000	0.01	19668
Number of reviews: below median	-0.004	0.01	19668

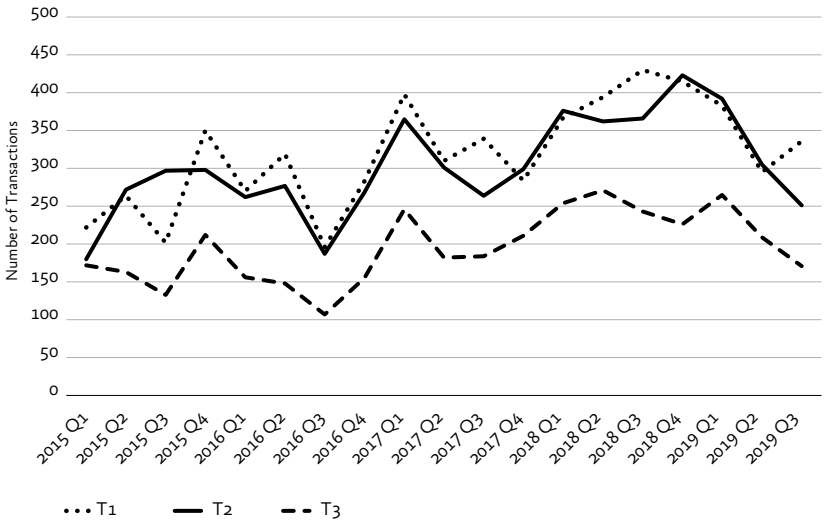
Notes: For more details, please refer to tables 7 and 8 in Gonçalves et al. (2020). The period of analysis ranges between 2018 Q2 — 2019 Q3. Asterisks depict significance levels of * p < 0.10, ** p < 0.05, *** p < 0.01.

5.4.3. The real estate market: quantity and price

We now rely on the data of the SIR.RU system to analyse the impact of the short-term rental ban on the real estate market. More precisely, we focus on the quantity and price of dwellings traded in the market. For the sake of anonymity, the data is aggregated to the neighbourhood level and type of dwelling, i.e., according to the number of bedrooms. This explains the smaller number of observations, a limitation we tackle by augmenting the comparison group with neighbouring civil parishes, as displayed in figure 63. This leaves us with 9 treated neighbourhoods, which we compare with 54 comparison groups.[41]

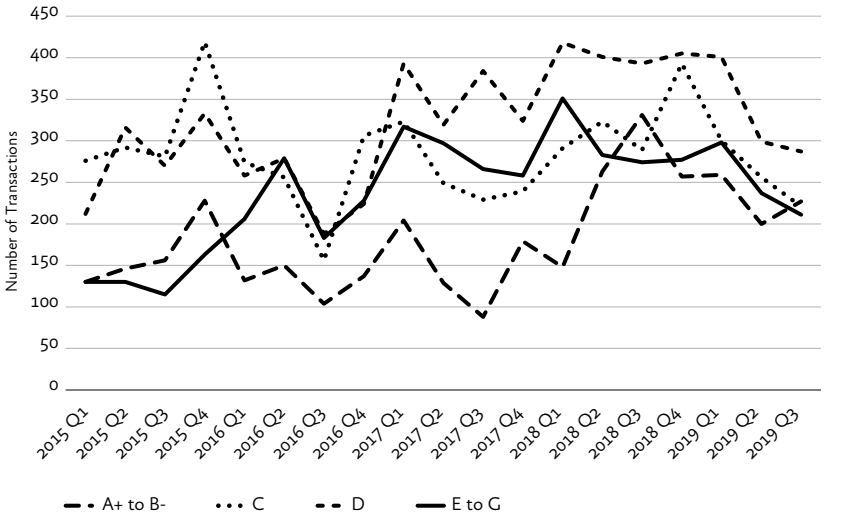
To have a better idea regarding the dwellings of the geographic areas considered in our study, we illustrate the evolution of house transactions across two dimensions: 1) number of bedrooms; and 2) energetic efficiency (where A+ are the most efficient and G are the least efficient). These are portrayed in figures 67 and 68, respectively. Both graphs underline important characteristics of our sample: houses in these areas are typically small (with one or two bedrooms) and display low levels of energetic efficiency.

Figure 67 Number of house transactions, by number of bedrooms



Source: RNAL

Figure 68 Number of house transactions, by energetic efficiency



Source: RNAL

The possibility to register a dwelling as a short-term rental creates option value, which is eliminated with the ban. More importantly, we do not expect the surge in the number of registries to eliminate this option value, as the short-term rental license belongs to the owner and is lost with the property transaction. Therefore, anyone buying a house does not benefit from the spike in registries depicted in figure 64 and the ban effectively eliminates the option value.

We first analyse the effects on property transactions. The results for the overall sample and for the subsamples of houses with different numbers of bedrooms are presented in table 15. The ban decreased the number of houses traded in the market by almost 20%. The evidence supports the argument that the option to participate in the short-term

rental market is an important determinant of the housing market demand in these areas. Moreover, the effect is driven by housing units of smaller dimensions, which confirms the results in table 13 that the short-term rental market is segmented according to the size of dwellings.

Table 15 Difference-in-Differences results — Ln (number of transactions)

Sample	Estimate	Standard error	Number of observations
Overall	-0.196**	0.08	660
1 bedroom	-0.219	0.12	584
2 bedrooms	-0.259***	0.06	584
3 bedrooms	-0.142*	0.07	557

Notes: For more details, please refer to tables 9 and 10 in Gonçalves et al. (2020). The period of analysis ranges between 2017 Q1 — 2019 Q3. Asterisks depict significance levels of * p < 0.10, ** p < 0.05, *** p < 0.01.

We now turn to real estate prices. The price information is omitted in our data for neighbourhoods with less than 4 transactions in a given quarter. The neighbourhoods that are dropped from the sample due to this restriction are, in principle, different from the remaining ones, as their real estate market is probably less dynamic. Therefore, to make our observations as comparable as possible, we focus on neighbourhoods with data in all four quarters, i.e., those with a sufficient number of transactions in a steady flow throughout the period we analyse. This leaves us with 5 treated and 37 comparison neighbourhoods.[42]

Table 16 Difference-in-Differences results — Ln (prices)

Sample	Estimate	Standard error	Number of observations
Overall	-0.086***	0.03	462
1 bedroom	-0.035	0.05	304
2 bedrooms	-0.197**	0.08	318
3 bedrooms	-0.019	0.06	232

Notes: For more details, please refer to tables 11 and 12 in Gonçalves et al. (2020). The period of analysis ranges between 2017 Q1 — 2019 Q3. Asterisks depict significance levels of * p < 0.10, ** p < 0.05, *** p < 0.01.

The results are presented in table 16. They show that the suspension of short-term rental registries induced an almost 9% decrease in prices. This further confirms the option value regarding the possibility to rent houses in the short-term rental market.

The results for the subsamples of houses with different number of rooms confirm that the more «Airbnb-marketable» properties are the relatively smaller ones. In this case, dwellings with 2 rooms experienced a price decrease of 20%.

5.5. Conclusion

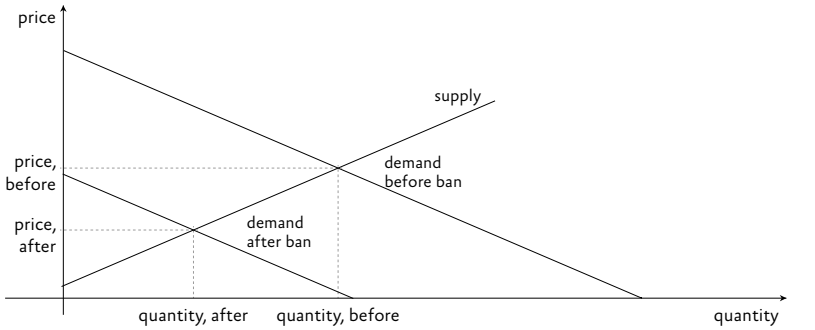
In this chapter, we discuss the tourism boom in Portugal, with a special focus on Lisbon and the related spread of short-term rental properties in the city. We analyse the impact of short-term rentals on the real estate market, taking advantage of a partial ban introduced by the municipality of Lisbon in November 2018, which prohibited new short-term rental licenses with immediate effect in some pre-selected areas of the capital.

We use a difference-in-differences strategy that compares the areas prohibited in 2018 with the others prohibited one year later, before and after the introduction of the ban. This allows us to obtain causal evidence on the regulation of the short-term rental market.

Our main findings are as follows. We show that the incumbent owners (mostly, Portuguese ones) rushed to register properties just before the ban was effective. This shows that the anticipation of the policy due to its wide public discussion, as we mentioned in Section 2, allowed incumbent owners to enter the market in the very last weeks during which it was allowed. We then analyse the evolution of Airbnb rental prices, finding no effects, at least in the short-run.

Regarding the real estate market, we document a sizeable decrease in the number and price of traded dwellings. More specifically, we find that the ban led to a 20% decrease in the quantity traded in the market and a 9% decrease in the price. The market for 2-bedroom flats drives these effects, showing a segmentation of short-term rentals in small to medium sized apartments. The price decrease for two-bedroom houses is almost 20%. This is consistent with a sharp reduction in the demand for this type of flats, confirming that the option to register a property as short-term rental is an important driver of the search for new properties. We illustrate the demand mechanism in figure 69.

Figure 69 **The demand driven impact in the real estate market**



Our work provides convincing evidence that the surge of short-term rental markets does create an upward pressure on real estate prices. However, our estimates suggest that, despite their salience, sharing economy platforms are not the full story behind the spectacular housing market boom in the city of Lisbon.

A few final notes are in order. We started this study before the COVID-19 pandemic led tourism and the short-term rental market to an almost complete halt. According to *Confidencial Imobiliário*, the occupancy rate of short-term rental properties in Lisbon was down to 5% in May 2020, a sharp decline compared with the 73% occupancy rate registered in May 2019.[43] This is a tremendous shock to the real estate market and the effects will depend on the duration of the pandemic and the evolution of international travel restrictions. Even if the impact of this shock is outside the scope of this study, our results strongly suggest that it may lead to a decrease in real estate prices in the near future.

References

Angrist J. D. and J.-S. Pischke, (2009), *Mostly harmless econometrics: an empiricist's companion*, Princeton, NJ: Princeton University Press.

Franco, S. F. and J.L. Macdonald, (2018a), «Measurement and valuation of urban greenness: remote sensing and hedonic applications to Lisbon, Portugal», *Regional Science and Urban Economics* 72, 156–180.

Franco, S. F. and J.L. Macdonald, (2018b), «The effects of cultural heritage on residential property values: evidence from Lisbon, Portugal», *Regional Science and Urban Economics* 70, 35–56.

Franco, S. F., C. Santos and R. Longo, (2019), «The Impact of airbnb on residential property values and rents: evidence from Portugal», *Working paper*.

Gonçalves, D., S. Peralta and J.P. Santos, (2020), «Do short-term rentals increase housing prices? Quasi-experimental evidence from Lisbon», *Working paper*.

Koster, H., J. van Ommeren and N. Volkhausen, (2018), «Short-rerm rentals and the housing market: quasi-experimental evidence from airbnb in Los Angeles», *Working pape*r.

Neumark, D. and H. Simpson, (2015), «Place-based policies», in *Handbook of Regional and Urban Economics*, Vol. 5, Elsevier, pp. 1197–1287.

Chapter 6
Urban rents in Portugal: a decline with no return?

Victor Reis

6.1. Introduction

This chapter analyses the evolution of urban rents in Portugal based on existing traditional dwellings, as well as their forms and regimes since the beginning of the 20th century. It addresses the development of traditional housing stock on a national level, and in the cities of Lisbon and Porto, together with their respective historic centres, since the 1960 census. We present the main legislative measures taken over the last century in terms of the liberalised rental markets, as well as the various social housing rental systems related to public housing policies.

From a political point of view, we explore the effects of these measures on the rental housing market, especially in terms of its decline and segmentation. However, in order to portray the evolution of urban rents, we needed to address several obstacles, such as the lack of information collected over the decades, especially prior to 2001, and the need to perform extrapolations, since until this time data on rented dwellings were presented by households. This entailed assessing over-occupancy and considering changes to concepts which occurred between censuses.

The analysis of the recent evolution of Lisbon and Porto's historic centres, the most relevant focus of the real estate market, is only possible after the 2001 census, when lease information disaggregated by civil parish becomes available. The information after the 2011 census is scattered and scarce, and it is only in 2017 that data on new lease agreements are disclosed.

In this paper, we consider the following assumptions:

- We conduct the analysis only on the so-called classical family dwellings;
- No information is presented prior to the 1960 census;
- In censuses from 1960 to 1991, the number of rented dwellings, was extrapolated from the proportion of dwellings registering over occupancy;
- Data on rented dwellings include sub-leases and exclude so-called «other situations» and «space lending»;
- The data presented by civil parish is aggregated based on changes occurred after 2013. In this way, we can compare these data with the most recent statistics for the historic centres of Lisbon and Porto.

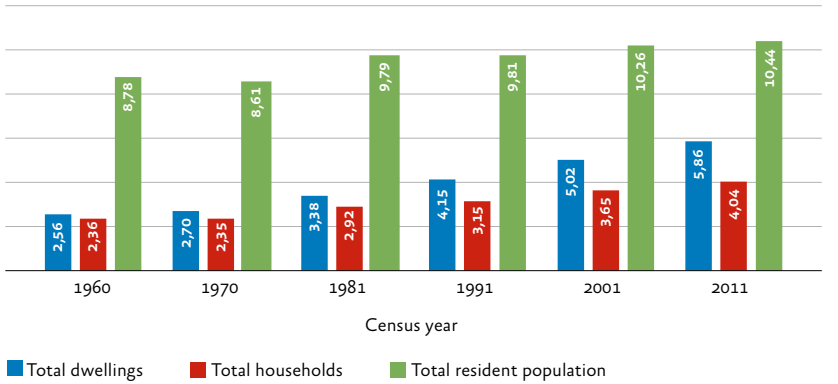
6.2. Census information

6.2.1. Portugal: the evolution of conventional dwellings over the last 50 years

As mentioned earlier, the available data presents deficiencies in terms of the evolution of urban rents in Portugal. However, the data that constitutes the statistical base of analysis allows us to visualise a path which simultaneously shows a surprising growth in national housing stock and a sharp decline in the number of properties available for rental purposes.

In the five-decade period between the 1960 and 2011 censuses, the housing stock of traditional family dwellings more than doubled, rising well above the number of households, and the ratio of dwellings per household increased from 1.08 to 1.45 (see next graph).

Figure 70 Evolution of conventional dwellings, households and residents in Portugal (Unit: millions)



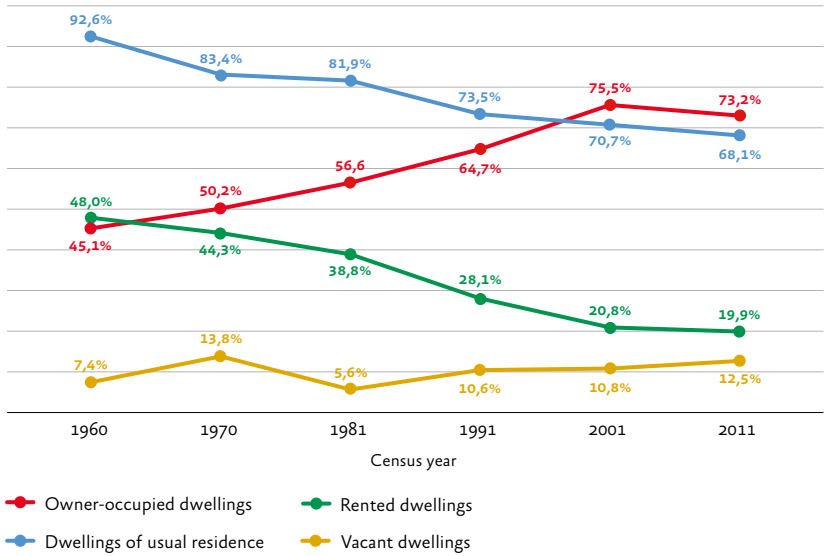
Source: Statistics Portugal

As is well known, the growth rates observed for each decade have been greatly influenced, both by migration flows and demographic changes. In the 1960s, emigration was responsible for the low growth of the number of dwellings at 5.5%, while in the 1970s, the decolonization process generated the highest growth ever in housing stock (25.2%). Since 2002, with the end of subsidized credit, and after 2007 with the subprime crisis, there was a slowdown in dwelling construction, and in the 2011 census growth had declined to 16.7%. The latest data provided by Statistics Portugal on housing stock for 2018, estimates a growth of only 1.6%, since 2011.

