

Solo demand, rising rents: how young singles shape urban housing costs

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Abstract

Purpose – This study investigates how the concentration of young single-person households (aged 24–35 years) influences small-unit rental prices in Istanbul’s fragmented housing market. Amid rapid demographic shifts and urban restructuring, this paper aims to provide robust causal evidence on the demand-side pressures driven by young singles in shaping rental dynamics, particularly in the increasingly competitive one-bedroom apartment segment.

Design/methodology/approach – Using a novel cross-sectional data set covering 605 neighborhoods in Istanbul, this study applies a two-stage least squares instrumental variable strategy to address endogeneity, particularly simultaneity bias. The spatially lagged share of young singles is used as an instrument. The model controls for a rich set of neighborhood-level variables, including accessibility, amenities, income, education, population structure and housing stock age.

Findings – A one-percentage-point increase in the share of young single-person households leads to a 4.2% increase in average rents for one-bedroom apartments. These effects are more pronounced in neighborhoods near employment centers, with strong transit access and lifestyle amenities. The results of this study emphasize that demographic clustering at the micro scale drives localized price inflation in the rental market and disproportionately burdens high-demand segments.

Originality/value – To the best of the authors’ knowledge, this study is among the first to causally link neighborhood-level solo living patterns to rental inflation in emerging urban contexts. This study advances housing scholarship by segmenting the market by unit size and household structure, while offering policy-relevant insights for managing affordability. The findings of this study support a targeted small-unit housing strategy that responds to evolving demographic realities in dense metropolitan regions.

Keywords Young single households, Rental affordability, Neighbourhood dynamics, Small-unit housing market, Causal impact, Demographic change

Paper type Research paper

Introduction

In recent decades, two major societal transformations – the rising prevalence of single-person households and the growing dominance of rental-based housing tenure – have significantly reshaped both the social fabric and the spatial structure of cities. Single-person households have become an increasingly prominent household type not only in Europe and North America – with rates such as 41.5% in Germany, 34% in the UK, 37.5% in France, 38.1% in the USA and 29.3% in Canada – but also across other parts of the



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world (OECD, 2024; UN DESA, 2022; Eurostat, 2023). This demographic shift changes household composition. It also reflects a broader trend toward individualization and urban autonomy – known as the “rise of solo living” (Klinenberg, 2013). For instance, one-person households now constitute 25.4% of all households in China, 14.8% in Brazil, 34% in Japan, 42% in South Korea and 19.7% in Turkey. Alongside this, renting has expanded, especially for young and low-income urban residents. Between 2010 and 2022, homeownership rates declined in several countries, including Australia (from 64.4% to 62.7%), Denmark (57.4%–50.8%), Germany (44.4%–40.8%), Spain (79.4%–76%) and Turkey (59%–56.7%) (OECD, 2024; UN DESA, 2022; TURKSTAT, 2024). This shift has been driven by interrelated factors such as rising housing costs, limited availability of social housing and demographic changes, including decreasing household sizes, delayed marriage and declining marriage rates (Gilbert, 2016; Fuster *et al.*, 2018; Cournède and Plouin, 2022; Li *et al.*, 2022; Vangeel *et al.*, 2023; Mundt *et al.*, 2024). This transformation represents not only a shift in housing supply but also a novel demographic process in which the growing concentration of young single-person households has begun to shape small-unit submarkets in distinctive ways.

These concurrent trends have led to increased demand for small rental housing, particularly in central urban areas. Single-person households, typically consisting of young adults, tend to prefer compact apartments because of financial constraints, lifestyle preferences and space requirements (Lau and Wei, 2018; Pfeiffer *et al.*, 2019; Ehlenz *et al.*, 2020). Although this preference is well documented, there is limited research examining whether and how the spatial clustering of single-person households contributes to local rent inflation, particularly in deregulated and rapidly changing housing markets. The relationship between small unit rents and the density of single-person households is likely bidirectional: affordable rents attract singles, but clustering can further intensify demand and push rents upward (Brueckner, 1987). Nevertheless, most studies focus on ownership rather than rental segments and rarely distinguish by unit type or household composition (Tyvimaa and Kamruzzaman, 2018).

This study addresses these gaps by examining how the neighborhood-level concentration of young single-person households (aged 24–35 years) in Istanbul affects the prices of one-bedroom rental apartments. Conceptually, it treats living alone as not merely a demographic outcome but also a dynamic driver of urban market segmentation. Drawing on submarket theory, this article interprets Istanbul’s small-unit rental sector as a distinct submarket where demographic clustering, constrained supply and weak regulation collectively shape price formation. This perspective goes beyond descriptive analysis to address how local demographic pressures translate into differentiated affordability outcomes across housing segments. The article makes three key contributions. First, it provides causal evidence on the impact of young single-person households on small-unit rents by using the spatially lagged measure of young singles’ density as an instrumental variable (IV) to address simultaneity bias. Second, it clearly defines one-bedroom units as a distinct rental submarket with demand and price mechanisms distinct from family-oriented units. Third, by examining these dynamics in the deregulated and spatially fragmented context of the Global South, it demonstrates how demographic clustering and institutional weakness intensify rental inequality.

Istanbul provides a compelling and policy-relevant example for this analysis. With a population of over 15 million and deep socio-spatial inequalities, its weakly regulated rental system demonstrates how demographic transitions and limited regulations create variable rental submarkets. The rapid proliferation of small single-bedroom dwellings, combined with the rise in single-person households, has increased the proportion from 13.7% in 2014

to 19.4% in 2024, intensifying rental competition, particularly in central areas with limited new supply. These dynamics make Istanbul an ideal context for investigating how demographic clustering functions as a structural force in fragmented housing systems.

Combining demographic segmentation, submarket theory and causal inference, this study facilitates both theoretical and empirical understanding of urban rental dynamics. It argues that in cities characterized by fragmented markets and limited regulation, demographic clustering functions as a powerful yet understudied driver of local rent increases. Beyond its empirical findings, this study emphasizes that addressing rent affordability requires recognizing that pressure is concentrated in specific submarkets, particularly those serving young, single and mobile urban residents.

Literature review

Urban housing markets have been extensively analyzed through frameworks of housing demand, supply and affordability. While a substantial body of work focuses on the determinants of housing sale prices, rental housing markets have received comparatively less attention (Egner and Grabietz, 2017; Kim and Jin, 2019). Moreover, rental units are often treated as a homogeneous category in empirical studies, overlooking important differences across unit types such as one-bedroom versus larger apartments. This lack of granularity is problematic because different demographic groups, including single-person households, exhibit distinct rental preferences and constraints. Recent studies also highlight that the rise of single-person households is reshaping not only demand patterns but also the broader financial logics of rental markets, as growing small-unit demand becomes embedded within institutional restructuring processes (Nethercote, 2023; Howard, 2024). This shift has further driven the emergence of shared housing arrangements among young singles as an adaptive response to affordability pressures (Druta, Ronald and Heath, 2021).

Single-person households, which represent a growing share of urban residents, are shown to prefer small apartment units located in urban centers (Lau and Wei, 2018; Pfeiffer *et al.*, 2019; Ehlenz *et al.*, 2020). However, much of this research focuses on household preferences rather than assessing whether the demographic concentration of such households generates inflationary pressure on local rental markets. One notable exception is the study by Tyvimaa and Kamruzzaman (2018), which investigates the causal effect of young (aged 25–34 years) single-person households on apartment sale prices in Helsinki, Finland. While their study focuses on sales rather than rental prices, it provides important empirical evidence that the residential concentration of single-person households may exert upward pressure on housing costs – an insight that has not yet been extended to the rental market. Most existing studies are conducted in contexts with relatively stable rental markets and strong regulatory frameworks. However, cities like Istanbul, with informal housing and limited tenant protection, need local analysis of rental dynamics.

