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# Screening Under Regulation: How Landlords Adapt Deposits to Perceived Risk in Rental Housing Markets

This paper analyses the determinants of security deposits in residential rental contracts as a proxy for landlords' perceived adverse selection risk. Using administrative data from the Basque Autonomous Community, we estimate General Linear Models with robust errors and interaction terms capturing tenant and landlord characteristics, demographic composition, market size, and regulatory change. We pay particular attention to the regulatory change introduced by Royal Decree-Law 7/2019, which strengthened tenant protection and capped deposits. The results show that deposits are not uniformly related to demographic or contractual attributes but vary in a context-dependent manner shaped by market conditions, institutional actors, and regulation. Rather than reflecting objective risk or discrimination, deposits operate as adaptive screening devices under asymmetric information. The findings point to the limits of uniform regulation and the need for context-sensitive housing policies.

*Este artículo analiza los factores determinantes de los depósitos de garantía en los contratos de alquiler residencial como indicador del riesgo de selección adversa percibido por los propietarios. Utilizando datos administrativos de la Comunidad Autónoma Vasca, estimamos modelos lineales generales con errores robustos y términos de interacción que capturan las características de los inquilinos y los propietarios, la composición demográfica, el tamaño del mercado y los cambios normativos. Prestamos especial atención al cambio normativo introducido por el Real Decreto 7/2019, que reforzó la protección de los inquilinos y limitó los depósitos. Los resultados muestran que los depósitos no están relacionados de manera uniforme con los atributos demográficos o contractuales, sino que varían en función del contexto, determinado por las condiciones del mercado, los actores institucionales y la regulación. En lugar de reflejar un riesgo objetivo o una discriminación, los depósitos funcionan como dispositivos de selección adaptativos en un contexto de información asimétrica. Las conclusiones apuntan a los límites de una regulación uniforme y a la necesidad de políticas de vivienda sensibles al contexto.*

Artikulu honetan, berme-gordailuen faktore erabakigarriak aztertzen dira bizitegi-alokairuko kontratuetan, jabeek hautemandako hautaketa kaltegarriaren arriskuaren adierazle gisa. Euskal Autonomia Erkidegoko datu administratiboak erabiliz, maizterren eta jabeen ezaugarriak, osaera demografikoa, merkatuaren tamaina eta arau-aldaketak islatzen dituzten errore sendoak eta elkarrekintza-terminoak dituzten eredu lineal orokorrak estimatzen ditugu. Arreta berezia eskaintzen diogu 7/2019 Errege Dekretuak sartutako arau-aldaketari, maizterren babesa indartu eta gordailuak mugatu baitzituen. Emaitez erakusten dute gordailuak ez daudela modu uniformean lotuta demografia- edo kontratuezaugarriekin; aitzitik, testuinguruaren arabera aldatzen dira, merkatuaren baldintzek, eragile instituzionalek eta erregulazioak baldintzatuta. Arrisku objektibo bat edo diskriminazio bat islatu beharrean, gordailuek hautaketa-gailu moldagarri gisa funtzionatzen dute, informazio asimetriko testuinguru batean. Ondorioek erregulazio uniformearen mugak eta testuinguruarekiko sentikorrak diren etxebizitza-politiken beharra adierazten dituzte.

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**Keywords:** Rental housing market, adverse selection, security deposits, asymmetric information, rental regulation.

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## **1. INTRODUCTION**

Access to rental housing has become a central economic and social concern not only in the Basque Country or Spain, but in many European regions, particularly for vulnerable groups, such as young adults or immigrants, facing increasing labor market uncertainty. Rising housing costs, delayed emancipation, and demographic change have intensified debates around affordability, discrimination, and the effectiveness of regulatory interventions in rental markets. Understanding how landlords set contractual conditions—and how these conditions respond to

demographic pressure and regulation—is therefore essential for both academic research and policy design.

We analyse rental contracts within a principal–agent framework, focusing on adverse selection problems and the screening strategies used by landlords when tenant quality is imperfectly observable. A defining feature of rental markets is the presence of asymmetric information between landlords and prospective tenants. At the time of contract signing, landlords observe only imperfect indicators of tenant reliability, while future behavior related to payment compliance and property care remains uncertain. Economic theory predicts that, under such conditions, contractual terms are adjusted to mitigate perceived adverse selection risk rather than to reflect objective default probabilities (Akerlof, 1970; Rothschild & Stiglitz, 1976). In regulated markets, where rent levels and exclusion mechanisms are constrained, agents adapt by reallocating risk management to unconstrained contractual margins (Williamson, 2000; North, 1990), and security deposits therefore emerge as a key non-price instrument for managing uncertainty (Benjamin *et al.*, 1998; Ambrose & Diop, 2014).

Recent empirical research on rental housing markets has highlighted that landlord responses to regulation extend beyond posted rents and often operate through less visible contractual and screening margins. Reviews of rent control policies suggest that regulation may affect not only price levels but also allocation mechanisms, supply decisions, and contract design. In this context, landlords may adjust along dimensions that are less directly regulated, including deposits, guarantees, or selection criteria. There is evidence showing that while these regulations are highly effective at lowering costs for tenants in protected units, adverse trade-offs appear, such as reduced residential mobility, the deterioration of housing quality, and a decline in new construction (Kholodilin, 2024). For example, Autor *et al.* (2014), analyzing the situation of rental housing in Cambridge, Massachusetts, find evidence of chronic maintenance problems that were significantly more frequent in units subject to rent control prior to its deregulation in 1995. Diamond *et al.* (2019) find a reduction of rental housing supply by 15 percent in San Francisco (CA), as a result from converting units to owner-occupied condominiums or redeveloping buildings to exempt them from regulation.