Note that after the 1991 census, several experts pointed to the existence of a housing deficit in Portugal of around half a million homes, leading to the proposal of «the 500 thousand housing plan»[44]. At the time, the total number of dwellings of usual residence was 3.05 million and there were 3.14 million households, which suggests the need for one hundred thousand additional homes. Over the next two decades, 1.7 million conventional dwellings were built in Portugal and despite this 41% increment and only 28.5% increase of households for the same period, the difference between conventional dwellings and households in 2011 was of approximately 52,000 dwelling units.

The demographic evolution and the changes in the structure and size of households registered in Portugal by 2011, show a country in which the number of families had grown 71.6% since 1960, but the number of residents had increased only 18.9%. However, the difference between population growth and housing stock over this period shows divergent behaviour when analysed from a standpoint of forms and regimes of dwelling occupancy, as shown in the graph below.

Figure 71 Evolution of forms and regimes of dwelling occupancy



Source: Statistics Portugal

On the one hand we can observe a continuous and significant drop in weight regarding dwellings of usual residence, which decreased from 92.6% in 1960 to 68.1% in 2011. In absolute values, these dwellings grew 68.4%, from 2.36 to 3.99 million, while the total number of conventional dwellings more than doubled within the same period. At the same time, there were also three significant changes in the composition of the housing stock:

Owner-occupied conventional dwellings grew to 73.2% of the total number of dwellings of usual residence, when 50 years earlier that weight was of 45.1%. This corresponds to a nearly tripled increase, from 1.07 to 2.92 million dwellings;

The weight of vacant dwellings also grew, although less significantly, reaching 12.5% in 2011. Despite the rise, it is lower than the 13.8% quantified by the 1970 census. However, when comparing the 2011 census results with those of the previous decade, an increase of 35.2% can be observed, representing an increase from 543 thousand to 735 thousand dwellings in absolute terms;

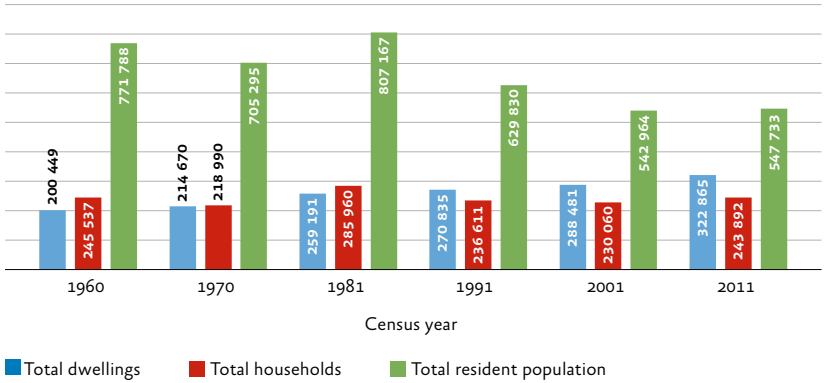
However, it is amongst rented and vacant dwellings that the greatest decline can be observed. In the 1960 census, the weight of these dwellings was 48%, but by 2011 it had reduced to 19.9%. In absolute terms, the decline was of around 30%, decreasing from 1.14 million dwellings in 1960, to just over 794 thousand in 2011, for these types of regimes. It should be noted, however, that in the decades starting from 1970 and 2001, there was an increase of approximately 7% in rented dwellings, for each period.

6.2.1.1. The case of Lisbon and its historic centre

When specifically analysing the data for the cities of Lisbon and Porto, which have been subject to a long period (38 years) of legal rent freeze, it appears that these patterns present greater deviations than those registered at a national level.

As can be seen in the following graph, until 1981 Lisbon has more households than conventional dwellings, and only in the following censuses does the data show a reversal of this reality. The ratio of dwellings per household increased from 0.81 in 1960 to 1.32 in 2011.

Figure 72 Evolution of conventional dwellings, households and resident population in Lisbon



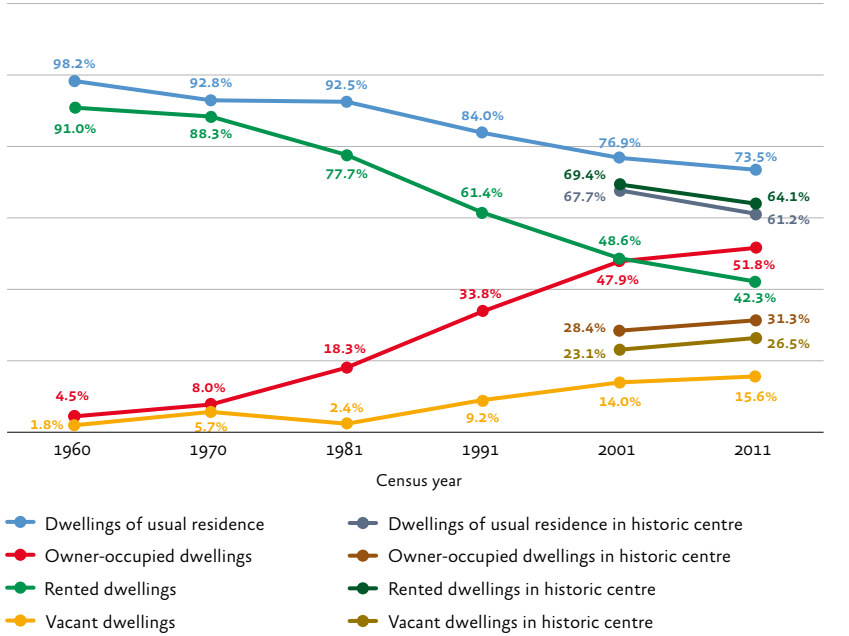
Source: Statistics Portugal

However, while at a national level there was an increase in households and resident population, in Lisbon there was a sharp decline in these values from 1981 to 2001. The 2011 census shows a slight inflection of this trend. In the 30-year interval between 1981 and 2011, we observe a loss of nearly one-third of the resident population and 15% of families. According to Statistics Portugal's estimates for 2018, the resident population decreased 7.4% in comparison to 2011.

The next graph shows the evolution of the housing stock in Lisbon between 1960 and 2011, and the changes that occurred in the forms and regimes of dwelling occupancy. The data available for 2001 and 2011 also provide information for the three civil parishes within the city's historic centre (Santa Maria Maior, Misericórdia and S. Vicente). As previously indicated, there is no data available at the municipal level in censuses prior to 2001.

Following national trends, the numbers of usual and rented dwellings decreased and owner-occupied and vacant dwellings increased. These patterns are even more pronounced in the historic centre.

Figure 73 Evolution of forms and regimes of dwelling occupancy in Lisbon



Source: Statistics Portugal

The city as a whole witnessed a fall in dwellings of usual residence to 73.5% of the total number of dwellings. During these 50 years, the total number of dwellings increased by approximately 122,000, reaching a total of 322,000, and those dwellings of usual residence only grew 40,000 in number, totalling 237,000. In 2011, the weight of

dwellings of usual residence in the historic centre was lower (61.2%) and showed a sharp decrease when compared to 2001.

In 2011, Lisbon had 15.6% of vacant dwellings, a number higher than the 12.5% registered at a national level, and 26.5% in its historic centre, a percentage higher than that of the city as a whole. In absolute terms, the number of vacant dwellings in the historic centre amounted to 8,365. If we extend this analysis to the limits of the first ring road which includes the civil parishes of Estrela, Campo de Ourique, Santo António, Arroios and Penha de França, the number increases to 22,472. Considering the rest of the civil parishes altogether, a further increase of 27,737 is observed. Thus, Lisbon totalled 50,209 vacant dwellings in 2011.

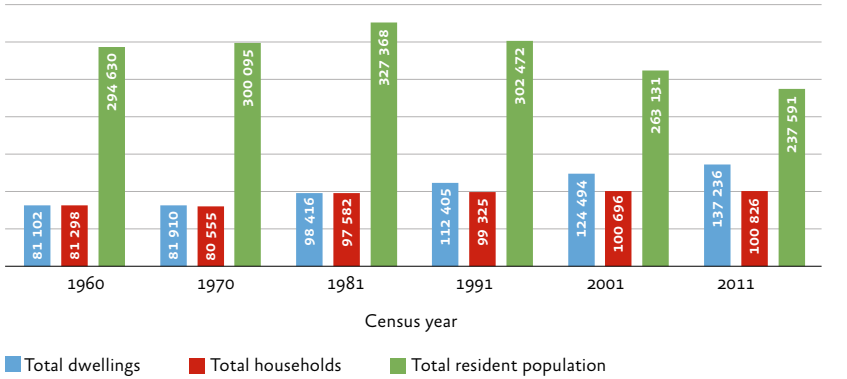
The variation in owner-occupied dwellings as well as rented dwellings presents an almost symmetrical trend, which intersects in the 2001 census, when owner-occupied dwellings begin to have more significance than rented dwellings. Once again, the figures for the historic centre deviate from those of the city. In 2011, owner-occupied dwellings already have a weight of 51.8% in the city as a whole, while in the historic centre the percentage is only 31.3%. The phenomenon repeats itself in the same year for rented dwellings, which in the city represent 42.3% and in the historic centre represent 64.1%.

In summary, dwellings of usual residence and rented and vacant dwellings in Lisbon have a greater weight than at country-level, and only owner-occupied dwellings show an opposite behaviour. The historic centre shows a greater weight of rented and vacant dwellings than the city as a whole, while dwellings of usual residence and owner-occupied dwellings show a lower rate.

6.2.1.2. The case of Porto and its historic centre

With regard to the city of Porto, although there are many similarities with the patterns observed for Lisbon, there are some specificities to be highlighted. The ratio of family dwellings increased from 0.99 in 1960 to 1.36 in 2011.

Figure 74 **Evolution of conventional dwellings, households and resident population in Porto**

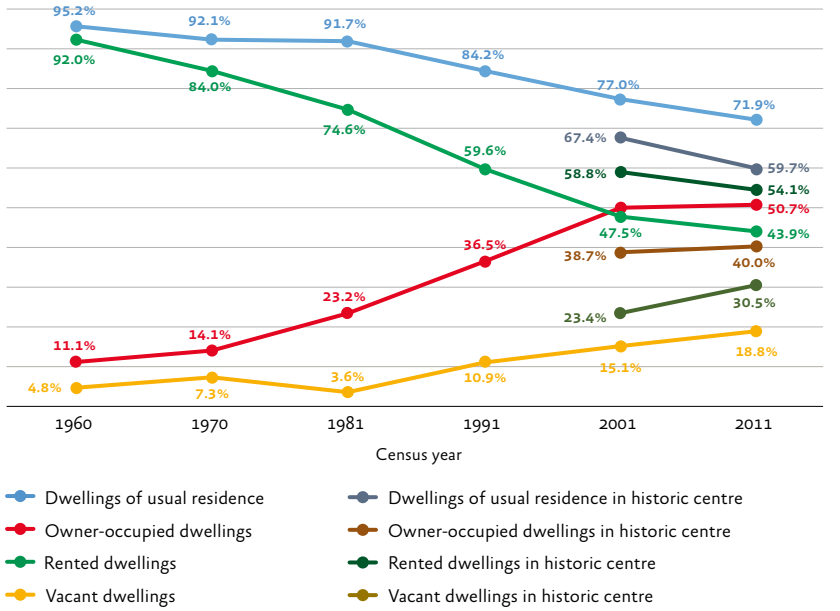


Source: Statistics Portugal

From the 1981 census onwards, and to a lesser extent in Lisbon, there is a drop of approximately 30% in resident population, although the number of families does not vary widely. However, in Porto's case, the 2011 census does not show stability in the number of resident population, as observed in Lisbon. In contrast, Porto shows a continuous decline and according to Statistics Portugal's estimates for 2018, the resident population suffers a decrease of 9.4% in comparison to 2011.

The following graph shows the evolution of housing stock in Porto, which is much alike Lisbon's. Similarly to the trend observed, both at a national level and in Lisbon, Porto displays two trajectories of sharp decline for dwellings of usual residence and rented dwellings, as well as increasing trajectories for owner-occupied dwellings and vacant dwellings.

Figure 75 Evolution of forms and regimes of dwelling occupancy in Porto



Source: Statistics Portugal

However, in the historic centre of Porto these trajectories show a few particularities that must be highlighted: the weight of rented dwellings is much lower than in Lisbon (54.1% to 64.1%), while in Porto the percentage of owner-occupied dwellings (40.0% to 31.1%) as well as vacant dwellings (30.5% to 26.5%) is higher than in Lisbon.

Over the past five decades, dwellings of usual residence in Porto have fallen to 71.9% of the total number of dwellings. Between the 1960 and the 2011 censuses, this type of dwelling increased by about 56,000, reaching 137,000 units, while dwellings of usual residence grew 22,000 to a total of 98,000 units. Furthermore, in 2011, in the historic centre of Porto, the weight of dwellings of usual residence is much lower, only corresponding to 59.7%, and showing a decrease of almost 10% when compared to 2001.

Porto has a higher percentage of vacant dwellings in 2011 than Lisbon and the country as a whole (18.8% to 15.6% and 12.5%, respectively), while in the historic centre the percentage is even greater than that of the city as a whole (30.5%). From the analysis of vacant dwellings in absolute terms, Porto had a total of 25,833 units according to the last census, of which 9,327 were located in the historic centre, and 16,506 throughout the city. It should be noted that in 2011 the historic centre of Porto had 30.5% of vacant dwellings, which when compared to that of the other Portuguese municipalities, is only surpassed by Penela (31.8%), and followed by the historic centre of Lisbon (26.5%), Mora (23.9%), Coruche (23.3%) and Tarouca (22.8%). It is important to mention that these municipalities represent the country's interior regions, considered to be low density areas and strongly affected by the depopulation process.

As in Lisbon, the variation in owner-occupied dwellings and rented dwellings in Porto has symmetrical trends that intersect in 2001, a time when owning a house acquires more weight than renting one. Once

again, the numbers in the historic centre deviate from this pattern. In 2011, owner-occupied dwellings already weigh 50.7% in the city and 40.0% in the historic centre. The relative weight of rented dwellings is 43.9% and 54.1%, respectively.

In summary, as in Lisbon, dwellings of usual residence, as well as rented and vacant dwellings in Porto, have greater weight than at national level, and only owner-occupied dwellings show the opposite behaviour. Furthermore, when focusing on Porto's historic centre, both rented and vacant dwellings have greater weight than in the city as a whole, while dwellings of usual residence and owner-occupied dwellings have lower weights (a behaviour similar to that observed in Lisbon).

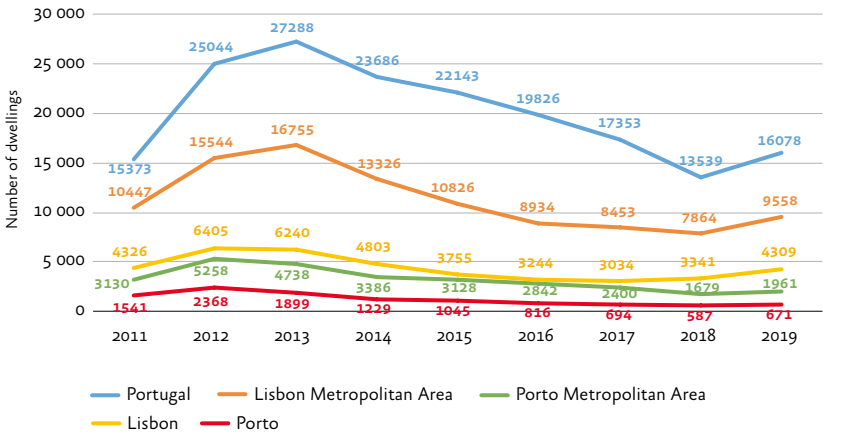
6.2.2. Information available after the 2011 census

This study was carried out approximately a year before the 2021 census and, in the nine years since the last census, the information available on the evolution of housing stock does not allow for an in-depth analysis, as does the information contained in the censuses. Statistics Portugal produces annual housing stock estimates in terms of dwellings, but these do not allow for a disaggregated view of their forms and occupancy regimes. It also provides housing rent statistics at the local level, with data series starting in 2017 which, being newly implemented do not allow for comparison with the 2011 census.

Also available are the statistics produced by *Confidencial Imobiliário*, a repository with the most extensive series on the rental market over the last decade, as well as information from the Tax and Revenues Authority (AT) which is sporadically disseminated in the media. As we will see, these statistics show that in recent years, the rental market has been in contraction. In several regions of the country, the decline in supply has been significant and the price increase very sharp.

Statistics by *Confidencial Imobiliário* beginning in 2010 illustrate the evolution of supply and the contraction of new rental housing agreements in Portugal, as can be observed in the following graphs.