To explain rental price variation, this study highlights four key dimensions:

- (1) location and accessibility;
- (2) neighborhood amenities;
- (3) sociodemographic composition; and
- (4) physical housing characteristics.

This study examines how neighborhood dynamics and housing demand interact in dense cities like Istanbul.

Location and accessibility

Accessibility to central business districts (CBDs) and employment hubs is a strong determinant of rent levels. Renters – especially single, young, low-income individuals – tend to settle in areas close to public transportation and urban employment centers to minimize commuting time and costs and to maximize access to job opportunities. Numerous studies have found that rental prices tend to decline with increasing distance from CBDs (McCord *et al.*, 2014; Jun and Kim, 2017; Leung and Yiu, 2018; Wang *et al.*, 2021; Zhan *et al.*, 2023; Wang *et al.*, 2025). Other studies have similarly measured the positive impact of job accessibility and being close to employment centers on rental housing prices (Bala *et al.*, 2014; Cui *et al.*, 2018; Clark *et al.*, 2021; Zhang *et al.*, 2023). Given renters tend to rely heavily on public transportation rather than private vehicles, making proximity to rail-based transit systems a key determinant of rental demand and pricing. Numerous studies have confirmed a positive association between access to rail transit – such as metro, tram or commuter rail – and higher rental prices (Efthymiou and Antoniou, 2013; Wang *et al.*, 2016; Clark and Lomax, 2018; Sadayuki, 2018; Liu *et al.*, 2022; Yoshida *et al.*, 2022; Kim *et al.*, 2024), while others have identified causal effects – for example, Sun *et al.* (2015) and He *et al.* (2023) demonstrate that the expansion of urban rail systems significantly increases nearby rental prices. However, this effect is not spatially uniform. Li *et al.* (2019) find that subway proximity has little or even negative influence on rents in inner-city areas, likely because of already dense transit infrastructure, whereas strong positive effects are observed in suburban and transitional zones. Similarly, Huang (2017) shows that rental premiums for metro access are more pronounced in low-income neighborhoods, highlighting the greater relative value placed on public transit by disadvantaged populations.

Neighborhood amenities

Beyond accessibility, built environment characteristics – such as the presence of green spaces, building and population density and proximity to various urban amenities – also play a critical role in shaping rental demand and pricing patterns. Urban green spaces, for instance, are generally considered valuable amenities that enhance residential desirability and, thus, exert a positive influence on rental prices (Schläpfer *et al.*, 2015; Jun and Kim, 2017; Leung and Yiu, 2018; Hu *et al.*, 2019; Wang *et al.*, 2025). However, the effect of green spaces is not always straightforward or uniformly positive. In their study of single-room dwellings in Tokyo, Hoshino and Kuriyama (2009) found that the presence of parks within a 450-m radius was associated with higher rents, while larger parks or green spaces located within a 1,000-m radius had a negative effect on rental prices. The authors argue that single-person renters may not frequently use such parks and instead derive only indirect benefits from their presence. Furthermore, they suggest that an overconcentration of large green areas may disrupt land use diversity and contribute to noise or crowding, thereby reducing the appeal of nearby rental units. Similarly, other studies have reported negative or insignificant effects of green space proximity on rental prices (Sun *et al.*, 2015; Kim and Jin, 2019), indicating that contextual factors such as park size, location and usage patterns must be taken into account.

In addition to green space, high building and population densities have been consistently found to exert downward pressure on rental prices, as dense neighborhoods are often associated with overcrowding, noise and reduced residential quality (Löchl and Axhausen, 2010; Egner and Grabietz, 2017; Zhang *et al.*, 2023). Conversely, neighborhoods that offer a rich array of daily amenities – such as retail shops, restaurants and entertainment venues – tend to attract higher rental demand and command premium prices (Clark and Lomax, 2018; Clark *et al.*, 2021; Hu *et al.*, 2019; Wittowsky *et al.*, 2020; Liu *et al.*, 2022). Proximity to

hospitals and shopping centers has also been explored, with mixed findings. While some studies suggest that accessibility to these facilities enhances rental values because of their convenience (Cui *et al.*, 2018; Hu *et al.*, 2019; Li *et al.*, 2019; Liu *et al.*, 2022), others highlight possible drawbacks – such as traffic congestion and noise pollution – that may diminish their appeal and negatively impact rent levels (Huang 2017; Zheng *et al.*, 2015; Hu *et al.*, 2022; Zhan *et al.*, 2023). These divergent results underscore the importance of considering both the type and context of amenities when evaluating their influence on rental price formation. Although highways are essential components of urban mobility and may enhance vehicle-based accessibility, their proximity to residential areas is generally associated with lower rental prices. This counterintuitive effect is attributed to the adverse externalities of highways – such as noise, air pollution and reduced aesthetic value – which tend to outweigh the benefits of improved accessibility (Löchl and Axhausen, 2010; Efthymiou and Antoniou, 2013; Schlöpfer *et al.*, 2015).

Neighborhood sociodemographic composition

Neighborhood socioeconomic composition is one of the most significant determinants of housing demand and, consequently, rental prices. As the share of highly educated residents increases (Diamond, 2016; Wang *et al.*, 2021; Leal *et al.*, 2023) and neighborhood income levels rise (Bala *et al.*, 2014; Clark and Lomax, 2018; Ayoubia *et al.*, 2020), rental prices also tend to increase. In addition, students and single households form a large tenant share. Universities and high student density often push rents up (Egner and Grabietz, 2017; Leal *et al.*, 2023). However, the effect of age composition shows mixed results. Kim (2024) found a negative association between the elderly population (65+) and rental prices in US counties, whereas Kim and Jin (2019) reported a positive effect of average age on rental prices in the Chicago metropolitan area. This discrepancy may stem from the different age variables used: while Kim (2024) focused on the elderly population, Kim and Jin (2019) used average age, which may reflect neighborhoods with a high share of mid-aged households. In the US context, mid-aged households – typically economically stable and professionally active – often reside in well-served, desirable neighborhoods, which may contribute to higher rental prices.

Physical housing characteristics

Furthermore, studies examining rental prices often incorporate housing attributes into hedonic price models, particularly when analyses are conducted at the dwelling level. Features such as floor level, elevator access, parking garage availability, number of bedrooms and unit orientation are widely recognized for their positive effects on rental value (Brunauer *et al.*, 2009; Löchl and Axhausen, 2010; McCord *et al.*, 2014; Schlöpfer *et al.*, 2015; Sadayuki, 2018; Yoshida *et al.*, 2022). In addition, building age is commonly acknowledged as a key factor influencing rental prices, as older dwellings are generally less preferred by tenants, thereby tending to lower their market value (Hoshino and Kuriyama, 2009; McCord *et al.*, 2014; Zheng *et al.*, 2015; Zhan *et al.*, 2023; Wittowsky *et al.*, 2020). Much of the existing research relies on cross-sectional data and does not account for potential endogeneity between household structure and rent levels. Moreover, studies focusing on micro-level housing attributes often overlook neighborhood-scale dynamics, which are critical for urban policy.

Despite the extensive literature on rental housing prices, several important gaps remain. First, most studies treat rental housing as a homogeneous category rather than segmenting by unit size (e.g. one-bedroom vs two-bedroom), even though the demand drivers and price determinants can differ significantly across segments. Second, the composition of

households demanding rental units – such as single-person vs family households – is rarely explored in detail. Finally, the potential causal relationships between household composition and rental pricing, such as the link between one-person households and demand for one-bedroom units, have not been sufficiently examined. This study aims to address these gaps by offering a more nuanced analysis of the relationship between rental housing prices and household composition. In summary, while previous research has addressed many determinants of rental housing prices, critical gaps remain: namely, the segmentation of rental demand by household composition, the dynamic interactions between household structure and rent and the application of these insights in highly volatile urban contexts. This study addresses these gaps by focusing on Istanbul as a data-rich and policy-relevant case. [Table 1](#) summarizes key studies on rental price determinants and household structure. It highlights the limited attention to small-unit rentals, single-person households and causal methods – especially in fast-changing urban contexts.