At the same time, a growing body of literature has examined how tenant selection operates under conditions of asymmetric information, emphasizing the role of informal screening, discrimination, and context-dependent signals. Selection practices vary significantly across market segments and local

environments, and are shaped by both institutional constraints and perceived risk (Ghekiere & Verhaeghe, 2022; Weichselbaumer & Riess, 2024; Bunel & Tovar, 2024). Landlords often use signals like ethnic origin as proxies for unobserved characteristics, such as the ability to pay (Bosch *et al.* 2010). Also, they may use “documentation requirements” as a screening tool to manage perceived risk (Zanoni & Diaz, 2024).

This paper contributes to the literature by analyzing the security deposit-to-rent ratio as an indicator of contractual stringency in the Basque rental market. Using data from the *Bizilagun* dataset, a large administrative dataset covering more than 270,000 rental contracts during a period spanning from the beginning of October 2015 until September 30<sup>th</sup> 2025, we analyze the logarithmic transformation of the normalized deposits by monthly rent. This ratio is interpreted as a proxy for landlords’ perceived ex ante adverse selection risk. The paper further examines how this perceived risk varies across time, market size, contractual actors, and demographic environments, and how it is affected by the entry into force of Royal Decree-Law 7/2019. In itself, and alongside other elements of rental contracts, the security deposit has also been subject to regulatory decisions in the cited Royal Decree. Thus, it is relevant to ascertain whether this and other measures are helping to overall curb prices (i.e. the monthly rent) and other conditions in the rental market.

The remainder of the paper is organised as follows. Section 2 describes the institutional and regulatory framework governing the rental housing market in Spain and the Basque Country, with particular attention to recent legal reforms. Section 3 develops the conceptual framework, grounding the analysis in theories of asymmetric information, adverse selection, and contract design, and motivates the use of the deposit-to-rent ratio as a proxy for perceived risk. Section 4 discusses the market, legal, and individual determinants of perceived risk and presents the formulation of the research hypotheses. Section 5 presents the data, variables, and model specification, and outlines the regression framework. Section 6 provides further interpretation and discusses the results. Section 7 presents the conclusions of the study and considers the policy implications. Finally, Section 8 outlines the limitations and directions for future research.

## **2. REGULATORY AND INSTITUTIONAL FRAMEWORK OF THE RESIDENTIAL RENTAL HOUSING MARKET**

Recent social surveys in Spain, and in the Basque Country in particular, confirm that access to housing has become the issue that most concerns citizens. According

to the Public Opinion Barometer of the *Centro de Investigaciones Sociológicas* (CIS), housing has been identified as the main social problem in Spain, with 30.4% of respondents citing it in September 2025, surpassing traditional concerns such as employment. In the Basque Country, regional surveys indicate that between 43% and 58% of respondents consider housing to be the most important social problem, exceeding concerns about crime, immigration, or employment (DeustoBarómetro Social, 2025; Basque Government Barometer, 2025). Objective indicators, such as the high share of household income devoted to rent or mortgage payments and the growing difficulty for young people to access homeownership, reinforce this perception of a housing crisis.

As a consequence of the generalized increase in housing costs, both in homeownership and in the residential rental market, the period from 2015 to 2025 has been marked by a profound transformation of the regulatory framework governing urban leases, at national and regional levels. A major turning point occurred with the entry into force on 6 March 2019 of Royal Decree-Law 7/2019, which introduced substantial amendments to the Spanish Urban Leases Act (Law 29/1994) and reversed earlier liberalising reforms adopted in 2013. In particular, the minimum mandatory duration of contracts was extended to five years when the landlord is a natural person and to seven years when the landlord is a legal entity. Tacit renewals were strengthened, and additional guarantees that landlords may require from tenants were explicitly limited.

Subsequently, in response to the inflationary episode of 2022–2023, the central government adopted extraordinary measures to cap annual rent updates, limiting them to 2% in 2023 and 3% in 2024. A further major reform was the approval of Law 12/2023 on the Right to Housing, which introduced the concept of “stressed residential market areas” (*Zonas de Mercado Residencial Tensionado*, as originally cited in Spanish). In such areas, initial rents and renewals may be regulated, and specific obligations are imposed on large landlords.

In addition, recent regulatory developments further reinforce the relevance of this analysis. The Royal Decree-Law 8/2026 introduces an extraordinary extension of up to two additional years for rental contracts of primary residence expiring between 2026 and 2027, alongside a cap of 2% on annual rent updates. These measures, adopted in response to current economic conditions, imply a direct intervention not only on price dynamics but also on contract duration and renewal conditions. By constraining both rent adjustments and contractual flexibility, the regulation potentially shifts landlords’ incentives towards alternative margins of adjustment. In this context, the analysis of deposit-to-rent ratios becomes especially

relevant as an observable contractual mechanism through which perceived risk may be reallocated under increasing regulatory constraints.

In the Basque Autonomous Community, this framework began to be implemented in 2025 with the designation of municipalities such as Bilbao, Vitoria-Gasteiz, Donostia-San Sebastián, and Errenteria as stressed areas. In addition, from 1 January 2025 a new Reference Index for Rent Updates (IRAV) replaced the Consumer Prices Index (CPI) as the benchmark for annual rent adjustments in new contracts. Together, these reforms define a more interventionist regulatory regime aimed at containing price growth and enhancing tenant protection, with expected effects on rents, contract duration, and the behaviour of both landlords and tenants.

At the Autonomous Community level, the Basque Housing Act 3/2015 and its implementing Decree 42/2016 introduced the mandatory registration of rental contracts and security deposits through the *Bizilagun* system, thereby creating a stable administrative source for monitoring the rental market. Mandatory registration came into force on 31 March 2016, following a transitional period from 1 October 2015. The dataset used in this study therefore covers contracts registered between October 2015 and September 2025 and does not include contracts signed earlier that have already expired or remain in force.