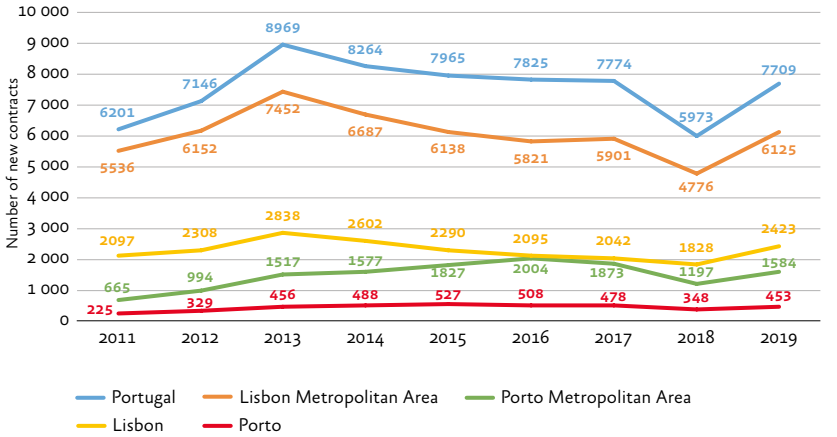
Figure 76 Number of rental housing units supplied per year



Source: *Confidencial Imobiliário*

With the exception of the inflection observed in 2019, the supply of rental housing has been in continuous decline since 2013 in various areas of the country.

Figure 77 Number of new housing rental contracts per year

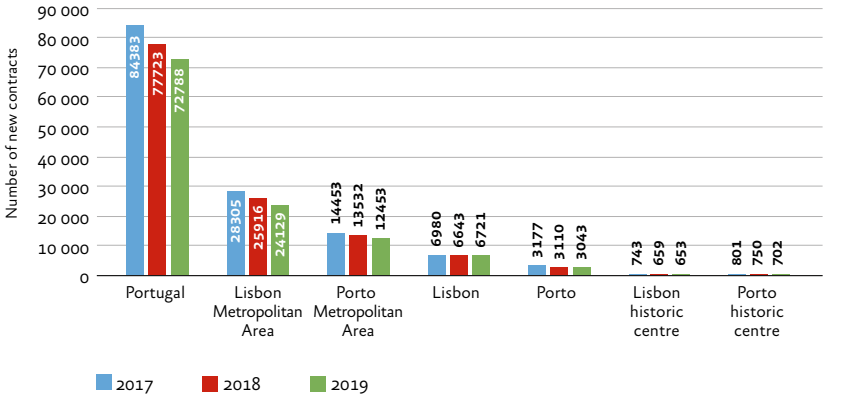


Source: *Confidencial Imobiliário*

In terms of new rental housing agreements, the number generally grew until 2013, with the exception of Porto and the metropolitan area of Porto, where it continued to increase until 2015 and 2016, respectively. Subsequently, there was a drop in these indicators which persisted until 2018, followed by an inflection and increase in 2019.

However, this latest increase is contradicted by housing rental statistics at the local level from 2017 to 2019, produced by Statistics Portugal and based on data from agreements registered at the AT. With the exception of the city of Lisbon, which in 2019 presented a growth of 1.2%, the variations are negative for all other indicators, with the two metropolitan areas displaying the greatest reduction: 14.8% in Lisbon and 13.8 % in Porto. The national decrease from 2017 to 2019 was 13.7%, and 3.7% and 4.2% in Lisbon and Porto, respectively.

Figure 78 Number of new rental contracts per year



Source: Statistics Portugal

These data only refer to new rental agreements, and contain no indication of how many have ceased. Therefore, they do not enable the assessment of changes occurred in the rental market as a whole, nor do they allow us to understand whether the global trend decline registered in the censuses continues to be true. In this regard, it is only possible to obtain some indications through the information released by some media outlets, based on data from the AT. In February 2018, *Dinheiro Vivo* reported that 24,477 fewer annual income returns had been filed, corresponding to 20,474 less landlords[45], in conformity with data provided by the AT. According to this publication, these figures resulted from the number of filings of Form 44 (*Modelo 44*), which in 2018 had been 130,321 and in the previous year 154,798. A few months later, on the 24th of October, quoting *Correio da Manhã*, *Dinheiro Vivo* reported that in the first 10 months of 2018 there was a 3.6% drop in the registration of new housing rental agreements[46]. The news

article added that the termination of agreements had increased from 124,000 to 134,000. More detailed information on the recent situation of urban housing rentals was released by *Negócios* in January 2020, reporting that 754,278 housing rentals were registered through *Portal das Finanças* (Portugal's online fiscal platform), based on data from the AT[47]. The comparison of this number with that of the 2011 census indicates a reduction of about 5%. The news article refers to a relevant aspect of rental housing, especially those with agreements signed before November 1990, and commonly known as «old agreements». The 2001 census quantified 440,000 agreements, a number that decreased to 225,000 in the 2011 census. *Negócios* also added that in 2018 this number dropped to 78,383, and in 2019 to 50,462, corresponding to 6.7% of the total registered agreements.

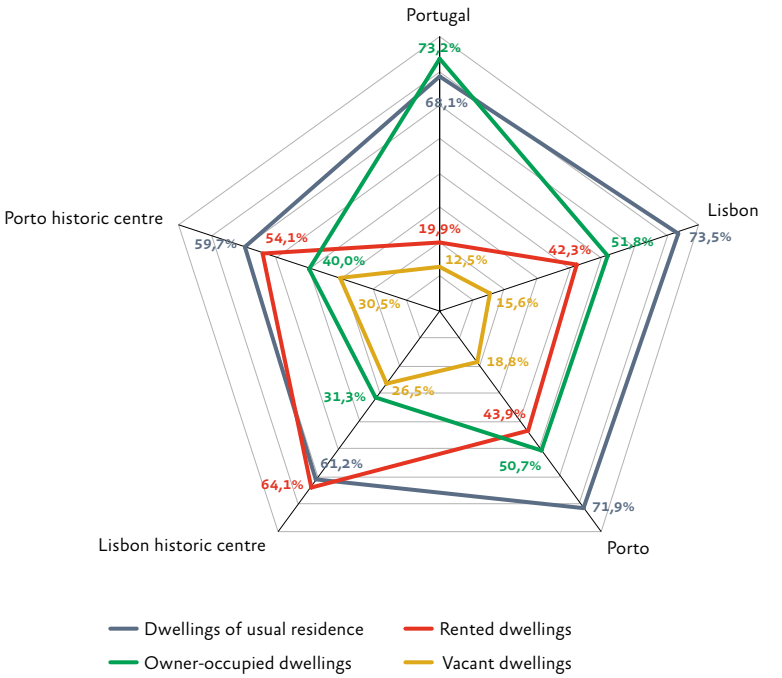
6.2.3. A profound change in the housing stock

In the 50-year interval between censuses, a period during which the country more than doubled its housing stock, dwellings of usual residence lost significant weight, dropping from 92.6% to 68.1% of the total housing stock; the remaining 31.9% are divided between secondary, seasonal or vacant dwellings. In the universe of permanent dwellings, owner occupied dwellings increased from 45.1% to 73.2%, and rented dwellings fell sharply from 48% to 19.9%.

In Lisbon and Porto, the weight of dwellings of usual residence presents similar patterns, but when the analysis is restricted to their respective historic centres the weight is much lower in the 2011 census: 61.2% in Lisbon and 59.7% in Porto. Meanwhile, the percentage of vacant dwellings in both historic centres increased. While its national weight is 12.5%, the historic centres of Porto and Lisbon represented 30.5% and 26.5%, respectively.

With regard to the indicators of owner-occupied dwellings and rented dwellings, the pattern reverses: in the first case, the weight at a national level is 73.2%, while in Lisbon and Porto it is 51.8% and 50.7%, respectively; and in their historic centres 31.3% and 40%, respectively.

Figure 79 **Weight of forms and occupancy regimes in 2011**



Source: Statistics Portugal

As for rental housing, the national weight drops to 19.9% in 2011, but continues to have some significance in Lisbon and Porto, with 42.3% and 43.9%, respectively; these weights are higher in their respective historic centres, 64.1% and 54.1%, respectively.

These patterns are not repeated in other Portuguese municipalities and those that come closest to these percentages of housing rentals are Guimarães and Amadora (both with 30.5%), Espinho (with 29.9%) and Loures (with 29.5%), which presented higher percentages of dwellings of usual residence (approximately 80%) and much lower vacant dwellings (between 9% and 11%).

6.3. Rent control in housing markets

6.3.1. A century of legislative instability

Urban rental housing in Portugal, in the so-called free market since 1910, can be divided into four major cycles, which occurred throughout different political regimes:

iii) 1910 to 1948

Following the Implantation of the Portuguese Republic in 1910, the law «regulating tenancy»[48] is published, decreeing the first rent freeze, which was supposed to last for one year but lasted for several more. This legislation would remain in force until the publication of another decree in 1919[49], which attempts to provide greater consistency to rent policy and maintained the transitional and emergency measures enacted during the First World War crisis. During this period, throughout the First Republic and after the establishment of the Estado Novo, several attempts were made to update rent prices.

iv) 1948 to 1976

In 1948[50] changes to rent prices in Lisbon and Porto were suspended, a situation which lasted until 1986, and tenancy agreement transmissions were extended to both antecedents and descendants. In 1966, the Civil Code[51] grants unlimited duration to rental agreements. With the April 1974 revolution, rent freeze became widespread throughout the country, evictions were suspended and the illegal occupancy of vacant dwellings was legitimized.

v) 1976 to 2016

With the first constitutional government being established in 1976[52] the reversal of measures from the previous cycle begins. In 1981, discretionary rent agreements are allowed, conditional rent is created, the annual rent adjustment mechanism is defined and the Rent Law is published[53] — allowing for exceptional rent updates on agreements previous to 1980. The publication of the Urban Lease Regime (RAU)[54] opened a path of progressive and greater liberalization for urban rental housing, which was in place until 2016. Limited-term tenancy agreements are initiated and changes are made to the rights of tenants regarding the transmission of agreements to antecedents and descendants. In 1995[55], this reform was extended to the non-housing rental market. In 2006, with the publication of the New Urban Lease Regime (NRAU)[56], a new process for updating rents is initiated, depending on the building's state of conservation, automatic transfers of non-housing leases are over, the form of housing lease transmission is restricted and a rent subsidy is created. With Law no. 31/2012 of 14 August, a transition period is established for the update of rents prior to 1990, according to tenants' income and age. A special

eviction procedure is created, as well as the National Leasing Office (*Balcão Nacional do Arrendamento*), and also provisions for the vacancy of property in order to carry out extensive construction work when needed. This law was changed in 2014[57], with several amendments, namely relating to the protection of tenants, notification periods and compensation for improvements made. The rent subsidy regime of 2012 is regulated through Decree-law no. 156/2015 of 10 August.

vi) 2016 to the present

In 2016, the reversal of several approved measures, especially those from the previous legislature, begins. The notion of «shops with history»[58] is created, the regime for carrying out maintenance and repair work in rented buildings is changed, the right of preference is modified[59] (declared unconstitutional in June 2020), harassment and rent penalties are legislatively prohibited[60], the transition period of tenancy agreements to new lease regimes is prolonged (with a minimum duration limit of at least three years now imposed on agreement renewals), arrears interest is reduced, and certain types of lease become lifelong, depending on the specific tenancy situation[61] and including fixed term agreements. Affordable rental programmes for the middle class are created.

Over the 110 years covered by these four cycles there is a dense and vast legislative framework which despite changes in political regimes has generated a climate of increasing instability and insecurity in the rental market.

In the next section, we will examine important legislative interventions, such as rent freeze, the duration of rent agreements and their transfer, eviction procedures, security deposits and penalties for late rent payments, state social support instruments and the issue of vacant dwellings.

6.3.2. Indefinetly extended transitional regimes

One of the common factors of the various legislative processes within the last 110 years, is the transitional nature of their measures, always justified by situations of crisis or emergency. After the first transitional period, the same measures were generally renewed several times. The first rent freeze, enacted on 12 November, 1910, was intended for a one year period but remained in effect until 1914, and the mechanism for fixing rents enacted in 1914 was successively changed in following years and until 1924, maintaining its initial transitional nature. Law No. 1662, published in 1924, set restrictions for rent updates which would remain in effect until the end of the following year. However, these restrictions were extended until the end of 1927 and, on the 28th of November, 1927, Decree no. 14630 prolongs the situation once again, «until publication of a new decree». In short, annual transition becomes definitive. The rent freeze imposed by Law No. 2030 in 1948 within Lisbon and Porto makes rent updates dependent on the execution of fiscal assessments. In 1966, when the Civil Code was approved, the need for this update was acknowledged, although it still remains to be carried forward to this day. The correction of rents is only initiated 38 years later with the Rent Law. More recently, the NRAU transitional regime for pre-1990 agreements set out by Law No. 31/2012, initially for five years, was extended for another three years in 2017 and for two more years in 2020, thus totalling 10 years, twice the term initially established. It would be of no surprise if it were to be extended until 2022. These are just some

examples portraying the legislative practices that have been in place over decades, common to the First Republic, the Estado Novo and the times of the PREC, and which still exist today.

6.3.3. Rent freeze and price control

Throughout the aforementioned cycles, the situations in which there was an effective rent freeze must be distinguished from those in which it was legislated to allow updates, although these did not have any real practical effects due to procedural factors. In fact, there were only three rent moratoriums: 1) an intended one-year period in 1910 which lasted until 1914 and in some situations until 1919; 2) a 38-year period in the cities of Lisbon and Porto, which started in 1948[62]; and 3) a rent moratorium applied to the entire country in 1974[63] which lasted for 12 years.

In 1910, new agreements had to maintain the price of rents from previous agreements[64]. Between 1914 and 1924, a rent control system was in force that distinguished maximum rent values between Lisbon, Porto, other cities and the rest of the country. For example, in 1914 rents under 18 escudos in Lisbon, 15 escudos in Porto, 10 escudos in other cities and 5 escudos in the rest of the country, were frozen[65], unless the tenant agreed to a higher value. In 1917, the 1914 Decree remained in force, prolonging the rent freeze for values that had been previously set, but new maximum values for rents were stipulated: 25 escudos in Lisbon, 20 escudos in Porto, 13 escudos in other cities and 8 escudos in the rest of the country[66]. Rents above these limits could be increased in up to 10% of their value[67]. In turn, the 1919 Decree determined that in case of the renewal of existing agreements, rents could not exceed 50 escudos in Lisbon, 40 escudos in Porto, 20 escudos in other cities and 15 escudos in the rest of the country[68].

In short, although there is a rent freeze for existing agreements and, between 1910 and 1914 there are ordinances which determine that new agreements cannot establish rents higher than the previous ones, there is still a high increase in the value of rents. Compare, for example, the limits in Lisbon, which went from 18 escudos to 50 escudos between 1914 and 1919. It should be noted that from 1917 onwards, agreements between landlords and tenants regarding rent increases above the legally established limits were prohibited[69]. It is not clear how long this rule was in force, but it seems that it ceased to have legal value in 1933[70].

The publication of Law No. 1368 of 21 September, 1922, which remodelled the fiscal regime, indexed rents to property income and revoked the rent freeze of 1919. There was also a permanent deferral of the revaluation of properties, which present extremely outdated values, indirectly used to curb the increase of income. This was the plan that froze rents in Lisbon and Porto from 1948 to 1986, and made several ordinances, which were later published to allow rent increases, worthless.

The strong devaluation the Portuguese escudo suffered in the 1920s contributed towards the impossibility of low increases in rents offsetting the effects of this devaluation. This situation is not unrelated to the provision published in 1924, stating that «the value of the rents of urban buildings must always be set in Portuguese money and currency at the date of their payment»[71], since there were many agreements contemplating payments in foreign currency or even through in-kind contributions, as had been approved by the 1867 Civil Code.

In 1928, rent increases are allowed based on the property's value, but up to the respective limits of those values[72]. In the case of houses that

became vacant or did not serve as permanent housing, landlords were free to set the value of a new rent[73]. However, in 1948, the Estado Novo imposed a system of rent freezes on the cities of Lisbon and Porto in a «draconian» manner, by blocking land tax assessments. In 1966, the Civil Code[74] maintained the suspension of tax assessments for the purpose of updating rents in these cities.

After the 1974 decrees[75] which extended the rent freeze to the entire country, it was only in 1981 that a decree was published in an attempt to start reversing this situation, although it did not produce practical effects on existing leases. Two rent schemes were created: free leasing, in which the parties can reach an agreement without an imposed limit on the value of the rent but not subject to updates[76] and, the conditional rent scheme, with its value determined according to a rate and formula which took the value of the dwelling into account[77]. The conditional rent could be updated annually according to a coefficient published by the government[78]. However, this decree maintained the suspension of fiscal assessments for the purposes of updating housing rents[79], although it revoked the 1974 legislation which froze rents.