The remainder of this paper proceeds as follows: Section 2 introduces the data and methodology, Section 3 presents the empirical findings and discussion and Section 4 concludes with implications for policy and future research.

Housing submarkets and demographic segmentation

Although housing markets are often conceptualized as unified entities, they in fact consist of multiple submarkets shaped by variations in user characteristics, spatial contexts and lifestyle preferences. A housing submarket can be understood as a cluster of dwellings that are highly substitutable within their own group but only weakly interchangeable with others. Consequently, each submarket tends to form its own mechanisms of price formation, balance between supply and demand and distinctive user profile. Empirical research conducted in cities such as Sydney and Melbourne confirms the statistical segmentation of housing markets and shows that the determinants of price formation differ substantially across these submarkets ([Bourassa et al., 1999](#)). Additional evidence from the Sydney metropolitan area further indicates that housing affordability varies considerably between submarkets, with income levels, supply constraints, investor behavior and price sensitivity displaying spatial heterogeneity ([Bangura and Lee, 2023](#)). Collectively, these findings challenge the notion of a uniform housing market and highlight that large metropolitan areas operate through multiple layers of submarkets, each influenced by its own socioeconomic and institutional conditions.

Housing submarkets are also dynamic structures that evolve over time. Their boundaries are continuously reshaped by new housing construction, internal migration and broader socioeconomic transformations. They tend to emerge through spatial clustering and low demand elasticity, that is, strong consumer preference for certain housing attributes, and are particularly affected by new supply introduced in areas with high income elasticity ([Costello et al., 2019](#)). This framework is particularly relevant for large metropolitan regions where housing supply is spatially uneven and demand pressure remains intense, as in the case of Istanbul. Multilevel modeling has been identified as an effective analytical approach for investigating such market structures. Empirical evidence from Istanbul demonstrates that the influence of housing attributes on prices varies markedly across neighborhoods and that submarket-based modeling provides the best statistical fit ([Keskin, 2022](#)). These results suggest that the city's housing system is fragmented across both physical and socioeconomic dimensions, thereby supporting the conceptualization of one-bedroom rental units as a distinct submarket with its own demand, supply and pricing dynamics.

Istanbul's housing market is defined by high land prices, weak rent control, restricted new housing production and significant spatial inequalities. Such structural conditions have fueled the proliferation of small dwellings – particularly one-bedroom apartments – in

Table 1. Critical literature review table

Study	Context	Data type and level	Market focus	Method	Unit type segmentation	HH structure	Causal link	Main findings
Tyvima and Kamruzzaman (2018)	Helsinki, Finland	Cross-sectional (census tract)	Ownership	2SLS IV Model	No	Yes	Yes	Single-person HH increases apartment prices
Kim and Jin (2019)	Chicago, USA	Cross-sectional (census tract)	Rental/ Ownership	Generalized Spatial 2SLS IV Model	No	No	Yes	Mixed land use increases rent
Leung and Yiu (2018)	Hong Kong	Cross-sectional (SDU)	Rental	OLS + WLS (weighted least squares)	No	No	No	Housing quality and privacy shape rents
Hoshino and Kuriyama (2009)	Tokyo, Japan	Cross-sectional (unit)	Rental	Spatial hedonic	No	No	No	Park size and proximity rent effect varies
McCord et al. (2014)	The UK	Cross-sectional (unit)	Rental	Spatial hedonic model	No	No	No	Spatial non-stationarity and socio-political segregation shape rents
Zhan et al. (2023)	Hangzhou, China	Cross-sectional (unit)	Rental	Multilevel spatial model	No	No	No	Building and street-level location jointly shape rents
Liu et al. (2022)	Chongqing, China	Cross-sectional (neighborhood blocks)	Rental	OLS + GWR	No	No	No	Transit and amenities determines rents; strong spatial heterogeneity
Jun and Kim (2017)	Seoul, Korea	Cross-sectional (unit)	Rental	Spatial hedonic model	No	No	No	Greenbelt proximity reduces rent; effect varies by submarket
Sadayuki (2018)	Tokyo, Japan	Cross-sectional (unit)	Rental	Spatial hedonic model	No	No	No	Multiple station proximity ranks affect rent
This study	Isanbul, Turkey	Cross-sectional (neighborhood)	Rental	2SLS IV Model	Yes	Yes	Yes	Young single clustering increases small-unit rents in fragmented market
Source(s): Authors' own creation								

central districts, where this housing type has gradually evolved into a separate segment of the market. According to TURKSTAT data for 2014–2024, the average gross floor area of newly occupied dwellings in central districts such as Beyoğlu, Fatih, Beşiktaş and Kadıköy is 93.9 m². This figure rises to 98.8 m² in middle-ring districts including Maltepe, Bayrampaşa, Bahçelievler and Bakırköy and further increases to 110.6 m² in peripheral areas like Beylikdüzü, Sultanbeyli and Başakşehir. These statistically significant differences ($p < 0.05$) reveal a clear gradient of dwelling size expansion from the city core toward the outer periphery.

This spatial variation in dwelling size is mirrored in Istanbul’s rental price structure. Average rents per square meter amount to 172.8 Turkish Liras (TL) for one-bedroom (1 + 1) apartments, 146.9 TL for two-bedroom (2 + 1) units, 139 TL for three-bedroom (3 + 1) homes and 151 TL for four-bedroom (4 + 1) dwellings, indicating that 1 + 1 units command a statistically higher price ($p < 0.05$). This submarket is distinguished by not only its compact size but also the relative uniformity of its occupants. Such units are predominantly preferred by young, single adults – often university-educated, employed in white-collar professions and prioritizing centrality and accessibility over space. Yet, the surge in demand for small apartments has not been matched by an equivalent increase in supply, resulting in a persistent price premium. This pattern is most visible in districts offering proximity to employment centers, public transit and cultural amenities.

Market evidence from the 2019–2024 TURKSTAT data sets clearly supports this observation. Across Turkey, average rents for one-bedroom units rose from 18.5 TL to 216.9 TL per square meter, whereas the mean rent for all dwelling types increased from 14 TL to 159.75 TL. In Istanbul, this divergence is even more pronounced: one-bedroom rents jumped from 22.58 TL to 277.25 TL per square meter, while the overall rental stock climbed from 19 TL to 220.25 TL (Figure 1). These figures confirm that one-bedroom dwellings form a

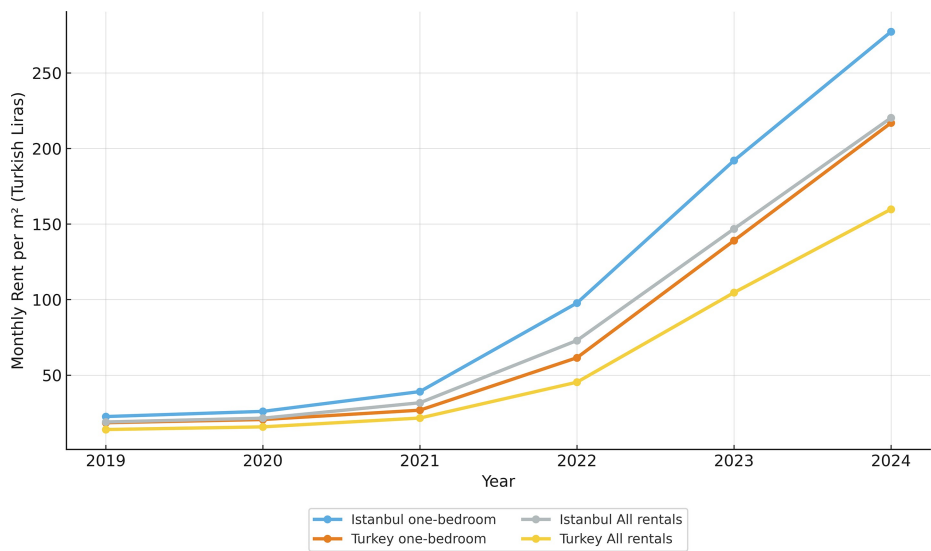


Figure 1. Average rental prices (one-bedroom and all types) in Istanbul and Turkey (2019–2024)
Source: Authors’ own creation

distinct and high-performing submarket characterized by accelerated price appreciation and persistent demand pressures.