The recent approval of the *Decree on the Urgent Amendment of Regulatory Provisions in Housing Matters*, in a session of the Council of Government of the Basque Government (21 April 2026), introduces significant adjustments to the legal framework governing residential leases in the Basque Autonomous Community. The decree amends several regulatory developments of Law 3/2015, strengthens the mechanisms applicable in designated stressed areas, and updates the eligibility criteria for public housing programmes. Taken together, these changes consolidate a more intensive and directly interventionist regulatory framework, with immediate implications for rent setting and the contractual structure of tenancy agreements.

Overall, the evolution of rental regulation, driven by sustained increases in housing prices, supports the view that access to rental housing constitutes a complex interaction between supply and demand characterised by coordination problems, incentive misalignments, and informational frictions, as emphasised by the New Institutional Economics (Williamson, 2000; North, 1990). The analytical framework adopted in this paper therefore conceptualises rental contracting as a principal-agent selection process under asymmetric information.

### 3. CONCEPTUAL FRAMEWORK: PERCEIVED ADVERSE SELECTION RISK, ASYMMETRIC INFORMATION, AND THE DEPOSIT-TO-RENT RATIO

Rental housing contracts are formed under conditions of asymmetric information between landlords and prospective tenants. At the time of contract signing, landlords observe only imperfect signals of tenant quality—such as income documentation, employment status, or prior rental history—while key dimensions of future behaviour, including payment compliance, care of the dwelling, or opportunistic conduct, remain unobservable. This setting corresponds closely to the principal–agent framework, in which a principal delegates the use of an asset to an agent whose type cannot be perfectly observed *ex ante* (Jensen & Meckling, 1976).

In this context, the primary contractual challenge faced by landlords is one of adverse selection, rather than moral hazard. Adverse selection arises prior to contract formation, when landlords must select among heterogeneous tenant types without full information about their risk profile. While moral hazard concerns post-contractual behaviour and is typically addressed through monitoring, sanctions, or contract enforcement, adverse selection is managed *ex ante* through the design of contractual safeguards. In rental markets, both rents and security deposits constitute salient *ex ante* instruments for mitigating perceived adverse selection risk (Benjamin *et al.*, 1998; Ambrose & Diop, 2014).

Security deposits function as financial guarantees, or bonding costs incurred by the tenant (the agent) to guarantee to the landlord (the principal) that they will not engage in behaviour that harms the landlord's interests (Jensen & Meckling, 1976). These are meant to limit expected losses associated with non-payment, property damage, or costly eviction processes. In regulated rental markets—where rent levels, screening practices, or exclusion mechanisms may be legally constrained—deposits become particularly important as a non-price adjustment margin. Rather than reflecting objective default probabilities, deposit requirements capture landlords' perceived risk at the moment of tenant selection (Akerlof, 1970; Rothschild & Stiglitz, 1976).

To operationalize this mechanism, this study focuses on the deposit-to-rent ratio, expressed in logarithmic form. Using the ratio, rather than the deposit level in absolute terms, allows normalization by the economic value of the contract and reduces confounding variation related to housing quality, size, location, and price levels. Conceptually, the deposit-to-rent ratio can be interpreted as a measure of the relative intensity of contractual guarantees,

analogous to loan-to-value ratios in credit markets or margin requirements in financial contracts (Benjamin *et al.*, 1998). It therefore provides a more appropriate proxy for perceived risk than the nominal deposit amount.

Since rental contracting takes place under conditions of incomplete information, we maintain that perceived risk may vary systematically with time, municipal size, some features of the contractual actors, and regulatory regimes, even in the absence of direct discrimination or objective differences in tenant quality. In the context of the pronounced rise in housing prices in Spain, and especially in the Basque Country, the regulatory framework has undergone significant changes in recent years with the explicit aim of strengthening the protection of tenants in the residential rental market.

#### **4. MARKET, LEGAL, AND INDIVIDUAL DETERMINANTS OF PERCEIVED RISK AND HYPOTHESIS DEVELOPMENT**

The perceived adverse selection risk in rental markets is not a static value; it varies based on the institutional, legal, and organisational identity of the contracting parties. Landlords cannot perfectly observe a tenant's true nature, and hence the problems they may pose as tenants once the contract is set. Rather, they behave or decide in accordance with the conjectures they form from visible features of the nature of tenants in their juridical form, taken as hints for judging their quality (Akerlof, 1970). Equally important, landlords may base their decisions conditioned by their own organizational structure.

On landlords' side, we may conjecture several factors. A landlord's organisational structure significantly influences how risk is managed. In the case of joint-stock companies, there is a separation of ownership and control (Jensen & Meckling 1976). Managers in these firms may not exercise the same "anxious vigilance" as individual owners, potentially leading to different risk thresholds or more rigid, bureaucratic screening processes to mitigate internal agency costs.

Secondly, there are effects from specialisation and monitoring. In this sense, larger organisations may have a comparative advantage in monitoring. They can invest in formal control systems and "self-selection mechanisms"—such as complex contract menus with varying price-and-quantity packages—to induce tenants to reveal their true risk profile (Rothschild & Stiglitz, 1976).

Third, it may be that individual landlords, or those individuals living in smaller communal groups often rely on personal knowledge about the tenant or his/her

character. In contrast, large-scale, organisational landlords must rely more heavily on “market statistics”, such as credit scores, or employment history to judge quality.

