

How does regulation impact housing rental prices? Evidence from Spain using fractional integration techniques

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ABSTRACT

This paper examines the impact of housing regulations on rental prices in Spain from 1962 to 2024, focusing on fiscal policies and contract duration regulations. Employing fractional integration techniques, we assess the effectiveness of supply- and demand-side measures in stabilizing rental prices. The findings reveal that regulatory interventions have not achieved consistent long-term price stabilization, with shocks to rental prices displaying persistent effects. Notably, the 1999 fiscal policy changes temporarily influenced demand, but no significant lasting impact was observed across other regulatory measures. These results highlight the structural deficiencies in Spain's housing policies, characterized by a lack of effective supply-side incentives and protection and inadequate demand-side measures. To address affordability challenges and meet constitutional housing mandates, the study recommends adopting comprehensive policies, including fiscal incentives for landlords, expanded social housing programs, and stronger tenant protections. This research contributes to understanding the interplay between regulation and housing market dynamics in Spain.

1. Introduction

According to the Spanish Constitution, every citizen has the right to decent housing, and the State must ensure that this is upheld. When housing prices continually increase, part of the population cannot afford it, and Governments try to face this problem modifying the law regulations. Sometimes they apply fiscal stimulus, sometimes they remove them. At times they implement supply-side policies to protect owners, at times they carry out demand-side measures to defend renters. And depending on the Government wing, the policies may be more interventionist (control prices, for example) or less (i.e. land liberalisation).

Our original research question follows this line of inquiry: Are public authorities in Spain fulfilling their obligation to promote public policies that facilitate citizens' access to decent housing?

Spain has faced housing access problems for two decades. According to the 2001 Population and Housing Census, the country had 3.1 million unoccupied dwellings, equivalent to some 14.8% of the total housing stock. Ten years later, following the burst of the real estate bubble, the 2011 Census recorded 3.4 million empty dwellings, or 13.7% of a stock of 25.2 million. The most recent figures, drawn from the 2021 Census, put the number of vacant dwellings at 3.8 million, or 14.4% of the total

(INE, 2023). It should be noted that the 2021 Census was compiled from administrative registers and classifies dwellings according to electricity consumption, so that its results are not strictly comparable with those of earlier censuses.

At this point, it is important to clarify that these figures for vacant housing do not include second homes or holiday dwellings.

Housing stock data in Spain

	Number	Percentage of total housing
Total homes	26,623,708	
Empty homes	3,837,328	14.4
Homes with very low energy consumption	943,924	3.5
Occasional use dwellings	2,514,511	9.4
Rest of homes	19,327,945	72.6

Source: <https://www.ine.es/jaxi/Datos.htm?tpx=59531>.

The National Institute of Statistics, from which the data was obtained, distinguishes, based on electricity consumption, between: vacant homes, homes with low energy consumption, homes used occasionally, and other homes. Therefore, the 14% figure excludes homes used as second homes or vacation properties.

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The aim of this study is not to examine second homes or dwellings intended for holiday use, but rather those dwellings whose electricity consumption clearly indicates that they remain vacant throughout the year and which, therefore, could potentially be placed on the rental market.

Furthermore, this study does not seek to claim that vacant dwellings are either the sole cause of, or the solution to, the problem of access to housing in Spain, particularly since many of them are located in areas with low demand. Nevertheless, with the appropriate incentives, these dwellings could be offered by their owners on the rental market, thereby contributing to an improvement in the situation in certain areas. Indeed, the Bank of Spain has suggested making vacant dwellings available to the public sector for social rental purposes. Moreover, even some dwellings currently used for temporary or holiday purposes could eventually be redirected towards the long-term residential rental market if sufficient conditions of profitability, legal certainty and regulatory stability were in place.

In this context, Autonomous Communities and City Councils are working to mobilize as many empty houses as possible and reverse the great problem we face: the lack of rental housing in our country. Article 47 of our Constitution establishes a strong mandate for public powers that must implement the regulations and means necessary to ensure that the right to enjoy decent and adequate housing is real and effective.

It is evident that social rights (economic and cultural) set limits on the discretion of state action, both from a legislative and budgetary point of view (Alexy, 2001). In this same sense, the European Parliament spoke out in its resolution of January 21, 2021, on access to decent and affordable housing for all, stating: “that the EU and its Member States have the obligation to guarantee access for all to decent and affordable housing in accordance with fundamental rights such as articles 16, 30 and 31 of the European Social Charter and the European Pillar of Social Rights” (European Parliament, 2021).

The State has assumed a series of obligations that are imposed on it in the Constitution and its priority must be to comply with those obligations.

However, our research hypothesis suggests that the mere adoption of housing regulations and legislative measures aimed at implementing the constitutional right to housing is not sufficient to effectively guarantee access to affordable housing, given the evolution of rental prices and the available rental housing stock.

The main aim of this research paper is to analyze the impact of key regulatory changes (especially fiscal policies) on housing rental prices in Spain from 1962 to 2024. We pretend to evaluate the effectiveness of some of the current housing policies in Spain and, therefore, the level of compliance with the constitutional mandate. To achieve this, we apply fractional integration techniques, accounting for breakpoints during specific periods of regulatory changes. If current housing policies do not facilitate the existence of housing at affordable prices for the population, the constitutional mandate of guaranteeing access to decent housing is not being fulfilled.

The structure of the paper is as follows: first, we summarize the most important studies regarding housing prices and regulatory changes in the real estate market; second, we describe the data AND justify the methodology applied; then we present the main results and compare them with other studies; and finally, we offer conclusions and a discussion section.

2. Literature review

2.1. The right to decent housing and public intervention in Spain

In Comments on the Spanish Constitution of 1978, Bassols Coma (1996) defines very well what is meant by decent housing and says that “housing constitutes a framework or spatial dimension of a private nature and essential for the personal and social life of the individual, and in particular for the development of family life”. The European

Parliament has expressed itself in this same sense, in its Resolution of January 21, 2021, on access to decent and affordable housing for all, in which it asks the Commission and the Member States to ensure that The right to adequate housing is recognized and enforceable as a fundamental human right through applicable European and national legislative provisions, and that guarantee equal access for all to decent housing.

The effectiveness of fundamental social rights, including the right to decent housing, does not depend solely on their formal recognition in constitutional texts, but also on public spending decisions and the public policies adopted by the State to ensure their effective protection. In this regard, social rights necessarily entail positive obligations on the part of the State, the implementation of which is closely linked to budgetary decisions and the allocation of public resources (Alexy, 2001, pp. 489–490). From this perspective, the analysis of fiscal and regulatory housing policies becomes particularly relevant, as it makes it possible to assess whether the measures adopted by the legislature effectively contribute to improving access to housing or, on the contrary, hinder the fulfilment of this social right.

Regarding the role of public authorities as guarantors of the right to housing, Rafael Herranz (2003, p. 1508) argues that Article 47 of the Spanish Constitution recognizes that the right to housing preexists the obligations imposed on public authorities and that their intervention operates as a guarantee mechanism aimed at ensuring its effectiveness. However, the author emphasizes that such effectiveness cannot be reduced merely to the formal adoption of legislative or regulatory measures. According to Herranz Castillo, actions such as promoting adequate conditions, establishing legal rules or regulating land use are examples of the instruments available to public authorities to ensure that the right to decent and adequate housing becomes genuinely effective for all citizens.