Among the institutional drivers of these dynamics, the most decisive is the expansion of the short-term rental sector. As of 2025, 58% of the 20,481 active short-term rental listings in Istanbul consist of one-bedroom apartments (Homesberg, 2025). This transformation has generated a dual impact: many 1 + 1 units have been converted into transient tourist accommodations, thereby shrinking the stock available to permanent residents, and the ensuing supply contraction has amplified rent volatility and elevated price levels within this category. These developments align with Costello *et al.* (2019), who emphasize that housing submarkets evolve under the twin pressures of supply adjustment and migration. In Istanbul, short-term rental activity disturbs the internal equilibrium of the one-bedroom segment, reinforcing its volatility and accelerating price escalation.

The rapid expansion of Istanbul's one-bedroom submarket, however, cannot be attributed solely to market mechanisms; it is also closely intertwined with broader demographic change. Data from TURKSTAT's (2024) *Demographic Indicators* and the *Family Structure Survey* reveal that between 2001 and 2024, the average age at first marriage rose from 26 to 28.3 years for men and from 22.7 to 25.8 years for women. Over the same period, the national share of single-person households grew from 13.9% to 20%, while in Istanbul it increased from 13.7% to 19.4% (Figure 2). This evolution reflects the normalization of individualized living arrangements and the postponement of marriage, both emblematic of shifting social norms in large metropolitan areas. The "intra-urban migration" and "socioeconomic re-clustering" processes identified by Costello *et al.* (2019) are, thus, observable in Istanbul as a distinct form of demographic segmentation: the spatial concentration of young, single and highly educated individuals in central districts produces a high-demand–low-supply equilibrium that drives rents in the one-bedroom submarket upward at a faster rate than in any other segment.

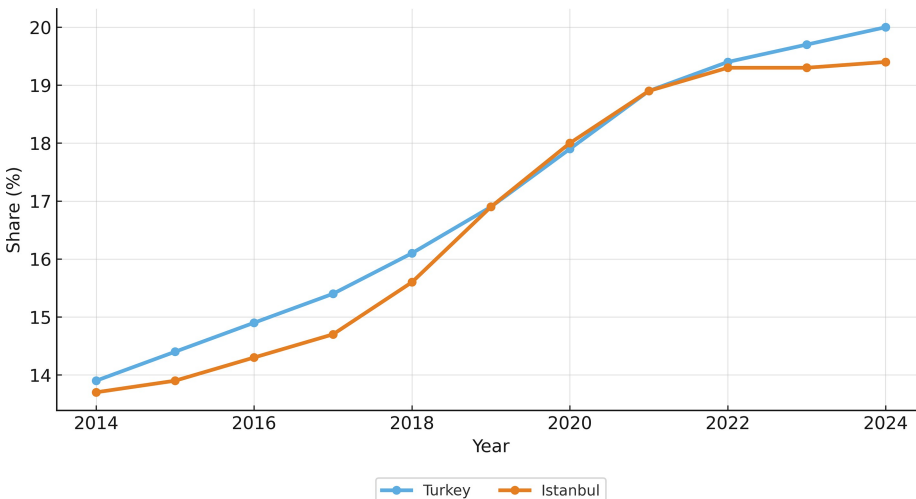


Figure 2. Share of young single-person (aged 24–35 years) households in Istanbul and Turkey (2014–2024)

Source: Authors' own creation

Multilevel analyses of Istanbul's housing market further indicate that price formation operates differently across micro- and macro-level dimensions. At the neighborhood scale, socioeconomic factors such as income, education, earthquake risk and accessibility interact with unit-level characteristics including floor area, building age and dwelling type to delineate submarket boundaries (Keskin, 2022). This interaction demonstrates that Istanbul's housing market is both physically and socially stratified, reflecting a complex and segmented urban fabric. Consequently, one-bedroom rental units should not be viewed merely as a typology for small households; rather, they represent a distinct submarket shaped by the convergence of demographic individualization, investor behavior and the short-term rental economy. Within this fragmented spatial context, the 1 + 1 segment establishes its own equilibrium price, demand–supply cycle and resident profile. Thus, examining the influence of young single-person households on this segment extends beyond demographic observation – it provides a conceptual lens through which Istanbul's broader housing dynamics can be analyzed within the framework of submarket theory.

Data and method

Case study area: Istanbul, Turkey

This study focuses on Istanbul, the largest and most demographically diverse city in Turkey, located in the northwestern part of the country and spanning both sides of the Bosphorus Strait. Covering an area of 5,461 km², Istanbul had a population of 15,701,602 in 2024, making it not only the most populous city in Turkey but also its primary economic and cultural center. Because of its historical and contemporary role as a major internal migration hub, Istanbul serves as a microcosm of national demographic trends, reflecting the broader structural shifts taking place across the country. Istanbul is also the center of Turkey's housing sector. According to TURKSTAT data, 239,213 housing units were sold in Istanbul in 2024, accounting for 16.18% of all residential sales nationwide. Moreover, 14.3% of the total residential floor area (in square meters) granted occupancy permits across the country was located in Istanbul, underscoring the city's central role in shaping national housing dynamics.

Istanbul's residential market is shaped by significant social and economic disparities, challenging topography with steep slopes and elevation differences, and major physical and transportation barriers such as highways, bridges and the Bosphorus Strait. These factors strongly reinforce the city's spatial fragmentation and the emergence of localized housing submarkets with distinct socioeconomic and physical characteristics. The recent spread of gated communities further accentuates this divided urban structure by creating enclosed residential enclaves within already fragmented neighborhoods. Taken together, Istanbul offers an empirically rich and policy-relevant setting to investigate how demographic change, particularly the rising prevalence of single-person households, shapes the pricing dynamics of small rental units in large urban housing markets.

Data

This study uses a spatially disaggregated, cross-sectional data set covering all neighborhoods within metropolitan Istanbul to capture intra-urban variation in demographic structure and housing prices at the neighborhood level. The data set mainly reflects 2023 and combines multiple sources: real estate listings, demographic statistics from TURKSTAT, proprietary data from private company, Istanbul Chamber of Commerce records, municipal open data portals and geospatial repositories. The dependent variable is the average neighborhood-level rent per square meter for one-bedroom apartments. The key independent variable is the share of single-person households aged 24–35 years, calculated from TURKSTAT's

Address-Based Population Registration System. The model controls for neighborhood sociodemographics, housing stock, accessibility and amenities. Variables such as the proportion of married people, elderly population (65+), population density, average household income and education level come from TURKSTAT and private company. Data on buildings built before 2000 and per capita park area (m²) are from Istanbul Metropolitan Municipality records, with older building counts normalized by the number of households for comparability. The number of cafés and restaurants per neighborhood is based on Chamber of Commerce data. Accessibility is measured by the shortest straight-line distance from each neighborhood centroid to the nearest public transit station (metro, Metrobus or Marmaray), while proximity to employment centers is defined by the shortest distance to one of four major business hubs: Maslak–Barbaros, Basın Ekspres, Istanbul Finance Center and Kartal. Additional spatial controls include distances to E-5 and TEM highways, the Bosphorus shoreline and the nearest shopping mall. For detailed variable descriptions, see [Table 2](#).