For its part, the tenant’s status as an individual or a legal entity changes the landlord’s risk assessment. Arguments posed by prior literature on this ground seem contradictory. On the one side, if a tenant is a legal entity with limited liability, the risk of default is shifted. This institutional trait may increase the landlord’s perceived risk because the tenant does not bear the full cost of unpaid debts in the event of failure, leading the landlord to demand higher contractual guarantees (Jensen & Meckling, 1976). On the other side, there is the reasoning that the distribution of a tenant’s wealth affects their ability to signal quality. A tenant with higher net worth can post larger hostages, or bonding expenditures (such as high security deposits), which reduces the perceived risk of opportunistic behaviour (Hoff 1994, as cited from Stiglitz 2000, on p.1458). Also, tenants from institutional backgrounds with well-audited books or credible certifications reduce information asymmetry (Akerlof, 1970; Stiglitz, 2000). Where such institutional transparency is missing, adverse selection risk increases.

Building on these ideas we formulate the following hypothesis:

H1: Perceived adverse selection risk in rental markets varies systematically with the institutional characteristics of the contracting parties, in particular with the legal and organisational nature of both tenants and landlords.

The interaction between the parties is also shaped by the broader institutional environment. A factor repeatedly stated is market size and anonymity. In large municipal markets, the lack of personal ties increases the reliance on institutional heuristics (Akerlof, 1970). Adverse selection risk becomes more context-dependent as the cost of identifying quality rises. In other words, conditions push landlords to rely on higher rents or deposits, since there is a lack of good references or knowledge about tenants, in the same manner as happens to lack of quality signals in second-hand car markets, originally referred from Akerlof (1970). Some social groups entering the allocation rent market face difficulties due to their lack of past records or good references. We may consider this is the case of young people and immigrants.

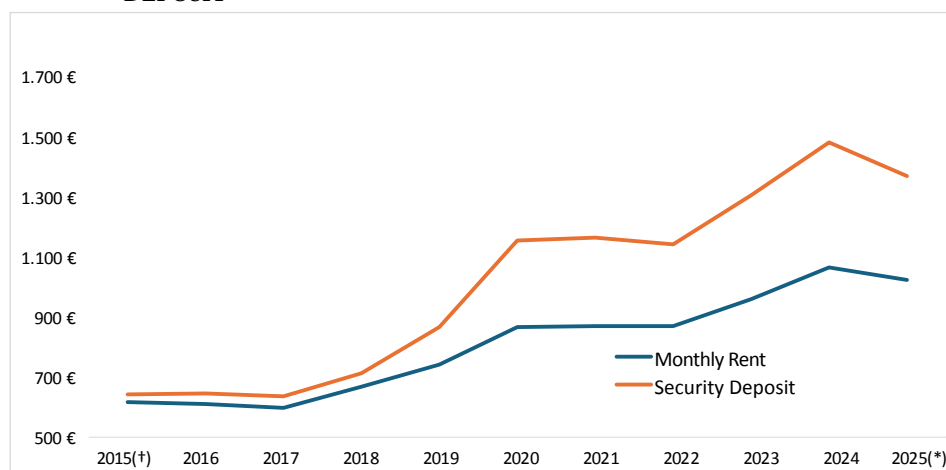
Based upon this reasoning, we pose the following hypothesis:

H2: Perceived adverse selection risk in rental markets varies with local market conditions, as reflected in municipality size and in the demographic

composition of the resident population, particularly the shares of young and foreign residents.

Thirdly, there is the influence from legal frameworks. Prior literature has focused primarily on fraud regulation and reporting requirements (Stiglitz, 2000). If regulations restrict landlords' ability to screen or price for risk (e.g., rent control), then perceived risk is translated into other contractual terms, such as more intensive deposit requirements (Benjamin *et al.*, 1998; Ambrose & Diop, 2014). Paradoxically, this may be one reason for the steep increase in deposits relative to rents as a reaction to the new legal measures introduced by Royal Decree-Law 7/2019 to protect tenants, despite the explicit two-month cap on security deposits established by this regulation (Graph<sup>1</sup>).

Graph 1. EVOLUTION OF MEAN VALUES OF MONTHLY RENT AND SECURITY DEPOSIT



(†) Since 1st March

(\*) Until 30<sup>th</sup> September

Source: Own elaboration.

According to these considerations, we formulate our third hypothesis:

H3: Changes in the legal framework governing rental contracts alter how adverse selection risk is managed in rental markets, leading to systematic

1 As shown in Graph 1, up to the beginning of 2019 the average deposit was only slightly higher than the average rent. Following the entry into force of Royal Decree-Law 7/2019, average deposit levels increased notably.

changes in contractual safeguards following the introduction of Royal Decree-Law 7/2019.

To evaluate these hypotheses, we analyse rental contract data using a sequence of nested general linear models.

## 5. DATA, VARIABLES, AND MODEL SPECIFICATION

### 5.1. Microdata used, selected variables and regression analysis methodology

The empirical analysis is based on administrative rental contract data for the Basque Country, comprising a total of 270,352 rental contracts, registered in the *Bizilagun* database from October 1<sup>st</sup> 2015 until September 30<sup>th</sup> 2025. The fields contained in the original list were: (1) Date of contract signature; (2) Monthly rate; (3) Postcode; (4) Municipality; (5) Historical Territory (Province in the BAC); (6) Type of landlord (Physical entity; Juridical entity; or Both); (7) Type of renter (with the same division); (8) Security deposit; (9) State of contract (ongoing or finished), and (10) Date of termination (for those contracts that are extinct).