At a time when the demand for rental housing in Spain is much greater than the supply, it is important to point out that 92% of the homes offered for rent in our country are in the hands of private owners and not legal companies, as is the case in other neighboring countries, where the percentage of housing in the hands of commercial companies is much higher (such as in Germany, the Netherlands or Denmark). This is the reason why our study has focused on regulatory measures to encourage renting aimed at natural persons. (Banco de España, 2024).

2.2. Historical evolution of the housing market in Spain and the rationale behind the regulatory measures analysed

The evolution of tax and regulatory measures concerning habitual residential leases in Spain must be understood in relation to the different political, economic and social contexts that have shaped the housing market since the second half of the twentieth century. The Spanish trajectory reflects a constant tension between two objectives: ensuring stability and protection for tenants while, at the same time, providing sufficient legal certainty and profitability for landlords so that they maintain or incorporate dwellings into the long-term rental market.

During the 1960s and 1970s, in the final stage of Franco's dictatorship, housing policy was strongly oriented towards construction and home ownership, in a context of intense urban growth and internal migration from rural areas to cities. In the field of leases, the 1964 Urban Leases Act followed a logic of strong tenant protection through mandatory lease extensions, which allowed contracts to continue indefinitely. This system provided residential stability for tenants, but also reduced landlords' incentives to place dwellings on the rental market, especially when rents became disconnected from market prices.

With the democratic transition and the approval of the 1978 Constitution, housing came to be recognized as a social right under Article 47 of the Spanish Constitution. In addition, the new territorial model granted the Autonomous Communities significant powers in the areas of housing, urban planning and land-use regulation, creating a residential policy framework shared by the State, the Autonomous

Communities and municipalities. In the 1980s, in a context of economic openness and European integration, the 1985 Boyer Decree marked a liberalising turn by abolishing mandatory lease extensions for new contracts and allowing the duration of leases to be determined by agreement between the parties. The aim was to stimulate a rental market perceived as rigid, although this came at the cost of reducing tenant stability.

The 1994 Urban Leases Act sought to correct the excesses of the two previous models. In contrast to the indefinite protection established under the 1964 legislation and the liberalisation introduced in 1985, the 1994 Act established a minimum lease duration of five years, seeking to strike a balance between tenant stability and landlord security. However, from the mid-1990s until 2007, the Spanish housing market was dominated by the expansionary cycle of home ownership. Access to mortgage credit, the growth of the construction sector, rising land prices and the social and fiscal preference for ownership consolidated a model in which renting occupied a secondary position.

The financial and mortgage crisis that began in 2007–2008 profoundly altered this model. Job destruction, credit restrictions and the increase in mortgage foreclosures made access to home ownership more difficult, especially for young people, lower-income households and foreign residents. As a result, a growing share of residential demand shifted towards renting. In the following years, public policies fluctuated between demand-side support measures, such as the Basic Emancipation Income and the state tax deduction for rent, and reforms aimed at making supply more flexible. In 2013, the minimum duration of lease contracts was reduced from five to three years with the stated aim of promoting the rental market, although this also increased residential insecurity for tenants.

From 2015 onwards, the scenario changed again. Economic recovery, the concentration of population in large urban areas, labour mobility, the arrival of foreign population and the growth of alternative uses of housing, such as tourist rentals and seasonal rentals, intensified pressure on the residential rental market. Demand grew faster than supply, particularly in large cities and tourist areas, while the public stock of rental housing remained limited and the market continued to depend largely on small private landlords.

This context explains the new regulatory shift of 2018 and 2019, when the minimum lease duration was once again extended to five years where the landlord is an individual and to seven years where the landlord is a legal entity. The main purpose of these reforms was to strengthen tenants' residential stability in a context of rising prices and increasing difficulties in accessing housing. However, from a supply-side perspective, this extension also affects landlords' expectations, as it limits for a longer period their ability to recover the dwelling or modify the contractual conditions.

In the most recent stage, the tension between affordability and supply has intensified due to inflation, rising financing costs, insufficient production of new housing in high-demand areas and the pressure generated by alternative uses of housing. In response, extraordinary limits on annual rent updates have been adopted, followed by Law 12/2023 on the Right to Housing, which introduces stressed residential market areas, new rules on rent updates, measures concerning vacant housing and modulated tax incentives under personal income tax.

From a tax perspective, Law 12/2023 represents a significant change in supply-side incentive policy. The general reduction applicable to net income from the rental of habitual residences decreases from 60% to 50%, although it may increase to 60%, 70% or 90% where certain requirements are met. The measure seeks to redirect the tax incentive towards affordability objectives, but at the same time reduces the general tax benefit previously available to all landlords. This is particularly relevant in a market in which the supply of long-term rental housing depends largely on individual private landlords.

In short, the historical evolution of the Spanish housing market shows that the measures analysed respond to successive attempts to balance tenant security, landlord profitability and housing affordability.

After the mortgage crisis, renting ceased to be a secondary option and became a necessity for broad sectors of the population. Since then, the main challenge has no longer been to stimulate demand, but to increase an affordable, stable and sufficient supply of residential rental housing in a system characterized by rigid supply, a limited public housing stock and growing demand concentrated in specific urban and tourist areas.

2.3. Regulatory instruments affecting long-term rental supply in Spain

In relation to the fiscal policies to stimulate supply, as we can see in the table, the main advantage that the landlord of habitual residence has in Spain, in general, is the expected reduction in the net returns obtained by said activity. That is, the possibility of not paying Income Tax on the total income obtained, provided that the property is used by the tenant as their main residence.

With the entry into force in January 2024 of the new reductions provided for in Housing Law 12/2023, the reduction applicable to the net income derived from the lease of a dwelling used as the tenant's habitual residence decreases, as a general rule, from 60% to 50%.

Law 12/2023 introduces the following percentages of reduction in Personal Income Tax on the net income that must be declared by owners in relation to rental income derived from the lease of a dwelling used as the tenant's habitual residence:

- 90% reduction: for contracts in stressed residential market areas where the rent has been reduced by at least 5% compared with the previous contract.
- 70% reduction: where the dwelling is leased for the first time to young people between 18 and 35 years of age in stressed residential market areas, or where the dwelling is leased to the public administration or to non-profit entities.
- 60% reduction: where the dwelling has been subject to rehabilitation or improvement works in the two years prior to the conclusion of the contract, under the terms provided for in the Personal Income Tax Regulations.
- 50% reduction: applicable, as a general rule, in any other case in which the dwelling is leased as the tenant's habitual residence. This general reduction, without additional requirements, was 60% until the entry into force of the new rules, provided that the dwelling was used as the tenant's habitual residence.
- This reform places the Spanish system within a European landscape where tax incentives for residential rentals are implemented through various mechanisms. Thus, while Spain maintains a system based on a percentage reduction of the net income obtained by the landlord from renting their primary residence, France links the Loc'Avantages scheme to a tax reduction calculated on gross rental income, conditional on rent moderation and the signing of an agreement with the ANAH (National Association of Housing Companies). Portugal, for its part, uses a different mechanism, based on reducing the tax rate applicable to rental income according to the duration of the contract.

Regarding demand, it is true that at this moment demand does not need stimuli, since it is much higher than supply. However, it does need help since the prices at which the homes are being offered are difficult to access for most of the population.

The tax incentives for demand at the state level disappeared definitively in 2015 and from that moment on, only tenants who signed their contract before January 1st, 2015, can take the deduction.