Despite the issuance of legislation which allowed rents to be updated as a result of maintenance and repair works on buildings, it was only in 1985, with the publication of what became known as the Rent Law[80], that rent freezing ended and an extraordinary revision began for those prior to 1980[81]. In 1986, conditional rent[82] and rent subsidy regulations[83] were produced, but there were still situations on which «liberalization» had no effect, as was the case of rents ulterior to 1980. In addition, a rather curious provision about this transition of schemes allows for the annual update of rents but only from the seventh year onwards, counted from the end of the year in which the agreement was signed[84]. In practice, agreements signed in 1984 or 1985 under the free leasing regime, could only begin annual rent updates eight years after they had started.

With Decree-law no. 321-B/90, of 15 October, which publishes the RAU, a new impetus is given to the process of liberalizing housing rents. Limited-term agreements arise with a minimum term of five years, three years being allowed in the case of real estate management and investment companies, and real estate investment funds. Rents are updated annually according to coefficients published by the government.

Despite the extraordinary rent adjustments initiated in 1986, and the new fixed term agreements created in 1990, a new update of rent values is attempted in 2006 with the publication of the New Urban Lease Regime (NRAU)[85]. This regime creates a complex rent update system, which obliges landlords to request a fiscal assessment of the property and its state of conservation and, in case of unsatisfactory results impedes any increase to the rent value. It also establishes that rent value cannot exceed 4% of the property's value, and defines a phased approach to rent updates, with intervals which can reach up to 10 years, depending on the tenants' respective income. Adhesion to this system was weak because, besides its complexity and obligatory fiscal assessments, it also depended on the properties' state of conservation and, as is well known, buildings in Portugal were very degraded after decades without proper maintenance, leaving decapitalized landlords unable to conduct the works that would allow them to increase rents.

It was under these circumstances, and already under the troika's memorandum, that Law no. 31/2012, of 14 August, was published: the most liberalizing impulse attempted to date in terms of urban leasing

in Portugal. This law establishes a transition period of five years for all lease agreements, with a protection system for people over 65 or with a disability equal to or greater than 60%, during which the rent is updated according to their income. After the transition period, rents are updated to the limit of 1/15 of the property's value and a rent subsidy is created for low-income families.

Despite the fact that in 2016 a process of reversing the liberalization measures of 2012 was initiated, there were no measures in force to cause a rent freeze, despite regulations imputing obligations to landlords in terms of repossessions or compensation for tenants, in the case of works or agreement terminations. It is also worth mentioning the creation of the affordable rental programme for the middle class, which will be analysed below, within the framework of the rent regimes associated with public housing policies.

6.3.4. The duration and transfer of agreements

The duration of agreements and the various forms and provisions used to extend them, through their renewal, transfer or the right to a new lease, cannot be separated from this discussion. Prior to 1910, a lease could have a term of less than one month, and as a rule, written agreements were not required, and rent could be paid on any day of the month. The 1910 Decree establishes that lease agreements cannot be made for less than 30 days, rent is paid monthly and leases always start on the first day of the month[86]. Longer deadlines are set for communicating opposition to agreement renewals: ninety days for agreements with a term of more than one year, fifty days for agreements with terms between 6 and 12 months, 20 days for agreements with 3 to 6 months terms and 10 days for agreements with terms under 3 months[87]. These standards remain in 1919[88]. As of 1917, the law penalizes situations in which landlords and tenants have agreed on rents above the stipulated limits, in these cases reducing the agreements to sixty days in order to force compliance with the new legal limits[89]. Two years later new legislation establishes that agreements are renewed for one year when their term is equal to or greater than one year, or for a term equal to the agreement when it is less than one year[90].

From 1924 onwards, the transfer of a lease due to the death of a lessee, which was already possible for spouses, also became possible for any heir who had lived with the lessee for over six months[91]. Despite efforts towards greater openness in favour of landlords in 1928[92], even in cases in which a dwelling was not for permanent use, as of 1948 the transfer of a lease due to the death of the lessee incorporated antecedents and descendants, who had shared the dwelling for at least one year[93], this way allowing for a second lease transfer[94].

With the publication of the Civil Code of 1966, dwelling lease agreements began to have indefinite duration[95], and could only be terminated by landlords when a dwelling was by them required for living purposes or reasons of major maintenance or construction. These two rules were however suspended in 1974 and 1975, shortly after the revolution, and repealed in 1977.

The rule for leases for an indefinite term only ceased to exist in 1990 with the introduction of RAU. Fixed term agreements[96], though automatically renewable at the end of the term for another three years, could be terminated by the landlord with a year's notice[97].

In terms of lease transfers, in essence, the rent law maintains the existing regime with regards to the lessee's death, and includes those who lived with the lessee for over five years, in conditions similar to those of a spouse, in cases in which the lessee was not married[98]. However, the 1990 law considers the possibility for excluding the right to transfer if the tenant has another dwelling in a nearby location[99].

With the publication of the NRAU in 2006, the regime of fixed term agreements remains, but a new figure emerges, associated with the termination of the lease agreement for the demolition or major building renovations, regulated by Decree –Law no. 157/2006, of 8 August. This consideration gives landlords the possibility to terminate agreements at least five years in advance or requires them to rehouse tenants or pay compensation for the amount corresponding to two years of rent. In a lease transfer, those who live in non-marital cohabitation with the tenant will have equal treatment and preference[100]. The reform of the NRAU, carried out in 2012, introduces total flexibility as to the terms of new lease agreements[101], thus allowing agreements with previously established minimum terms of less than five years. Mechanisms for the landlord to oppose the renewal of the agreement are facilitated and respective term periods, previously three years, are reduced[102]. Decree--law no. 157/2006, of 8 August, is also amended, facilitating solicitations for demolition, remodelling or major renovations, in order to terminate leases. In 2017, the five-year deadline to shift to NRAU, set in 2012, is extended for another three years, thus totalling eight years[103]. This rule is changed again in 2020, with a new two-year extension, introduced when the 2020[104] Government Budget was approved, increasing the NRAU transition period to 10 years.

In 2019, more changes are introduced to the NRAU, namely, a minimum term of at least one year for lease agreements[105]. Also, fixed-term agreements are renewed for at least three years, even if the renewal term in the agreement is shorterand the landlord is in opposition[106]. In other words, the law requires that an agreement terminating in 2018, which has been renewed for an additional year, should in fact be subject to renewal for at least another three years, if the landlord does not timely communicate the intention to terminate the agreement, leading to a four year extension. In the case of agreements for an indefinite term, cancellation by the landlord would have to occur at least five years in advance[107], whereas before, according to the Law of 2012, the requirement was two years. However, the most unexpected changes benefit tenants covered by the NRAU transition regime who have resided in a dwelling for over 15 years and are 65 years of age or older, or have a degree of disability equal to or greater than 60%. These tenants receive a new life-long lease entitlement, since landlords cannot oppose the renewal of agreements[108], a situation which also applies to similar cases regarding tenants who have lived under fixed term lease agreements for over 20 years [109].

6.3.5. Eviction processes

Eviction is undoubtedly the most sensitive and controversial element of tenancy regimes in any society, and the Portuguese case is no exception. Given the great legislative complexity and the countless changes that have occurred over the last century, we will not go into the same detail as in the two previous topics. The 1907 decree, which had liberalized eviction procedures, was revoked in 1910, and several rules were introduced, clarifying its handling by court and the way in which

tenants opposed it. However, the timeframe for these procedures were quite limited, in some cases with a maximum limit of five days[110].

In 1917, eviction based on lack of convenience for landlords in continuing the lease was also prohibited, regardless of the rent value[111]. There were a few exceptions, such as maintenance and repairs approved by city council, damages resulting from tenants' negligence, refusal to accept rent increases permitted by law and conduct causing nuisance or disturbance to neighbours, such as «pounding, dragging furniture, and the like» between one and nine in the morning. Some of these rules, which already came from the Civil Code of 1867, are still in force today. Nowadays, speaking of placing notices on windows is like remembering a relic. However, during the first half of the 20th century the law required tenants to do so in cases of lease termination or eviction, in order to allow visits to the home, often at predetermined times such as on weekdays from midday to 5 pm. The law also foresaw forced entry into the home if tenants failed to comply with displaying their notices[112].

The perception of social repercussions resulting from evictions, and the total inability of public authorities to respond to them, contributed to the emergence of new legal provisions to protect tenants in the following decades.

In the 1918 decree, in cases of proven serious illness of the tenant or family member, evictions would be suspended until the tenant had recovered, though the suspension could not exceed two months[113]. In contrast, in the 1924 decree, eviction is determined for cases where the tenant has not used the leased premises for over a year[114]. This rule, still present in the Civil Code is, however, difficult to prove in court. Over the following decades, there was an effort to make the eviction process more expeditious. First, with Decree no. 22661 of 13 June, 1933, and later with the Civil Procedure Code published in 1939[115].

In 1948, Law no. 2030 suppresses the expiry periods for eviction actions, defined in the 1924 decree, simplifying and accelerating the respective processes when leases expired. However, there are still cases in which eviction cannot be carried out either due to illness or absence resulting from official duties, such as public office or the military, for up to two years.

This decree maintains the provision of appeals of eviction sentences to the Court of Appeal, but forbids the appeal to the Supreme Court, even when the amount exceeds its sphere of authority, thus revoking the 1925 decree.

With the Civil Code of 1966, restitution of the leased premises could only be claimed three months after the verification of the facts which determined the lease expiry or termination[116], and in cases of denunciation by legal action this verification would be required at least six months in advance, and eviction would only occur three months after the final decision[117].

After the 1974 revolution, evictions resulting from the denunciation of leases, for demolition purposes or for occupancy by owners, were suspended with Decree-law no. 155/75, of 25 March, and decrees specifically intended for the urban areas of Porto[118]. It is during this period that the turbulent process of illegal occupancy of vacant dwellings occurs, with two attempts at legalization in 1975 and 1977[119]. The legal provisions accumulated since 1976 to protect tenants' rights before an increasingly degraded housing stock, and the

lobbying of landlords using mechanisms provided by the law, such as demolitions or major construction works, and even the claim of the leased property for their own housing, created a legal «entanglement» which, together with the increasing inefficiency of the legal system, led to delayed eviction actions in the courts, with some cases taking more than 10 years. With the creation of the National Leasing Office (*Balcão Nacional do Arrendamento*) and the special eviction procedure in 2012[120], there is an improvement in the eviction process. Reports from January 2018 indicated that processes have only lingered on average three to four months[121]. Also in 2012, landlords were allowed to proceed with the termination of agreements when two rent instalments were in arrears[122]. A situation altered by Law no. 43/2017 of 14 June, which restores the rule that had been in force in 2006, considering a minimum of three instalments. Moreover, in 2012, a rule is included which allows landlords to terminate the agreement in case of four consecutive or non-consecutive periods of overdue rent within a twelve-month period[123]. This norm continues in force today.

6.3.6. Rents paid in advance

The issue of advanced rent payment has changed over the past decades, with legislators seeking to impose limits and landlords defending its increase, since it is the main and most immediate form of guarantee for situations of late rent payment or damages incurred. In 1910, it was forbidden to anticipate rents beyond the amount corresponding to one month, and in these cases, payments were required to be made at the beginning of the corresponding month[124]. This rule was changed in 1919, allowing advance rent payment on the first business day of the month prior to the corresponding period[125], or guaranteed by legal provisions, an amendment maintained by the Civil Code of 1966[126] and reinforced in 1990 by article 14 of Decree-law no. 321-B/90, of 15 October. This decree establishes landlord-imposed rent deposits exceeding the amount corresponding to one month of rent as a speculative crime. With the NRAU, advance payments of up to three months were allowed[127]. Despite these legal restrictions placed on individuals, the «Safe Rent Programme» (Renda Segura), launched by the Lisbon City Council in 2020, offers up to 36 months of rent anticipation.

6.3.7. Penalties for rent arrears

The first reference made to rent arrears was in 1924 and stated that tenants may avoid eviction if payment of five times the amount of arrears is made within eight days[128]. In 1933, the penalty is reduced to three times the rent owed[129]. With the approval of the Civil Code in 1966, the penalty is further reduced to double the value of the rent owed[130]. In 1977, tenants could simply deposit 50% of the owing rent[131] as long as payment was made within eight days, in order to prevent eviction. In 2019, the penalty is reduced to 20% of the rent owed[132]. The series of reductions made in terms of compensation are a move towards its growing irrelevance, which may call into question the obligation of the timely payment of rent.

6.3.8. The state's social support instruments

In addition to resettlement actions and the construction of social neighbourhoods, which began several decades ago, it was only in 1977 the state created its first mechanisms for the protection of evicted tenants and for the compensation of landlords, in cases where the eviction of tenants is deferred. The Family and Social Action Institute

(*Instituto da Família e Acção Social*) is responsible for managing these situations, promoting resettlement solutions for tenants, compensating landlords for the time they defer evictions and creating a register of tenants who benefit from these supports[133].

With the publication of the Rent Law[134], a rent subsidy is created, regulated by Decree-law no. 68/86, of 27 March, and aimed at tenants whose rents have undergone extraordinary corrections or have been increased due to conservation works or improvements carried out by the landlord or the municipality. This allowance was in force from 1987 to 2011.

In 1990, the RAU attributed the responsibility and means to support landlords and tenants, in situations where the deferral of housing eviction occurs, to the Institute for Financial Management of Social Security (*Instituto de Gestão Financeira da Segurança Social*), a system still in place today.

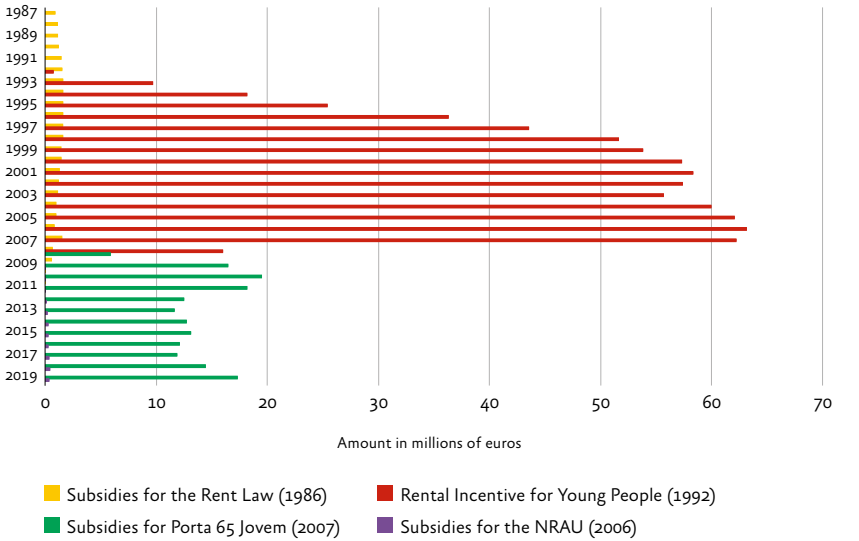
Within the scope of youth support policies, the *Rental Incentive* for *Young People* (IAJ)[135] was created in 1992 and operated until 2007, then being replaced by the *Porta 65 Jovem* programme[136], which introduced several changes, the last of which in 2017. Initially, the programme was aimed at young people up to the age of 30, a limit then extended to the age of 35.

As with the Rent Law, a rent subsidy is also created[137] with the publication of the NRAU in 2006, aiming to support those most in need, as some become subject to a higher burden rate, according to their income, as a result of rent increases. However, given landlords' weak adherence to rent updates, this subsidy has less effect than that of 1986.

With the reform carried out in 2012, the creation of a new income subsidy was expected to replace the previous one, through Decree-law no. 156/2015, of 10 August. However, this did not occur due to the change of government at the end of 2015.

In the following graph it is possible to observe the size and evolution of rent subsidies between 1987 and 2019. It should be noted that, in 2008, the values of the IAJ and *Porta 65 Jovem* subsidies should be added.

Figure 80 Evolution of spending in rent subsidy programmes



Source: IGAPHE, IHRU

6.3.9. The issue of vacant buildings

One of the elements which is always present in the lease legislation, as well as in the political discourse, is the issue of vacant dwellings and buildings.

The 1914 Decree created a mechanism which allows anyone to force the rent of a vacant dwelling, depositing the rent in court in the landlord's name, even if the landlord refused to rent it out[138]. Exceptions included situations on premises requiring repair work.

In 1919, this obligation is extended to tenants and sub-tenants whose dwellings are unused, further imposing that the new rent value cannot exceed that of the last agreement[139].

This matter is only resumed after the 1974 revolution, with owners being obliged to accept a lease when, among other conditions, the previous one has ceased more than 120 days ago[140]. The rent value however «would result from free play of supply and demand»[141].

With the Rent Law, a rule that increases property tax is approved and applied to buildings or parts of vacant buildings. This value results from the calculation of rent in a conditional rent regime and is attributable to landlords.