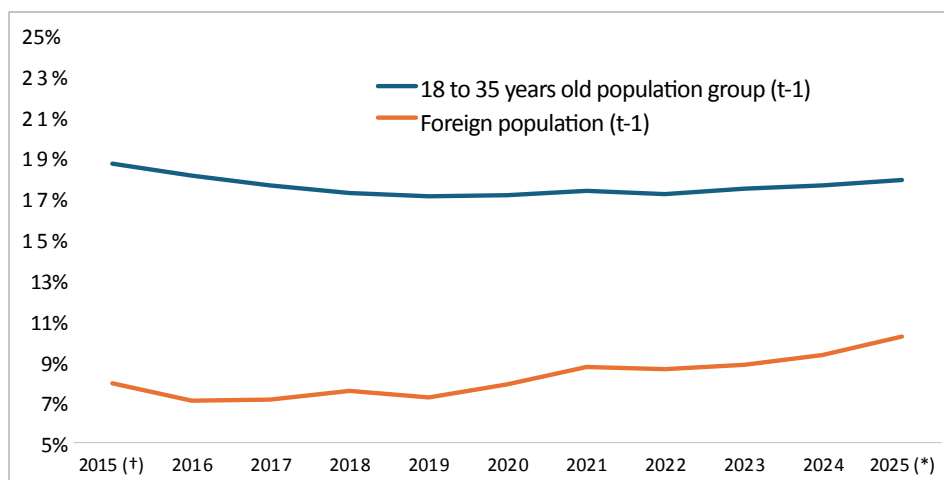
Two additional variables were constructed and merged into the dataset. First, the proportion of the population aged 18 to 35 in each municipality and year (measured at  $t-1$  relative to the contract year) was obtained from the Basque Institute of Statistics - Eustat. Second, the proportion of foreign residents in each municipality and year (also measured at  $t-1$ ) was added. Both variables were calculated as shares of the total municipal population and were merged with a one-year lag, reflecting the reporting delay in the official Eustat data.

Finally, two further variables were incorporated: a categorical indicator of municipality size with six categories<sup>2</sup>, and a dummy variable identifying contracts signed before the entry into force of Royal Decree-Law 7/2019.

Graph 2 displays the evolution of the share of the population aged 18–35 and the share of foreign residents. While the youth share remains relatively stable over time, the proportion of foreign residents increases steadily, indicating growing demographic pressure on the rental market from this group.

<sup>2</sup> Municipality size categories were constructed based on population thresholds from official municipal population data from Eustat. Monthly these groups: <2,000, 2,001–10,000, 10,001–20,000, 20,001–50,000, 50,001–100,000, and >100,000 inhabitants.

**Graph 2. EVOLUTION OF PERCENT VALUES OF 18 TO 35 YEAR OLD AND IMMIGRANT POPULATION GROUPS**



(†) Since 1st March

(\*) Until 30th September

Source: Own elaboration.

The dependent variable considered is the logarithmic transformation of the deposit-to-rent ratio. In this way, coefficients are to be read as proportional changes in contractual stringency, consistent with the idea that perceived risk and expected losses scale multiplicatively rather than linearly. Second, it aligns with expected-utility frameworks in which principals respond to uncertainty by adjusting guarantees proportionally to perceived risk. Finally, from an econometric standpoint, the logarithmic specification reduces skewness and heteroskedasticity, which are typical in large administrative datasets.

Key independent variables include municipal size, type of landlord, type of tenant, year of contract signing, and the two mentioned demographic context variables measured for each municipality and consecutive year (t-1): the proportion of residents aged 18–35 and the proportion of foreign residents. Lastly to capture regulatory change, a dummy variable is introduced for Royal Decree-Law 7/2019, coded using the exact date of entry into force (6 March 2019).

The interpretation of the Royal Decree-Law 7/2019 dummy requires caution, as the reform introduced a legally binding upper bound on the amount of security deposits and additional guarantees that landlords may require. As a result, the post-reform distribution of the deposit-to-rent ratio is censored from above.

Under these conditions, average treatment effects are expected to be attenuated, and the impact of the reform is more likely to emerge through changes in contractual segmentation rather than through a uniform shift in mean deposit levels.

The analysis is performed using a general linear model (ANOVA/GLM) framework (Kutner et al., 2005; Maxwell, Delaney, and Kelley, 2018), employing type III sums of squares and incorporating a set of first-order interactions (Shaw and Mitchell-Olds, 1993). This approach is particularly suitable for processing observational data of an administrative nature, in which multiple categorical and continuous factors interact simultaneously in determining the dependent variable. In particular, the use of GLM models allows for the estimation of adjusted marginal effects and the evaluation of the significance of structural factors and their interactions, while maintaining the interpretability of the results in applied contexts.

Furthermore, the systematic inclusion of first-order interactions reflects the contextual nature of the phenomenon being analyzed, allowing us to capture how the effect of certain variables—such as the demographic context or the regulatory framework—depends on the presence of other institutional or temporal factors. Given the large sample size, statistical inference focuses on patterns of effects and interactions and on the magnitude of the estimated coefficients, rather than on the isolated interpretation of p-values, which can be uninformative in large samples.

## 5.2. Baseline effects

Table 1 reports the results for a sequence of models explaining variation in the logarithm of the security deposit-to-rent ratio, estimated using robust (HC0) standard errors and including year and municipality size fixed effects throughout.

In the baseline specification (Model 1), tenant and landlord characteristics already account for a substantial share of the variation in required deposits. Contracts involving legal-entity tenants are associated with significantly higher security deposit requirements than contracts involving mixed tenant types (cases, for example, where a house is inherited, where there are several owners of the house and where one of them is an organization, company, city council, etc.), whereas contracts signed by individual landlords and legal-entity landlords exhibit systematically lower deposit-rent ratios relative to the mixed reference category. These effects are precisely estimated and remain stable across model specifications.

Therefore, results seem to confirm the idea that legal-entity tenants are generally perceived as bearing more risk than mixed or individual ones.