With the disappearance in 2015 of the state deduction for housing rentals provided for in personal income tax, the tax benefits for tenants depend largely on the Autonomous Community in which they are located. Many Autonomous Communities in Spain have approved tax deductions for housing tenants that usually vary depending on economic capacity, age or membership in vulnerable groups. So, the tax benefits on demand now depend on the regulatory decisions of each Autonomous Community and not the State.

Another decisive factor for the housing supply in Spain is related to the minimum duration established by the standard for rental contracts for primary residences. As can be seen in the table, this duration has gone through various phases in Spain: A first moment in the 60s and 70s in which indefinite protection was opted for in favor of the tenant, a later phase in which it was liberalized in favor of the agreement between the parties and a final phase of greater regularization. Since 2019 in Spain, the minimum duration of housing leases has been established at 5 years when the landlord is a natural person and 7 years when the landlord is a legal entity.

Finally, the table reflects the introduction of rent limitation measures. These measures may contribute to moderating rent increases in the short term. Their long-term effects on the supply of long-term rental housing are, however, less straightforward and may depend on the broader regulatory and market context. In particular, where landlords have alternative uses available for their properties, seasonal rentals, tourist accommodation, vacancy or sale, rent limitations could generate incentives to reallocate dwellings away from the conventional long-term rental market unless they are accompanied by sufficient measures to sustain supply. Economic theory has long studied the relationship between price ceilings and supply shortages (Frank, 2025; Mankiw, 2023), and a substantial empirical literature has documented such effects in a variety of institutional settings (Abel et al., 2024; Autor et al., 2014; Diamond et al., 2019; Izquierdo Llanes et al., 2026; Jenkins, 2009; Pérez García, 2026; Sims, 2007). This should not be read as a causal result derived from our empirical model, but as a potential risk requiring territorial and submarket-specific analysis.

2.4. The analysis of housing prices in Spain

Taltavull de La Paz (2003) states residential price levels in Spain vary broadly among markets. According to this author, prices depend on market characteristics such as vacancy level, land availability, construction supply elasticity to respond to high or low speed to changes on the demand, as well as potential for economic growth, industrial and services activities located inside urban areas. From a demand side, she highlights three main factors: wages, migrations and productive structure.

Banco de España (2020) studies the housing market from 2014 to 2019 and shows evidence of price increasing. One important reason is related to foreign buyers, the share of property purchased by foreign buyers has increased significantly in the last years (from 7% to 19% between 2007 and 2019).

Taltavull de La Paz (2023) also focuses on forecasting housing prices using machine learning models and spatial hedonic tools, offering insights into regional price variations. She explains housing prices in Spain by means of five fundamental variables: changes in population, income, number of mortgages, interest rates, and vacant.

Rental market prices have also risen significantly in recent years, at an even faster pace than house prices (Banco de España, 2020). These price developments in the rental market are largely in response to the sharp surge in demand, especially among young people. The Spanish Survey of Household Finances (EFF, by its Spanish abbreviation) shows a marked increase in renting among households whose head is under 35 years of age, from 24% in 2011 to 43% in 2017. Among households whose head is between 35 and 44 years of age the figure has also increased, albeit more moderately. This pattern reflects a certain degree of convergence towards the core euro area countries. The higher demand for rental housing among young people is in response to various factors relating to changes arising following the crisis that began in 2008, both in the labor and the credit market, and in taxation on housing. Regarding the labor market for youth, data shows low wages and high unemployment rate; concerning the credit market, deposit institutions have applied more prudent credit conditions and standards; and as far as taxes are concerned, the changes to taxation on housing introduced after the financial crisis made renting more attractive than

home buying. Thus, the tax credit for purchase of main residence was finally eliminated from 1 January 2013. In addition, taxes on both homeownership and house purchases were raised: specifically, in the first case, property tax (IBI, by its Spanish abbreviation); and in the second, transfer tax (ITP, by its Spanish abbreviation) in some regions of Spain and VAT nationwide. According to these conditions, it is difficult for young people to consider buying a home.

In addition to the sharp increase in rental demand by young people, the surge in rental market prices has also been driven by certain supply-side factors. First, the Spanish rental market is relatively small, in a setting in which the share of homeownership has traditionally been very high in comparison with other European countries. The Spanish rental market is dominated by retail investors. However, in recent years, the share of institutional investors, including listed real estate investment companies (SOCIMIS) and specialized investment funds, has increased.

Second, technological progress and widespread internet use have led to the emergence of digital platforms that have opened up the traditional tourist apartment market to other dwellings that were being used for residential purposes or were empty. This behavior is observed in cities such as Madrid and Barcelona, among others. The expansion of this activity is explained by the higher returns expected from tourist rentals compared with residential rentals.

Other authors, however, have put the stress on regulation. For instance, Nasarre-Aznar and Molina-Roig (2017) point out the Spanish rental market only meets temporary housing needs, and it is very atomized and lacks professionalism. It does not provide an adequate legal framework to fulfil the parties' aspirations (i.e. stability, affordability and flexibility for tenants; profitability, security and guarantees to landlords).

De Jorge-Huertas and De Jorge-Moreno (2021) analyze the long-term effects of housing market deregulation in Spain over the period 1977–2019. Using a historical time-series approach, the authors examine how successive regulatory and deregulatory reforms influenced house price dynamics. Their findings indicate that deregulation measures tended to intensify price growth by stimulating housing demand and easing market constraints, whereas subsequent regulatory interventions only partially mitigated these effects. The study concludes that institutional and regulatory changes constitute key structural drivers of housing price fluctuations, highlighting that the design of housing policies can generate persistent effects on market behavior beyond the influence of conventional macroeconomic fundamentals.

Gonzalez-Morales et al. (2021) joins demand and supply factors. They show that an increase in the number of tourist apartment vacancies increases residential rental prices, while an increase in the rate of foreclosure evictions causes residential rental prices to fall. In the same line of research, Álvarez Ondina (2024) indicates that the combination of rapid population growth and the gradual decline in interest rates, coupled with the lack of supply, is driving up home prices (rental and ownership) particularly in the new housing market and in the most buoyant regions, as well as in those that are most popular with tourists. Montoriol Garriga (2024) also states that strong demand and short supply shape Spain's real estate sector. She points out that the production of new housing will continue to be weighed down by several structural factors, such as the lack of land earmarked for development and the shortage of skilled labor. In the absence of a significant increase in the housing supply in the coming years, the gap between supply and demand will steadily widen, and this could apply further pressure on home prices, especially in areas that are experiencing more rapid demographic growth. She also states that the increase of foreigners who visit Spain for relatively long periods is putting pressure on prices in some cities such as Madrid, Barcelona, Alicante, Balearic Islands, Canary Islands, Malaga. These dynamics are exacerbating the housing affordability problems that are affecting certain groups, such as young people.

Finally, Kholodilin (2025) provides one of the most comprehensive reviews of the empirical evidence on the effects of government intervention in housing markets. Based on a meta-study of 886 empirical

studies covering 95 countries, the author analyses the impact of 57 different policy instruments, including rent control, housing allowances, social housing, land-use regulations, taxation, macroprudential measures, and monetary and fiscal policies. The findings show that housing policies generate both intended and unintended consequences, often involving significant trade-offs between affordability, housing quality, market efficiency, and price stability. Moreover, the study highlights that the simultaneous implementation of different policy instruments may produce offsetting or reinforcing effects, suggesting that housing outcomes depend not only on individual measures but also on the overall policy mix adopted by governments.