The issue of vacant dwellings was resumed in the year 2000, with respect to the execution of coercive works in private buildings by the municipalities, giving them the possibility of maintaining possession of the vacant dwellings and renting them under the conditional rent regime, for a period which could vary between three and eight years[142].

With the approval of the 2005 Government Budget, a provision is inserted that alters article 112 of the IMI Code[143], allowing municipalities to increase the rate applicable to urban buildings which have been vacant for at least one year in up to 30%. The absence of ongoing agreements with essential public service providers or billing related to the consumption of water, electricity, gas and telecommunications.

With the publication of the NRAU in 2006, this change to the IMI Code acquires new wording and, in the case of urban buildings which have been vacant for over a year, the respective tax rates are doubled[144]. At the same time, a tax concept for vacant buildings is created by Decree-law no. 159/2006, 8 August, pursuant to which the signs of vacancy previously defined are maintained.

In 2008, tax rates on buildings vacant for more than a year are doubled and, in the case of ruined buildings, tripled[145].

With the approval of the 2012 Government Budget, these rates are once again increased, tripling in both cases[146].

In 2018, the government makes an exception for «unused public real estate»[147], legislating in its own cause, to protect itself from the aggravations it applies to the private sector.

The following year, the increase in the tax rate covers vacant parts of buildings that are not constituted by horizontal property, thus allowing its partial application, which until then was not legally possible[148].

Still in 2019, an article is added to the IMI Code as part of the creation of the urban pressure zone figure, which originates a sixfold increase

in the IMI tax rate and a 10% annual increase, for buildings and autonomous fractions located in these areas which have been vacant for over two years[149].

6.4. Social lease systems

6.4.1. A wide variety of regimes

So called «social» rent schemes took many forms since their first practical application in 1938, with the demountable housing programme[150].

It is important not to confuse the regime of economic housing, instituted in 1933[151] — which took advantage of the first social neighbourhood construction policy, launched in 1918[152] —, with social housing leasing systems. In these regimes (which should also not be confused with low-income housing), the dwellings were left on the property of their residents after a period of amortization, during which the state played a role which nowadays belongs to the banking system.

Over these eight decades, three types of rent systems can be identified. The first, of charitable nature and casuistic analysis, for which there are no regulatory guidelines established in legal decrees, and aimed at «poor» families. The second, with fixed or conditional rent, determined according to construction costs — but always below market values —, or according to the burden rate or family income. And, the third and last, a social income system, with values varying in accordance to households' income and composition. Amongst these systems, both the first and last allow rents to increase or decrease, according to families' changing situation.

6.4.2. The «charitable» income system

The demountable housing programme, launched in 1938 with the initial intention of relocating families living in Lisbon's shack neighbourhoods (Bairro das Minhocas and Bairro da Bélgica), does not include a clearly defined rent regime. Occupancy of houses takes place on a precarious basis; the rent is fixed and received by the Lisbon City Council[153], and residents may be forced to vacate them within 30 days, or face administrative eviction. This programme was extended to Porto, in 1943[154] and to the rehousing of Alta de Coimbra, in order to allow the construction of the Coimbra University, between 1945 and 1949[155].

It was then followed by the housing programme for poor families — which sees its execution extended to administrative bodies and *Misericórdias* (network of charity institutes), establishing the following in its preamble: «implementing very low monthly rents — a few dozen escudos — within the limits that are feasible to those for whom they are intended». The dwellings are allocated on a precarious basis and rents are fixed, in each case, with the approval of the Minister of Finance, not only taking into account the local conditions but also the residents' income[156]. The houses are primarily «assigned to poor families displaced as a result of home demolitions due to urbanization or other actions of public interest».

Through Decree-law no. 35106 of 6 November 1945, which regulates the regime for assigning, occupying and transmitting the rights and obligations of residents, as well as the grounds for home eviction, it is clear that the decision of establishing rents is the responsibility of the Minister of Finance, who must take «local conditions and the residents' situation» into account.

There is, therefore, a centralized and casuistic decision-making process, of discretionary nature, which lies in total contrast with what occurs as a result of the economic housing programme, created in 1933.

The programme had a significant impact with the involvement of a wide variety of entities, including the *Património dos Pobres* (Heritage of the Poor) and the *Casas de Pescadores* (Fishermen's Houses)[157].

However, as early as 1940, and because there was no legal framework for this regime, the Porto Municipality asked the national government to apply the decree of demountable housing to the real estate development being built on Rua Duque de Saldanha. The authorization was attributed by Decree-law no. 30750, of 13 September 1940, on the condition that a special regulation for this purpose be submitted to the government for approval; revealing that, in the absence of this authorization, the city council would have to apply the general laws of urban leasing. This situation is repeated in 1957, when the government publishes new legislation[158], in which it is assumed that there are many dwellings «built by initiative of associations or social assistance institutions» and intended for housing poor families, reason why «it was understood that the occupancy of these dwellings be removed from the general legislation on tenancy».

6.4.3. Fixed or conditional rent schemes

In this type of rents, four regimes are commonly identified:

6.4.3.1. Affordable housing

The affordable housing regime created in 1945[159], which lasts until the creation of the Housing Financing Fund (FFH) in 1969, involves a multiplicity of entities, from municipalities, cooperatives, companies and manufacturing companies to *Casas do Povo* from 1958 onwards[160]. It also applies to housing for public service authorities, such as the Armed Forces, PSP (Public Security Police) and GNR (National Republican Guard). In 1945, basic rents under this regime vary between $300 and $500, for single houses, and between $240 and $40, for apartments. The base rent is the maximum rent that can be applied, and its update depends on government authorization, taking into account the increase in construction or the cost of living. The agreements are celebrated for a period of one year and are renewable. Their breach is subject to administrative eviction, namely, in the event of a delay in the payment of three rents.

Only families registered as partners in regulatory bodies have access to low-income dwellings, as long as their income does not exceed an amount equivalent to six times the given rent. If, during the lease, the total income of the household exceeds 20% of this amount, the family will have to leave the dwelling within six months or face eviction. The tenant must provide annual proof of his household's income.

6.4.3.2. Limited rent housing

The limited rent housing construction programme was launched in 1947[161] and was designed to encourage the promotion of «investment buildings» within the private sector. These «investment buildings» demand that a maximum rent value be previously fixed for each dwelling in return for access to cheaper land plots and exemption from several taxes, fees, emoluments, licenses, and also property tax for 12 years.

The fixing of the rent value aims to counter existent speculative processes and is accompanied by several measures to combat cost increases in construction materials and reduce tax exemptions for free rent promotions.

In 1958[162], the programme was extended for another 10 years, accompanied by measures to encourage the promotion of this type of lease, to the detriment of the free lease. Tenants are allowed to purchase the houses they inhabit, and it is determined that municipalities give priority to these promotions, in public auctions of land[163].

From 1974[164] and until this leasing regime is extinguished, the existence of a single housing category is established, and distinction is made by typology. Annually, the government publishes an ordinance with the update on the criteria applicable for establishing the limit of rent values, either taking into account typologies or dwelling areas. In 1977[165], this decision is decentralized to the municipalities that provide housing services.

6.4.3.3. The conditional rent regime

This rent regime started in 1981[166], as the first attempt to reopen the rental market to new agreements, after the rent freezes of 1948 and 1974. In this regime rent is based on the value of dwellings and, unlike free leasing, which had then been relaunched, sees it value updated on an annual basis. Hence, its intention is to attract landlords to a non-speculative rental system that benefits from property tax exemption during the first five years. With the publication of the Rent Law in 1985, conditional rent becomes mandatory for dwellings built by the state and sold to their respective residents, as well as those whose construction is financed by the State, such as cooperatives, housing development contracts and residents' associations. It is also established that when there is a right to a new lease[167] conditional leasing is applied, which represents, to date, an increase in the values of the previously frozen rents. These rules are maintained in the RAU of 1990[168], which extends their application to cases of transfer by death and, also, as a penalty for lease agreements not reduced to writing[169]. This rent regime had little impact as there was no inspection to ensure the application of the obligations determined by law. The registration of any burden of conditional leasing was not mandatory, its formulas were complex and there was lack of tax assessment processes, which were oftentimes excessively time-consuming.

Since 1990, changes to this regime have been foreseen, depending on the publication of the Assessment Code, which only occurred in 2003, with the publication of the IMI Code. Finally, in 2014[170], the change is made with regime being used to determine the maximum value of rent in the supported rent regime, as well as the value of leases in the Social Leasing Market, which involved a few thousand housing units belonging to the Institute for Housing and Urban Rehabilitation (IHRU) and the several banks.

6.4.3.4. The affordable rent regime

In 2019, the government launches the affordable rent programme[171], which has some similarities to the limited rent regime. Its main objective consists in motivating landlords to rent dwellings for values about 20% below the practiced market value, based on the median of rents calculated by INE[172]. Lease agreements would continue to have a minimum term of five years, and nine months for student leases.

The rent value must represent a burden of 15% to 35% on household income, and in return landlords benefit from property tax exemption, applied to IRS or IRC, depending on the case.

6.4.4. Social, support and rent-support schemes

In 1977, and within the scope of the regulation of the Land Law, the first ordinance to institute the social income regime in Portugal[173] is published. This regime introduces a system which is still in use today, establishing that the value of rent must be calculated according to household income and composition. This scheme establishes a minimum rent of 400 escudos and a maximum rent — corresponding to the dwelling's so-called technical rent[174] — which is applied to all households with incomes above three times the national minimum wage (SMN), whereby the rest of the household pay a social rent — called individual rent instalment. The difference between social rent and technical rent is considered to be a subsidy in the form of a grant, and despite the terminology, it has never undergone proper regulation or been accounted for. Households must provide proof of their composition and income for the purpose of updating the rent, on an annual basis. The social rent regime is revised in 1983[175] but essentially maintains the previous rules and standards. Despite high inflation, and six years having passed since the first ordinance, the minimum rent remains at 400 escudos. The threshold for the payment of technical rent remains the same, and despite the announced intention to explain the value of income subsidies granted in terms of rent reductions, for a clearer understanding of the State's effort, this did not happen. A provision allowing all tenants with overdue rent the possibility of payment without the 50% fines set forth by law is also introduced[176].

However, the measure has poor results, given that problems with the collection of unpaid rents still persists.

When the Special Rehousing Programme was launched in 1993, the supported rent regime[177], which replaced the social rent regime and had been set out since 1990, is also published.

There are several issues in question: the standardization of the various existing social rent regimes, some of which originated in the 1940s; the creation of a mechanism for updating the maximum (technical) rent, suspended since 1977 and unsynchronized with the construction costs and income of families with greater resources; the annual and automatic update of the rent value; the end of the ambiguous rent subsidy that had never been accounted for; the creation of a progressive system of income burden rates, depending on the income of household and the indexation of the minimum rent to the national minimum wage.

The social rent system is resumed, in terms of its main variables, in order to follow the variation of increases according to the national minimum wage, income and construction costs, without losing its original characteristic of evolving in accordance to income and household size.

These changes, despite having been successfully applied to houses built after 1993, did not work for older dwellings, due to large differences between current and new rents, resulting from their tenants' increase in income. In many cases there were no rent updates for 40 years and households with incomes above two thousand euros per month paid a rent that was below three euros!

In order to correct these issues, the supported leasing[178] regime was created in 2014, seeking to evolve from a «rent regime» to a «lease regime», by covering all situations of social nature in place with the old systems, some of which were incompatible with the 1993 decree. The attribution regime was integrated with the management system, giving it a binding national scope for all entities and creating a system of progressivity in the value of rents, for families with higher incomes.

The rent calculation system is maintained, considering household income and the possibility for changes, just as before. However, a fundamental change is introduced concerning the powers of administrative eviction, with housing stock management entities having the authority to intervene in order to reduce rents due and illegal occupancies, which increased in a concerning way.

This regime is changed a few months after the beginning of the following legislature[179], with the revocation of innovations which extended the powers of management entities, immediately eliminating the process of administrative eviction. Rent update limitation is introduced in cases where the tenants invoke maintenance needs on the premises; progressive increase in the rents of higher income families is removed and the law's national scope is abolished, by allowing each municipality to approve its own regulation.

According to the latest Inquiry into Social Housing Characterisation (ICHS), carried out by Statistics Portugal, and referring to 2015[180], the accumulated value of rents owed had already reached 80 million euros. It also estimated that, by the end of 2019, this amount would exceed 100 million euros. There are many situations in which tenants refuse to pay the rent the law requires.

6.5. Is it possible to regulate housing supply through legislative action?

In the 50-year interval between 1960 and 2011, the weight of rented dwellings fell from 48% to 19.9% of the housing stock of usual residences and from 44.4% to 13.6% of the total of classic dwellings. The latest available figures from 2019 indicate that this decline continued after 2011.

The legislative measures approved and applied to the field of leasing since 1910, and promoting the right to housing, usually in circumstances of crisis, had perverse effects which drastically reduced supply and pushed investment away from this segment. Consequently, a «home for life» immobility culture develops, as well as a confrontation of Manichaean nature between owners and tenants, and permanent housing is no longer a priority in the budgets and savings of families with resources, living in dwellings with frozen rents or social housing.

The censuses show that the decline in rented dwellings occurs when housing stock more than doubled. Leasing becomes the black sheep of the real estate market in Portugal.

In addition to legislative changes there are also almost caricatural moments, such as the case of the prohibition of real estate brokerage activities in matters of leasing, as decreed in 1919[181]; the idea launched in October 2016 — which did not reach the letter of law — of «creating a subsidy for poor landlords with old rent agreements»; or, still, the passage from the preamble of the 1947 decree which created the programme for the construction of limited rent housing[182]: «(...) In this order of ideas, perhaps the radical measure to expressly prohibit the construction of free-income buildings should be adopted now, thus

leading the respective industry to concentrate all its resources on the construction of houses for low income (...), but, as it is recognized that the problem requires a more in-depth study, in order to coordinate its multiple aspects, it is not, for the moment, on such a radical path. (...)».

This text is published two months prior to the announcement of the Marshall Plan for the reconstruction of Europe, which Portugal, as is known, joined.

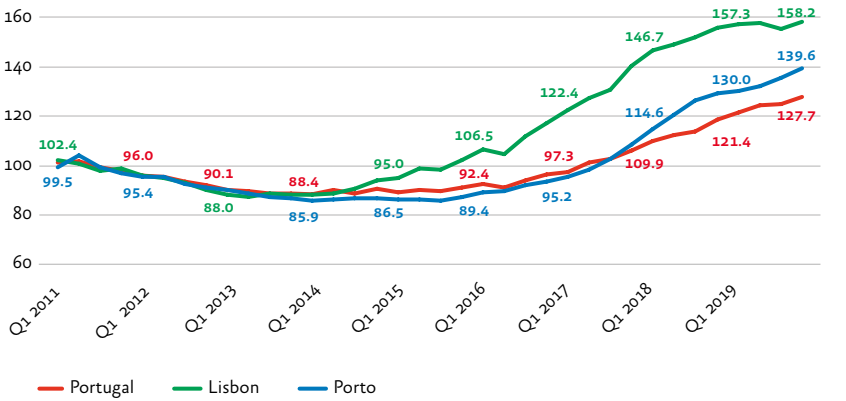
When we revisit the measures that intend to compel owners to put vacant houses and buildings to use, especially in the last two decades, what we find is a fiscal escalation where, year after year, tax rates increase, without any practical results.

Contrary to what happens in most Western European countries, Portugal did not gain budgetary «muscle» to develop a housing promotion policy and build a significant public housing stock, capable of assisting families with greater difficulties in accessing housing. It did not do so during the dictatorship of the Estado Novo, nor under democracy, after the April 1974 revolution. Today, this housing stock is made up of about 120 thousand dwellings, which represent only 2% of the total number of dwellings.

As a result of this incapacity, the problem arises. With rent freezes and the perpetuation of rental agreements, the state pushes its social and constitutional responsibilities regarding social housing to the private sector. Landlords, increasingly decapitalized and in possession of progressively degraded buildings, face a real estate market that thrives in all segments, except leasing.

The political and economic changes occurred in the last decade are in turn interesting, exposing an initial period during which the real estate crisis brings a new glow to the lease market, with increased supply and reduced prices. The 2011/2012 reforms reinforce this supply, but are shortly thereafter frustrated by the anathema of the «eviction law» which, after 2015, opens Pandora's box, with the resumption of real estate activities, the tourist boom and the succession of announcements, measures and decrees to «regulate» the market, creating the perfect storm: all landlords who are able to, restrain from renewing lease agreements and change their dwellings to tourist accommodations. There is a sharp drop in the supply of houses to rent and as the following graph shows, prices skyrocket, especially in Lisbon and Porto.