For their part, individual and to a lesser degree, legal entity landlords, seem to show a lower risk effect on the deposit-to-rent ratios, comparatively with the mixed status taken as reference.

### **5.3. Demographic composition and perceived risk**

Model 2 introduces demographic context variables capturing the share of young residents (18–35) and the share of foreign population at the municipal level, only as principal (i.e. main) effects. Both variables display strong and statistically significant main effects.

A higher youth population share is associated with a significantly higher deposit–rent ratio, suggesting that landlords demand larger ex-ante financial guarantees in municipalities where younger households are more prevalent. By contrast, a higher foreign population share is associated with lower deposit–rent ratios on average. Importantly, these main effects should be interpreted cautiously, as they represent average associations across heterogeneous local housing markets.

### **5.4. Institutional change: the 2019 rental law reform**

Model 3 incorporates a dummy variable capturing contracts signed before the entry into force of Royal Decree-Law 7/2019. The coefficient on the pre-reform indicator is negative and highly significant, indicating that deposit–rent ratios were systematically lower prior to the reform.

The introduction of a legal ceiling of two months' rent on security deposits, compresses the upper tail of the distribution after 2019, and therefore, it appears to contradict its intended effect. However, this main effect is complemented with the effects stemming from interactions with the type of landlord, type of tenant, municipality size and the relative proportion of young and immigrant populations, as set on Model 4.

### **5.5. Interaction effects and heterogeneity**

Model 4 introduces a broad set of first-order interaction terms to explore heterogeneity in the relationship between demographic context, institutional change, and contractual outcomes. Several interaction patterns emerge.

First, the effect of the youth population share varies sharply by municipality size. In small and medium-sized municipalities, higher youth shares are associated with significantly lower deposit–rent ratios, whereas this relationship weakens or reverses in large urban areas. This suggests that landlords in smaller housing markets may perceive younger populations as less risky or liquidity-constrained, while larger cities offer lower alternative screening mechanisms for this group. This result seems to confirm the idea posed in the reasoning leading to Hypothesis H2 in the sense that young tenants in smaller municipalities seem to benefit from personal ties, leading to lower deposit-to-rent ratios.

Second, this reasoning seems to run in the opposite direction for the case of immigrant tenants. Judging from a higher concentration of immigrants across municipalities, there are increases in the dependent variable across all municipality size categories other than the largest ones (four in our dataset, namely, Barakaldo, Bilbao, Donostia-St. Sebastian and Vitoria-Gasteiz), with a slight exception in the case of upper-medium municipalities (from 20,001 to 50,000 inhabitants). In the largest municipalities (reference category), immigrants face less restrictions in the form of higher deposit-to-rent ratios. This pattern is consistent with differential sorting mechanisms and varying degrees of information asymmetry across local rental markets.

Third, tenant characteristics interact meaningfully with demographic context. Contracts involving legal-entity tenants display a stronger positive association between youth share and deposit requirements, while contracts involving individual tenants show the opposite pattern. Similarly, the interaction between tenant type and foreign population share reveals that landlords differentiate sharply across tenant categories when translating demographic context into contractual safeguards. In the case of this group, the effect is of the opposite sign: while individual tenant contracts in higher immigrant population municipalities face an increase in the deposit-to-rent value, the interaction of legal entity tenants and foreign share is negative.

Finally, the interaction between the Royal Decree-Law 7/2019 pre-reform period and legal-entity tenants is negative and statistically significant, indicating that the regulatory change disproportionately constrained deposit requirements in contracts involving organizational tenants.

Taken together, the results show that security deposits function as a flexible ex-ante screening device whose use varies systematically with tenant type, local demographic composition, market size, and institutional constraints. While

average effects provide useful benchmarks, the interaction patterns reveal substantial heterogeneity. These findings support interpreting the deposit–rent ratio as a proxy for perceived adverse selection risk on the landlord side, shaped jointly by market structure and regulatory intervention.

## 6. INTERPRETATION AND DISCUSSION

This study analysed the determinants of the security deposit–to–rent ratio as a proxy for perceived adverse selection risk in the Basque rental market, explicitly accounting for demographic composition, institutional actors, market context, and regulatory change. Interpreting the deposit–to–rent ratio in this way provides a unified explanation for the empirical patterns observed. The results do not support a view in which risk is mechanically associated with specific social groups or contractual forms as a main effect. Instead, perceived risk emerges as a relational and context-dependent construct, shaped by the interaction between institutional actors, local market environments, and regulatory constraints. The absence of strong unconditional demographic effects in Model 4 does not imply that demographic context is irrelevant. Rather, it indicates that demographic characteristics matter primarily through interaction effects conditioned by market size, tenant type, and institutional change. This supports a view of rental risk as contextual rather than intrinsic, and of deposits as adaptive contractual devices rather than as fixed risk premia.

A similar logic applies to the role of regulation. Royal Decree-Law 7/2019 does not generate a uniform shift in deposit intensity across the market. Instead, it reshapes how perceived risk is translated into contractual safeguards across different institutional and market contexts. In a standard agency framework, the deposit is a signal used to achieve a separating equilibrium—distinguishing high-risk “lemons” from low-risk tenants (Macho-Stadler & Pérez-Castrillo, 2012). By limiting this signal’s intensity (the deposit-to-rent ratio), the law forces landlords to rely on other “noisy” signals, such as employment type or demographic heuristics, to form their subjective risk assessments. When RDL 7/2019 introduced formal constraints on security deposits, it limited one “price-and-quantity” dimension of the contract. However, because the underlying quality uncertainty (i.e. low reliability towards tenants) remains, rational landlords do not simply accept higher risk; they shift their defensive strategies to other margins, such as informal screening or redefining contracts based on contextual cues. This pattern is consistent with theories of adaptive behaviour under asymmetric information, according to which regulation alters the margins available for screening without

eliminating uncertainty itself. The findings therefore caution against interpreting higher deposits as evidence of direct discrimination or of objective differences in default risk. Rather, deposit variation reflects context-specific assessments of uncertainty and institutional adaptation within a regulated market environment.