3. Data and methodology

3.1. Data

Our research made use of monthly non-seasonally adjusted data extracted from the Spanish Statistical Office. The time series started in January 1962 and ended in January 2024 with the number of observations amounting to 745. The selected variable to measure the Spanish rental housing prices has been the Consumer Price Index – Housing Rentals (Year over Year). Authors such as [Cotton and O'Shea \(2023\)](#) and [Dias and Duarte \(2019\)](#) have used this indicator before to analyze the housing rental market.

[Fig. 1](#) illustrates the evolution of rental housing inflation in Spain between 1962 and 2024, together with the main legislative reforms affecting the rental market. Rental price inflation was particularly high during the 1970s and early 1980s, before gradually moderating over subsequent decades. The figure also identifies the principal regulatory milestones, including reforms related to lease duration, fiscal incentives for landlords and tenants, and recent rent update limitations. These legislative changes provide the basis for defining the sub-periods analysed in the empirical section to assess whether regulatory interventions altered the persistence and long-run dynamics of rental prices.

Two considerations regarding the definition of the sub-periods are in order. First, the dates used to delimit them correspond to the entry into force of each measure, which may differ from the date of publication of the corresponding legal act; to the extent that economic agents adjust their behavior in anticipation of a reform, any resulting change in the dynamics of rental prices would be attributed to the preceding sub-period, so that our procedure is conservative in this respect. Second, our partition, derived from the legislative milestones summarised in [Table 1](#), is consistent with the literature that measures the intensity of

rental market regulation rather than the mere occurrence of legislative acts ([Andrews et al., 2011](#); [Kholodilin, 2020](#); [Malpezzi & Ball, 1993](#); [Weber, 2017](#)): the long-term indices of rent control and eviction protection available for Spain register their principal changes at dates that coincide closely with the reforms considered here.

3.2. Methodology

3.2.1. Unit roots

Statistics and econometrics use single or multi-equation regression models on time series to model variables and understand interrelationships ([Box & Jenkins, 1970](#)).

But it's crucial to comprehend how these time series behave before using these kinds of models. In order to deal with the series, one must first determine if the process is stationary $I(0)$ when it does not have a unit root, or non-stationary $I(1)$ when it does (see to [Nelson & Plosser, 1982](#)).

Therefore, we utilize the conventional unit root test to ascertain each time series' integration order. The most often used and well-liked unit root test is the Dickey-Fuller test (see to [Dickey & Fuller, 1979](#)). If a non-systematic component in Dickey-Fuller models is autocorrelated, an enhanced Dickey-Fuller test is developed ([Dickey & Fuller, 1981](#)). Many different tests have been considered because of their increased power. Some of these are [Phillips \(1987\)](#) and [Phillips and Perron \(1988\)](#), who used an estimate of the spectral density u_t at zero frequency that was non-parametric. [Kwiatkowski et al.'s \(1992\)](#) technique provides the foundation for the analysis of the deterministic trend.

3.2.2. ARFIMA (p, d, q) model

After assessing each time series' integration sequence using standard unit root tests, we employ a more advanced method. According to the idea put forth by [Adenstedt \(1974\)](#), [Granger and Joyeux \(1980\)](#), [Granger \(1980, 1981\)](#), and [Hosking \(1981\)](#), the number of differences can be any point on the real line, making it fractional $I(d)$, rather than always having to be an integer value in order to achieve stationarity $I(0)$.

Fractional differencing is used to make a time series stationary $I(0)$. Because of its increased power under fractional alternatives, this approach is more sophisticated than unit root testing (see [Diebold & Rudebush, 1991](#); [Hassler & Wolters, 1994](#); [Lee & Schmidt, 1996](#)).

The capacity to identify and capture persistence in the data, a word used to describe circumstances in which observations are widely spaced in time but exhibit strong correlations, is another characteristic of $I(d)$ models.

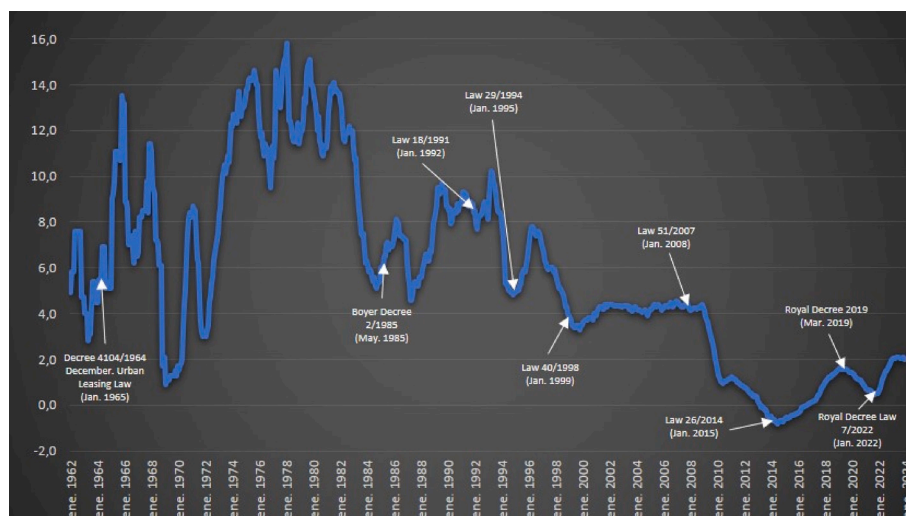


Fig. 1. CPI Housing Rentals (YoY) in Spain.

Source: Own elaboration from INE

Table 1

Regulatory evolution of tax incentives for supply and demand and regulations on the duration of contracts for leasing primary residences and on price limitations.

Time period	FISCAL MEASURES ON THE SUPPLY SIDE. Tax modifications that affect the homeowner	FISCAL MEASURES ON THE DEMAND SIDE. Tax modifications that affect the tenant	OTHER REGULATORY MODIFICATIONS. Minimum duration of lease contracts and limitation of rental prices
1965 (January)			Decree 4104/1964 December. Urban Leasing Law. (Ley de Arrendamientos Urbanos) Indefinite duration of lease contracts
1985 (May)			Boyer Decree 2/1985 of April 30. (Decreto Boyer 2/1985) The forced extension of the lease in favor of the tenant is eliminated and it is said that the duration of the lease will be the one agreed upon by the parties.
1992 (January)		Law 18/1991 (Ley 18/1991 del Impuesto sobre la Renta de las Personas Físicas) provides for a deduction for renting a habitual residence of 15%, with a maximum of 100,000 pesetas annually, of the amounts paid in the tax period for this concept.	
1995 (January)			Law 29/1994, of November 24. (Ley 29/1994 de Arrendamientos Urbanos) Lease duration up to 5 years.
1999 (January)		The deduction for renting a habitual residence disappears (Law 40/1998) (Ley 40/1998 del Impuesto sobre la Renta de las Personas Físicas) Although a transitional regime is established for those who had rented their home before April 1998.	
2003 (January)	Law 46/2002 of December 18. (Ley 46/2002, de 18 de diciembre, de reforma parcial del Impuesto sobre la Renta de las Personas Físicas) A reduction of 60% of the net income is approved for		

Table 1 (continued)