Neighborhoods vary significantly in key variables ([Table 3](#)). For instance, the average share of young single-person households (aged 24–35 years) is about 5.1%, but this figure can exceed 19% in certain areas, illustrating significant local clustering. One-bedroom rent levels also display wide dispersion, underscoring Istanbul’s fragmented rental market. Control variables such as income, education levels, population density and accessibility measures also show substantial heterogeneity, which may shape local rent dynamics. These figures show why neighborhood-level analysis is needed because of spatial variation ([Table 3](#)).

Model identification strategy

This study aims to estimate the causal impact of the neighborhood-level share of young single-person households on the average rental price per square meter of one-bedroom apartments (1 + 1 units) in Istanbul. A critical methodological challenge lies in addressing endogeneity, particularly simultaneity bias. This bias arises because rental prices and the concentration of single-person households may be jointly determined: while a higher presence of young singles can drive up rental demand and prices, elevated rental costs may simultaneously affect where affordability-constrained single-person households choose to reside. In such cases, Ordinary Least Squares (OLS) estimates would be biased and inconsistent.

To mitigate this bias, this study implements a two-stage least squares (2SLS) IV approach, using a robust cross-sectional data set covering 605 neighborhoods in Istanbul for the year 2023. The first-stage instrument for the endogenous variable – the share of young single-person households – is a spatially lagged version of the same variable, calculated using a K-nearest neighbors (KNN = 5) spatial weights matrix based on Euclidean distances. The reduced-form model for the second stage is specified as:

$$\log(Rent_i) = \gamma_0 + \gamma_1 \widehat{SinglePersonShare}_i + \gamma_2 X_i + \varepsilon_i \quad (1)$$

where $\log(Rent_i)$ is the natural logarithm of the average rental price per square meter in neighborhood i , $\widehat{SinglePersonShare}_i$ is the instrumented (predicted) value of the local share of young single-person households, X_i is a vector of neighborhood-level control variables (demographics, amenities, accessibility and housing stock) and ε_i is the error term.

The first-stage equation is:

$$SinglePersonShare_i = \Pi_0 + \Pi_1 SpatialLag_i + \Pi_2 X_i + u_i \quad (2)$$

Table 2. Variables definitions and sources

Variable name	Definition	Source
Average rent for one bedroom sq meter price	Neighborhood average of rent price one bedroom apartment sq meter in 2023 year	İstanbul planning agency (Endeksa real estate company database)
Single person household share	Percentage of one person household age between 24 and 35 years in a neighborhood	
Share of 65+ population	Share of 65+ years population in a neighborhood	
Shared of married population	Share of married population in a neighborhood	
Green area	Per person sq meters of urban park in a neighborhood	İstanbul metropolitan municipality database
Population density	Population density of neighborhood (persons per km ²)	
Income	Average household income (Turkish Liras) in a neighborhood	
Education	Share of population with high-school and above degree in a neighborhood	
Old building stock	Per household number of building built before 2000 year	İstanbul metropolitan municipality database
Number of cafe and restaurant	Number of cafes and restaurants in a neighborhood	
Distance to public transportation	Neighborhood centroid distance (meters) from nearest metro, rapid bus line (metrobus) or commuter rail (marmaray) situations	
Distance to CBD	Neighborhood centroid distance (meters) from nearest CBDs	
Distance to highways	Neighborhood centroid distance (meters) from Tem or E-5 highways	İstanbul metropolitan municipality database
Distance to bophorus	Neighborhood centroid distance (meters) from İstanbul bophorus	
Distance to shopping mall	Neighborhood centroid distance (meters) from nearest shopping mall	
Neighborhood location side	Whether neighborhood located Asian side or European side	
Source(s): Authors' own creation		

Table 3. Descriptive statistics

Variables	Mean (%)	SD	Min.	Max.
Log of average rent for one bedroom sq meter price	5.07	0.40	3.22	6.26
Single person household share (25–34)	5.12	2.85	1.48	19.31
Spatially Lagged Single person household share (25–34)	5.18	2.32	2.68	14.90
<i>Location and accessibility characteristics</i>				
Log of distance to public transportation	7.08	1.15	3.87	10.87
Log of distance to CBD	8.73	0.74	6.42	11.12
Log of distance to highways	7.47	0.95	3.89	10.32
Log of distance to bophorus	9.05	0.98	6.27	11.33
<i>Neighborhood amenities</i>				
Log of green area	1.59	1.49	0.01	8.80
Log of population density	9.54	1.33	3.39	11.40
Log of number of cafes and restaurants	2.10	1.23	0	5.56
Log of distance to shopping mall	7.66	0.91	4.54	10.8
<i>Neighborhood location side</i>				
Europe (%)	0.62	–	–	–
Asia (%)	0.38	–	–	–
<i>Neighborhood sociodemographic characteristics</i>				
Share of 65+ Population	9.51	4.79	2.32	26.92
Shared of married population	18.5	17.0	1.23	53.9
Log of income	9.99	0.51	9.05	11.21
Education	44.21	11.75	17.44	72.1
<i>Physical building characteristics</i>				
Log of old housing stock	0.19	0.14	0	0.95
Number of observations	605			

Source(s): Authors' own creation

Here, *SpatialLag_i* is the average share of young single-person households in the five nearest neighborhoods to *i*, reflecting the spatial diffusion of demographic patterns across urban space. This IV strategy requires two conditions: relevance and exclusion restriction.

Instrument relevance

The spatial lag is expected to be a strong predictor of the local share of young single-person households because of the spatial autocorrelation of demographic characteristics. Following Tobler's First Law of Geography – “everything is related to everything else, but near things are more related than distant things” – neighborhoods that are geographically proximate tend to share similar socioeconomic, demographic and housing attributes. Previous empirical studies (Tyvimaa and Kamruzzaman, 2018) support the notion that household compositions are spatially clustered in urban settings. Our exploratory spatial data analysis confirms statistically significant spatial autocorrelation in the distribution of young single-person households (Moran's $I = 0.598$ and $p < 0.01$) and in neighborhood-level rental prices (Moran's $I = 0.513$ and $p < 0.01$), reinforcing the need for a spatial identification strategy.

Exclusion restriction

We argue that the spatial lag of young single-person households affects rental prices in neighborhood *i* only through its impact on the local share of such households, not through

direct spillovers. This claim is theoretically justified and contextually grounded in the following:

Urban fragmentation in Istanbul: Istanbul's neighborhoods show marked economic segregation and income disparities that help define localized housing submarkets (Ozus, 2022). More importantly, the widespread presence of gated communities physically and socially reinforces this fragmentation by limiting interactions between neighboring areas (Akgün and Baycan, 2012; Akbulut and Özçevik, 2019). Major physical and transportation barriers – such as highways, steep slopes and the Bosphorus Strait – further constrain direct price spillovers.

Rental market segmentation: Despite spatial proximity, neighborhoods often function as relatively closed rental submarkets with distinct socio-economic profiles and housing typologies (Ozus, 2022). The clustering of gated enclaves and exclusive housing compounds further strengthens this separation (Akgün and Baycan, 2012).