Consistent with H1, the institutional characteristics of the contracting parties are systematically associated with deposit intensity, particularly on the tenant side. Certain tenant categories operate as salient institutional signals through which landlords infer contractual risk, even after controlling for demographic context and regulatory change. At the same time, landlord type plays a more limited role once contextual interactions are introduced. Apparent differences between individual and corporate landlords are largely absorbed by market size and tenant composition, suggesting that institutional context dominates ownership form in shaping risk perceptions.

In line with H2, local market conditions strongly shape how demographic composition affects perceived risk. Municipality size moderates the effects of youth and foreign population shares, indicating that demographic signals are interpreted differently across market environments. In smaller and medium-sized municipalities, higher youth shares are associated with lower deposit-to-rent ratios, whereas in large urban markets this effect weakens or reverses. Again, the baseline of this interaction effect for the case of higher youth population occurs in largest cities. One possible interpretation is that smaller markets reduce informational asymmetries through personal ties and repeated interactions, while larger markets rely more heavily on formal contractual screening. A related but more heterogeneous pattern emerges for foreign population shares. In the largest municipalities (the reference category in the interaction effect in model 4), the association is statistically neutral. In contrast, in large municipalities (second level in size) the interaction term is positive and significant, indicating higher deposit-to-rent ratios as foreign population shares increase. However, this pattern does not follow a monotonic gradient across municipality sizes: upper-medium municipalities display a negative association, while small and lower-medium municipalities again show positive effects. This non-linear pattern suggests that the interpretation of foreign population as a risk signal depends critically on local market structures, with smaller markets possibly amplifying informational frictions, while larger urban settings rely on more formalized screening mechanisms.

Consistent with H3, the introduction of Royal Decree-Law 7/2019 constitutes a significant institutional intervention that alters the mapping between tenant

characteristics and contractual safeguards without eliminating heterogeneity in risk management strategies. Interaction effects indicate that deposit requirements decrease more strongly for certain tenant categories and in larger markets, while remaining more rigid in smaller municipalities. This pattern suggests partial regulatory displacement: formal constraints limit the use of deposits, but informal or contextual screening mechanisms persist where market conditions allow them. This aligns with theories of institutional adaptation under asymmetric information, in which regulation reshapes behaviour along unconstrained margins rather than producing uniform outcomes.

From a theoretical perspective, these findings support a relational and context-dependent view of adverse selection. Deposits function not as uniform risk premium but as adaptive screening devices whose use depends on institutional context. This challenges models that treat tenant risk as an individual attribute and instead emphasises situated decision-making by landlords operating within constrained environments. From a policy perspective, the results suggest that deposit caps alone are unlikely to equalise access to housing. While Royal Decree-Law 7/2019 reduces deposit intensity on average, demographic and territorial inequalities persist, particularly outside large metropolitan areas. Complementary instruments such as public guarantees, rental insurance schemes, or targeted enforcement may therefore be necessary to prevent the re-emergence of exclusionary practices in regulated markets.

## 7. CONCLUSION

This study shows that the deposit-to-rent ratio can be meaningfully interpreted as a proxy for landlords' perceived adverse selection risk. This ratio functions as a measure of contractual guarantee intensity, analogous to a loan-to-value ratio in credit markets, which captures the weight of the protection the landlord feels is necessary. Crucially, the ratio does not measure ex-post default behaviour or actual damages; instead, it captures the landlord's subjective expectations and risk assessments at the specific moment of tenant selection (Stiglitz, 2000).

Perceived risk is neither uniform nor automatically driven by demographic composition or regulatory change. Instead, it emerges from the interaction of institutional actors, demographic context, market size, and regulatory constraints. Deposits thus function as adaptive screening devices whose use reflects situated responses to uncertainty rather than fixed assessments of tenant quality.

By integrating a conceptual framework grounded in asymmetric information with rich empirical evidence from a regulated rental market, this paper provides a nuanced understanding of how contractual safeguards are shaped by institutional and contextual heterogeneity. Importantly, the findings suggest that housing regulation cannot be evaluated solely in terms of its average effects on prices or contractual terms. Its impact depends critically on how market actors adapt to new constraints across different institutional environments. This has direct implications for policy design: effective interventions must combine formal regulation with supportive institutional mechanisms that reduce informational asymmetries and provide credible substitutes for private screening tools.

From this perspective, policies aimed at improving access to housing should not only limit exclusionary contractual practices but also actively lower perceived risk for landlords in socially desirable ways. Public guarantee schemes, targeted insurance instruments, and differentiated regulatory enforcement can play a central role in preventing vulnerable groups from being indirectly excluded, especially in smaller or less competitive markets. More broadly, the results underline the importance of designing housing policies that are sensitive to institutional diversity and market context, rather than relying on uniform regulatory solutions. Doing so increases the likelihood that regulation will achieve its intended social objectives without generating unintended adaptive responses that reproduce inequality through alternative contractual channels.