Time period	FISCAL MEASURES ON THE SUPPLY SIDE. Tax modifications that affect the homeowner	FISCAL MEASURES ON THE DEMAND SIDE. Tax modifications that affect the tenant	OTHER REGULATORY MODIFICATIONS. Minimum duration of lease contracts and limitation of rental prices
	owners of properties rented out as their primary residence.		
2007 (January)	Law 35/2006 of November 28. (Ley 35/2006 del Impuesto sobre la Renta de las Personas Físicas). A 100% reduction in income from renting a habitual residence is introduced, provided that the tenant is between 18 and 35 years old.		
2008 (January)		January 2008 (Law 51/2007, of December 26, General State Budgets). (Ley 51/2007 de Presupuestos Generales del Estado). The government resurrects the state deduction, after ten years. A deduction of 10.05% in personal income tax for housing rental is approved at the state level (meeting a series of requirements). In January 2008 (Royal Decree 1472/2007, of November 2) the Emancipation Income comes into force. A benefit of 210 euros per month to pay the rent for the habitual residence for a maximum of four years for young people between 22 and 30 years old, who have a source of income of less than 22,000 euros gross per year.	
2012 (July)		The basic emancipation income disappears.	
2013 (June)			Law 4/2013, of June 4, on flexibility and market promotion measures of housing rental. (Ley 4/2013,

(continued on next page)

Table 1 (continued)

Time period	FISCAL MEASURES ON THE SUPPLY SIDE. Tax modifications that affect the homeowner	FISCAL MEASURES ON THE DEMAND SIDE. Tax modifications that affect the tenant	OTHER REGULATORY MODIFICATIONS. Minimum duration of lease contracts and limitation of rental prices
			de 4 de junio, de flexibilidad y medidas de fomento del mercado del alquiler de vivienda). Set the minimum duration at 3 years. A 40% bonus on the rental income of a habitual residence of 40% is approved in general, provided certain requirements are met.
2015 (January)	Ley 26/2014. Law 26/2014. (Ley 26/2014, de 27 de noviembre, por la que se modifican la Ley 35/2006, de 28 de noviembre, del Impuesto sobre la Renta de las Personas Físicas). The 100% reduction for owners who rent their habitual residence to those under 35 years of age disappears. Therefore, landlords who receive rental income under these circumstances will not have to pay income tax on it. This is therefore a reduction of the tax burden, since the owner will not pay Income Tax on the income obtained from the rental of a property intended as the tenant's main residence.	January 2015. The 10.05% rental deduction for tenants disappears.	
2018 (December)			Royal Decree-Law 21/2018 of December 14. (Real Decreto-ley 21/2018, de 14 de diciembre, de medidas urgentes en materia de vivienda y alquiler). Extends the duration of leases to 5 years + 3 extensions. If it is a legal entity lessor, 7 years + 3 extension. The new housing plan maintains the bonus on the rental income of habitual residence of 40% in

Table 1 (continued)

Time period	FISCAL MEASURES ON THE SUPPLY SIDE. Tax modifications that affect the homeowner	FISCAL MEASURES ON THE DEMAND SIDE. Tax modifications that affect the tenant	OTHER REGULATORY MODIFICATIONS. Minimum duration of lease contracts and limitation of rental prices
2019 (January and March)			general, if certain requirements are met. On January 22, 2019 (resolution of January 22, 2019, of the Congress of Deputies) Royal Decree-Law 21/2018 (Real Decreto-ley 21/2018, de 14 de diciembre, de medidas urgentes en materia de vivienda y alquiler) is repealed and the duration is set at 3 years + 1 extension. Subsequently, on March 6, 2019 (Royal Decree 2019) (Real Decreto-ley 7/2019, de 1 de marzo, de medidas urgentes en materia de vivienda y alquiler), a new reform extends the duration again to 5 years + 3 extension or 7 + 3 if the lessor is a legal entity. These deadlines remain in force in 2024.
2022 (March and January)		Royal Decree 42/2022 (Real Decreto 42/2022, de 18 de enero, por el que se regula el Bono Alquiler Joven y el Plan Estatal para el acceso a la vivienda 2022–2025). comes into force in March 2022. A 50% bonus on the rental income of primary residences is approved in general, provided certain requirements are met.	Royal Decree Law 7/2022 (Real Decreto-ley 6/2022, de 29 de marzo, por el que se adoptan medidas urgentes en el marco del Plan Nacional de respuesta a las consecuencias económicas y sociales de la guerra en Ucrania) entered into force on January 18. The updating of rental income is limited to 2%.
2023			The limit on updating rental income at 2% continues until December 31.
2024 (January)	Law 12/2023. (Ley 12/2023, de 24 de mayo, por el derecho a la vivienda). New reductions in personal income tax on income from renting a primary residence:		Law 12/2023. (Ley 12/2023, de 24 de mayo, por el derecho a la vivienda). The limit on updating rental income is extended to 3%.

(continued on next page)

Table 1 (continued)

Time period	FISCAL MEASURES ON THE SUPPLY SIDE. Tax modifications that affect the homeowner	FISCAL MEASURES ON THE DEMAND SIDE. Tax modifications that affect the tenant	OTHER REGULATORY MODIFICATIONS. Minimum duration of lease contracts and limitation of rental prices
	-General reduction of 50%– 60% if rehabilitation works have been carried out - Reduction of 70% when the home is rented for the first time to tenants aged between 18 and 35 years -90% reduction when the owner lowers the rental price by 5% in relation to the price of the last rental.		

Note: the dates shown correspond to the entry into force of each measure, which may differ from the date of publication in the Boletín Oficial del Estado (BOE); the official Spanish denomination of each legal act is provided alongside its English description. Possible anticipation effects arising from this distinction are discussed in Section 3.1.

Source: Own elaboration/The original names of the standards in Spanish have been introduced in parentheses.

The ARFIMA (p, d, q) model is the fractional integrated approach that we employ in this research paper. The mathematical notation for this model is:

$$(1 - L)^d x_t = u_t, t = 1, 2, \quad (1)$$

Eq. (1) denotes the time series with an integrated process of order d ($x_t \approx I(d)$), d denotes any real number, L is the lag-operator ($Lx_t = x_{t-1}$) and u_t denotes $I(0)$, the covariance stationary process with a positive and finite spectral density function at zero frequency and a weak form of time dependence. We may therefore say that x_t is $ARMA(p, d, q)$ if u_t is $ARMA(p, q)$.

Eq. (1) returns the binomial expansion for the polynomial $(1 - L)^d$, where x_t for every real d depends on its entire history in addition to a finite number of previous observations. Therefore, a larger value of d denotes a stronger degree of correlation between the series' observations.

The value of the parameter d determines which cases we can distinguish between.

Table 2 presents a summary of the various outcomes of d .

The degree of long-memory and fractional integration can be estimated using a variety of methods (Geweke & Porter-Hudak, 1983; Phillips, 1999, 2007; Sowell, 1992; Robinson, 1994, 1995a, 1995b; etc.). On the other hand, we use the Akaike information criterion (AIC) (Akaike, 1973) and the Bayesian information criterion (BIC) (Schwarz, 1978) to select the best ARFIMA model.

Table 2
Interpretation of the results of d for the ARFIMA model.

$d = 0$	x_t process is short memory
$d > 0$	x_t process is long memory
$d < 0.5$	x_t is covariance stationary
$d \geq 0.5$	x_t is nonstationary
$d < 1$	x_t is mean reverting
$d \geq 1$	x_t is not mean reverting

4. Results

The first step of this research involves conducting a thorough stationarity analysis of housing rental prices in Spain, spanning the period from January 1962 to January 2024. To this end, we employ three widely used statistical tests: the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. These methodologies enable us to ascertain whether the time series is stationary ($I(0)$) or non-stationary ($I(1)$), a distinction of paramount importance in econometric modeling. The assumption of stationarity is critical, as non-stationary series can produce misleading parameter estimates, erroneous model interpretations, and spurious conclusions about the relationships between variables. Additionally, non-stationary data often reflects stochastic or deterministic trends that obscure the underlying economic processes.