Distance-based KNN matrix: Unlike contiguity-based instruments, our use of a KNN matrix based on straight-line distances ensures that functional rather than merely administrative proximity is captured. This is especially important in cities with irregular neighborhood geographies, where adjacent units may differ drastically in socioeconomic or built environment characteristics. As highlighted by He and Jin (2024), distance-based matrices are more reliable for capturing meaningful spatial influence under such conditions.

Rich set of controls: The model incorporates a comprehensive array of neighborhood-level covariates – household income, educational attainment, park space, housing stock age, population density and proximity to urban infrastructure – thereby reducing the risk of omitted variable bias and supporting the credibility of the exclusion restriction.

Taken together, Istanbul's fragmented rental market structure – reinforced by gated communities, socio-economic divides and physical barriers – makes it plausible that the spatial lag affects local rents only indirectly through its influence on local household composition (Akgün and Baycan, 2012; Akbulut and Özçevik, 2019; Ozus, 2022).

In addition, alternative outcome models using theoretically unrelated neighborhood characteristics, such as the share of elderly households and the proportion of married population, household income, proportion of population with highschool or above degree and the per person green area, produce insignificant or theoretically plausible effects, providing further support for the exclusion restriction. Our strategy follows the argument by Lokshin and Ravallion (2008), who demonstrate that spatially lagged variables can serve as valid instruments when direct spillovers to the outcome variable are unlikely, helping to address simultaneity bias and measurement error in neighborhood-level models. It is also conceptually consistent with Tyvima and Kamruzzaman (2018), who use a similar spatial lag instrument to identify the effect of young single households on apartment prices in Helsinki.

To assess the robustness of our identification strategy, we experimented with alternative spatial lag specifications using KNN matrices with $K = 3$ and $K = 7$. For $KNN = 3$, the instrumented variable (*SinglePersonShare_i*) lost statistical significance, suggesting that an overly narrow spatial range may fail to capture meaningful neighborhood clustering. By contrast, results for $KNN = 7$ remained stable and significant, reinforcing that $K = 5$ strikes an optimal balance between spatial proximity and demographic representativeness, yielding strong first-stage results and significant second-stage estimates. Therefore, we retain $KNN = 5$ as our primary specification (Supplementary Material).

Figures 3 and 4 illustrate the spatial clustering patterns of one-bedroom rental prices and the share of young single-person households across Istanbul's neighborhoods. These hot spot

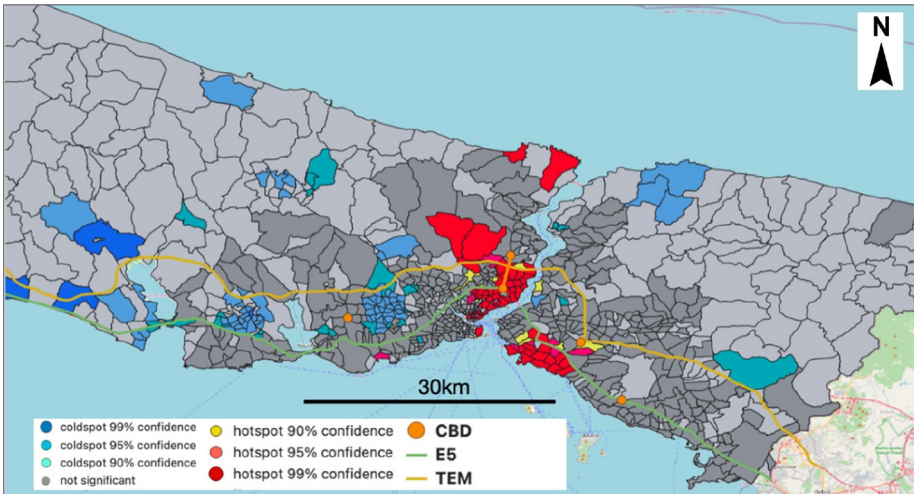


Figure 3. Hot spot analysis result showing the spatial distribution of one-bedrom rent prices in Istanbul
Source: Authors' own creation

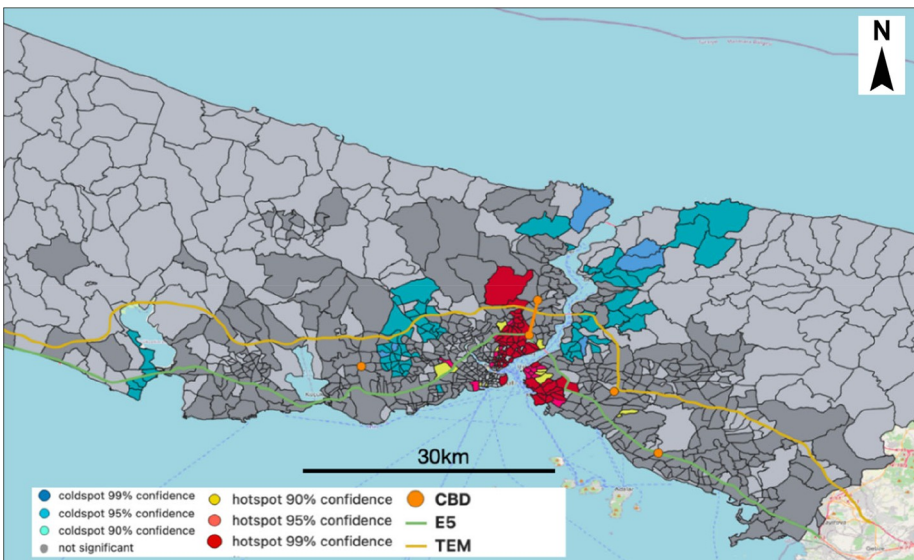


Figure 4. Hot spot analysis result showing the spatial distribution of young, one-person household in Istanbul
Source: Authors' own creation

maps visually confirm the presence of localized rent pressures and demographic clustering, highlighting the spatial fragmentation that justifies our neighborhood-level causal approach.

In sum, our identification strategy leverages spatial dependence in household composition while mitigating concerns about direct spatial spillovers. It provides a theoretically grounded

and contextually appropriate framework for identifying the causal impact of demographic change – specifically, the concentration of young single-person households – on small-scale rental housing prices in Istanbul.

Results and discussion

Table 4 reports the main empirical results. The first three columns present the OLS estimates, while the last three columns show the 2SLS estimates. In both models, the dependent variable is expressed in natural logarithmic form. Therefore, for independent variables that are not log-transformed, the coefficients are interpreted using the formula $((\exp(\text{coefficient}) - 1) \times 100)$. Overall, the OLS model is statistically significant ($F = 57.74$ and $p < 0.01$) and demonstrates good explanatory power ($R^2 = 0.597$). The results indicate a positive and statistically significant relationship between the neighborhood-level share of young single-person households and the average rental price per square meter for one-bedroom units: a one percentage point increase in the share of young single-person households is associated with an approximate 2.53% increase in the average rent $((\exp(0.025) - 1) \times 100)$. This finding is in line with theoretical expectations, as an increase in the proportion of young single-person households would be expected to raise demand for small rental units. However, as simultaneity bias can cause the OLS estimates to be inconsistent, the 2SLS model is used to address potential endogeneity. The Durbin and Wu-Hausman test results (Wu-Hausman $F = 10.5$ and $p < 0.01$; Durbin $\chi^2 = 10.63$ and $p < 0.01$) confirm that the relationship between the share of young single-person households and rental prices is indeed endogenous. Therefore, the young single-person share is not exogenous, and OLS would be biased.