Figure 81 **Index of residential rents (2011=100)**

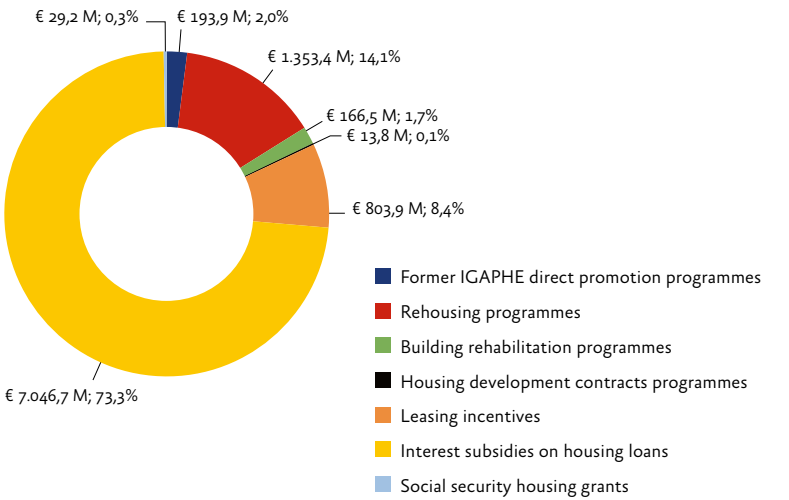


Source: *Confidencial Imobiliário*

6.5.1. The incentive for owner-occupied dwellings

Private initiatives have for long abandoned leasing and channelled their efforts to safer and more profitable initiatives. Public authorities, who are unable to face the controversies and confront the political costs that would result from the liberalization of urban leasing, found a solution in subsidized credit, financing new construction and urban expansion, and encouraging families to buy a house. It should be noted that the same decree which is responsible for freezing rents in the cities of Lisbon and Porto in 1948, has a provision that requires the government to establish the system of property by floors or horizontal property within 180 days[183]. This is one of the great drivers of policies promoting self-owned housing, which become dominant at the end of the 20th century. Until then, the so-called property by floors, dealt with in small article 2335 of the Civil Code of 1867, was rarely applied. It is in 1986, the year the Rent Law is regulated, that the subsidized credit for the acquisition of own housing[184], created in 1976[185], is relaunched with great success. The study published by the IHRU in 2015 on the State's budgetary effort to provide subsidies during the 25 years between 1987 and 2011, is a faithful picture of the period of greatest brilliance regarding policies and public investment in the area of housing, in which leasing shows little impact, as can be seen in the following graph.

Figure 82 State efforts for housing 1987–2011



Source: IHRU

The largest share belongs to interest subsidies on housing loans and the acquisition of permanent own housing (73.3%), followed by rehousing programmes (14.1%). Leasing support initiatives have a smaller representation (8.7%). The most empowered, the *Rental Incentive* for *Young People* (IAJ), presents significant results in 2006, with 63.2 million euros of non-repayable grants. However, it is in 2001 that the largest number of lease agreements is subsidized, totalling 24,676[186], that is, only 3.3% of the 740,425 leases existent in Portugal that year[187]. The result of these policies is the inversion of the weight between rented housing and owner-occupied housing, with the latter becoming dominant and holding almost three quarters of dwellings of usual residence.

Is it cheaper to buy or rent a house?

When interest rates started to fall, the perception that it is more favourable to buy a house than to rent it is created, since the provision of mortgage loans has similar or lower values in comparison to the value of the rents, even after the end of subsidized loans in 2002. The series of housing yields prepared by *Confidencial Imobiliário* in the last decade[188], which result from the comparison of transaction prices with rents under new agreements, presents rates that vary on average between 4.1 % and 5.3% in the cities of Lisbon and Porto, in the last two years, showing a more favourable perspective on purchase than on lease.

There are, however, three factors with regard to property-related obligations that have been overlooked. The first results from taxes and fees on assets, in particular the IMI. The second corresponds to insurance costs. In Portugal, fire insurance is only mandatory for horizontal property, when legislation should have already made multi-risk insurance for collective buildings and fire insurance for single-family buildings mandatory. The third includes expenses associated with commonholds, regarding the conservation and future maintenance of buildings. It is anachronistic that after 26 years the law still states the rule of keeping at least 10% of the monthly fee regarding commonhold assessment as a reserve fund for the future maintenance of the building[189], when these savings can represent less than one thousand euros after a 10-year period, which is clearly insufficient to cover the general maintenance of any building.

If the legal changes occur to make the set of owner or joint owner obligations consistent with an assessment of all costs, the differences identified today in housing yields will be reduced or even reversed.

6.6. The segmentation of the lease market

Whatever remains of the rental market in Portugal is deeply segmented, even more so than the labour market. This segmentation originates from the three rental regimes in force — subsidised, affordable and free — causing a great disparity in the way families are treated in terms of:

- housing access rules;
- duration of lease agreements;
- exceptional treatment resulting from the household's socioeconomic condition and the age or disability of any of its members;
- systems that determine the value of rents.

Regarding housing access rules, it appears that, in the case of subsidised leasing, there is no minimum or maximum limit on household income to access a home, unless the household comes from the *1º Direito* (1st Right) programme, which as a rule excludes households with an average monthly *per capita* income 1.5 times above the value of the social support index (IAS)[190]. Now, in affordable rent, the average monthly income of the household is required to be compatible with a burden rate between 15% and 35% of the rent value.

As for the duration of the agreements, subsidised leasing provides lifelong agreements, in practice, while affordable rent provides fixed-term agreements with a minimum duration of five years. In the case of free leases, and although the rule points to fixed-term agreements, legal changes are made in 2019 to make some of them lifelong: in the case of tenants who have been on the lease for more than 15 years and are over 65 years old, as well as those with fixed-term agreements that have lasted for more than 20 years. On the other hand, for both

subsidised leasing and the transition processes operated by the NRAU regarding free leases, mechanisms are created to protect households taking into account income, age and situations of disability, conditions which neither included in affordable rent nor, generally, in free leasing. The greatest disparity, however, is registered in the value of rents. In subsidised leasing, income is calculated according to the composition and income of the household, which does not occur in the other schemes. But, as subsidised leasing establishes a maximum income for each dwelling, regardless of the household's income, there are many households with high incomes under this regime who pay much less in comparison to lower values promoted by affordable rent, which are often supported by households with one third of the income. As an example, there may be a household with a five thousand euro monthly income benefitting from subsidised leasing who pays a rent of two hundred euros, while another, under the affordable rent regime, has an income of eighteen hundred euros and pays a rent of six hundred euros.

, Some programmes benefit from public support, so in many of these situations, paradoxically, two equal households with equal income, in identical dwellings within the same building, sometimes even on the same floor, pay very different rents, because they are under different rent regimes. On an even more serious note, it sometimes happens that households with lower incomes pay significantly higher rents. And, just as happens in the labour market, for younger people, although there is greater difficulty in accessing homes and greater insecurity in the duration of lease agreements, rents have a higher value. In short, not only does is intercommunication and harmonization between public supported schemes inexistent, but each one determines the support and benefits to be provided in different ways, with income as a common denominator. In addition, the subsidised rental regime has no interaction with social security, so often beneficiaries of subsidies and support from the social state — pensions, social support, health and education — do not pay the rent of the dwellings they lease, without incurring any penalties for non-compliance.

6.7. Brief conclusion

The problem of urban leasing in Portugal is not short-term. It is not the result of the 2012 reform, nor of the increase in tourist demand which has occurred in recent years. The issue is structural and lies in several bottlenecks that cannot be concealed. From the outset, the state's inability to create adequate responses to housing shortages. Then, the «home for life» culture, which took root and became an anachronism, given the evolution of the labour market and the new demands for mobility. Finally, the ideological prejudices, which created too many misunderstandings and conflicts, between the right to housing and the right to property, and today are the main cause for the loss of investor confidence in political institutions and the enormous reputational damage the lease market has suffered with the succession of legislative advances made by the latter. In practice, and perversely, public policies and legislative measures have been promoting and subsidizing inequality. At the same time, the state was — and still is — unable to meet the demand, contributed to contracting supply and discarded its social responsibilities to the private sector.

In short, urban leasing continues to languish and find itself at a dead end.

6.8. Conclusion

The present study is carried out on the eve of the start of the 2021 census, which will reveal, in all dimensions, the changes occurred over the last decade. After this census, it will be helpful to have complete information on the evolution of the housing stock and the rental market, at least on an annual basis.

This will allow a monitoring of the existing reality, and a timely and close assessment of public policies and investments made, which has not happened so far. It will also be relevant to carry out an in-depth study of the results of the next census regarding vacant dwellings, which will allow an inventory of their location, age, state of conservation, feasibility of use and the situation of the respective property. The 2011 census quantified 735 thousand vacant classic dwellings, which accounted for 12.5% of all conventional dwellings. However, part of these dwellings are either in depopulated territories, just a pile of abandoned stones or part of undivided inheritances whose beneficiaries do not attribute any value to, excusing themselves from the task of dividing the property in face of the bureaucratic mazes they will have to deal with. Therefore, it is important to understand, which vacant dwellings are inhabitable.

It is also important to have knowledge, in detail and frequency, of data relating to the management of public or social housing and the third sector, and the support component for housing integrated in the subsidies granted by social security.

Finally, since the Tax and Revenues Authority (AT) has a huge and unique repository of data related to real estate and leasing, it will make sense to go further in making this information available, especially to Statistics Portugal, instead of watching its surgical and sporadic dissemination in the media, which invariably raises suspicions about the political purposes of its management.

Abbreviations

AT — Tax and Revenues Authority (Autoridade Tributária e Aduaneira)

FFH — Housing Financing Fund (Fundo de Fomento da Habitação)

IAJ — *Rental Incentive* for *Young People* (Incentivo ao Arrendamento por Jovens)

IAS — Social Support Index (Indexante dos Apoios Sociais)

ICHS — Inquiry into Social Housing Characterisation (Inquérito à Caraterização da Habitação Social)

IGAPHE — State Housing Management and Administration Institute (Instituto de Gestão e Administração do Património Habitacional do Estado)

IHRU — Institute for Housing and Urban Rehabilitation (Instituto da Habitação e da Reabilitação Urbana)

IMI —Municipal Property Tax (Imposto Municipal sobre Imóveis)

INE — Statistics Portugal (Instituto Nacional de Estatística)

IRS — Personal Income Tax (Imposto sobre o Rendimento das Pessoas Singulares)

IRC — Corporate Income Tax (Imposto sobre o Rendimento das Pessoas Coletivas)

NRAU — New Urban Lease Regime (Novo Regime de Arrendamento Urbano)

PREC — Ongoing Revolutionary Process — which designated the period between April 1974 and November 1975 (Processo Revolucionário Em Curso)

RAU — Urban Lease Regime (Regime de Arrendamento Urbano)

SMN — National Minimum Wage (Salário Mínimo Nacional)

References

Instituto Nacional de Estatística, (1964), *X Recenseamento geral da população 1960*, Lisbon, Sociedade Tipográfica, Lda.

Instituto Nacional de Estatística, (1973), *11° Recenseamento da população 1970 — Estimativa a 20%*, Lisbon, Sociedade Tipográfica, Lda.

Instituto Nacional de Estatística, (1975), *1° Recenseamento da habitação 1970 — estimativa a 20%*, Lisbon, Sociedade Astória, Lda.

Instituto Nacional de Estatística, (1984), *XII Recenseamento geral da população e ii recenseamento geral da habitação 1981*, Lisbon, INCM.

Diversos autores, (1993), *Livro branco sobre a política de habitação em Portugal*, Santa Maria da Feira, Associações organizadoras do I Encontro Nacional da Habitação, Raínho and Neves, Lda.

Instituto Nacional de Estatística, (1996), *XIII recenseamento geral da população e iii recenseamento geral da habitação* (CENSOS 91), Lisbon, Statistics Portugal.

Instituto Nacional de Estatística, (2001), *XIV recenseamento geral da população e iv recenseamento geral da habitação* (CENSOS 2001), Lisboa, Gráfica Maia Douro, SA.

Instituto Nacional de Estatística, (2012), *XV recenseamento geral da população e v recenseamento geral da habitação* (CENSOS 2011), Lisbon, INE.

Instituto da Habitação e da Reabilitação Urbana, (2015), *25 anos de esforço do Orçamento de Estado com a habitação — 1987–2011*, Lisboa, IHRU

Instituto Nacional de Estatística (2016), *Inquérito à caraterização da habitação social em Portugal, 2015*, Lisbon, Statistics Portugal.

Various authors, (2018), *Habitação: Cem anos de políticas públicas em Portugal, 1918–2018*, Lisbon, Instituto da Habitação e da Reabilitação Urbana, INCM.

Conclusion

The contributions in this book provide insightful analyses of the real estate market in Portugal, both in terms of house prices and rents, up until the beginning of 2020. The studies put forward analyse the real estate market from an aggregate country level perspective, as well as, from a more disaggregate perspective at the municipality and civil parish levels.

The results of chapter 1 show that the real estate market contributes to one-fifth of Portuguese GDP, and that its cycles have been strongly correlated with the Portuguese business cycles over the last two decades. Housing is a relevant asset in the balance sheet of Portuguese households, which presents a composition similar to that of the European Union's average, especially in 2017. However, there is a great deal of variation between European countries, and Portugal belongs to a group in which a high percentage of households do not have liquid assets, therefore being more vulnerable to aggregate shocks.

In recent years, broad based exuberant behaviour is evident in Portuguese house prices, although timely differences across municipalities can be observed. Chapter 2 provides an in-depth analysis of this behaviour and highlights that these recent dynamics can result from a range of reasons other than speculative bubbles. For instance, local and foreign investment associated to tourism dwellings, foreign direct investment and shifts in preferences can explain some, but supposedly not all, of the exuberant behaviour observed over recent years in the Portuguese real estate market. Moreover, it is also shown that the exuberant behaviour in Lisbon and Porto, seem to have had contagious effects on surrounding housing markets.

The housing price synchronisation analysis in chapter 3, between Portugal and other eleven European Union member states (Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, and the United Kingdom), covers the period of 1988–2019, and reveals two primary cycles in the Portuguese House Price Index, one about nine years long and the other with a duration of approximately 14 years; these two cycles almost run the whole sample and overlap. A shorter cycle, of close to four years, corresponding to the international financial crisis, and the subsequent sovereign debt crisis (2008–2012), is also identified.

The analysis shows that the British housing market is the one most synchronized with the Portuguese. Italy, Spain, and France come next. A more detailed analysis revealed that Spain is the country with which Portugal has the largest regions of statistically significant coherency. Until early the 2000s, there is a region of high coherency between the 4 and 8 year frequencies; and after that, prominent coherencies at higher and lower frequencies are detected. Furthermore, it is found that Spain is the leader and Portugal the follower.

Synchronicity has also been observed between Portuguese cities. It is observed that Braga, Santarém, Portalegre, Leiria, and Setúbal are quite de-synchronized with the rest of the country (the last two form a cluster of their own). Although the remaining cities seem relatively

well synchronized between themselves, some subclusters can be identified; one is formed by Lisbon, Porto, and Faro (the three district capitals with international airports); and the other by Aveiro, Bragança, Coimbra, and Guarda.

The two most important Portuguese cities, Lisbon and Porto, are synchronized at longer run cycles, with Lisbon's cycle leading Porto's. However, at higher frequencies, the cycles diverge and the correlation is negative. Lisbon and Faro became very synchronized after 2005, with Lisbon leading. Viana do Castelo and Beja are the most synchronized pair and their cycles are almost simultaneous. Leiria and Viseu are the least synchronized pair but display a common long-run cycle. The results of chapter 3 suggest that the Portuguese housing market is segmented and displays regional heterogeneities. The fact that the housing cycles of Portuguese cities may be de-synchronized, suggests that housing policies should be designed locally.

Chapter 4 introduces two housing affordability metrics: i) the housing expenditure burden index and ii) the housing unaffordability risk index. The former assesses the ratio between estimated values of housing and household income, using civil parishes as the unit of analysis, and the households living in subsections where the ratio is higher than 0.4; the latter analyses the proportion of households living in subsections with median income lower than the median of the municipality, and housing cost higher than the median housing cost in the municipality. As expected, results show strong spatial heterogeneity in housing affordability patterns and significant evidence of spatial dependence, thus claiming the importance of a territorial perspective in the design of public policies that impact housing (which is in line with the results of chapter 3).

One of the most important results of this chapter is the identification of housing affordability challenges in territories located between the largest cities. On the one hand, regarding the coastline, we find small and medium-sized cities, which conflate urbanization, urban expansion and suburbanization processes, and have been serving as alternatives to large urban centres (Lisbon and Porto), placing them in a challenging position to achieve reasonable housing affordability levels. On the other hand, among the inland regions, phenomena of consolidation in small urban and rural centres, which may play a key role in countering depopulation, also seem to face housing affordability issues that place them in similar positions to those of more socially and economically dynamic territories.