The results for the original time series, as presented in Table 3, demonstrate predominantly non-stationary behavior ($I(1)$). The ADF and PP tests consistently fail to reject the null hypothesis of a unit root, while the KPSS test confirms non-stationarity with test statistics exceeding the critical values. This indicates that housing rental prices in Spain exhibit stochastic trends, where deviations from the mean are not self-correcting over time. As a result, future price values depend not only on previous observations but also on the accumulation of past random shocks. This stochastic nature of the trend implies that policies aimed at stabilizing rental prices face significant challenges, as the system lacks inherent corrective mechanisms.

To address the non-stationarity, we differentiate the series and analyze the first differences. The resulting series exhibits $I(0)$ stationarity, as evidenced by the rejection of the null hypothesis in the ADF and PP tests and the non-rejection of the null hypothesis in the KPSS test. This confirms that the time series achieves stationarity after first differencing, consistent with theoretical expectations of integration order.

To assess the effect of government interventions on rental prices, we divide the dataset into sub-periods corresponding to distinct regulatory regimes. The analysis considers policies aimed at influencing the supply and demand sides of the housing market in Spain.

Supply-side policies, analysed across the periods 2003–2007, 2007–2015, and 2015–2024, show no consistent evidence of achieving long-term price stabilization. While the 2007–2015 period presents marginal indications of stationarity in the ADF test, this result is not corroborated by other tests. These findings suggest that supply-side interventions, such as increasing housing stock, have limited and short-lived impacts, constrained by structural inefficiencies and market rigidities.

In contrast, demand-side policies exhibit a more pronounced but temporary stabilizing effect. During 1998–2008, rental prices demonstrate stationarity across all tests, likely driven by targeted measures aimed at reducing speculative demand and indirect expenditures. However, the effects dissipate after 2008, with no evidence of sustained stabilization. This indicates that while demand-side interventions can be effective in specific macroeconomic contexts, their long-term impact is insufficient in addressing stochastic price trends.

These findings suggest that price control policies and regulations targeting the supply and demand of rental housing have failed to achieve consistent and sustained stabilization of prices over the long term. However, temporary effects are evident in specific periods, indicating limited short-term effectiveness of such interventions within certain macroeconomic contexts.

The next step in this research paper is to allow fractional differentiation using ARFIMA (p, d, q) models, thereby providing additional flexibility in the dynamic definition of the model. We use this technique to analyze the persistence of rental housing prices for the case of Spain, as the unit root methods have lesser power under fractional alternatives.

The Bayesian information criterion (BIC; Schwarz, 1978) and the Akaike information criterion (AIC; Akaike, 1973) are used to determine the appropriate AR and MA ordering for the models. Based on Sowell's

Table 3

Unit root tests for housing rentals in Spain (YoY%).

	ADF			PP		KPSS	
	(i)	(ii)	(iii)	(ii)	(iii)	(ii)	(iii)
Original data							
Jan 1962–Jan 2024	−1.2396	−1.8017	−2.857	−2.1042	−3.3116	6.0683	0.9361
Sub-samples related to regulations affecting supply							
Jan 2003–Jan 2007	0.2136	−1.9579	−2.8222	−1.47	−2.0503	0.5307	0.2214
Jan 2007–Jan 2015	−2.1424*	−1.1379	−1.4917	−0.8984	−1.1045	2.3672	0.2869
Jan 2015–Jan 2024	0.2662	−1.1984	−1.5686	−1.3028	−1.3832	1.4742	0.285
Sub-samples related to regulations affecting demand							
Jan 1991–Jan 1998	−1.1985	−1.7152	−2.0164	−1.3124	−1.7054	1.0929	0.1985
Jan 1998–Jan 2008	−1.386	−3.6013*	−4.2842*	−4.0125*	−4.5492*	0.2207*	0.1427*
Jan 2008–Jan 2015	−2.327*	−1.5826	−1.4013	−1.3639	−0.9341	1.9782	0.3378
Jan 2015–Jan 2024	0.2662	−1.1984	−1.5686	−1.3028	1.3832	−1.4742	0.285

* Denotes significance level at the 5% level

(1992) maximum likelihood estimator of various ARFIMA (p , d , q) specifications for all combinations of p , $q < 2$, Table 4 displays the estimates of the AR and MA components for each time series in addition to the fractional differencing parameter d .

The advantages of using the ARFIMA (p , d , q) model over any Unit Root tests are several: 1) They allow fractional values for d providing greater flexibility in how the series is modeled; 2) They capture long-term dependence; 3) They offer a complete framework for modeling and predicting time series.

The point estimates of d lie below unity in all subsamples except that corresponding to 1998–2008. In four of them, however, the confidence interval includes unity, so that the null of a unit root cannot be rejected. In all cases the evidence points to a long memory process in which shocks to rental prices display highly persistent effects.

For the original data, $d = 0.54$ suggests that shocks to rental prices have long-lasting effects but are not permanent. The identification of the process as $I(d)$ confirms fractional integration, implying a degree of mean reversion over the medium to long term. This behavior suggests that while rental prices eventually revert to their historical trend following shocks, the adjustment process is notably slow, reflecting resilience rather than immediate stabilization.

The results from supply-related subsamples (2003–2007,

Table 4

Results of long memory tests.

Data analysed	Sample size	Model selected	d	Std. error	Interval	I (d)
Original data						
Jan 1962–Jan 2024	745	ARFIMA (2, d, 2)	0.54	0.060	[0.44, 0.63]	I (d)
Sub-samples related to regulations affecting supply						
Jan 2003–Jan 2007	49	ARFIMA (2, d, 2)	0.75	0.166	[0.48, 1.03]	I (1)
Jan 2007–Jan 2015	97	ARFIMA (1, d, 0)	0.64	0.114	[0.45, 0.82]	I (d)
Jan 2015–Jan 2024	109	ARFIMA (2, d, 0)	0.88	0.174	[0.60, 1.17]	I (1)
Sub-samples related to regulations affecting demand						
Jan 1991–Jan 1998	85	ARFIMA (0, d, 2)	0.91	0.133	[0.69, 1.12]	I (1)
Jan 1998–Jan 2008	121	ARFIMA (0, d, 0)	1.19	0.065	[1.08, 1.30]	I (1)
Jan 2008–Jan 2015	85	ARFIMA (1, d, 0)	0.65	0.115	[0.46, 0.84]	I (d)
Jan 2015–Jan 2024	109	ARFIMA (2, d, 0)	0.88	0.174	[0.60, 1.17]	I (1)

2007–2015, 2015–2024) reveal that the fractional differencing parameter (d) is consistently high but remains below 1 ($d < 1$), indicating a persistent long memory process. During 2003–2007, $d = 0.75$ reflects significant persistence of shocks, while 2007–2015 shows a moderate decline to $d = 0.64$, suggesting some reduction in the persistence of price changes during this period. However, 2015–2024 records $d = 0.88$, indicating a resurgence in persistence. These findings imply that supply-side regulations, such as promoting housing stock or incentivizing construction, failed to effectively mitigate the persistence of shocks or stabilize rental prices in the long term. This may be attributed to structural inefficiencies in the housing market and the inability of supply-side measures to address demand dynamics comprehensively.