## 8. LIMITATIONS AND FUTURE RESEARCH

This study relies on the deposit-to-rent ratio as a proxy for perceived risk, capturing formal screening mechanisms but not informal practices such as reference checks, personal networks, or informal discrimination. We know from anecdotal evidence collected prior to this study that it is a widespread practice from many landlords to count on real estate agents in order to refrain themselves from having to deal with would-be-tenants directly and having to do themselves the selection process from tenants' ethnicity, origin, family status or salary checks. Unfortunately, these aspects are well beyond the possibilities that the fields taken from the *Bizilagun* database offered for our analysis, partly owing to personal data protection issues and its collusion with legal norms protecting these, and partly due to the above acknowledged quality problems with some fields of this database. In sum, the solution of these problems implies the need for further analysis with data centered on personal features, just as the discussed theory demands. Future research could combine administrative data with survey,

interview, or experimental evidence to better capture landlords' expectations, perceptions, and behavioural responses. In addition, dynamic analyses could examine how adjustment processes unfold over time following regulatory change, particularly whether initial compliance gives way to longer-term circumvention strategies or institutional learning.

It should also be acknowledged that public housing services such as *Etxebide* and *Alokabide* by the Department of Housing and Urban Agenda of the Basque Government, play important roles in the Basque rental market by administrating access to social and assisted rental housing and offering landlord guarantees and rent support programs (e.g., *Gaztelagun* or *Bizigune*). This study does not model these institutional mechanisms directly, as comprehensive data on their uptake and contractual effects at the micro level were not available for the analysed period.

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Table 1. PARAMETER ESTIMATES WITH ROBUST STANDARD ERRORS FROM NESTED LINEAR MODELS

| Variable (reference category)                   | Model 1           | Model 2           | Model 3           | Model 4 (with interactions) |
|-------------------------------------------------|-------------------|-------------------|-------------------|-----------------------------|
| Intercept                                       | 0.177*** (0.012)  | 0.070*** (0.015)  | 0.070*** (0.015)  | 0.508† (0.274)              |
| Tenant type: Individual (vs. mixed)             | 0.002 (0.003)     | 0.002 (0.003)     | 0.002 (0.003)     | 0.207* (0.104)              |
| Tenant type: Legal entity (vs. mixed)           | 0.294*** (0.004)  | 0.293*** (0.004)  | 0.293*** (0.004)  | 0.298* (0.116)              |
| Landlord type: Individual (vs. mixed)           | -0.069*** (0.011) | -0.068*** (0.011) | -0.068*** (0.011) | -0.985*** (0.265)           |
| Landlord type: Legal entity (vs. mixed)         | -0.023* (0.011)   | -0.023* (0.011)   | -0.023* (0.011)   | -0.842** (0.267)            |
| Youth population share (18–35)                  | —                 | 0.767*** (0.050)  | 0.765*** (0.050)  | -1.858 (1.424)              |
| Foreign population share                        | —                 | -0.303*** (0.026) | -0.302*** (0.026) | 0.048 (0.745)               |
| RD-Law 7/2019 = 0 (pre-reform) (ref. = 1 post-) | —                 | —                 | -0.040*** (0.003) | 0.016 (0.103)               |
|                                                 |                   |                   |                   |                             |
| Key first-order interactions (Model 4)          |                   |                   |                   |                             |
| Small municipality × Youth share                | —                 | —                 | —                 | -2.268*** (0.183)           |
| Lower-medium municipality × Youth share         | —                 | —                 | —                 | -2.198*** (0.172)           |
| Medium municipality × Youth share               | —                 | —                 | —                 | -1.503*** (0.168)           |
| Upper-medium municipality × Youth share         | —                 | —                 | —                 | -1.638*** (0.157)           |
| Large municipality × Youth share                | —                 | —                 | —                 | 1.023† (0.584)              |
| Small municipality × Foreign share              | —                 | —                 | —                 | 0.469*** (0.118)            |
| Lower-medium municipality × Foreign share       | —                 | —                 | —                 | 0.451*** (0.100)            |
| Upper-medium municipality × Foreign share       | —                 | —                 | —                 | -0.262* (0.112)             |

| Variable (reference category)                   | Model 1 | Model 2 | Model 3 | Model 4 (with interactions) |
|-------------------------------------------------|---------|---------|---------|-----------------------------|
| Large municipality × Foreign share              | —       | —       | —       | 1.381*** (0.156)            |
| Individual tenant × Youth share                 | —       | —       | —       | −0.771* (0.309)             |
| Legal-entity tenant × Youth share               | —       | —       | —       | 1.306*** (0.383)            |
| Individual tenant × Foreign share               | —       | —       | —       | 0.540*** (0.159)            |
| Legal-entity tenant × Foreign share             | —       | —       | —       | −0.885*** (0.199)           |
| Legal-entity tenant × RD-Law 7/2019 (pre)       | —       | —       | —       | −0.111*** (0.027)           |
| Small municipality × RD-Law 7/2019 (pre)        | —       | —       | —       | 0.054** (0.017)             |
| Upper-medium municipality × RD-Law 7/2019 (pre) | —       | —       | —       | 0.022** (0.007)             |
|                                                 |         |         |         |                             |
| Controls and fixed effects                      |         |         |         |                             |
| Year fixed effects                              | Yes     | Yes     | Yes     | Yes                         |
| Municipality size fixed effects                 | Yes     | Yes     | Yes     | Yes                         |
| Landlord type fixed effects                     | Yes     | Yes     | Yes     | Yes                         |
| Tenant type fixed effects                       | Yes     | Yes     | Yes     | Yes                         |
| Observations ('000s)                            | 269,89  | 269,89  | 269,89  | 269,89                      |
| R <sup>2</sup>                                  | 0.157   | 0.158   | 0.159   | 0.184                       |

† p ≤ 0.1; \* p ≤ 0.05; \*\* p ≤ 0.01; \*\*\* p ≤ 0.001; Notes (for the manuscript)  
Robust standard errors (HCO) are reported in parentheses.  
Reference categories: year 2025; municipality size category 6 (largest municipalities); landlord type "mixed"; tenant type "mixed"; RD-Law 7/2019 = 1 (post-reform).  
Source: Own elaboration.