The analysis of chapter 5 focuses on the impact of short-term rentals on the real estate market. Taking advantage of a partial ban introduced by the municipality of Lisbon in November 2018, which prohibited new short-term rental licenses with immediate effect in some pre-selected areas of the capital, revealed some interesting conclusions. More specifically, it is shown that incumbent owners (mostly Portuguese) rushed to register properties just before the ban was effective. This shows that the anticipation of the policy, due to its wide public discussion, allowed incumbent owners to enter the market in the very last weeks before licensing was interrupted.

The results in this chapter document a sizeable decrease in the number and price of traded dwellings. More specifically, this chapter shows that the ban led to a 20% decrease in the quantity traded on the market and a 9% decrease in price. The market for 2-bedroom flats drives these effects, showing a segmentation of short-term rentals in small to medium sized apartments. The price decrease for

two-bedroom houses is almost 20%, which is consistent with a sharp reduction in the demand for this type of flat, confirming that the option to register a property as short-term rental is an important driver of the search for new properties. This chapter also highlights the fact that the surge of short-term rental markets does create upward pressure on real estate prices. It also indicates that, despite their salience, sharing economy platforms are not the full story behind the spectacular housing market boom in the city of Lisbon.

Finally, chapter 6 addresses the important topic of urban leases in Portugal and its complexities, and suggests that this is not a short-term problem. It is structural and a consequence of several bottlenecks. One is the lack of adequate responses to housing shortages; the other is the «home for life» culture, which took root and became an anachronism, given the evolution of the labour market and the new demands for mobility; and finally the ideological prejudices, which created too many misunderstandings and conflicts between the right to housing and the right to property, and today are the main cause for the loss of investor confidence in political institutions and the enormous reputational damage that the lease market has suffered with the succession of legislative advances made by the latter. An interesting overview of renting legislation in Portugal is also provided, contributing towards a better understanding of the dynamics and evolution of this important dimension of the real estate market in Portugal.

A final note is in order, as this study began before the COVID-19 pandemic, which originated a significant shock in the real estate market, whose effects will depend on the duration of the pandemic and the economy's recovery process.

The COVID-19 pandemic has had negative impacts beyond the health sector and generated a worldwide crisis which is having consequences on basically all sectors of the economy, including real estate. Moreover, the pandemic crisis has also led to the re-organisation of activities in terms of urban spaces and mobility, as well as different usage of house spaces.

As was shown in the different chapters of this book, the trends of the real estate market in the pre-COVID era are clear, whereas we can only hypothesise about the post-COVID period, at this moment. The real estate market potentially requires adjustments in order to meet needs, be useful to a society which is changing in its requirements and guarantee its wellbeing.

This change in trend may be due to several factors related to the lockdown, including households' economic instability and lower incomes, alongside changes in lifestyle and working conditions. In addition, the decrease in tourism, and therefore in related rents, has also strongly affected the real estate trend in Portugal. Overall, this sector is facing important challenges which will likely affect its short and long run dynamics.

Notes

< 1. The analyses, opinions and findings of this paper represent the views of the authors, and are not necessarily those of the Banco de Portugal or the Eurosystem.

< 2. For a more complete overview of different bubble models and how they might be tested econometrically, see Gürkaynak (2008).

< 3. See Appendix B for details and results of the quantile cointegration test and previously conducted unit root tests.

< 4. For the test statistic and limit distribution of the GSADF test, see Appendix A.

< 5. Note that Figure 22 only plots the results for the 2013–2020 period, which does not exclude the possibility of other periods of exuberance having occurred before 2013.

< 6. We have used (Kruskal 1964a, 1964b)'s stress algorithm to minimize the square differences between the distances in the map and the wavelet dissimilarities.

< 7. Local housing strategies («Estratégias Locais de Habitação — ELH») are a mandatory requirement for public and private entities, both individual and collective, to access the programme *«1.º Direito — Programa de Apoio ao Acesso à Habitação» (1st Right — Support Programme for Housing Access*), which focuses on financial support for initiatives aiming to solve housing needs, although legislation is clear that the strategy can and should have a more general nature.

< 8. This refers to a direct intervention in the context of the housing market, which goes beyond the traditional public supply focused on population segments that are excluded from the housing market.

< 9. The focus on mainland Portugal arises from the increasing difficulties in widening this study to the autonomous regions, which due to the insular characteristics of their territory, call for a specialized study.

< 10. Carried out by municipal councils, in the context of the elaboration of local housing strategies, its goal is to identify and characterise the situation of households that meet the criteria for access to the various housing solutions recommended by the program; this document is the basis for access to public (financial) support for resolving situations of housing needs.

< 11. The first local housing strategies (ELH as described in footnote 1) were published and approved in 2020, meaning that these results are still based on a small sample, therefore the numbers can be expected to be even more significant.

< 12. Even if data on the housing market is exposed to many constraints and asymmetries.

< 13. More information on this metric can be seen here.

< 14. The annual estimate is based on a weighted average of the quarterly data, using the number of contracts for purchase and sale of urban buildings in each quarter as a weight — that is, from the data available here.

< 15. Other variable transformation features are the semi--log and, more generally, the possibilities established by the Box-Cox transformation. The Box-Cox transformation was introduced by Box G., and Cox D., (1964) as a way to solve the estimation problem in non-linear regressions.

< 16. The metric in question can be accessed here.

< 17. Housing cost € per year is estimated from the housing market value in 2016 (€/m2 total). The yearly value is obtained considering a projected payment period of 30 years and an associated annual charge of 2%.

< 18. Retrieved from the urban area typology («tipologia de área urbana» — TIPAU) defined by Statistics Portugal at the civil parish level. For municipalities, this variable is defined considering the most frequent classification in civil parishes within the municipality.

< 19. This information will be included as dummy variables in the econometric model.

< 20. This information will be included as dummy variables in the econometric model.

< 21. Real estate supply data from real estate listing portals (e.g. CasaSapo, Imovirtual, Idealista), real estate networks or real estate agencies is difficult to compile. Not only are there no application programmable interfaces (APIs) to automatically access the data made available on the properties, but there is also no centralized registration mechanism that allows the identification, at any given moment, of the property on offer, its data and (quotation) prices.

< 22. The first year for which this metric is presented.

< 23. The tourism data comes from the open-access platform available here, which was collected and processed by the authors — who cross-referenced the data with the georeferenced database of considered administrative and statistical political partitions (municipalities, civil parishes).

< 24. In most cases, these are municipalities that have previously occupied prominent positions in the political administrative structure, namely with respect to former districts/civil governors. They are also municipalities that house many of the central administration's regional services.

< 25. We thank Vitor Reis for his very careful reading of this chapter and the interesting comments and Alex Coutts for the feedback on an earlier version. We are grateful to Jacob Macdonald and the Municipality of Lisbon for help with data sources and management.

< 26. link.

< 27. link.

< 28. link.

< 29. Franco et al. (2019) estimate the quarterly housing prices as a function of Airbnb concentration before and after the 2014 regulatory reform. They quantify that a 1 p.p. increase in the share of Airbnb properties increases house prices by 4.5%.

< 30. For more information about difference-in--differences see Angrist and Pischke (2009).

< 31. To the best of our knowledge, the only paper in the literature that exploits quasi-experimental evidence from short--term rental restrictions is Koster et al. (2018). The authors take advantage of a regulation that prevented landlords from short-term renting any property besides their primary one in some regions of Los Angeles. They found that, due to this law, listings reduced by 50% and house prices by 3%.

< 32. link.

< 33. The thresholds below are from 2019. While the parameters may vary from year to year, the overall taxation scheme is the same.

< 34. link.

< 35. link.

< 36. link.

< 37. link.

< 38. link.

< 39. link.

< 40. Empirical evidence for Lisbon suggests that cultural heritage and access to green spaces are capitalized in real estate prices (Franco and Macdonald 2018 a,b). Gonçalves et al. (2020) show that differences between treatment and comparison areas are also remarkably low in these two regards.

< 41. Treated neighbourhoods are *Madragoa, Bairro Alto, Bica, Príncipe Real, Santa Catarina, São Paulo/ Boavista/ Conde Barão, Alfama, Mouraria,* and *Sé.*

< 42. The five treated neighbourhoods are *Madragoa, Bairro Alto, Santa Catarina, Alfama,* and *Mouraria.*

< 43. link.

< 44. White book on Housing Policy in Portugal, ENH 1993.

< 45. link.

< 46. link.

< 47. link.

< 48. Decree of 12 November, 1910.

< 49. Decree no. 5411 of 17 April, 1919.

< 50. Law no. 2030 of 22 June, 1948.

< 51. Decree-law no. 47344 of 25 November, 1966.

< 52. Decree-law no. 583/76 of 22 June.

< 53. Law no. 46/85 of 20 September.

< 54. Decree-law no. 321-B/90 of 15 October.

< 55. Decree-law no. 257/95 of 30 September.

< 56. Law no. 6/2006 of 27 February.

< 57. Law no. 79/2014 of 19 December.

< 58. Law no. 42/2017 of 14 June.

< 59. Law no. 64/2018 of 29 October.

< 60. Law no. 12/2019 of 12 February.

< 61. Law no. 13/2019 of 12 February.

< 62. Law no. 2030 of 22 June, 1948.

< 63. Decrees-law no. 217/74 of 27 May and 445/74 of 12 September.

< 64. Article 9 of Decree of 12 November, 1910.

< 65. Article 1 of Decree no. 1079 of 23 November, 1914.

< 66. No. 1 of article 2 of Law no. 828 of 28 September, 1917.

< 67. No. 4 of article 2 of Law no. 828 of 28 September, 1917.

< 68. Article 106 of Decree no. 5411 of 17 April, 1919.

< 69. Article 5 of Law no. 828 of 28 September, 1917.

< 70. Decree no. 22661 of 13 June, 1933.

< 71. Articles 1 and 3 of Decree no. 9496 of 14 March, 1924.

< 72. Article 27 of Decree no. 15289 of 30 March, 1928.

< 73. Article 29 of Decree no. 15289 of 30 March, 1928.

< 74. Article 10 of Decree no. 47344 of 25 November, 1966, introducing the Civil Code.

< 75. Decrees-law no. 217/74 of 27 May and 445/74 of 12 September.

< 76. No. 2 of article 2 of Decree-law no. 148/81 of 4 June.

< 77. No. 3 of article 2 and articles 3 and 4 of Decree-law no. 148/81 of 4 June.

< 78. Article 7 of Decree-law no. 148/81 of 4 June.

< 79. Article 14 of Decree-law no. 148/81 of 4 June.

< 80. Law no. 46/85 of 20 September.

< 81. Article 11 of Law no. 46/85 of 20 September.

< 82. Decree-law no. 13/86 of 23 January.

< 83. Decree-law no. 68/86 of 27 March.

< 84. No. 3 of article 8 of Law no. 46/85 of 20 September.

< 85. Law no. 6/2006 of 27 February.

< 86. Article 4 of Decree de 12 November, 1910.

< 87. Article 12 of Decree de 12 November, 1910.

< 88. § 4 of Article 70 of Decree no. 5411 of 17 April, 1919.

< 89. Article 8 of Law no. 828 of 28 September, 1917.

< 90. Article 30 of Decree no. 5411 of 17 April, 1919.

< 91. No. 3 of article 1 of Law no. 1662 of 4 September, 1924.

< 92. Decree no. 15289 of 30 March.

< 93. No. 1 and 2 of article 46 of Law no. 2030,of 22 June, 1948.

< 94. No. 3 of article 46 of Law no. 2030 of 22 June, 1948.

< 95. Article 1095 of the Civil Code.

< 96. Article 98 of RAU approved by Decree-
-law no. 321-B/90 of 15 October.

< 97. Article 100 of RAU approved by Decree-
-law no. 321-B/90 of 15 October.

< 98. Article 40 of Law no. 46/85 of 20 September
amending article 1111 of Civil Code.

< 99. Article 86 of RAU approved by Decree-
-law no. 321-B/90 of 15 October.

< 100. Article 1106 of the Civil Code modified
by Law no. 6/2006 of 27 February.

< 101. Article 1026 of the Civil Code modified
by Law no. 31/2012 of 14 August.

< 102. Article 1097 of the Civil Code modified
by Law no. 31/2012 of 14 August.

< 103. Article 35 of Law no. 6/2006 of 27 February,
modified by Law no. 43/2017 of 14 July.

< 104. Article 35 of Law no. 6/2006 of 27 February,
modified by Law no. 2/2020 of 31 March.

< 105. No. 2 of article 1095 of the Civil Code,
modified by Law no. 13/2019 of 12 February.

< 106. Articles 1096 and 1097 of the Civil Code,
modified by Law no. 13/2019 of 12 February.

< 107. Paragraph c) of article 1101 of the Civil Code,
modified by Law no. 13/2019 of 12 February.

< 108. No. 10 of article 36 of Law no. 6/2006 of 27 February
modified by Law no. 13/2019 of 12 February.

< 109. No. 3 of article 14 of Law no. 13/2019 of 12 February.

< 110. Articles 11, 13, 14 and 18 of Decree of 12 November, 1910.

< 111. No. 5 of article 2 of Law no. 828 of 28 September, 1917.

< 112. § 7 of article 12 of Decree no. 4499 of 27 June, 1918.

< 113. Article 82 of Decree no. 5411 of 17 April, 1919.

< 114. § 9 of article 5 of Law no. 1662 of 4 September, 1924.

< 115. Article 986 et seq. of Decree no. 29637 of 28 May, 1939.

< 116. Article 1053 of the Civil Code approved by
Decree-law no. 47344 of 25 November, 1966.

< 117. Article 1097 of the Civil Code approved by
Decree-law no. 47344 of 25 November, 1966.

< 118. Decrees-law no. 6/75 of 7 January and 232/75 of 16 May.

< 119. Decrees-law no. 198-A/75 of 14 April and 294/77 of 20 July.

< 120. Articles 15 and 15-A of Law no. 31/2012 of 14 August.

< 121. link.

< 122. No. 3 of article 1083 of the Civil Code
modified by Law no. 31/2012 of 14 August.

< 123. No. 4 of article 1083 of the Civil Code
modified by Law no. 31/2012 of 14 August.

< 124. § single of article 3 and § 1 of article 5
of Decree of 12 November, 1910.

< 125. § single of article 37 of Decree no. 5411 of 17 April, 1919.

< 126. Article 1091 of the Civil Code approved by
Decree-law no. 47344 of 25 November, 1966.

< 127. Article 1076 of the Civil Code modified
by Law no. 6/2006 of 27 February.

< 128. § 1, a) of article 5 of Law no. 1662 of 4 September, 1924.

< 129. § single of article 2 of Decree no. 22661 of 13 June, 1933.

< 130. Article 1041 of the Civil Code approved by
Decree no. 47344 of 25 November, 1966.

< 131. Article 1041 of the Civil Code modified
by Decree-law no. 293/77 of 20 July.

< 132. No. 1 of article 1041 of the Civil Code
modified by Law no. 13/2019 of 12 February.

< 133. Articles 10, 15, 16 and 26 of Decree-law no. 293/77 of 20 July.

< 134. Law no. 46/85 of 20 September.

< 135. Decree-law no. 162/92 of 5 August.

< 136. Decree-law no. 308/2007 of 3 September.

< 137. Decree-law no. 158/2006 of 8 August.

< 138. Articles 3 to 5 of Decree no. 1079 of 23 November 1914.

< 139. Article 108 of Decree no. 5411 of 17 April 1919.

< 140. Article 108 of Decree no. 5411 of 17 April 1919.

< 141. Article 17 of Decree-law no. 445/74 of 12 September.

< 142. No. 7 of article 15 of RAU approved by Decree-
-law no. 321-B/90 of 15 October, modified by Decree-
-law no. 329-B/2000 of 22 December.

< 143. Article 37 of Law no. 55-B/2004 of 30 December
modifying no. 8 and 9 of article 112 of the IMI Code.

< 144. Article 7 da Law no. 6/2006 of 27 February
amending no. 3 of article 112 of the IMI Code.

< 145. Article 93 da Law no. 64-A/2008 of 31 December
amending no. 3 of article 112 of IMI Code.

< 146. Article 141 da Law no. 64-B/2011 of 30 December
amending no. 3 of article 112 of IMI Code.

< 147. Article 11 da Law no. 51/2018 of 16 August
amending no. 3of article 112 of IMI Code.

< 148. Article 10 da Law no. 119/2019 of 18 September
amending no. 3 of article 112 of IMI Code.

< 149. Article 5 of Decree-law no. 67/2019 of
21 adding article 112-B to IMI Code.

< 150. Decree-law no. 28912 of 12 August 1938.

< 151. Decree-law no. 23052 of 23 September 1933.

< 152. Decree no. 4137 of 25 April 1918.