Demand-side regulatory measures exhibit similar challenges in reducing price persistence. In 1991–1998, $d = 0.91$ indicates strong persistence of shocks, while the 1998–2008 period stands out with $d = 1.19$, showing an increase in persistence. This is likely linked to the abolition of the tax deduction for renting a primary residence (RDL 1998/2866), which redirected housing demand and intensified long memory behavior. During 2008–2015, $d = 0.65$ suggests a moderate decline in persistence, but 2015–2024 reflects $d = 0.88$, similar to supply-side results. These findings indicate that demand-side policies were largely ineffective in sustainably stabilizing rental prices, as shocks continued to exhibit prolonged effects.

Both supply- and demand-side regulations show limited success in reducing the persistence of shocks to rental prices. While temporary reductions are observed in certain periods, such as 2007–2015, neither approach achieved sustained stabilization, with long memory processes persisting across most subsamples. This underscores the need for more integrated and targeted policy frameworks to address the structural dynamics of rental markets.

The results are broadly consistent with those reported by De Jorge-Huertas and De Jorge-Moreno (2021), who argue that institutional and regulatory reforms constitute important drivers of housing market dynamics, although their effects are neither uniform nor sufficient to permanently alter long-run price trajectories. While their study focuses on house prices and concludes that deregulation episodes tended to accelerate price growth whereas subsequent interventions only partially mitigated these effects, our findings for the rental market reveal a similar pattern: successive fiscal and contractual reforms generated only temporary changes in price dynamics without modifying the underlying persistence of rental prices. This suggests that regulatory reforms, irrespective of whether they are expansionary or interventionist, are unable to overcome the structural imbalance between housing supply and demand in Spain. Our evidence also reinforces the conclusions of Kholodilin (2025), whose meta-study highlights that housing policies frequently produce intended and unintended effects simultaneously and that their effectiveness depends on the interaction of multiple policy

instruments rather than on isolated measures. The persistence detected through the ARFIMA models indicates that fragmented regulatory interventions are insufficient to stabilize rental prices in the long run, supporting Kholodilin's argument that only comprehensive policy packages combining fiscal incentives, supply expansion, social housing and appropriate tenant protection are likely to generate durable improvements in housing affordability.

4.1. Robustness

As a robustness check, and in order to ensure that our estimates of d are not driven by the parametric specification adopted for the short-run dynamics, we re-estimate the order of integration using the parametric testing procedure of Robinson (1994) under two alternative specifications for the disturbance term: white noise and the exponential spectral model of Bloomfield (1973), each estimated under the three standard configurations of deterministic terms (no regressors, an intercept, and an intercept with a linear time trend). We complement this with the semiparametric local Whittle estimator of Robinson (1995a), applied to the first-differenced series for a range of bandwidths, which imposes no parametric structure whatsoever on the short-run component; for the original data, the estimates are 0.97, 0.66, 0.87 and 1.08 for $m = T^{0.4}$, $T^{0.5}$, $T^{0.6}$ and $T^{0.7}$, respectively. Table 5 reports the results of the Robinson (1994) procedure. The estimates are, if anything, higher than those reported in Table 4: once the autoregressive components of the ARFIMA specifications are removed, the estimated orders of integration lie at or above unity in most samples, and the unit-root null cannot be rejected in any of them. The only exception is the 2003–2007 subsample under Bloomfield disturbances, where the short span of the series (49 observations) makes the separate identification of the long-memory parameter and the short-run component particularly difficult. The qualitative conclusion is therefore not merely robust to the specification of the short-run dynamics but reinforced by it: shocks to Spanish rental prices display very high persistence, with little or no evidence of mean reversion, and this property holds across every regulatory regime considered.

A final caveat concerns the most recent measure examined. Our sample ends in January 2024 and therefore contains only a small number of observations following the entry into force of the rent limitation mechanisms introduced by Law 12/2023. Fractional integration techniques require sufficiently long spans to estimate the order of

integration reliably, and we consequently make no claim regarding the effect of this particular measure on either rental prices or rental supply. Its evaluation must await the accumulation of further data, and we identify it as a priority for future research in Section 5.3.

5. Conclusion and discussion

This research paper has analysed the impact of housing regulations on rental prices in Spain over the period from 1962 to 2024, with a particular focus on fiscal policies and contract regulations using fractional integration techniques.

5.1. Discussion: regulatory episodes and the persistence of rental prices

Before drawing the main conclusions, this subsection reads the estimates reported in Section 4 against the historical and institutional framework presented in Section 2.2, in order to make explicit the connection between each regulatory episode and the persistence properties of rental prices.

Over the full sample, the estimated order of integration ($d = 0.54$ under the ARFIMA specification, and at or above unity under the robustness specifications of Section 4.1) indicates that shocks to Spanish rental prices dissipate extremely slowly, if at all. This finding spans the two polar regimes described in Section 2.2: the indefinite tenant protection of the 1964 Urban Leases Act and the full liberalisation of contract duration introduced by the 1985 Boyer Decree. Two diametrically opposed regulatory philosophies thus bracket the same underlying property of the series, which is consistent with the evidence in De Jorge-Huertas and De Jorge-Moreno (2021) that regulatory and deregulatory episodes alike altered the trajectory of prices without modifying their long-run dynamics, and with the diagnosis of Nasarre-Aznar and Molina-Roig (2017) that the Spanish rental framework has historically failed to satisfy the aspirations of tenants and landlords simultaneously.

The 1991–1998 sub-period, which contains the attempt of the 1994 Urban Leases Act to strike a balance between the two preceding models through a five-year minimum duration, displays an estimated d of 0.91. The search for contractual equilibrium, whatever its distributional merits, is not associated with any reduction in the persistence of rental price shocks.

The 1998–2008 episode deserves particular attention, as it is the only one in which a fiscal reform is visibly associated with a change in the

Table 5
Robustness: estimates of d under alternative specifications (Robinson, 1994 test).

Sample	White noise disturbances			Bloomfield (1) disturbances		
	No regressors	An intercept	A linear time trend	No regressors	An intercept	A linear time trend
Original data: Jan 1962–Jan 2024	1.10 [1.05, 1.17]	1.10 [1.05, 1.17]	1.10 [1.05, 1.17]	1.15 [1.02, 1.30]	1.16 [1.03, 1.33]	1.16 [1.03, 1.33]
Sub-samples related to regulations affecting supply						
Jan 2003–Jan 2007	0.94 [0.73, 1.28]	0.87 [0.63, 1.39]	0.87 [0.62, 1.40]	0.71 [0.19, 1.31]	0.38 [0.06, 0.78]	0.29 [−0.08, 0.76]
Jan 2007–Jan 2015	1.04 [0.91, 1.24]	1.57 [1.43, 1.76]	1.57 [1.43, 1.76]	0.99 [0.78, 1.32]	1.59 [1.27, 2.02]	1.60 [1.28, 2.03]
Jan 2015–Jan 2024	1.27 [1.17, 1.42]	1.56 [1.45, 1.71]	1.56 [1.45, 1.71]	1.54 [1.28, 1.91]	1.69 [1.47, 2.00]	1.72 [1.48, 2.05]
Sub-samples related to regulations affecting demand						
Jan 1991–Jan 1998	1.02 [0.87, 1.27]	1.39 [1.20, 1.68]	1.39 [1.20, 1.69]	0.90 [0.63, 1.31]	1.15 [0.83, 1.62]	1.15 [0.83, 1.64]
Jan 1998–Jan 2008	0.90 [0.76, 1.10]	1.20 [1.10, 1.34]	1.19 [1.10, 1.32]	0.76 [0.51, 1.11]	1.44 [1.22, 1.74]	1.39 [1.21, 1.62]
Jan 2008–Jan 2015	1.05 [0.92, 1.27]	1.59 [1.46, 1.79]	1.59 [1.46, 1.79]	1.03 [0.77, 1.43]	1.70 [1.35, 2.17]	1.70 [1.32, 2.18]
Jan 2015–Jan 2024	1.27 [1.17, 1.42]	1.56 [1.45, 1.71]	1.56 [1.45, 1.71]	1.54 [1.28, 1.91]	1.69 [1.47, 2.00]	1.72 [1.48, 2.05]