Consistent with this, the 2SLS model is statistically significant overall (Wald $\chi^2 = 839.57$ and $p < 0.01$) and maintains a similar level of explanatory power ($R^2 = 0.59$). Both models report heteroskedasticity-robust standard errors. Most control variables are consistent in sign and magnitude across the two models; however, the natural logarithm of shopping mall distance, which is insignificant in the OLS model, becomes significant at the 10% level in the 2SLS specification, whereas the natural logarithm of Bosphorus distance, which is significant at the 10% level in the OLS model, becomes insignificant in the 2SLS model. Finally, the strong first-stage results ($R^2 = 0.61$, adjusted $R^2 = 0.60$, partial $R^2 = 0.43$, $F = 304.39$ and $p = 0.001$) demonstrate that the spatially lagged variable serves as a valid and powerful instrument.

To ensure that the identified effect is not driven by instrument endogeneity or spatial reflection, several complementary robustness analyses were conducted. Placebo IVs constructed from the 2014–2015 spatial distributions of single-person households produced consistent coefficients ($\beta = 0.036$ – 0.039), confirming that the estimated relationship is not affected by contemporaneous rental shocks. A district-excluded leave-one-out IV and a zonal distance-weighted IV both yielded stable estimates ($\beta = 0.053$ – 0.058), suggesting that local spillovers do not bias the results. Moreover, re-estimating the main specification (spatially lagged single person share IV) using Conley (1999) spatial-HAC robust standard errors (3.5 km cutoff, Bartlett kernel) confirmed the robustness of the effect ($\beta = 0.041$, $SE = 0.0098$ and $p < 0.001$). Taken together, these robustness checks confirm the stability of the estimated effect, allowing for a more confident interpretation of its economic significance (Supplementary material).

The 2SLS estimate remains positive and statistically significant: a 1% increase in the share of young single-person households is associated with approximately a 4.19% rise in one-bedroom rental prices $((\exp(0.041) - 1) \times 100)$. This coefficient differs notably from the OLS estimate, indicating that once endogeneity bias is addressed, the true effect of young

Table 4. Two-stage least squares and Ordinary Least Squares regression results

Explanatory variable	Dependent variable: Log of average rent per square meter for one-bedroom units			
	Coefficient	t	OLS estimate	p > t
	Coefficient			
Single person household share (25–34)	0.025	4.91	0.000	0.000
<i>Location and accessibility characteristics</i>				
Log of distance to public transportation	–0.199	–2.72	0.007	0.004
Log of distance to CBD	–0.102	–5.45	0.000	0.000
Log of distance to highways	0.027	2.07	0.039	0.025
Log of distance to bophorus	–0.027	–1.69	0.092	0.305
<i>Neighborhood amenities</i>				
Log of green area	0.004	0.01	0.410	0.658
Log of population density	–0.192	–3.10	0.002	0.001
Log of number of cafes and restaurants	0.042	3.38	0.001	0.006
Log of distance to shopping mall	0.026	1.37	0.170	0.091
European side (ref: Asia)	–0.022	–0.69	0.491	0.356
<i>Neighborhood sociodemographic characteristics</i>				
Share of 65+ population	–0.003	–0.57	0.569	0.761
Share of married population	0.001	0.28	0.783	0.824
Log of income	0.161	3.34	0.001	0.002
Education	0.009	3.61	0.000	0.003
<i>Physical building characteristics</i>				
Log of old housing stock	–0.207	–1.18	0.237	0.123
Log of distance to public transportation X log of population density	0.018	2.47	0.014	0.007
Constant	5.676	6.50	0.000	0.000
Number of observation	605			
Adjusted R ²	0.5969			

(continued)

Table 4. Continued

Explanatory variable	Dependent variable: Log of average rent per square meter for one-bedroom units			
	Coefficient	OLS estimate <i>t</i>	<i>p</i> > <i>t</i>	2SLS estimate <i>z</i>
F	57.74		0.000	
Wald Chi ²				0.000
Durbin test chi ²	10.63		0.001	
Wu-Hausman F test	10.50		0.001	
First stage F	304.39		0.000	
Partial <i>R</i> ² (First stage)	0.435			
Note(s): Heteroskedasticity-robust standard errors are reported. The dependent variable is the natural log of the neighborhood-level average rent per square meter for one-bedroom apartments (1 + 1 units). The instrumental variable for the share of young single-person households is its spatial lag (KNN = 5). Diagnostic tests confirm instrument strength and relevance (First-stage F > 10) and the endogeneity of the regressor (Durbin-Wu-Hausman tests significant at <i>p</i> < 0.01)				
Source(s): Authors' own creation				

singles' concentration on small-unit rents is stronger. The magnitude of this elasticity is plausible and broadly consistent with the existing literature. For instance, [Tyvimaa and Kamruzzaman \(2018\)](#) reported that a one percentage point increase in the share of young single-person households per grid cell was linked to a 0.51% increase in apartment sale prices. Although this figure appears lower than our estimate, the difference is reasonable given that our analysis focuses on rental markets in Istanbul – a highly segmented and demand-constrained context – whereas their study examined Helsinki's more stable and homogeneous market. Consequently, the higher elasticity observed here likely reflects the intensified sensitivity of rental prices to demographic shifts in rapidly changing urban markets. The larger effects found in our study compared to those in regulated European contexts (e.g. Stockholm, Berlin, Helsinki; [OECD, 2024](#)) are consistent with Istanbul's fragmented and weakly regulated rental system, where demographic clustering translates more directly into price adjustments. We, therefore, interpret our coefficients as upper-bound elasticities characteristic of deregulated, high-pressure markets, a proposition that future cross-city comparative studies could further test.

To examine spatial heterogeneity, separate models were estimated for Istanbul's core, peripheral and full-city submarkets. A one-percentage-point increase in the share of young single-person households is associated with approximately 2.5% higher one-bedroom rents in core districts ($p = 0.028$), 4.1% in peripheral districts ($p \approx 0.09$) and 4.1% citywide ($p < 0.001$). First-stage strength remains high across specifications ($F \approx 94.6; 30.2; 304.4$). This pattern is consistent with submarket theory: demand elasticities differ across market segments – smaller but highly stable in dense, supply-constrained cores; larger yet less stable in emerging peripheries.

Beyond magnitude, the 2SLS estimates highlight the significant spatial variation in how neighborhood-level sociodemographic composition influences one-bedroom rental prices. The persistent positive effect of young single-person households demonstrates that local demographic clustering acts as a clear demand-side driver in Istanbul's highly fragmented rental market. This micro-scale spatial dependence shows that even within short spatial ranges, concentrated pockets of young singles can amplify localized rental pressures, especially in small-unit segments. This pattern complements earlier evidence from ownership markets ([Tyvimaa and Kamruzzaman, 2018](#)) and resonates with prior research indicating that single-person households and students can exert upward pressure on local rents in diverse urban contexts ([Egner and Grabietz, 2017](#); [Leal et al., 2023](#)). These findings indicate that the small-unit rental market is highly responsive to neighborhood-level shifts in household structure and that the locational preferences and mobility patterns of young single tenants amplify demand in central and transit-accessible areas. For policymakers, this highlights the need to expand the supply of affordable one-bedroom units in neighborhoods where demographic clustering and lifestyle amenities align with young singles' preferences, helping to ease local rent pressures and mitigate spatial inequalities.