< 153. Articles 11 and 12 of Decree-law no. 28912 of 12 August 1938.

< 154. Decree-law no. 33278 of 24 November 1943.

< 155. Decree-law no. 37576 of 10 October 1949.

< 156. Article 3 of Decree-law no. 34486 of 6 June 1945.

< 157. Decree-law no. 35732 of 4 July 1946.

< 158. Decree-law no. 41470 of 23 December 1957.

< 159. Law no. 2007 of 7 May 1945.

< 160. Law no. 2092 of 9 April 1958.

< 161. Decree-law no. 36212 of 7 April 1947.

< 162. Decree-law no. 41532 of 18 February 1958.

< 163. Articles 12 and 13 of Decree-law no. 41532 of 18 February 1958.

< 164. Decree order no. 759/74 of 23 November.

< 165. Decree-law no. 518/77 of 15 December.

< 166. Decree-law no. 148/81 of 4 June.

< 167. Articles 7 and 28 of Law no. 46/85 of 20 September.

< 168. Decree-law no. 321-B/90 of 15 October.

< 169. No. 3 of article 7 of Decree-law no. 321-B/90 of 15 October.

< 170. Law no. 80/2014 of 19 December.

< 171. Decree-law no. 68/2019 of 22 May.

< 172. Decree order no. 176/2019 of 6 June.

< 173. Decree order no. 386/77 of 25 June.

< 174. Technical rate: designates the monthly amount supported by the household, reflecting the real cost of the housing unit, determined by its typology, year of construction, gross area, age, and state of preservation. The value is also calculated taking the average cost of construction and the cost of urbanised land into account, and is only applied in cases where the household has an overall monthly income of more than three times the National Minimum Wage rate in force (definition adapted from here).

< 175. Decree order no. 288/83 of 17 March.

< 176. No. 24 da Decree order no. 288/83 of 17 March.

< 177. Decree-law no. 166/93, of 7 May.

< 178. Law no. 81/2014 of 19 December.

< 179. Law no. 32/2016 of 24 August.

< 180. link.

< 181. Article 111 of Decree no. 5411 of 17 April 1919.

< 182. Decree-law no. 36212 of 7 April 1947.

< 183. Article 30 da Law no. 2030 of 22 June 1948.

< 184. Decree-law no. 328-B/86 of 30 September.

< 185. Resolution of the Council of Ministers of 24 February 1976, published on 19 March, 1976.

< 186. Source IGAPHE/IHRU: Program IAJ.

< 187. Source Statistics Portugal: Census 2001.

< 188. Residential Information System — lease in Lisbon and Porto — quarterly data from 2010 to 2019.

< 189. Article 4 of Decree-law no. 268/94 of 25 October.

< 190. Article 8 of Decree-law no. 37/2018 of 4 June and article 2 of Decree order no. 311-D/2011 of 27 December.

Index of figures

Index of tables

Authors

AGUIAR-CONRARIA, Luis
Holds a PhD in Economics from Cornell University, is a Professor of Economics at the University of Minho and dedicates himself to Macroeconomics and Political Economics. In 2011, he was awarded the Gulbenkian Prize for the Internationalization of Social Sciences. He is currently the Director of the Department of Economics at University of Minho. He is also a member of the Economic Cycle Dating Committee and a columnist for the weekly newspaper Expresso.

BARROS, Vera Gouveia
Is an Economist, with a BSc from the Nova School of Business and Economics.She holds an MA in International Economics and European Studies from the ISEG Lisbon School of Economics & Management, where she is currently completing her PhD in Economics, with a thesis on Tourism Economics, a field in which she has developed research, alongside Housing Economics. She was also a faculty member at the University of Madeira.

BATISTA, Paulo
Holds a PhD in e-Planning from the University of Aveiro (UA). He is a Researcher in the Department of Social, Political and Territorial Sciences (UA) and a member of the Research Unit on Governance, Competitiveness and Public Policies. He has developed research and applied work on methods and techniques for territorial analysis.

BRINCA, Pedro
Holds a PhD in Economics from Stockholm University. Prior to joining Nova School of Business and Economics as an Assistant Professor in 2015, he worked for the European University Institute, Stockholm University, the European Central Bank and the University of Minnesota. His research essentially focuses on two topics: economic cycles and the interaction between micro-heterogeneity and macroeconomic dynamics. He is also an Associate Researcher at the University of Oslo.

CASTRO, Eduardo Anselmo
Has been a Professor at the University of Aveiro since 1982, having been Vice-Rector for Cooperation with Society and Technology Transfer of the institution. Currently Vice-President of the Centro Regional Coordination and Development Commission (CCDR-C), he has coordinated dozens of national and international research projects in domains related to regional development.

DUARTE, João B.
Holds a PhD in Economics from the University of Illinois Urbana-Champaign. Prior to joining Nova School of Business and Economics in 2017 as an Assistant Professor, he worked at Cambridge University. His research has mainly focused on the housing market and monetary policy. He has been published in the Journal of the European Economic Association and in the Journal of Applied Econometrics.

GONÇALVES, Duarte
Holds an MA in Economics from Nova School of Business and Economics. He is also a Teaching Assistant at that same institution, having collaborated in courses such as Public Economics, Advanced Microeconomics and Industrial Economics. He was an intern economist at the Competition Authority (AdC).

HUGET, René
Currently works as a freelance consultant and is a senior associate in strategic consulting. His research interests focus on Applied Macroeconomics, Asset pricing and Behavioural Economics. He holds a BA in Economics from the University of Cologne and an MA in Economics from the Nova School of Business and Economics.

LOURENÇO, Rita Fradique
Has been an Economist at the Economics and Research Department of the Banco de Portugal since 2001, having joined the institution's staff about a decade earlier as a member of the Markets Department. She holds a BSc degree in Economics from the Nova School of Business and Economics and has completed the curricular part of the PhD and MA Programme in Economics from the same University. In recent years, her research has included the dynamics of housing markets, with several published work in co-authorship with Paulo M. M. Rodrigues.

MARQUES, João Lourenço
Is a Professor at the Department of Social, Political and Territorial Sciences of the University of Aveiro, teaching and researching in the areas of Regional Economics, Regional Planning and Public Policies, namely, methods and techniques to support decision-making. He is a member of the Research Unit on Governance, Competitiveness and Public Policies, coordinating the Systems for Decision Support Research Group.

PERALTA, Susana
Is an Associate Professor, with agregação, at the Nova School of Business and Economics, and holds a PhD in Economics from the Université Catholique de Louvain, in Belgium. She is a specialist in Public Economics and has research published in international journals, including the Journal of Public Economics, Journal of Urban Economics, The Economic Journal or Public Choice.

REIS, Victor
Holds a BA in Architecture and is a Senior Technical Advisor at the Institute for Housing and Urban Rehabilitation (IHRU), having assumed the presidency of the institution between 2012 and 2017. During his professional career he was involved in the kick-off of urban rehabilitation operations in Alfama and Mouraria, in the creation of RECRIA, IAJ and PER, in the implementation of the 2012 urban lease reform and in the study on the 100 years of housing policies.

RODRIGUES, Paulo M. M.
Is a Consultant Researcher at the Economics and Research Department of the Banco de Portugal and Adjunct Professor at the Nova School of Business and Economics. He holds a PhD in Econometrics from the University of Manchester and develops research in Theoretical and Applied Econometrics to Finance and Economics. He is a member of the editorial board of several international scientific journals and an external research fellow of the Essex Centre for Financial Econometrics at the University of Essex, and the Clive Granger Centre for Time Series Analysis at the University of Nottingham.

SANTOS, João Pereira dos
Holds a PhD in Economics from the Nova School of Business and Economics. He was a visiting student at the Harvard Kennedy School and completed the Advanced Studies Program at the Kiel Institute for the World Economy. His research focuses on the evaluation of public policies. He currently works as a technical advisor for the cabinet of the Assistant Secretary of State to the Prime Minister.

SOARES, Maria Joana
Is an Associate Professor in the Department of Mathematics of the University of Minho and a member of NIPE — Centre for Research in Economics and Management. Her main research interests lie in the field of Numerical Analysis and in the applications of Wavelet Theory to Economics, having developed a Matlab toolbox for the use of various wavelet tools, in collaboration with Luís Aguiar-Conraria.

Francisco Manuel dos Santos Foundation

Published studies

Economics

O Cadastro e a Propriedade Rústica em Portugal
Coordination by Rodrigo Sarmento de Beires; 2013.

Custos e Preços na Saúde: Passado, presente e futuro
Coordination by Carlos Costa; 2013.

25 anos de Portugal Europeu: A economia, a sociedade e os fundos estruturais
Coordination by Augusto Mateus; 2013.

Que economia queremos?
Coordination by João Ferrão; 2014.

A Economia do Futuro: A visão de cidadãos, empresários e autarcas
Coordination by João Ferrão; 2014.

Três Décadas de Portugal Europeu: Balanço e perspectivas
Coordination by Augusto Mateus; 2015.

Empresas Privadas e Municípios: Dinâmicas e desempenhos
Coordination by José Tavares; 2016.

Investimento em Infra-Estruturas em Portugal
Coordination by Alfredo Marvão Pereira; 2016.

Benefícios do Ensino Superior
Coordination by Hugo Figueiredo and Miguel Portela; 2017.

Diversificação e Crescimento da Economia Portuguesa
Coordination by Leonor Sopas; 2018.

Dinâmica Empresarial e Desigualdade
Coordination by Rui Baptista; 2018.

Encerramento de Multinacionais: O capital que fica
Coordination by Pedro de Faria; 2018.

GDP-linked bonds in the Portuguese Economy
Coordination by Gonçalo Pina, 2020.

Features by Portuguese International Trade: a Firm-level Perspective
Coordination by João Amador; 2020.

Financial Constraints and Business Dynamics: Lessons from the 2008--2013 Recession
Coordination by Carlos Carreira, Paulino Teixeira, Ernesto Nieto--Carrillo and João Eira; 2021.

Transport systems in Portugal Analysis by efficiency and regional impact
Carlos Oliveira Cruz, Álvaro Costa, Joaquim Miranda Sarmento, Vítor Faria e Sousa and João Fragoso Januário, 2021.

From made in to created in: A new paradigm for the portuguese economy
Coordination by Fernando Alexandre; 2021.

The real estate market in Portugal: Prices, rents, tourism and accessibility
Coordination by Paulo M. M. Rodrigues; 2022.

Institutions

Droga e Propinas: Avaliações de impacto legislativo
Coordination by Ricardo Gonçalves; 2012.

Justiça Económica em Portugal: A citação do réu no processo civil
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Factos e números
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Gestão processual e oralidade
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Meios de resolução alternativa de litígios
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Novo modelo processual
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: O sistema judiciário
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Produção de prova
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Recuperação do IVA
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Justiça Económica em Portugal: Síntese e propostas
Coordination by Mariana França Gouveia, Nuno Garoupa, Pedro Magalhães; 2012.

Segredo de Justiça
Coordination by Fernando Gascón Inchausti; 2013.

Feitura das Leis: Portugal e a Europa
Coordination by João Caupers, Marta Tavares de Almeida and Pierre Guibentif; 2014.

Portugal nas Decisões Europeias
Coordination by Alexander Trechsel, Richard Rose; 2014.

Valores, Qualidade Institucional e Desenvolvimento em Portugal
Coordination by Alejandro Portes and M. Margarida Marques; 2015.

O Ministério Público na Europa
Coordination by José Martín Pastor, Pedro Garcia Marques and Luís Eloy Azevedo; 2015.

Juízes na Europa: Formação, selecção, promoção e avaliação
Coordination by Carlos Gómez Ligüerre; 2015.

Limitação de Mandatos: O impacto nas finanças locais e na participação eleitoral
Coordination by Francisco Veiga and Linda Veiga; 2017.

O Estado por Dentro: Uma etnografia do poder e da administração pública em Portugal
Coordination by Daniel Seabra Lopes; 2017.

O Impacto Económico dos Fundos Europeus: A experiência dos municípios portugueses
Coordination by José Tavares; 2017.

Orçamento, Economia e Democracia: Uma proposta de arquitetura institucional
Coordination by Abel M. Mateus; 2018.

Instituições e Qualidade da Democracia: Cultura política na Europa do Sul
Coordination by Tiago Fernandes; 2019.

Os Tribunais e a Crise Económica e Financeira: Uma análise ao processo decisório em contexto de crise económico-financeira
Patrícia André, Teresa Violante and Maria Inês Gameiro; 2019.

Society

Como se aprende a ler?
Coordination by Isabel Leite; 2010.

Fazer contas ensina a pensar?
Coordination by António Bivar; 2010.

Desigualdade Económica em Portugal
Coordination by Carlos Farinha Rodrigues; 2012.

Projecções 2030 e o Futuro
Coordination by Maria Filomena Mendes and Maria João Valente Rosa; 2012.

Envelhecimento Activo em Portugal: Trabalho, reforma, lazer e redes sociais
Coordination by Manuel Villaverde Cabral; 2013.

Escolas para o Século XXI: Liberdade e autonomia na educação
Coordination by Alexandre Homem Cristo; 2013.

Informação e Saúde
Coordination by Rita Espanha; 2013.

Literatura e Ensino do Português
Coordination by José Cardoso Bernardes and Rui Afonso Mateus; 2013.

Processos de Envelhecimento em Portugal: Usos do tempo, redes sociais e condições de vida
Coordination by Manuel Villaverde Cabral; 2013.

Que ciência se aprende na escola?
Coordination by Margarida Afonso; 2013.

Inquérito à Fecundidade 2013
Statistics Portugal and FFMS; 2014.

A Ciência na Educação Pré-Escolar
Coordination by Maria Lúcia Santos, Maria Filomena Gaspar, Sbyia Saraiva Santos; 2014.

Dinâmicas Demográficas e Envelhecimento da População Portuguesa (1950–2011): Evolução e perspectivas
Coordination by Mário Leston Bandeira; 2014.

Ensino da Leitura no 1.º Ciclo do Ensino Básico: Crenças, conhecimentos e formação dos prbyessores
Coordination by João A. Lopes; 2014.

Ciência e Tecnologia em Portugal: Métricas e impacto (1995–2012)
Coordination by Armando Vieira and Carlos Fiolhais; 2014.

Mortalidade Infantil em Portugal: Evolução dos indicadores e factores associados de 1988 a 2008
Coordination by Xavier Barreto and José Pedro Correia; 2014.

Os Tempos na Escola: Estudo comparativo da carga horária em Portugal e noutros países
Coordination by Maria Isabel Festas; 2014.

Cultura Científica em Portugal
Coordination by António Granado and José Vítor Malheiros; 2015.

O Multimédia no Ensino das Ciências
Coordination by João Paiva; 2015.

O Quinto Compromisso: Desenvolvimento de um sistema de garantia de desempenho educativo em Portugal
Coordination by Margaret E. Raymond; 2015.

Desigualdade do Rendimento e Pobreza em Portugal: As consequências sociais do programa de ajustamento
Coordination by Carlos Farinha Rodrigues; 2016.

Determinantes da Fecundidade em Portugal
Coordination by Maria Filomena Mendes; 2016.

Será a repetição de ano benéfica para os alunos?
Coordination by Luís Catela Nunes; 2016.

Justiça entre Gerações: Perspectivas interdisciplinares
Coordination by Jorge Pereira da Silva and Gonçalo Almeida Ribeiro; 2017.

Migrações e Sustentabilidade Demográfica: Perspectivas de evolução da sociedade e economia portuguesas
Coordination by João Peixoto; 2017.

Mobilidade Social em Portugal
Coordination by Teresa Bago d'Uva; 2017.

Porque melhoraram os resultados do PISA em Portugal? Estudo longitudinal e comparado (2000–2015)
Coordination by Anália Torres; 2018.

Igualdade de Género ao Longo da Vida: Portugal no contexto europeu
Coordination by Anália Torres; 2018.

As mulheres em Portugal, Hoje: Quem são, o que pensam e como se sentem
Coordination by Laura Sagnier and Alex Morell; 2019.

Financial and Social Sustainability by the Portuguese Pension System
Coordination by Amílcar Moreira; 2019.

Identidades Religiosas e Dinâmica Social na Área Metropolitana de Lisboa
Coordination by Alfredo Teixeira; 2019.

A evolução da ciência em Portugal (1987-2016)
Elizabeth Vieira, João Mesquita, Jorge Silva, Raquel Vasconcelos, Joana Torres, Sylwia Bugla, Fernando Silva, Ester Serrão and Nuno Ferrand; 2019.

A pobreza em Portugal: Trajetos e quotidianos
Coordination by Fernando Diogo, 2021.

Os jovens em Portugal, hoje: Quem são, que hábitos têm, o que pensam e o que sentem
Coordination by Laura Sagnier and Alex Morell; 2021.


FUNDAÇÃO
FRANCISCO MANUEL DOS SANTOS