Note: point estimates of d (values for which the Robinson (1994) statistic equals zero), with 95% non-rejection intervals in brackets. Bloomfield disturbances of order 1.

dynamics of the series. The abolition of the state tax deduction for tenants (approved in 1998 and effective from 1999) redirected part of housing demand towards ownership precisely at the onset of the credit-driven expansion described in Section 2.2. The standard unit root tests of Table 3 detect stationary behavior in this sub-period, while the ARFIMA estimate rises to $d = 1.19$, the highest of the whole analysis. The two results are complementary rather than contradictory: rental inflation fluctuated within a narrow band during the ownership boom, which the unit root tests read as stability, yet the shocks that did occur were fully persistent, so that the series possessed no self-correcting mechanism. In other words, the one demand-side measure that demonstrably shifted behavior did not make the rental market more resilient; it removed pressure from the rental segment while leaving its memory structure intact or even reinforced. This nuance matters for policy evaluation: apparent price stability under a given regime need not indicate that the regime has equipped the market to absorb future shocks.

The decline in persistence observed in 2008–2015 ($d = 0.65$) should be interpreted with similar caution. As documented in Section 2.2, the financial and mortgage crisis shifted residential demand towards renting for cyclical rather than regulatory reasons, and the reduction of the minimum lease duration in 2013 cannot plausibly claim credit for a moderation that was already under way. The estimate reflects the correction of the previous excesses more than the success of any intervention.

Finally, the 2015–2024 sub-period records a resurgence of persistence ($d = 0.88$) despite the return to five- and seven-year minimum durations in 2018–2019. This is the period in which, as discussed in Section 2.2, demand concentrated in large urban and tourist areas and alternative uses of housing expanded, increasing the permeability between the conventional residential segment and the seasonal and tourist submarkets (Gonzalez-Morales et al., 2021; Montoriol Garriga, 2024). Measures that operate on the terms of conventional leases alone leave these adjacent margins untouched, which may help to explain why the strengthening of tenant protection did not translate into a reduction in the persistence of rental prices.

Taken together, the episode-by-episode reading yields the answer to the research question posed in the Introduction. Across six decades and under regulatory regimes of opposite sign — indefinite protection, liberalisation, contractual rebalancing, fiscal stimulus and its withdrawal, and renewed intervention — the persistence of rental price shocks has remained essentially unaltered. The imbalance between supply and demand in the Spanish rental market is therefore structural, and fragmented interventions on individual margins have proved insufficient to correct it. In the light of Article 47 of the Spanish Constitution, the mandate to make the right to decent housing real and effective cannot be regarded as fulfilled by the mere succession of legislative measures; our evidence supports the conclusion of Kholodilin (2025) that only comprehensive policy packages, combining fiscal incentives, supply expansion, social housing and appropriate tenant protection, are likely to generate durable improvements in affordability.

5.2. Conclusions and policy implications

The findings reveal that neither supply- nor demand-side measures have consistently succeeded in stabilizing rental housing prices over the long term. Shocks to rental prices tend to exhibit a long-memory process, indicating persistent effects despite regulatory interventions.

While the fiscal measures introduced in 1999 appear to have temporarily influenced market dynamics, particularly in the demand segment, no other regulatory intervention produced a lasting effect on price stability. Policies targeting rental supply, such as tax incentives, failed to sufficiently address the rigidity in the housing market. Similarly, demand-side regulations have not significantly mitigated the price pressures caused by excessive demand.

Overall, the findings suggest that Spain's housing policies have been inadequate to ensure the constitutional right to decent and affordable

housing, as mandated by Article 47 of the Spanish Constitution.

In this regard, the lack of sustained impact from Spain's rental market regulations highlights structural deficiencies in its housing policy framework. Unlike other European countries such as France and the UK, where comprehensive approaches to incentivizing supply and ensuring tenant protections are more robust, Spain has underutilized mechanisms to address supply shortages effectively. More in detail:

Supply Incentives: Spain has not sufficiently supported the development of social housing or provided meaningful fiscal incentives and protection to encourage landlords to increase rental housing availability. Lessons can be drawn from the UK's public-private partnership models and France's social housing programs.

Tenant Protection: Despite some demand-side regulations, such as rental income limitations, affordability challenges remain acute for vulnerable groups, including young people. Measures like long-term rent stabilization policies, implemented in other European nations, could offer more security for tenants.

Integrated Policies: A more holistic approach that combines fiscal incentives, social housing development, and targeted tenant support is essential. In 2020, Spain had 2.5% of social housing with respect to the total construction in the country. The Netherlands, with 30%, is the country with the highest percentage. Collaborative efforts across government levels, private investors, and community organizations are needed to create a balanced housing market. We also identify as necessary to address market rigidity through zoning reforms and reducing bureaucratic barriers to construction.

These measures, informed by successful practices in other European contexts, could help achieve a more equitable and sustainable rental housing market in Spain.

5.3. Limitations and future research

Two limitations of the analysis should be made explicit. First, the empirical model does not estimate differentiated effects by municipality, province, Autonomous Community or stressed residential market area. This delimitation is consistent with the purpose of the study, which focuses on the State-level regulatory and tax framework affecting the supply of long-term rental housing; housing policy in Spain nonetheless has a significant territorial dimension, since the Autonomous Communities may adopt specific measures concerning housing, rental assistance, subsidised housing, tourist accommodation or the designation of stressed residential market areas, which may produce heterogeneous effects across territories. Second, as noted in Section 4, the sample contains too few observations after the entry into force of Law 12/2023 to permit any assessment of the rent limitation mechanisms it introduces.

These limitations delineate the natural extensions of this work. Future research could incorporate geographical variables and territorial regulatory factors, such as urban density, the intensity of tourist and seasonal rentals, population growth, labour-market concentration and the measures adopted by each Autonomous Community, in order to assess whether rent limitations and tax measures have heterogeneous effects across territories and whether they encourage substitution between long-term residential leases and alternative rental uses. A multivariate treatment of the determinants of rental prices within a fractionally cointegrated framework (Johansen & Nielsen, 2012) constitutes a second avenue, as consistent monthly series for the relevant covariates become available. Third, the long-term indices of rent control and eviction protection compiled for Spain (Kholodilin, 2020) open the possibility of relating the degree of persistence directly to the intensity of regulation, rather than to the occurrence of individual legislative acts. Finally, once sufficient data have accumulated, the evaluation of Law 12/2023 and of the stressed residential market areas it creates will be a priority.

CRediT authorship contribution statement

Sofía Borgia: Writing – review & editing, Writing – original draft, Validation, Supervision, Investigation, Formal analysis, Conceptualization. **Manuel Monge:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Carlos Poza:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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