The control variables also provide meaningful insights. Positive associations between income, education and proximity to the CBD and leisure amenities (e.g. cafés and restaurants) reaffirm that young tenants value urban convenience and lifestyle quality ([Clark and Lomax, 2018](#); [Liu et al., 2022](#)). Conversely, the negative or insignificant effects of proximity to highways and large shopping malls align with prior research highlighting how noise, congestion or poor walkability can dampen residential desirability despite functional accessibility ([Löchl and Axhausen, 2010](#); [Efthymiou and Antoniou, 2013](#)). In particular, greater distance from major highway corridors (TEM and E-5) is linked to higher small-unit rents, reflecting not only potential negative externalities but also Istanbul's fragmented urban structure. In some districts, highway-adjacent areas overlap with industrial or low-income

zones with fewer amenities, while in others, they coincide with more desirable clusters. This mixed spatial pattern suggests that the average effect may mask significant submarket differences. The interaction between population density and public transportation access further demonstrates that the value of transit proximity depends on neighborhood conditions, echoing findings by [He et al. \(2023\)](#) and [Sun et al. \(2015\)](#). This significant interaction effect implies that in Istanbul's highly heterogeneous urban fabric, the premium for transit accessibility can be diminished in overcrowded areas because of congestion and quality-of-life concerns but strengthened in well-planned, moderately dense neighborhoods where young singles prioritize convenience and mobility.

Finally, the weak and statistically insignificant effect of green areas aligns with previous research suggesting that small-unit tenants – particularly young singles – derive limited direct utility from urban parks compared to families. In dense inner-city contexts such as Istanbul, where most one-bedroom units are located, park accessibility is often already saturated, and tenants prioritize proximity to workplaces and lifestyle amenities over large green spaces ([Hoshino and Kuriyama, 2009](#)). Therefore, the non-significance observed here is contextually consistent rather than contradictory to amenity premium literature. Similarly, the insignificant coefficient for the European versus Asian side indicates that once neighborhood-level socioeconomic, accessibility and amenity variables are controlled for, the inter-continental distinction loses explanatory power. This finding supports the view that Istanbul's rental market segmentation is increasingly driven by micro-scale neighborhood characteristics rather than broad geographic divisions.

Conclusion

This study addresses an underexplored question in urban housing research: how the neighborhood-level concentration of young single-person households (aged 24–35 years) shapes rental prices in the small-unit segment of Istanbul's fragmented housing market. Using a detailed cross-sectional data set covering 605 neighborhoods and a 2SLS IV model, the analysis reveals a robust causal relationship: a 1% increase in the share of young singles leads to roughly a 4.2% rise in one-bedroom rents. This finding highlights that in cities like Istanbul – where rental regulation is weak, tenant protections are poorly enforced, and short-term or informal leases are widespread – demographic clustering exerts stronger upward pressure on rents than in more regulated markets such as Berlin or Helsinki. In Istanbul, limited institutional capacity allows demand shocks to be transmitted almost entirely into prices rather than absorbed through contractual or regulatory mechanisms. These mechanisms are likely to generalize across cities, but with varying magnitudes depending on the institutional context. In more regulated and homogeneous systems – such as Berlin or Helsinki – stronger tenant protections and standardized contracts are expected to dampen the pass-through from demographic clustering to small-unit rents. Future cross-city research replicating this specification could further clarify how institutional settings shape submarket segmentation and demographic elasticity.

From a submarket perspective, the results demonstrate that the small-unit segment in Istanbul functions as a distinct and increasingly volatile submarket. The sharp rent escalation in 1 + 1 dwellings is not merely a reflection of aggregate housing shortage but also a product of concentrated demand from young, mobile and educated singles who cluster near transit corridors, business centers and lifestyle amenities. Unlike family-oriented submarkets, this segment operates with higher turnover, weaker lease protection and a dense network of informal rental arrangements – ranging from unregistered leases to short-term subletting through digital platforms. Consequently, the responsiveness of rents to demographic shifts is

amplified, particularly in neighborhoods where these informal arrangements intersect with speculative investment and limited new supply.

These structural realities call for policies that move beyond generic affordability frameworks toward submarket-specific interventions. In the small-unit rental segment, municipal governments should combine targeted supply incentives with institutional reforms that improve market transparency and tenant protection. Increasing the registered stock of affordable one-bedroom dwellings through developer incentives, adaptive reuse of vacant offices and small-scale infill housing could directly expand supply where demographic pressures are highest – particularly in central districts such as Kadıköy, Beşiktaş and Şişli, where 1 + 1 demand is intense, but legal rental stock remains constrained. Estimates suggest that Istanbul alone contains over half a million vacant dwellings that are not inhabited by permanent residents ([Istanbul Planning Agency, 2021](#)). Addressing this mismatch requires tighter regulation of long-term vacant units – especially in core districts with high concentrations of single-person households – and policies that encourage or mandate the reintroduction of these dwellings into the active rental market. In parallel, policy design must also consider external demand pressures: as the amendment to Law Number 5901 [1] on January 12, 2017, which facilitated property acquisition by foreign nationals, nearly 333,000 residential units have been sold to foreigners nationwide between 2017 and 2024 (TURKSTAT). A substantial share of these transactions occurred in Istanbul and involved small-sized apartments concentrated in the same central districts. This influx of foreign investment has likely amplified competition in the small-unit segment and contributed to price shocks in local rental submarkets. At the same time, Istanbul’s pervasive informal rental ecosystem – where a substantial share of small units is leased without contracts or through short-term platforms – requires stricter oversight. Implementing a mandatory lease registration system and enforcing the recent 7,464 law [2] on short-term rentals would help preserve long-term housing availability and stabilize submarket dynamics.

Moreover, policies addressing rental inflation must account for Istanbul’s structural inequalities in accessibility. As rents in well-connected neighborhoods rise rapidly, younger tenants are displaced toward peripheral areas with weaker transport infrastructure. Thus, integrated housing and transit planning such as extending metro coverage to mid-income districts and improving last-mile connectivity can redistribute housing demand and reduce concentration in overheated submarkets. Coordinated investment in these secondary corridors would not only moderate rent escalation but also reduce dependence on the informal housing sector.

Overall, the findings highlight that in deregulated and spatially fragmented urban systems like Istanbul, demographic segmentation interacts with institutional weakness to intensify rental inequality. Recognizing rental housing as a constellation of overlapping submarkets, each with its own actors, tenure structures and spatial dynamics, is crucial for designing effective policy interventions. Although the mechanisms identified here may extend to other cities, Istanbul’s case demonstrates how weak regulation, rapid rent inflation and informal market practices create conditions where demographic clustering directly shapes affordability outcomes. Future research should build upon this framework using longitudinal or quasi-experimental approaches to better capture how regulatory reforms, demographic transitions and small-unit developments jointly redefine affordability and housing stability over time.

This study’s causal claims rest on the validity of the spatial IV strategy, which necessarily warrants a balanced discussion of its limitations. While Istanbul’s fragmented urban fabric, closed communities, steep topography and spatially segregated rental housing submarkets may more strongly justify limited spatial spillover effects compared to more integrated metropolitan environments, exclusionary constraints cannot be definitively proven. We

explicitly acknowledge that some residual spatial dependence, particularly along major transport corridors, may persist. Such limitations, however, reflect not weaknesses in the research design but the inherent complexity of spatial identification in urban housing markets. The identification approach used here, though robust to multiple specifications and placebo tests, inevitably shares the broader constraints of spatial IV designs highlighted in the literature. Accordingly, the estimated effects should be interpreted as robust and plausibly causal local relationships rather than as universal elasticities. Future studies exploiting longitudinal data or quasi-experimental demographic shocks would provide valuable external validation and enhance the generalizability of these findings.

Notes

- [1.] Law No. 5901 refers to the *Turkish Citizenship Law*, which regulates the principles and procedures for acquiring, losing and regaining Turkish citizenship.
- [2.] Law No. 7464 is Turkey's framework law regulating the short-term rental of residential units for tourism purposes, requiring a permit from the Ministry of Culture and Tourism, mandating that listings display the permit/ID number, imposing obligations on intermediary platforms and prescribing administrative sanctions for non-compliance.

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Supplementary material

The supplementary material for this article can be found online.

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